An exploration of the experience of patients who have had an episode of Tuberculosis in Bangladesh focusing on delay in seeking treatment and the socioeconomic impact on patients and their families

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AN exploration of the experience of patients who have had an episode of Tuberculosis in Bangladesh focusing on delay in seeking treatment and the socioeconomic impact on patients and their families

By

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Table of Contents

List of Tables

List of Illustrations

Abbreviations

ACSM	Advocacy Communication and Social Mobilization
AFB	Acid Fast Bacilli
AIC	Akaike Information Criterion
ANOVA	One-way Analysis of Variance
ARTI	Annual Risk of Tuberculosis Infection
BBS	Bangladesh Bureau of Statistics
BCG	Bacillus Chalmette-Guerin
BDHS	Bangladesh Demographic and Health Survey
BIC	Bayesian Information Criterion
BRAC	Bangladesh Rural Advancement Committee
CDR	Crude Death Rate
CPR	Contraceptive Prevalence Rate
DOTS	Directly Observed Treatment Short-course
FPHP	Fourth Population and Health Project
GDP	Gross Domestic Product
GoB	Government of Bangladesh
HIV	Human Immunodeficiency Virus
HRD	Human Resource Development
IMR	Infant Mortality Rate
IQ	Intelligence Quotient
MBBS	Bachelor of Medicine and Bachelor of Surgery
MDG	Millennium Development Goal
MDR	Multi Drug Resistant
MMR	Maternal Mortality Rate
MoH&FW	Ministry of Health and Family Welfare
MoU	Memorandum of Understanding
NGO	Non-Governmental Organization
NTP	National Tuberculosis Programme
SCC	Short Course Chemotherapy
SEARO	South-East Asian Regional Office, WHO
SPSS	Statistical Package for Social Science
SVRS	Sample Vital Registration System, BBS
TDR	Research and Training in Tropical Diseases
TFR	Total Fertility Rate

UH&FWC	Union Health and Family Welfare Centre
UHC	Upazila Health Complex
UPHC	Urban Primary Health Care
WHO	World Health Organization

Declaration

The contents of this thesis are produced solely for the qualification of Doctor of Philosophy at Durham University and consist of the author's original individual contributions with appropriate recognition of any references being indicated throughout.

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Abstract

An exploration of the experience of patients who have had an episode of Tuberculosis in Bangladesh focusing on delay in seeking treatment and the socioeconomic impact on patients and their families

Bivakar Roy

This quantitative study explored the diversion, delay, social and economic impacts of an episode of tuberculosis on patients and their families in rural and urban areas of Bangladesh. A cross-sectional retrospective survey was conducted among 707 cured tuberculosis patients from 14 randomly selected rural and urban tuberculosis treatment units using a structured questionnaire. Information was obtained on diversion, delays, costs, other consequences, family income change and coping strategies for the whole span of the disease. Key findings include an examination of all the components of cost in relation to the tuberculosis episode, the impact on family incomes over the period, and the social impacts on patients and their families. Delay in seeking treatment was examined in detail and was found to be associated with the social process 'diversion' through patients shopping around and case holding by inappropriate health providers. The total costs were relatively high due to longer pre-treatment delay and higher indirect costs. Female patients, especially the divorced and widowed faced social rejection, and school children discontinued their studies. Poor patients were severely affected during the Tuberculosis episode and often had to sell or mortgage their assets to maintain daily life. However, higher income patients were more likely to be negatively affected in relation to household income in the longer term. So, effective policy and interventions should be initiated to reduce the number of health encounters and duration of delay before diagnosis since these are negative from a public health position and result in worse social and economic consequences for patients.

Keywords: Bangladesh, tuberculosis, diversion, delay, economic impact, costs, social impact, household.

> *"If the importance of a disease for mankind is measured by the number of fatalities it causes, then Tuberculosis must be considered much more important than those most feared infectious diseases, plague, cholera and the like. One in seven of all human beings die from Tuberculosis. If one only considers the productive middle-age groups, Tuberculosis carries away one-third, and often more"*
>
> *Robert Koch. March 24, 1882*

Today, more than a century after Koch discovered *Mycobacterium Tuberculosis* – the germ of Tuberculosis, there are still many infected individuals and around 1.5 millions of deaths annually resulting from the disease (WHO, 2009).

Tuberculosis was a major cause of death in developed countries until the last part of the twentieth century and still is one of the biggest killers among infectious diseases in developing countries. However, the resurgence of Tuberculosis in developed countries and the increase of cases in other parts of the world has occurred due to a range of factors such as the human immunodeficiency virus (HIV) epidemic, population growth, migration from high prevalence countries, socioeconomic changes, and the spread of aggressive as well as resistant new strains such as the Beijing strains (Dolin et al., 1994). Based on the alarming situation, the World Health Organization (WHO) declared Tuberculosis as a state of global emergency due to the steady increase worldwide along with HIV and malaria in 1993. WHO estimated the prevalence of Tuberculosis infection as affecting one out of three of the world's population in 1997 (Dye et al., 1999).

1.1. Background information

Approximately 9.27 million new Tuberculosis cases were estimated to occur globally in 2007, an increase from 9.24 million cases in 2006, 8.3 million cases in 2000 and 6.6 million cases in 1990. Fifty five percent of these cases were in Asia and 33 percent in Africa, with small proportions of cases from other regions (WHO, 2009). Out of the 9.27 million new cases in 2007, an estimated of 15 percent or 1.37 million were HIV-positive. Seventy nine percent of these HIV-positive cases were in the African Region and 11 percent were in the South-East Asia Region. An estimated 1.3 million deaths occurred worldwide among Tuberculosis cases and an additional 456 000 deaths among Tuberculosis-HIV co-infected cases in 2007. Case notification rate of the world in 2007 was highest in India, China, and Indonesia. Bangladesh was in 6th ranking for case-load and the case detection rate of new smear-positives from 1995-2007 had risen by 71 percent (WHO, 2009).

Tuberculosis transmission depends upon exposure to tubercle bacilli. The key factor determining the risk of becoming exposed is the duration of the infectiousness of an open case in the community. Fifty percent of patients die within 5 years without treatment; the others become a source of infection and each infects 10 to 15 people on an average per year (WHO, 1999). The overall goal of Tuberculosis control programs is to reduce mortality, morbidity and disease transmission within the community. However, considerable time is required to achieve this goal because most individuals in high burden as well as endemic areas are already infected. Thus they comprise a reservoir that continuously contributes to the pool of infectious cases. Delay in diagnosis is also a significant factor with regard to not only disease prognosis at the individual level but also transmission within the community (Dye et al., 1999). Most transmissions occur between the appearance of productive cough with sputum and initiation of treatment. Studies show that patients become more contagious as the delay progresses. The longest delays are associated with the highest bacillary numbers on sputum smears (Maidbo et al., 1999). The first objective of this study was to explore factors associated with delay in seeking effective treatment with a particular focus on delay of more than 30 days from recognition of symptoms to the initiation of proper treatment, the length of delay identified as acceptable by the Bangladesh Tuberculosis Control Programme.

A crucial issue in relation to both delay and incurred costs is the way in which patients shop around through contacting various health providers other than those which can deliver effective treatment. Patients lose considerable amounts of money in the form of direct costs thereby incurred. In addition, an adult Tuberculosis patient loses on average 3-4 months of work time which results in the loss of 20-30 percent of annual household income and an average or 15 years of income loss if the patient dies (WHO, 2000d). Longer delay also causes lots of psychological and social consequences for the patients and their families. So, an effective Tuberculosis control programme requires early diagnosis and immediate initiation of proper anti-Tuberculosis treatment to cut-off the transmission and reduces the economic burden. The second objective of this study was to identify the costs burden during Tuberculosis episodes to patients and their families, both in terms of the total costs incurred in relation to treatment and lost income during the episode, and in relation to the longer term impact on the family income. In addition, and as with the exploration of factors associated with delays, I wished to explore factors, in terms of attribute of patients and their households, relating to various costs and consequences. Although this seems to be very simple and straight forward, the practical situation is complicated. Based on both my practical experience as a Programme Manager and the literature review, it seems that patient's care seeking behaviors and diversion, passive case finding strategies, accessibility to proper Tuberculosis treatment services, and misdiagnosis as well as wrong treatment and case holding by the private health providers are some of the important factors that may hamper the process of early detection and cause higher economic burdens. The problem of diversion and delay in initiating anti-Tuberculosis treatment is one of the major challenges facing the global efforts in Tuberculosis control.

1.2. Existing work

Studies have been conducted on the economic impact and consequences of Tuberculosis for patients and their family worldwide and mostly these have been done in developing countries in Asia and Africa. Authors studied the magnitudes of economic costs and consequences for patients and their families especially for the women and children and examined the associated contributing factors. According to the reviewed literature the mean range of direct costs was US$12.44-608.12, indirect costs' range was US$15.81-118.78 and total costs' range were US$28.25-726.90. Studies also reported mental anguish, neglect by the family members and neighbours, and suffering of children, as social and psychological consequences. Studies indicated that factors such as gender, categories of health providers first visited by the patient, economic status of the patient, sputum smear status of patient and treatment strategy of the respective settings such as community/hospital based, all were important in relation to overall impact. However, very little was known about the economic impact of Tuberculosis in Bangladesh as only a small scale clinic based study had been conducted some time ago.

Studies in a range of countries over a long time period have found considerable delay both by patients and by health systems. The authors studied the magnitudes of delay duration and the contributing factors associated with those delays. The range of patient delay was 2.1-120 days, health system delay range was 2-87 days and total delay range was 28-136 days. Risk factors identified in the literature as associated with long delays before the initiation of anti-Tuberculosis treatment also varied. Studies from different countries showed gender, older age, patients' perception regarding the disease, patients' health seeking behavior, self medication, difficulty of access to proper health care facilities, utilization of nearby unqualified health providers as their first contact, and distance and quality of health facilities especially in rural settings, to be responsible factors for longer delay. Some studies also mentioned the status of the disease itself in terms of the severity or specificity of symptoms such as absence of haemoptysis, smear negative results at first diagnostic test as well as the absence of other diagnostic facilities such as X-ray. Moreover, diversion is one of the major contributing factors for longer delay but unfortunately no literature has been found regarding the issue. Moreover, little is known about delay in the Bangladeshi setting. So far only two gender based studies had addressed delay in seeking treatment for Tuberculosis in Bangladesh.

1.3. Justification of the study

Tuberculosis is a major public health problem in Bangladesh. Policy addressing Tuberculosis control in Bangladesh resulted in the implementation of the national Tuberculosis control programme (NTP) in 1994. Relatively great successes have been achieved in terms of the expansion of Tuberculosis services all over the country and in achieving the WHO target of 70 percent existing case detection and 85 percent treatment success rate for detected cases, but still there are many challenges facing Tuberculosis control in Bangladesh. Gender variations, patients' health seeking behaviours, lower detection of smear negative and extra-pulmonary cases, late presentation of infectious cases and the role of private sector in Tuberculosis control represent some of the difficult challenges confronting the Bangladesh national Tuberculosis programme.

I am a public health manager of the largest national NGO involved in Tuberculosis control in Bangladesh in partnership with Government and have been working in the field of Tuberculosis treatment and control for the last 15 years. I came in contact with lots of Tuberculosis patients and heard about their pre-treatment history and personal sufferings during my normal field supervision work. They talked about contacting various private health providers and their sufferings in terms of financial loss, rejection by their neighbours and family members and sometimes of the devastating experience of temporary or permanent separation for female patients. I also talked with some non-qualified and qualified health providers in the rural areas and realized that non-qualified providers lacked knowledge and qualified providers were reluctant to refer or conduct sputum tests. During encounters in Tuberculosis workshops at medical institutes we also faced the problem of distrust on the part of medical academicians in relation to intermittent chemotherapy and treatment duration of six months. As a supervisor of a public-private mixed pilot project at urban areas, I also found that professionals were unaware of nearby NTP recognized Tuberculosis treatment facilities and even reluctant to refer the suspected or confirmed patients to known public Tuberculosis treatment facilities. Through my personal experience I realized that an important aspect of the major problem might be the lack of community awareness regarding Tuberculosis and an immature relation between the public Tuberculosis services and other medical providers in the public or the private sectors.

So far only one study had been conducted in Bangladesh regarding the economic impact of Tuberculosis and that was done in 1997. The study was conducted in a Northern district NGO clinic far away from the capital city with a small sample size of 21 new smear positive cases after completing one month of treatment to assess the pre-treatment cost before attending the clinic. So the study did not calculate the during treatment costs, especially the indirect costs due to working day loss. Moreover, it did not measure the intangible costs i.e. psychological and social sufferings of the patients and their families described in other literature and which I had experienced in practice. So I decided to explore the country wide situation in relation to all forms of economic burden and social consequences experienced by the patients and their families and to likewise explore the factors contributing to these burdens and consequences.

Only two studies had been conducted in Bangladesh regarding the pretreatment delay. One demonstrated only patients' delay and discussed gender as a contributing factor to it. Another one studied all forms of delays but again only considered gender as a contributing factor. Both the studies were conducted in rural areas near the capital and neither investigated or discussed other factors considered in the international literature or drew on insights from practical field experience. So I decided to explore the scenario countrywide and explore other probable contributing factors. There was likewise no study conducted in Bangladesh regarding the geographical distribution of Tuberculosis in relation spatial variation in socio-demographic facts. So, originally in order to design my sample, I likewise decided to explore this using available secondary data.

1.4. Aim of the study

For the reasons given above the primary objective of this study is to explore the different kinds of costs and consequences related to Tuberculosis from the patient's perspective. Here I am not testing any hypothesis as the economic burden and consequences incurred by the patients already exist in the society. The consequences are investigated in terms of suffering due to adopting various coping strategies and social and psychological consequences as experienced by the patients during the disease period. Moreover, I am trying to determine the different factors and associations that may lead to higher costs and consequences among new pulmonary Tuberculosis cases detected in the period May 2006 to April 2007. Topics covered in the study include patient's perceptions about the disease, out-of-pocket expenditures, effects on family financial status, and patient's social and psychological sufferings.

From the existing electronic literature I came in contact that lots of attention had paid to identify the different durations of delays but there was no study which explores the contributing factors related to the duration of delay. I am going to call this process *diversion* and big part of my study is to explore *diversion*, which is actually the crucial factor in causing people to delay in reaching effective treatment. So, one of my research questions is not only to establish the duration of delay but actually to explore what causes delay.

Moreover, it was clear from the existing literature review and personal experience that delay in diagnosis and initiation of proper anti-Tuberculosis treatment is the main contributing factor for higher economic burdens and for other consequences for patients and their families. So, I also decided to investigate the magnitudes of different kinds of delays and to collect information on patients' socio-demographic, personal and health-care characteristics so as to explore how these were associated with delay for patients in both rural and urban areas of Bangladesh. Relationships have been explored using straightforward statistical procedures, generally by exploring associations among economic impact, delay and patient characteristics.

1.4.1. Research questions (objectives) addressed by the study

The research questions being addressed by this thesis can be expressed exactly as below:

1. What is the nature of diversion and what attributes of patients and their households are associated with diversion?
2. What are the attributes of patients and their households, and what are the health care seeking behaviours of patients, which are associated with delay, and in particular with delays greater than that specified as acceptable by the Bangladesh Tuberculosis Control Programme?
3. What are the tangible and intangible costs, both during the Tuberculosis episode and in the longer term, incurred by patients and their households as a consequence of an episode of Tuberculosis and what are the attributes of patients and their households which are associated with variation in these costs and with the impact of a Tuberculosis episode?

Of course delay itself is likely to be an important contributory factor in relation to costs so another aspect of the study is the exploration of the relationship between delay in seeking treatment and costs, both immediate and long term, of the Tuberculosis episode.

1.5. Intended new contribution

The original contribution of this research can be described in two ways. First, it is the largest and most comprehensive study of the issues both of delay in seeking treatment for Tuberculosis and the economic impact on Tuberculosis patient's families which has been conducted in Bangladesh. Second, it attempts a systematic investigation of the socio-economic characteristics of patients and their families in relation to both 'delaying behaviour' and economic impact, with 'delaying behaviour' understood as a crucial factor, but not the only factor, in relation to economic impact. This has not been done before in Bangladesh and it has not been done before on this scale and with this level of detailed exploration in studies carried out in developing countries elsewhere.

The overall intended contributions to knowledge are –

- Identification of diversion, delay and related factors during the pre-treatment period.
- Identification of costs incurred and related factors during the Tuberculosis episode.
- Exploration of family income change after completion of treatment.

In addition to these contributions to our understanding in general terms of the Tuberculosis experience in Bangladesh the study has always been intended to inform action in relation to the work of my own and related agencies. To this end it has the following intended contributions in relation to practice:

- Identify factors associated with delay in seeking treatment as a basis for designing interventions intended to reduce or eliminate such delay.
- Identify the components of costs and associated factors incurred by patients and their families with a view to identifying interventions which can reduce such costs.
- Exploring the intangible costs of social and psychological suffering associated with Tuberculosis with a view to identifying interventions which can address these issues.
- Identifying the longer term economic costs for patients and their families and identifying factors associated with these costs, so that attention can be paid to designing interventions which might reduce these costs.

In other words this is explicitly a study directed to 'Applying Social Science'. The findings are intended absolutely to influence practice and inform interventions in relation to the control of Tuberculosis and the development of initiatives which can target those groups which suffer most as a consequence of having an episode of the disease.

The words 'exploration' and 'exploratory' are very important in relation to the logic of this study. The above mentioned objectives and intended fundamental elements have been explored through conducting a nationwide survey which generated quantitative findings. These findings have been constructed explicitly in line with Tukey's assertion of the importance of exploration in quantitative work. As he said:

'Once upon a time, statisticians only explored. Then they learned to confirm exactly – to confirm a few things exactly, each under very specific circumstances. As they emphasized exact confirmation, their techniques inevitably became less flexible. The connection of the most used techniques with past insights was weakened. Anything to which a confirmatory procedure was not explicitly attached was decried as "mere descriptive statistics", no matter how much we had learned from it.' (Tukey, 1977; vii).

My approach is explicitly informed by Tukey's concern with seeing what the data are telling us. So most of the methods employed here to present data are quite simple and straightforward. They include extensive use of descriptive summary statistics and basic statistical testing to explore differences in relation to attributes of patients, their households, and their health seeking behaviour related to various costs and delays. The intention is to describe, with description considered to include the identification of differences which can help in the development of policy and practice that may help my agency, the Government and other partner agencies, both to enhance progress in Tuberculosis control in Bangladesh and to address the negative social and economic consequences of Tuberculosis for patients and their families.

1.6. Thesis organization

Chapter two – Tuberculosis and Bangladesh overview opens the thesis and will provide an overview of the disease I am dealing with. First it will explore the global scenario of the disease in terms of premature deaths and the risk factors contributing to higher likelihood of premature death. The chapter will then proceed to an overview of Tuberculosis control which will outline the principles and different controlling strategies that can be applied in relation to the hosts of the disease and routes of transmission. Then it will move to review the South-Asian Tuberculosis scenario. This is important because South Asia is the highest Tuberculosis burden WHO region and faces problems in relation to the lack of proper surveillance systems. Problems in relation to effective Tuberculosis control in this region will also be considered. Then the chapter will move to the Bangladesh context. First it will describe the overall demographic, cultural, economic and health status of the country. Then it will focus on the country's health system which is very important in terms of Tuberculosis control. Here it will describe public and private health care and the distinctive urban and rural health systems. After that, it will describe the present scenario and successes of Tuberculosis control in Bangladesh, outline the treatment strategy, and describe basic treatment units and the expansion of directly observed treatment short-course (DOTS). Then the chapter will describe the Government and Non-government partnership which is both unique and crucial for the success of Bangladesh Tuberculosis control. Definition of partnership, responsibilities of the respective partners and handling of donor money will be outlined here. Finally the chapter focuses on the most sensitive issue and one of the main obstacles to the Bangladesh Tuberculosis control - the Public-private partnership in relation to private practitioners' knowledge about national treatment and case detection guidelines, medical academicians' attitudes regarding national treatment guidelines, and the training of current medical students regarding treatment regimen and case detection techniques. Many patients first visit various private practitioners but in most cases these practitioners do not refer the suspected cases to the public health facilities or apply a simple sputum test rather than prescribing expensive tests (personal experience).

Chapter three – Patient's experience regarding delay in Tuberculosis treatment will present an overview of the second central concept *delay* as experienced by the Tuberculosis patients and based on relevant literature. I will first present a snapshot of the Tuberculosis scenario and go on to outline different case finding strategies, their advantages and disadvantages and their applicability in different national settings. The adverse effect of delay on patients will then be explained. Then the chapter will turn to a consideration of the principles of Tuberculosis control in high prevalence countries, of the risk factors in relation to spreading the disease, and the character of effective Tuberculosis control. The chapter will then explain the components of 'delay' and present appropriate definitions of these components. The literature relating to factors associated with delay will be considered here. The two existing Bangladesh studies examining the relationship between gender and delay will be reviewed here and the chapter will conclude with a development of the overall rationale of the study as a whole.

Chapter four – Economic impact and consequences of Tuberculosis will provide overview of the central concept of *economic impact and consequences* as experienced by the Tuberculosis patients studied in the available literature. First the chapter will provide a global overview of economic burdens and consequences based on available studies. Then it will move to consider the quality of public health care services and their utilization as linked with patients' tendency to shop around and incur unnecessary costs. Literacy, perception regarding the disease, family decision making processes and family income are significantly associated with the patient's health seeking behavior. Then it will outline the various strategies adopted by the patients examined in these studies so as to cope with the economic loss. The chapter will proceed to outline the definitions of economic impact both generally and in relation to specific cost components as presented in the literature. It will also review the factors these studies identify as associated with overall economic impact and cost components and consider the various definitions of these factors which are present in that literature.

Then the chapter will review the literature's treatment of other general consequences including personal and family income loss, inability to work, and decrease of production, and how these are explored in terms of the relation of age, literacy and type of occupation to income loss. It will also review the importance of social and psychological consequences like mental anguish and neglect / rejection by family members. The chapter will next consider gender based consequences and consequences for children. The chapter will outline the rationales for various coping strategies and then highlight various coping mechanisms reported in the available literature. Particular attention will be paid to the single Bangladesh study addressing these issues.

Chapter five – Materials and methods outlines the methodology used to carry out the research. The core of this research was based on a quantitative survey of 707 cured Tuberculosis patients to address the aims and objectives of this thesis. After providing background information, the chapter will move to an outline of the study design and the rationale for choosing these approaches. Then the chapter will move to the definition of major variables followed by a presentation of the sampling technique and a discussion of issues of instrument design. This chapter will also review ethical issues in relation to the study. Part of the chapter will describe the actual experience of doing the research in terms of research management and experiences. Finally the chapter will present a preliminary rationale for the modes of data analysis and interpretation employed in this study.

Chapter six – Socioeconomic characteristics of the interviewed patients will describe the socio-economic characteristics of the sampled patients and the interrelationships among these characteristics. The chapter will present and discuss findings in relation to this overall descriptive element. *Chapter seven – Results-Diversion and delay* will outline the pattern of various delays and of their associations with socioeconomic and health factors followed by a discussion of the findings presented in the chapter. *Chapter eight - Results-Socioeconomic impact of Tuberculosis* will examine in detail the various costs, consequences and coping strategies of the patients in the sample. It will then examine the associations of these attributes with different socioeconomic and health factors. It will then develop a discussion of the findings presented in the chapter.

Chapter nine – Conclusions and policy recommendations will present the conclusions of the thesis and will place the findings of this study in relation to the broader field of Tuberculosis socioeconomic impact research studies. Then it will draw together the key contribution and themes of this research so as to develop some recommendations for policy makers and practitioners so as to strengthen the existing programme implementation strategy and to reduce the costs and consequences incurred by the patients and their families. Finally, the Conclusion will outline the strength and weakness of the study and comprises a critical self reflection on the exercise as a whole.

> *"TB is a relentless leveler, an equal opportunity killer, hard-working and persistent … going about its deadly business with cool disregard for IQ, sex, class, race, occupation or even geographical boundaries"*
>
> The Economist, 1999, 350: 11

Tuberculosis (TB), an infectious deadly disease and one of the major health challenges facing the world, has been present throughout history. It still remains the major infectious disease killer of humans, causing 6.7 percent of all deaths in the developing world (Murray et al., 1990) and causes enormous economic and social burdens for individuals and the family.

2.1. Global Tuberculosis epidemiology

Given the devastating impact and prevalence of Tuberculosis (it is estimated that between 19 and 43 percent of the world's population is infected with *Mycobacterium Tuberculosis*, the bacterium that causes Tuberculosis infection and disease) (Sudre et al, 1992), the World Health Organization (WHO) declared Tuberculosis as a global emergency in 1993. The WHO estimated that 9.27 million new Tuberculosis cases occurred in 2007 in comparison to 9.24 million new cases in 2006 and an estimated 44 percent (4.1 million) were new smear positive cases from that total (WHO, 2009). Mainly the population growth has boosted the total number of new cases though the incidence rate decreased slightly from 140 to 139 per 100,000 cases in 2007. World wide the majority (80 percent) of Tuberculosis cases were found in 23 high burden countries (WHO, 2001a). India, China, Indonesia, Nigeria and South Africa are ranked from first to fifth in terms of the total number of incident cases. South-East Asia and the Western Pacific regions account for 55 percent of global cases, the African Region for 31 percent and the Americas, European and Eastern Mediterranean regions account for smaller proportions of global cases (WHO, 2009).

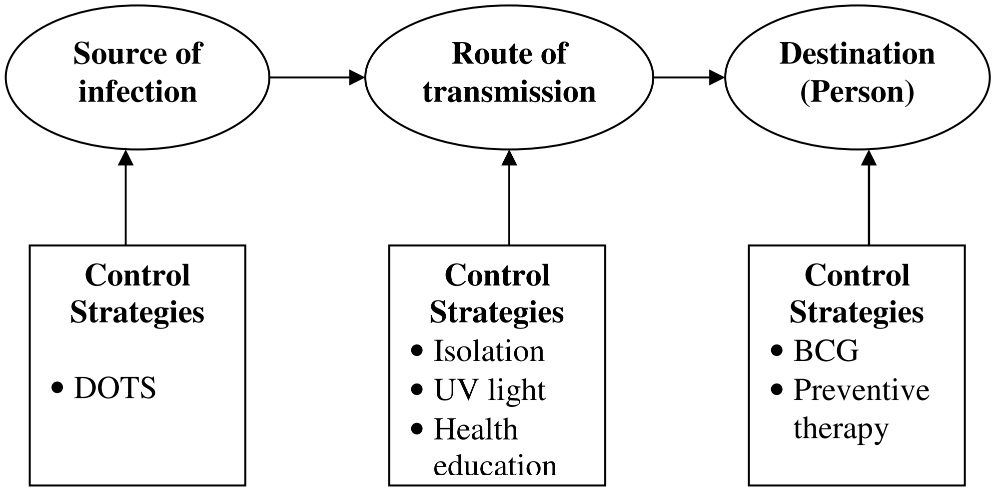
There were an estimated 13.7 million prevalent Tuberculosis cases in 2007 which was a slight decrease from 13.9 million in 2006 (WHO, 2009). This decline was in contrast to the rise in Tuberculosis incidence in the 1990s and might be due to the decrease on the average duration of disease as the Directly Observed Treatment Short Course (DOTS) treatment strategy has been introduced worldwide. Though the prevalence has been declining in the Eastern Mediterranean, the Americas, the South-East Asian and the Western Pacific Regions since 1990 it has increased substantially in the African and the European Regions indicating that the world as a whole is unlikely to meet the Stop TB Partnership target of halving the prevalence rate by 2015 (WHO, 2009).

An estimated 1.32 million people died from Tuberculosis as a sole cause of death in 2007 and an additional 456 000 deaths occurred among HIV-positive Tuberculosis cases (WHO, 2009). More than 90 percent of global Tuberculosis deaths occurred in the developing world, where 75 percent of the cases were in the most economically productive age group of 15-54 years (WHO, 2008). The global Tuberculosis mortality rate including the HIV-positive Tuberculosis deaths is estimated to have increased during the 1990s but reversed around the year 2000 and is now gradually declining (WHO, 2009). However, Tuberculosis is still a leading killer in the modern world and is one of the top ten causes of global mortality (Borgdorff et al., 2002). Tuberculosis accounts for more than one-quarter of all preventable deaths in the developing world (Nsubuga et al., 2002). It has been estimated that at least 20 million people have died unnecessarily of Tuberculosis in the past decade (Enarson, 2000). Many factors such as the site of disease, delay in diagnosis and initiation of treatment, age of the patients, poverty, household living condition and malnutrition increase the risk of dying from Tuberculosis (Rieder, 1999). In addition, an adult Tuberculosis patient loses on average three to four months of work time. This results in the loss of 20-30 percent of annual household income and, if the patient dies of Tuberculosis, the lost income has extended to an average of 15 years (WHO, 2000d)

2.2. Tuberculosis control

The overall aim of any infectious disease control effort is to eliminate the disease. The example of smallpox eradication is often cited but here there was an effective vaccination, no natural reservoir outside humans and no carrier state for the virus. Tuberculosis is very different from smallpox in terms of the availability of animal reservoirs, the lack of effective vaccination for adults and the fact that most infected people carry viable bacilli for a long time without symptoms (Enarson, 2000). So based on the above circumstances, the basic principle of Tuberculosis control is formulated simply as prevention of transmission of the infectious agent causing the disease. People with infectious Tuberculosis of the lungs produce tiny droplets of Tuberculosis bacteria into the air through coughing, sneezing, talking or even breathing and can infect 10-15 people per year (Bam et al, 2002). There are three options for interrupting the transmission: at the source, the route (air) and at destination, which are demonstrated in *Figure 2.1*.

Figure 2.1: Tuberculosis control strategies (adapted from Bam and Smith, 2002)



The principles of controlling Tuberculosis at the source are simple: finding the people who have infectious Tuberculosis and curing them through effective chemotherapy so that they cannot continue to infect other people (Bam et al, 2002). However, the principles of diagnosis and treatment are closely interrelated as diagnosing patients without curing them is a public disaster. Inadequate treatment means people do not die of their disease, but they are not cured, remain infectious and continue to spread the disease to other people, sometimes in drug-resistance form. The simple but most effective tools for diagnosing and treating Tuberculosis patients are sputum smear microscopy and modern regimens of short-course chemotherapy (SCC) and the whole package is named DOTS (World Bank, 1993). Directly Observed Treatment, Short-Course (DOTS) is a package of interventions that has been carefully designed to maximize accurate diagnosis of Tuberculosis and the delivery of effective treatment to Tuberculosis patients by ensuring they take a full course of a cocktail of the most effective modern anti-Tuberculosis drugs. DOTS hinges on government commitment, cases detection through sputum smear microscopy, treatment through SCC, uninterrupted supply of anti-Tuberculosis drugs and relevant logistics and a monitoring and reporting system to evaluate treatment outcomes for each patient (TDR, 2006).

The second approach to Tuberculosis control is to control the route of transmission – by isolating infectious cases so as to prevent them from infecting others. The sanatorium movement in 19th century was the first serious attempt to reduce the spread of Tuberculosis but sanatoria are now on longer in existence (Bam et al, 2002). Recently, ultra violet light has been used in high risk environments such as laboratories and Tuberculosis clinics in order to cut transmission but it is not feasible to introduce in homes, schools, prisons and work places where most transmission takes place. Health education e.g. advising the patients covering the mouth during coughing or sneezing, spitting in a reserved protected place and avoiding talking directly face to face, is a proven effective mechanism for preventing transmission in those circumstances.

The third approach to Tuberculosis control is to control Tuberculosis at the 'destination'- the person at risk of developing the disease. So far two approaches have been used: BCG vaccination and preventive therapy. The BCG vaccine is useful in preventing certain types of child Tuberculosis but is not effective against adult forms of the disease. The protective efficacy of BCG for preventing meningitis in children is greater than 80 percent and the protective efficacy for preventing pulmonary Tuberculosis in adolescents and adults varies from 0 to 80 percent (Colditz et al, 1994). BCG vaccination is used more widely in developing countries than in the developed world. Preventive therapy i.e. the treatment of latent Tuberculosis infection is widely used in several developed countries. Preventive therapy is of limited use in developing countries and is applicable only for children aged five years and under living in the same house as someone with infectious Tuberculosis and for people with HIV. The World Health Organization has published policy guidelines for the use of preventive therapy in people dually infected with Tuberculosis and HIV (Godfrey-Faussett, 1998).

2.3. South-East Asian Tuberculosis epidemiology

The South-East Asia Region comprising 11 countries carries one-third of the global Tuberculosis burden with India along accounting for over 20 percent of the world's disease burden. Five out of the 11 member countries in the Region are among the 22 high-burden countries with an estimated 4.88 million prevalent cases and an annual incidence of 3.17 million. Most cases occur in the age group of 15-54 years with the male/female ratio among newly detected cases being 2:1. More than 500,000 deaths occur each year in this region from Tuberculosis but this number has declined after the introduction of DOTS in the Region (SEARO, 2009).

Given the inadequacy of Annual Risk of Tuberculosis Infection (ARTI) studies across the South East Asian Region there are still uncertainties about the current estimates for Tuberculosis incidence, prevalence and mortality rates in the Region and in individual countries. The use of routine Tuberculosis notification data as a tool for measuring disease incidence is certainly the way to go in the future. This requires the strengthening of all aspects of the Tuberculosis surveillance system, focusing on quality of data entry, compilation and reporting.

Deployment of DOTS has steadily increased and covered 100 percent geographical area in the whole region by the end of 2007. However, the control of Tuberculosis in the Region is affected by variations in the quality and coverage of Tuberculosis treatment and control interventions, population demographics, urbanization, changes in socio-economic standards, HIV and emerging multi-drug resistance (SEARO, 2009).

2.4. Bangladesh socioeconomic and Health scenario

Bangladesh is Asia's fifth and the world's eighth most populous country with an estimated population of about 146.6 million and its population density of around 979 per square kilometer is the highest in the world. Seventy six per cent of the population is rural (BBS, 2009) but the proportion of population in urban areas is increasing quite fast. The majority (88 percent) of population is Muslim and the adult literacy rate is 56.3 per cent (SVRS, 2007). Though Bangladesh has made progress in reducing poverty and per capita income has been creeping up, one third of the population lives beneath the poverty line earning less than US$1 per day, and 85 percent of the poor reside in rural areas (Biswas et al., 2006).

The economy of Bangladesh is predominantly agriculture based, although the share of agriculture in Gross Domestic Product (GDP) has been decreasing over recent years due to rapid growth in the garment and other export based industries. The Gross domestic product (GDP) growth of Bangladesh was 6.19 percent and per capita income was US$ 608 in 2007-08 (BBS, 2009).

Despite many problems including natural disasters and political instability Bangladesh has made significant progress in health outcomes. Infant and Child mortality rates have been markedly reduced. The under five mortality rate declined from 151 deaths per thousand live births in 1991 to 60 in 2007 and during the same period the infant mortality rate declined from 94 deaths per 1000 live births to 43. The Total Fertility Rates (TFR) also went down from 3.4 in 1993-94 to 2.39 in 2007. The Contraceptive prevalence rate (CPR) consisting any method increased from 44.6 percent in 1993-94 to 59.0 percent in 2007. The Maternal mortality rate (MMR) reduced from 574/100,000 live births in 1991 to 290 in 2007. Life expectancy at birth has continuously been rising, and was 66.6 years in 2007 up from 58 in 1994 (SVRS, 2007). However, the country is over burdened with about two million new faces every year creating extra pressures on food, shelter, education, health, employment, etc., and thus making the anticipated economic growth difficult (BBS, 2009).

2.5. Bangladesh health system

The health care delivery system in Bangladesh consists of a complex arrangement of government, private and non-governmental organization (NGO) centers but the current composition of the health workforce is dominated by informal providers, especially the Village Doctors, constituting 95 per cent of total workforce (BHW, 2007). In the rural areas, the basic government health care system consists of Union Health and Family Welfare Centers (UH&FWC), Upazila Health Complexes (UHC) and tertiary care hospitals at the district level with deficiency in its workforce to provide health services to its 150 million people (WHO, 2006d), where services are offered more or less free. In contrast urban areas, there is no public heath infrastructure in urban areas (in contrast to rural areas) except for some big specialized hospitals and urban areas are mainly served by NGOs and private providers. A nominal fee is collected for diagnosis and treatment in the NGO run clinics. Private for-profit health providers are available all over the country and charge more for their services in comparison with the other two sectors. In Bangladesh, most Tuberculosis services are provided through UHCs at sub-district level where NGOs collaborate by providing screening and treatment at the rural community level. Conversely, NGOs and some specialized hospitals provide Tuberculosis services in urban areas.

2.5.1. Public health system

The Ministry of Health and Family Welfare (MoH&FW) is the largest institutional public health care provider in Bangladesh with the services it provides ranging from primary care to more complex treatments. All decisions regarding the development of personnel and facilities, the allocation of resources and the formulation of policy are made at the central level by the MoH&FW. The public sector primary care services are operated through the Upazila Health Complex (UHC) at sub-district level. These Units have both in and out-patient services with 31-50 beds for in-patient services and basic laboratory facilities. The Union Health and Family Welfare Centre (UH&FWC) operate at the periphery level comprising two or three sub centers and a network of field-based functionaries (Health Assistants and Family Welfare Assistants with their supervisors) who deliver health and family planning at the grass roots level controlled through UHC. The UHC is staffed by ten qualified allopathic practitioners and supporting staff, while the UH&FWCs are staffed by a Sub-assistant Community Medical Officer and a Family Welfare Visitor who trained in formal institutions. Above the sub district, there are the district hospitals (100-250 beds) and medical colleges (serving a group of districts with around 650 beds) providing secondary care, and the national tertiary level care facilities.

The government health care services at sub-district level (through UHC) covers a population of approximately 200 000, are not always easily accessible due to distance and poor transport facilities in rural areas. Sometimes a sick person may have to travel 20-30 km to reach the nearest UHC and wait longer time to get care. Also the community level health care system does not function well as the health care personnel are not well distributed and lack of drugs and other required utilities (HEU, 2003), although services and facilities exist physically. As a result the utilization rates of public health facilities in rural areas have dropped and the people prefer other options including qualified and unqualified private for-profit providers and clinics because of the perceived low quality care in and poor functioning of public health facilities (Ahmed, 2005).

2.5.2. Private health system

The majority of both the rural and urban population utilizes and depends mainly on both qualified and unqualified private medical practitioners for any health-care. According to Claquin, the private health-care providers of Bangladesh can be classified into seven broad categories. They are the allopathic practitioners with MBBS or higher degrees with medical board licenses; practitioners without medical degrees or licenses who use allopathic drugs, including antibiotics; practitioners using homeopathic medicine who are institutionally trained or self-taught; *Ayurredic* or *Unany* practitioners who are institutionally trained or self-taught; traditional midwives (dais) who learned their craft by apprenticeship and personal experience; spiritual healers who do not use medicine but heal through ritual chanting Amulets and charms; and others that do not fall into any of the above categories such as bone setters (Claquin, 1981). The service area spatial coverage of these seven types of health-care providers differs greatly. Some practitioners, regardless of their categories, work across large areas while most practitioners serve only their own locality, usually comprising a number of villages or neighborhoods (Paul, 1983).

2.5.3. Urban health services

There are many health care alternatives available in urban areas. Along with traditional healers, government secondary and tertiary services, NGO services, there are many private unqualified and qualified providers of modern allopathic care. The government has an informal policy of working in partnerships with NGOs to provide public health services in urban areas but private sector health services dominate the urban areas of Bangladesh. The availability of public or NGO services is very low compared with pharmacies and medicine shops, so that even the poorest of the poor utilize the private sector when they are ill (UPHC, 2000). This is quite different from rural areas where qualified private providers are less common and the government service infrastructure is better developed, particularly for primary and secondary levels of care.

2.6. Bangladesh Tuberculosis scenario

Tuberculosis is still a major public problem in Bangladesh. The actual extent of the Tuberculosis problem in the country is not known with certainty due to the lack of recent epidemiological information as the last two nationwide prevalence surveys were conducted in the 1964-66 and 1987-88. In 2006 Bangladesh ranked sixth on the list of 22 highest burdens Tuberculosis countries in the world based on WHO estimates (NTP, 2008). The WHO estimated that in 2007 there were approximately 387 all forms of Tuberculosis cases per 100,000 people. WHO also estimated that there were 223 new cases per 100,000 people in 2007 of which approximately 100 per 100,000 were infectious i.e. able to transmit Tuberculosis in the community. Moreover, the estimated

Tuberculosis death rate is about 45 per 100,000 people each year (WHO, 2009). Applying these most recent WHO estimates for 2007, this translates to the following absolute numbers: 559,000 all forms of prevalent cases, 321,675 all forms of new cases, 144,397 new smear-positive cases and 64,335 people dying from Tuberculosis. Although the HIV positive Tuberculosis incident is still low at only 0.3 percent of all forms of Tuberculosis cases, this poses a threat to Tuberculosis control. The Multiple Drug Resistant (MDR) Tuberculosis rate among new Tuberculosis cases was estimated to be 3.5 percent and was 20 percent among re-treatment cases (WHO, 2009).

Bangladesh has achieved significant success in halting and reversing the spread of Tuberculosis. After adopting the Directly Observed Treatment Short-course (DOTS) strategy, the case detection rate of all forms more than doubled from 34 to 92 (66 percent of new smear positive cases) percent between 2002 and 2007. Similarly the successful treatment completion of Tuberculosis has progressed from 84 percent in 2002 to 92 percent in 2007 (WHO, 2009).

2.7. National Tuberculosis Control Programme, Bangladesh

The National Tuberculosis Control Programme (NTP) falls under the Directorate General of Health Services, and is integrated with the National Leprosy Elimination Programme. The overall goals of Tuberculosis control are to reduce Tuberculosis morbidity, mortality and transmission of Tuberculosis infection and to prevent drug resistance. Before 1993 Tuberculosis control was limited to Tuberculosis clinics and Tuberculosis hospitals. Field implementation of Tuberculosis control integrated into the general health services delivered by Upazila Health Complexes (UHC's) started back in 80s. This level is the basic unit for diagnosis and management of Tuberculosis. Recording registers and treatment cards are maintained by trained health workers of the UHCs under the supervision of a Medical Officer. Tuberculosis hospitals, Tuberculosis clinics and general hospitals provide Tuberculosis services at the district and divisional level. Implementation of the DOTS strategy was initiated for a population of approximately one million in a rural setting in November 1993. Following a cure rate of 78 percent in the initial cohort of new smear-positive patients, the project was expanded to 460 Upazilas by June 1998 (Kumarasan et al, 2000). In June 1998 the NTP achieved coverage of all Upazilas under the DOTS strategy in collaboration with NGO partners (BRAC, 2005).

In Bangladesh, Tuberculosis services begun in 1965 and were mainly curative and based on 44 Tuberculosis clinics, 8 segregation hospitals and 5 Tuberculosis hospitals. Between 1986 and 1991 these services were expanded to 124 UHCs as a normal programme in addition to other health services. Recognizing the grave socio-economic consequences of the disease, the Government of Bangladesh (GoB) initiated a project entitled 'Further strengthening of Tuberculosis and leprosy control services' within the Fourth Population and Health Project (FPHP) financed by GoB, the World Bank and a donor consortium of development partners in 1992 (Kumaresan et al, 2000). In 1993, the GoB adopted the World Health Organization's (WHO) recommended strategy for Tuberculosis control known as DOTS. NTP started DOTS field implementation in November 1993 in 4 pilot Upazilas and progressively expanded to cover all 460 Upazilas by June 1998. At present the geographical coverage is 100 percent including the Metropolitan cities (NTP, 2008). The key factors contributing to the successes of the NTP are the strong government support which ensured necessary financial and technical input; regular supplies of drugs, laboratory and other materials; utilization of the existing health infrastructure; close collaboration and partnership with NGOs who assist in DOTS delivery at the community level and a well-maintained recording and reporting system followed by all programme implementation partners so as to achieve the national targets for Tuberculosis control (NTP, 2007)

2.8. GO-NGO partnership

Partnership can be defined as 'a joint formal agreement where there is agreement to cooperate in achieving a common goal, to share information and often pool resources, risks and rewards which are monitored by regular meetings' (Syfire, 2006). Bangladesh is a unique example of implementing a Tuberculosis control programme delivered largely by NGOs in collaboration with NTP through a memorandum of understanding (MoU). The Ministry of Health and Family Welfare (MoH&FW) is responsible for programme coordination, management, national guidelines for treatment and laboratory services, guidelines for Human Resource Development (HRD), strategies for Advocacy Communication and Social Mobilization (ACSM), training of programme coordinators, supervisors and laboratory staffs, procurement and distribution of drug and laboratory supplies, and monitoring and evaluation (BRAC, 2007). NGOs provide support to strengthen government health system for expansion of DOTS. NGOs are able to use government infrastructure and staff for DOTS delivery throughout the country. Systems were developed jointly to maintain a high cure rate, quality assured sputum microscopy, a strong recording and reporting system and the avoidance of overlapping within the NGOs operational area. The Tuberculosis control programme in Bangladesh has gained momentum through partnerships and this provides the programme with a strong technical base. Moreover, one of the partner NGOs, BRAC (Bangladesh Rural Advancement Committee) has also played a role as principal recipient of the NGO donor fund. Factors that contribute in successful partnerships are mutual understanding among partners, trusting and honoring each other's opinion, sharing ideas and sharing experiences nationally and internationally, both formally and informally.

2.9. Public private partnership

Considerable progress has been made towards achieving the goals of Tuberculosis control but several shortcomings have been hampering that progress. Treatment in the private sector is common and popular among Tuberculosis patients in Bangladesh, even though the quality of diagnosis and treatment of Tuberculosis has been poor and the cases are not reported in the NTP reporting system. This factor has to be addressed to ensure the further success of DOTS. Collaborative efforts between private practitioners and the government can achieve moderate to high rates of case detection and high rates of treatment success. Public-private services appeared to be more convenient to patients, who pay less for care and are less likely to miss work in order to participate in DOTS. Studies in India demonstrated the rapid increase of case detection and treatment completion for such partnerships (Murthy et al., 2001). Public-private pilot projects in Bangladesh also reported an increase of case detection in the study areas. Another Bangladeshi study reported that private practitioners were not aware of the NTP recommended regimen and preferred X-ray as a diagnostic tool. So the referral of patients to their preferred diagnostic centre for diagnosis and prescription varied (Zafar Ullah, 2010) which increased the cost and suffering of the patients.

Another problematic place arises from medical colleges and schools. The professors do not belief in intermittent therapy (thrice a week) in the continuation phase as recommended by the WHO for resource poor countries and train the students in conventional radiological and nonconventional diagnostic tests such as serology and molecular methods. As a result young medical professionals remain unaware of different regimens and employ conventional diagnostic tools and treatment regimes. The involvement of medical colleges seems to be crucial for the continuing success of the NTP as they are important in imparting knowledge and skills and in shaping the attitudes of medical students. Medical Schools have a strategic role to play in terms of advocacy, training, service delivery and research and must identify the means to overcome impediments to their involvement.

2.10. Chapter conclusion

The discussion of the World and Bangladesh Tuberculosis and relevant scenario demonstrated the following summary findings-

- Approximately 13.7 million prevalent Tuberculosis cases were worldwide in 2007.
- Approximately 9.27 million new Tuberculosis cases occurred globally in 2007 of which 4.1 million was the new smear positive.
- South-East Asia Region consists one-third of global Tuberculosis burden with estimated of 4.88 million prevalent and 3.17 million incident cases in 2007.
- Roughly 559 000 prevalent Tuberculosis cases were in Bangladesh in 2007.
- Approximately 321 000 new Tuberculosis cases occurred in Bangladesh in 2007 of which 144 000 was the new smear positive.
- Estimated 1.32 million people died worldwide only due to Tuberculosis in 2007. Ninety percent death occurred in developing countries and 75 percent cases were from the economically productive age group of 15-54 years.
- More than 500 000 deaths occurs in South-East Asia in each year.
- Approximately 64 000 occurred due to Tuberculosis in Bangladesh in 2007.
- An open Tuberculosis case infects 10-15 people per year.
- The three main options of prevention of Tuberculosis transmission are – seal the source, cut the route and protect the receiver.
- Bangladesh is the world's highest densely populated country with a population of 146.6 million in 2008 and the significant progress in health improvement and poverty reduction became futile due to the population explosion.
- Bangladesh have complex health care providing system consisting of public, private and NGO sectors. Rural areas mainly covered by public sector and urban areas by private and NGO sectors.
- The private health sector consists a huge range of seven categories from qualified allopath to spiritual healers.

● Government – Non-government collaboration are the back bone of success of Bangladesh Tuberculosis programme.

● Public private partnership is essential for proper Tuberculosis control in Bangladesh but costly.

Tuberculosis is a major public health problem in Bangladesh and country's existing health system is suitable for higher delay which is clear from the above discussion. So the available electronic literatures connected to the delay regarding Tuberculosis episode and consequences will be reviewed in the next chapter.

Chapter 03: Patients' Experience Regarding Delays in Tuberculosis Treatment

> 'Unless and until the underlying problems of socio-economic deprivation can be resolved … elimination of Tuberculosis remains an apparently unattainable goal even in prosperous countries'
>
> Moore Gillon 1998, 391

Tuberculosis is one of the greatest public health problems and a leading cause of morbidity and mortality worldwide especially in developing countries, where 95 percent of deaths caused by Tuberculosis. In 2006, there were 9.2 million new cases in comparison with 9.1 million in 2005, including 4.1 million new smear-positive cases and 1.7 million deaths from Tuberculosis globally. However, only a total of 5.1 million new cases were notified in 2007, of which 2.5 million were new smear-positive cases (WHO, 2008). Despite the recent advances in medicine and diagnostic tools, still many people are suffering and dying from this long standing disease. The reasons for this related to a range of complex and different causal factors.

Worldwide, detection of Tuberculosis cases is based on early passive case finding i.e. the voluntary presentation of patients to Tuberculosis care facilities for diagnosis and treatment, especially in the developing countries. However, some industrialized 'low prevalence of Tuberculosis countries' also practice an optional interventional approach. Such as the public health system in the United States has focused on interrupting the chain of transmission by treating active cases, tracing their contacts, and providing chemo-prophylaxis (Asch et al., 1998).

Active case finding is difficult on the large scale and requires the extensive investment of human and financial resources for a relatively lower number of extra cases (Lienhardt et al., 2001b). This means that it is difficult for the low resource high Tuberculosis prevalent countries to adopt this approach. The benefit of passive case finding method is low cost-effective but this approach has been found to cause delay in detection and treatment initiation of Tuberculosis cases with enormous consequences. These consequences have related to either the patient or the community. Delay in the diagnosis and treatment might worsen the course of the disease, risking prolonged morbidity, increased mortality and unnecessary health expenditure in terms of the patient related consequences (Needham et al., 2001; Demissie et al., 2002; WHO, 2003a). For example, a study from Gambia showed that the chance of dying is much increased among patients with delayed treatment of more than 8 weeks compared to the patients with lesser delays (Lienhardt et al., 2001b). Furthermore, these delays could be associated with the significant risk of prolonged morbidity, increased mortality, person to person transmission, unnecessary health expenditure and the development of multi-drug resistant Tuberculosis cases (Needham et al., 2001; Demissie et al., 2002; WHO, 2003a).

The key principle of Tuberculosis control, especially in high-prevalence countries, is to reduce transmission through early detection and prompt initiation of effective anti-Tuberculosis therapy of detected cases. This is especially important for the untreated smear-positive cases, which are the main sources of infection in the community. Diagnostic and treatment delays enhance the chance of transmitting the disease to the community which is the consequence from the community perspective (WHO, 2003a). The major factors that determine the risk of becoming exposed to tubercle bacilli include the number of incident infectious cases in the community, the duration of their infectiousness, and the number and nature of interactions between a case and a susceptible contact per unit of time of infectiousness (Rieder, 1999). Thus the risk of becoming exposed is greater if the duration of infectiousness is prolonged. It is estimated that an untreated smear-positive patient may infect on average more than 10 contacts annually and over 20 during the life span of the case until death (Lawn et al., 1998). Most transmissions occur between the appearance of cough and initiation of treatment. Moreover, a study showed that patients become more contagious as the delay progresses; the longest delays are associated with the highest bacillary numbers on sputum smears (Maidbo et al., 1999) which also make the patient weaker as well as more difficult to treat (personal experience). A study also demonstrated that delay in initiation of effective treatment for more than 2 months is enough to spread the infection to the domestic contacts (Asch et al., 1998). So, it might be concluded that pre-treatment period of a Tuberculosis patient is crucially important both from the patient and the community perspective for better treatment outcome and reduction of transmission in the community so as to achieve effective Tuberculosis control.

Consequently, the desired features of an effective Tuberculosis control programme are early case detection through passive case finding and prompt initiation of effective treatment. The success of the passive case finding approach largely depends on the patients' health awareness, ability to recognize the early signs/symptoms and accessibility to recognized health services for immediate self-reporting (Rubel and Garro, 1992). Unfortunately, such friendly conditions seldom exist in most settings, resulting in delays in various steps of the clinical process from diagnosis to initiation of effective anti-Tuberculosis treatment. Patient's misperception and belief regarding the disease as well as country wide health system pluralisms severely hamper the total process. Several studies suggested that the total delay from onset of the first disease symptoms to Tuberculosis diagnosis is unacceptably long (Mathur et al., 1994; Pirkis et al., 1996). Thus, delay has been a serious problem for most Tuberculosis control strategies including those in Bangladesh because delayed diagnosis, especially of smear-positive pulmonary Tuberculosis cases leads to prolonged spread of Tuberculosis. Moreover, the early or delayed diagnosis is dependent on the behavior or nature of both the patient and health care services, together with the quality and coverage of health care services (Jaramillo, 1998a).

The World Health Organization recommends a DOTS (directly observed short-course) strategy to control Tuberculosis through covering the whole country geographically. However, though the geographical coverage is crucial to ensure proper disease control, it is not the only factor that would influence timely access of patients to appropriate health services. Experience revealed that the access to proper treatment at the initial stage of the disease remains difficult for a high number of Tuberculosis patients, and this causes delays. Several factors have been identified as influencing delay in diagnosis and start of treatment, such as the individual's perception of disease, socioeconomic level, stigma, community awareness about the disease, the severity of the disease, distance between the patient's residence and health services and expertise of health personnel etc. (WHO, 2006a). For instance, a study in the United States demonstrated that Tuberculosis is more efficiently managed in elderly patients rather than younger patients, which might be as a result of an increase in awareness regarding the disease in this population group (Rao et al., 1999). Such delay may occur either through the patients' perspective i.e. *patient delay* or at the level of the health system i.e. *health system delay*. Factors which contribute to patient or health system delay are numerous, and it is important to identify and address these factors in order to formulate strategies for the effective national Tuberculosis control programme.

During the last two decades, several studies on delays in diagnosis and treatment of pulmonary Tuberculosis have been conducted in both high and low prevalence countries. Respective authors who studied the magnitudes of delayed duration including associated factors through summarizing the diversified data in order to propose various fruitful recommendations. In low prevalence countries, delay is mainly attributed to the fact that Tuberculosis is not suspected, or to disintegration of the previous infrastructure for Tuberculosis control. For instance, a Malaysian study demonstrated that Tuberculosis was not considered as suspect in most of patients in Kuala Lumpur when they first consulted with private practitioners and fundamental investigations such as sputum examination and/or chest x-ray were also often not done (Liam and Tang, 1997). In high prevalence countries, delays are often prolonged, and relate to both delays on the side of patients in seeking proper treatment and on the side of health personnel in diagnosis (Lawn et al., 1998). Patients have a tendency of shopping around before reporting to a proper anti-Tuberculosis treatment unit. Often they prefer private health facilities rather than public and often visit multiple health providers before reporting to a proper one. For instance, the majority of Tuberculosis patients including people from very low-income classes visited the various private sectors as first contact as demonstrated in an Indian study (Lonnroth et al., 2001). Another Gambian study also showed that the median number of providers seen by the patient before starting anti-Tuberculosis treatment was 4 and also that females have a tendency to see more providers than males (Lienhardt et al., 2001b).

In conclusion, it can be recognized that a prolonged pre-treatment period for Tuberculosis patients has serious consequences for both the patients and their community. Different factors contribute to longer or shorter diagnostic and treatment delays. So in this chapter, I have tried to review the available electronic literature both from high and low income countries to explore the magnitude of different kind of Tuberculosis treatment delay, namely '*patients delay*', '*health system delay'* and '*total delay*' as well as the associated factors related to longer or shorter delay. It is very important to be acquainted with the scale of delays at different stages of diagnosis to the initiation of proper treatment of a Tuberculosis case so as to compare it with the findings of the present study. Moreover, identifying the magnitude of various delays and analysis of the factors leading to the delay of first contact and diagnosis to initiation of proper anti-Tuberculosis therapy is crucial in formulating the strategy to combat the increasing Tuberculosis epidemic.

3.1: Delays

Delay in diagnosis and treatment affects patients adversely in various ways including more advanced disease, more complications and a higher mortality. This hits families in the developing world very hard, particularly the poor, because younger active wage-earners are the main victims of the disease. Early diagnosis and adherence to treatment are key factors for a successful Tuberculosis control programme. Several months of combined patient and health provider delay have been reported as the barrier to early diagnosis and initiation of proper chemotherapy in several countries. Patients are usually diagnosed with Tuberculosis as a consequence of the interaction between their active efforts in seeking care, and the passive case-finding activities of health care workers in health care centers (Jaramillo, 1998a). Factors affecting the behaviour of patients and health workers determine the delay and outcome of the case. How soon a patient is diagnosed and receives treatment have obvious implications for the infection risk: the longer the patient is infectious, the greater is the proportion of contacts being infected.

As described in the methodology chapter, the whole pre-treatment duration could be defined as *patient delay:* a period before patient's presentation to a recognized health provider; *health system delay*: a period between patient first contact with a recognized health provider until diagnosis and initiation of anti-Tuberculosis treatment and *total delay*: the combination of patient and health system delay (Rajeswari et al., 2002a). Theoretically, this division seems to be clear and easy, while in real practice it turns out to be more complicated. There were major differences among studies regarding inclusion and exclusion criteria of cases, onset of symptoms, first contact and end of delay duration which makes comparison more difficult. Duration of different delays was very much influenced and controlled by these factors. For example, detection of smear negative cases might require more time because the national treatment guideline suggested cough testing at the first stage and then X-ray as second step for diagnosis, which is very technical, costly and not available in all public/NGO health facilities. So it is important to discus different factors and criteria used by different authors which might influence the duration of delay.

3.1.1. Criteria and factors influencing delays

The types of cases and modes of diagnosis employed in the study have a great influence on different kinds of delay. For example, X-ray or culture positive Tuberculosis identification processes meant that more time is required to detect a case. Different studies used different case inclusion criteria. Some of them included all new Tuberculosis cases (Basnet et al., 2009; Deng et al., 2006; Paynter et al., 2004), some included all pulmonary Tuberculosis cases (Diez et al., 2005; Wondimu et al., 2007; Long et al., 2008; Liam et al., 1997), some included all cases with a positive sputum smear (Zerbini et al., 2008; Rodger et al., 2003), but most included all new cases with a positive sputum smear (Maamari, 2008; Ahmed, 2004). The study exclusion criteria also differed. Some studies excluded chronic pulmonary cases (Greenaway et al., 2002; Mirsaeidi et al., 2007; Basnet et al., 2009) and some excluded visitors and mentally disordered Tuberculosis cases (Leung et al., 2007; Huong et al., 2007). Regarding age, the exclusion criteria also varied in different studies. Most of the studies excluded cases below the age of 16 years (Steen et al., 1999; Pehme et al., 2007), some excluded cases below the age of 18 years (Sarmiento et al., 2006; Needham et al., 2004), two studies excluded cases below the 15 years of age (Wondimu et al., 2007; Liam et al., 1997), one study excluded cases of less than 14 years of age (Basnet et al., 2009) and a few included the children of all ages (Waidyaratne, 2005; Huong et al.,2007).

The pre-treatment period starts from onset of Tuberculosis suspected symptoms to the first contact with a health care provider which relates to health care seeking behaviors and accessibility to health care facilities. Tuberculosis suspected symptoms are productive cough for more than 2-3 weeks and/or with or without other symptoms such as fever, night sweating, anorexia and hemoptysis. The onset of symptom is usually defined as the day when the patient first became aware of symptoms or being seen at a health care facility. However, the definition of the onset of symptoms also varied. Most studies defined onset as the debut of any suspected symptom (Basnet et al., 2009; Maamari, 2008; Wondimu et al., 2007; Sarmiento et al. 2006), some studies defined onset as debut of cough (Huong et al., 2007; Karim et al. 2007), and few study defined onset as debut of any pulmonary symptom (Diez et al., 2005).

The variation in definitions or categories of health providers first visited by the patient influences the calculation of duration of delays and this also varied in the studies. Most of the studies defined the first contact as the first visit to a qualified health provider who worked in public or private health facility, health center, community hospital, Tuberculosis treatment unit or research institute (Basnet et al., 2009; Wondimu et al., 2007; Ward et al., 2001; Demissie et al., 2002; Cheng et al., 2005; Liam 1997). Some studies defined the first contact as the time when the patient sought contact with any healthcare provider outside the household, including traditional practitioners, drug seller, pharmacist or grocery shop owner (Steen et al., 1999; Rajeswari et al., 2002a; Wandwalo et al. 2000) and a few studies included both formal and non formal health providers (Yimer et al., 2005).

The studies also applied different definitions of the end of the delay. The majority of the studies defined the end of healthcare system delay as the time when the correct chemotherapy was initiated to the patient i.e. treatment delay (Wondimu et al., 2007; Leung et al., 2007; Golub et al., 2005); some studies defined it as the time when the correct diagnosis was made i.e. diagnostic delay (Lawn et al. 1998; Pronyk et al., 2001; Basnet et al., 2009), but some studies distinctly recorded both (WHO, 2006a). However, data of this kind were also not available for some studies (Needham et al., 2004).

Length of delay was also defined in various ways in different studies. Most studies defined the delay as a specific number of days presented by 'median' with inter-quartile range (Basnet et al., 2009; Wondimu et al., 2007; Greenaway et al., 2002; Rao et al., 1999; Lawn et al., 1998; Liam et al., 1997) or 'mean' values (Asch et al., 1998; Guneylioglu et al., 2004), but some studies presented it in both 'median' and 'mean' values (WHO, 2006a; Mirsaeidi et al., 2007).A few studies defined it as greater than a specific period of time such as >60 days, > 90 days (Long et al., 2008), or delay was defined as significantly longer in one group versus another group (Thorson et al., 2000).

3.1.2. Definition of delays

Patient's delay: Patient's delay is defined as the period from the onset of any Tuberculosis symptoms to the visit to a health provider or system. The length of this interval depended on the description of what is meant by the health care system and who is identified as the health care provider. A health care provider is any person or organization consulted by the patient about his or her sickness that took action on treatment such as prescribing some medicines, giving advice, or referring to appropriate health care facilities (Wikipedia). When patients first contact non formal or non qualified health providers such as village doctors, traditional healers, market drug sellers, pharmacists, village health workers or any source of medical care and these are defined in the study as health provider then the length of patient's delay would be shorter than health system's delay because the end point of patient's delay time is at the day he or she consults those health providers. For example, patient delay in Gambia was 2.1 days (Lienhardt et al, 2001b), 7 days in Vietnam (Lonnroht et al., 1999), and 9 days in Pakistan (WHO, 2006a). This short period is attributable to the definition used by researchers, when most of the time that would be accounted as the patient's period has been shifted to health providers. On the other hand, if the qualified or formal health providers such as the persons who work at the health centers, public or private health facilities which are qualified to deal health problems are treated as the health providers then the length of patient's delay might be longer than health system's delay. For example, the patient delay in as Tanzania was 120 days (Wandwalo et al., 2000), 81.8 days in Spain (Altet Gomez et al., 2003) and 60 days in Ethiopia (Demissie et al., 2002). In Tanzania and Ethiopia, ninety percent of the total pre-treatment period was due patient's delay, whereas in Gambia the health system delay exceeded the patients delay. However, there was no straight forward ascending pattern for the process of health care seeking in different settings, and the period of patient's delay could be shorter or longer in similar health provider settings.

Health system delay: Health system delay is the time interval from first patient consultation with a health provider until initiation of treatment on proper antibiotics or anti-Tuberculosis chemotherapy. There were different definitions for health system delay among different studies which depended mainly on the definitions of the health system for each country, although the core concept was similar. For example, the researchers in an Ethiopian study defined health service delay as the time interval from first consultation until the date of first diagnosis (Demissie et al., 2002), where the definition omits the time period between diagnosis and initiation of treatment. Health system's delay can be divided into referral interval i.e. from first consultation to diagnosing facility and diagnosing interval i.e. from first diagnosis process to initiation of treatment. Another study in Ethiopia defined health system's delay and health providers' delay separately so as to identify the duration from first visit to formal or non-formal health providers separately (Yimer et al., 2005). As discussed above, if the patients first consulted with a non-formal of unqualified health provider then the duration of health system's delay would rather be longer than patient's delay. For example, median health system delay in Pakistan was 87 days (WHO, 2006a), 65.7 days in Sri Lanka (Waidyaratne et al., 2005) and 59.5 days in Gambia (Lienhardt et al., 2001b). Almost ninety five percent of the delay in the health system in the Gambian study was due to health provider delay and the rationale behind such long delay was the broadness of the health provider definition used by the researchers. On the other hand, if the patients first contact a qualified professional health provider who worked in public or private health sector then health system delay would be shorter. For example, in Kenya health system delay was 2 days (Ayuo et al., 2008) and was 4 days in Malawi (Salaniponi et al., 2000).

Total delay: The total delay or total pre-treatment period can be considered as the sum of patient's delay and health system's delay and refers to the duration from the onset of symptoms to initiation of proper antibiotics or anti-Tuberculosis treatment for suspected or confirmed Tuberculosis patients. However, some studies omitted the time interval between diagnosing and initiation of treatment based on the notion of that the health system had rapidly processed these activities in the same day.

3.2. Patient's delay

Patient delay is an important issue in relation to enhancing Tuberculosis control through sealing the transmission of infection. Several studies have been done in developing as well as developed countries and have demonstrated patient-related delay risk factors such as economic status, age, gender, literacy status, unemployment, homelessness, distance to health facilities, visits to private health providers and traditional healers. The duration of delay varies in different settings. *Table3.1* lists the included studies according to the year of publications which review the patient, health system and total delays.

The longest median patient's delay of 120 days was reported in Tanzania a high endemic country (Wandwalo et al., 2000). But surprisingly, the second highest delays were in low prevalence developed countries. For example, in Barcelona in Spain it was reported 81.8 days (Altet Gomez et al., 2003), and New York City of USA of 73.5 days (Sarmiento et al, 2006). Factors associated with those surprising delays were 'reported late due to afraid of something serious', 'long waiting time for care', 'unemployment and cost of medical care' and 'afraid of immigration authority for illegal foreign born patients'. Conversely, the shortest of patient's delay of 2.1 days was reported in Gambia (Lienhardt et al., 2001b) and this was mainly because patients first contacted a non-formal health provider at their community level. The rest of the reviewed studies can be divided into three groups of 42 – 63 days (Basnet et al., 2009; Ayuo et al., 2008; Karim et al., 2007; Odusanya et al., 2004; Lewis et al., 2003; Needham et al., 2004), 21 - 32 days (Tobgay et al., 2006; Lambert et al., 2005a; Farah et al., 2006; Chang et al., 2007; Zerbini et al., 2008; Golub et al., 2005) and 7 – 20 days (Lonnroth et al., 1999; Gagliotti et al., 2006; WHO, 2006a; Yimer et al., 2005; Leung et al., 2007) according to the duration of reported patient's delay as shown in *Table 3.1*. The duration of patient's delay varied due to either the type of health provider first contacted by patient or the different socio-demographic factors of the studied population.

Table 3.1: Studies reviewed to analyze different delays (in days) and associated factors

Year	Author	Country	No. of patients and their status	Mode of calcula-tion	Patient delay	Health system delay	Total delay
2009	Basnet R, et al	Banke, Nepal	307 (all new cases)	Median	50	18	60
2008	Ayuo PO, et al.	Eldoret, Kenya	230 (new smear +ve cases)	Median Mean	42 77	2 21	44 -
2008	Maamari F	Syrian Arab Rep.	800 (new smear +ve cases)	Median Mean	31 52.7	15 27.6	57 79
2008	Zerbini E, et al.	Argentina	(all smear +ve cases)	Median Mean	31 58.8	12.5 32.6	62 92.1
2007	Mirsaeidi SM, et al.	Tehran, Iran	97 (new smear +ve cases)	Median Mean	13 15	75 93	96 108
2007	Pehme L, et al.	Estonia	185 (new culture +ve cases)	Median	-	19	-
2007	Karim F, et al.	Bangladesh	1000 (new smear +ve cases)	Mean	50.3	11.4	61.8
2007	Selvam JM, et al.	Tamil Nadu, India	601 (new smear +ve cases)	Median	28	28	62
2007	Chang CT, et al.	Sarawak, Malaysia	316 (new smear +ve cases)	Median	30	22	-
2007	Huong NT, et al.	Vietnam	2093 (new smear +ve cases)	Median Mean	21 33	7 19.6	28 52.5
2007	Wondimu T et al	East Wollega, Ethiopia	198 (all pulmonary cases)	Median	28	42	90
2007	Leung ECC, et al.	Hong Kong	1249 (all pulmonary cases)	Median	20	20	49
2006	Deng HJ, et al.	Shanghai, Chaina	146 (all new cases)	Median	19	5	31
2006	Sarmiento K, et al.	NewYork USA	39 (all new cases)	Mean	73.5	52.5	126
2006a	WHO (country wide study)	Iran	800 (new smear +ve cases)	Median Mean	24 51	42 75	88 124
2006	Ouedraogo M, et al.	Burkina Faso	Not mentioned	Mean	-	-	119.7
2006	Gagliotti C, et al.	Italy	271 (all smear +ve cases)	Median	7	36	65
2006a	WHO (country wide study)	Iraq	400 (new smear +ve cases)	Median Mean	31 40	2 5	36 44
2006	Okur E, et al.	Istanbul, Turkey	151 (all smear +ve cases)	Median Mean	30 46.4	19 32.1	- 77.3
2006	Tobgay KJ, et al.	Sikkim, India	323 (all cases)	Median	21	7	-

Year	Author	Country	No. of patients and their status	Mode of calcula-tion	Patient delay	Health system delay	Total delay
2006a	WHO (country wide study)	Pakistan	844 (new smear +ve cases)	Median Mean	9 9.9	87 90.7	91 96.3
2006	van der Werf MJ, et al.	Kiev city, Ukraine	190 (new smear +ve cases)	Median	30	-	-
2006a	WHO (country wide study)	Syria	800 (new smear +ve cases)	Median Mean	31 52.7	15 27.6	55 77.6
2006	Farah MG, et al	Oslo, Norway	83 (all cases)	Median	28	33	63
2006a	WHO (country wide study)	Somalia	809 (new smear +ve cases)	Median Mean	53 69	7 19.5	58 76.6
2006	Rojpibulstit M, et al.	Thailand	202 (all new pulmonary cases)	Median	30.8	19.6	65.8
2006a	WHO (country wide study)	Egypt	802 (new smear +ve cases)	Median Mean	12 24.3	18 33.6	42 55.9
2006a	WHO (country wide study)	Yemen	598 (new smear +ve cases)	Median Mean	28 39	4 20	35 57.4
2005	Yimer S, et al.	Ethiopia	384 (new smear +ve cases)	Median	15	61	80
2005	Chiang C-Y, et al.	Taiwan	206 (all new pulmonary cases)	Median	7	23	44
2005	Diez M, et al.	Spain	5184 (culture +ve)	Median	-	6	-
2005	Golub JE, et al.	Maryland, USA	158 (all smear +ve cases)	Median	32	26	89
2005	Waidyaratne DRADKM, et al.	Anuradhapura, Srilanka	85 (all new cases)	Mean	59.6	65.7	133.8
2005a	Lambert ML, et al.	Cochabamba, South America	144 (new smear +ve cases)	Median Mean	25.2 63	43.4 99.4	90.3 162.4
2005	Cheng, G et al.	Shandong, China	190 (new smear +ve cases)	Median	12.5	2	57
2005	Santos MAPS, et al.	Recife, Brazil	1105 (all pulmonary cases)	Median Mean	-	-	90 120
2005	Xu B, et al.	Jianhu China	493 (all new cases)	Median	15	18	31
2005	Kiwuwa MS, et al.	Kampala, Uganda	231 (new smear +ve cases)	Median	7	63	84
2004	Needham DM, et al.	Lusaka, Zambia	202 (all pulmonary cases)	Mean	63	-	-
2004	Ahsan G, et al.	Dhaka, Bangladesh	355 (new smear +ve cases)	Mean	63	-	-
2004	Odusanya OO, et al.	Lagos, Nigeria	151 (all new pulmonary cases)	Median Mean	56 86.1	14 14.7	70 100.1
2004	Paynter S, et al.	London, UK	71 (all cases)	Median	34.5-54	29.5	78-99
2004	Guneylioglu D, et al.	Istanbul, Turkey	204 (all smear +ve cases)	Mean	31.4	26.8	-
2004	Habibullah S, et al.	Karachi, Pakistan	115 (all pulmonary cases)	Mean	-	-	120
2003	Grover A, et al.	Haryana, India	192 (symptomatic)	Mean	56.6	-	-
2003	Altet Gomez MN, et al.	Barcelona, Spain	287 (new smear +ve cases)	Mean	81.8	43.3	38.5
2003	Lewis KE, et al.	London, UK	93 (Not mentioned)	Median	63	35	126
2003	Rodger A, et al.	United Kingdom	853 (all sputum +ve cases)	Median	-	-	49
2002a	Rajeswari R, et al.	Tamil Nadu, India	531 (new smear +ve cases)	Median	20	23	60
2002	Demissie M, et al.	Addis Ababa Ethiopia	700 (all new pulmonary cases)	Median Mean	60 78.2	6 9.5	64 88
2002	Greenaway C, et al.	Canada	429 (all new cases)	Median	-	19	-

Year	Author	Country	No. of patients and their status	Mode of calcula-tion	Patient delay	Health system delay	Total delay
2001	Ward J, et al.	Queensland, Australia	758 (symptomatic)	Median	29	22	-
2001	Pronyk PM, et al.	South Africa	298 (all pulmonary cases)	Median	28	7	70
2001	Needham DM, et al.	Lusaka, Zambia	202 (smear & culture +ve cases)	Median Mean	-	-	60.2 63
2001	Yamasaki-N M, et al	Nawalparasi, Nepal	390 (all new cases)	Median	18-24	24-39	69-94
2001b	Lienhardt C, et al.	Gambia	152 (all new cases)	Median Mean	2.1 4.9	59.5 75.6	60.2 80.5
2000	Salaniponi FML, et al.	Malawi	1099 (new smear +ve cases)	Median	49	4	56
2000	Wandwalo ER, et al.	Mwanza, Tanzania	296 (new smear +ve cases)	Median Mean	120 161.7	15 22.8	136 185
1999	Long NH, et al.	Vietnam	1027 (new smear +ve cases)	Mean	53.9	29.4	83.3
1999	Wares DF, et al.	London, UK	43 (all pulmonary cases)	Median	-	-	49
1999	Rao VK, et al.	Missouri, USA	203 (culture +ve cases	Median	-	6	-
1999	Steen T, et al.	South Batswana	212 (smear +ve cases)	Median Mean			84 121.1
1999	Sherman LF, et al.	NewYork, USA	145 (culture +ve)	Median	25	15	57
1999	Lonnroth K, et al.	Vietnam	434 (all cases)	Median Mean	7 21	30.1 49	44.1 69.3
1998	Lawn SD, et al.	Ghana	100 (new smear +ve cases)	Median Mean	28 89.6	56 126.7	120 231
1998	Asch S, et al.	California, USA	313 (all smear +ve cases)	Mean	74	-	-
1997	Liam CK, et al	Koalalampur, Malaysia	97 (all new pulmonary cases)	Median	14	52	93.5
1996	Pirkis JE, et al.	Victoria, Australia	142 (all cases)	Median Mean	-	-	52 104.4

3.2.1 Factors influencing patient's delay

Risk factors regarding patient's delay described in the studies reviewed above were heterogeneous and sometimes a risk factor for increased delay in some studies was a risk factor for decreased delay in other studies. Some factors were identified in numerous studies, while others were mentioned by only one study or a few studies. Socio-demographic factors normally play a very important role in enhancing delays. Patient's delay period is longer in female patients as compared with their male counterparts (Huong et al., 2007; Ahsan et al., 2004; Karim et al., 2007; Lawn et al., 1998; Lienhardt et al., 2001b; Rajeswari et al., 2002a; Chang et al., 2007; WHO, 2006a), while one study in Uganda demonstrated the opposite (Kiwuwa et al., 2005). Patients who were in middle and older productive age groups were found to have a longer period of delays as compared with patients who were from younger age groups (Huong et al., 2007; Zerbini et al., 2008; Ward et al., 2001; Sherman et al., 1999; Rajeswari et al., 2002a; Wandwalo et al. 2000; Paynter et al., 2004; Cheng et al., 2005; Chiang et al., 2005; Rojpibulstit et al., 2006). For example, patient's delay was higher for those aged more than 45 years in the Tanzania study (Wandwalo et al. 2000), in the age group of 45-54 years in the Vietnam study (Huong et al., 2007) and in the age group of 40-59 years in the China study (Cheng et al., 2005). On the other hand, a study in Norway demonstrated shorter patient's delay at the age of more than 60 years (Farah et al., 2006).

Physical demographic barriers to health care facilities can cause longer patient's delay. The extent of the patient's delay was higher in rural compared to urban settings (Huong et al., 2007; Lawn et al., 1998; Wandwalo et al. 2000; WHO, 2006a) because significantly higher proportions of rural respondents consulted unqualified medical practitioners whereas a majority of consultations in urban areas were with private qualified allopathic doctors (Grover et al., 2003; Long et al., 1999). But one study in India mentioned that the difference in contacting unqualified and qualified practitioners in rural and urban areas was not statistically significant (Grover et al., 2003). Some studies reported that migrant patients (Ward et al., 2001; Gagliotti et al., 2006), patients who were born in a high prevalence countries (Paynter et al., 2004) and the patients' whose primary language was other than English (Sherman et al., 1999) had a longer delay in comparison to their counterparts. However, a study in Norway reported that native patients had a longer patient delay (Farah et al., 2006) due to physicians' assuming that there was more chance of Tuberculosis in foreign born patients rather than native people. In Uganda, hospitalized patients had a shorter delay in seeking treatment compared to out-patients which is partly explained by the finding that the diagnosis was enhanced for HIV associated hospitalized cases (Kiwuwa et al., 2005).

Socio-economic and cultural context play an important role in patient's delay. Several studies demonstrated that financial problems mattered (Maamari, 2008; Needham et al., 2004; Rajeswari et al., 2002a; Golub et al., 2005; Okur et al., 2006) and one study indicated that poverty contributed to longer patient delay (Cheng et al., 2005). Studies in different countries revealed that longer distances of a range of 2-10 km. from patient's home to health care facilities caused longer patient's delay (Huong et al., 2007; Zerbini et al., 2008; Needham et al., 2004; Rajeswari et al., 2002a; Demissie et al., 2002; Pronyk et al., 2001; Wandwalo et al. 2000; Yimer et al., 2005; Okur et al., 2006). Some studies also indicated that cost of medical care was important (Sarmiento et al., 2006; Asch et al., 1998; Tobgay et al., 2006) and other studies mentioned that unemployment (van der Werf et al., 2006; Leung et al., 2007; Asch et al., 1998) contributed to longer patient's delay. Illiteracy and less education (Rajeswari et al., 2002a; Wandwalo et al. 2000; Golub et al., 2005; Xu et al., 2005; Kiwuwa et al., 2005) as well as inadequate knowledge regarding the disease (Maamari, 2008; Odusanya et al. 2004) were demonstrated as major influencing factor for patient's delay in some studies. One study mentioned that higher educated patients had a shorter delay (Cheng et al., 2005). Moreover, being a farmer (Kiwuwa et al., 2005), having no health insurance (Golub et al., 2005; Xu et al., 2005) and homelessness (van der Werf et al., 2006) were associated with poorer access to health care and longer patient's delay.

Clinical features and risk health behaviors can also cause longer patient's delay. Studies in different countries illustrated that severity of symptoms (Grover et al., 2003; Long et al., 1999), patients' who need hospital admission (Lawn et al., 1998), mild illness (Rojpibulstit et al., 2006), and presence of cough as symptom (Zerbini et al., 2008; van der Werf et al., 2006; Calder et al., 2000) were associated with longer patient's delay. Some other studies also demonstrated that sputum smear and culture positivity (Leung et al., 2007), being an extra-pulmonary Tuberculosis patient (Farah et al., 2006), and extensive lesions on X-ray (Leung et al., 2007) contributed to longer patient's delay. However, some studies mentioned that haemoptysis (Leung et al., 2007; Demissie et al., 2002) and sputum smear and culture positivity (Ward et al., 2001) contributed to shorter patient's delay. Some studies also demonstrated that patient's personal behavior and practice like alcohol abuse (van der Werf et al., 2006; Rajeswari et al., 2002a; Kiwuwa et al., 2005) and smoking (Calder et al., 2000; Selvam et al., 2007) were associated with longer patient's delay.

Patient's delay duration is not only related to patient's factors, but also the health system and health providers play an important part in the health seeking process. These factors are based on the context of socio-cultural and economic background of the country. Mostly, in developing countries, patients seek to consult first non-qualified health providers i.e. traditional healer, market drug seller, pharmacists etc (Maamari, 2008; Grover et al., 2003; Wandwalo et al. 2000; Yimer et al., 2005; Rojpibulstit et al., 2006; Tobgay et al., 2006; WHO, 2006a) or private health providers including private clinics (Needham et al., 2004; Grover et al., 2003; Ouedraogo et al., 2006). These routes play important roles in longer patient's delay. The longest patient's delay of 120 day from the study in Tanzania showed the patients who visited traditional healers had longer delay than those who visited a health care facility. Rural health care facilities had longer delays than urban health care facilities (Wandwalo et al. 2000). A study in Ethiopia also illustrated that the patients who attended non formal health providers such as traditional healer, drug retail outlet and local injector had longer patient's delay (Yimer et al., 2005). Several health care encounters before diagnosis (Maamari, 2008; Waidyaratne, 2005; Needham et al., 2004; Sarmiento et al., 2006; Long et al., 1999; Ouedraogo et al., 2006; Lienhardt et al., 2001b; Asch et al., 1998; WHO, 2006a) was also associated with longer patient's delay. Several other studies also demonstrated that initial visit to public health facilities other than a Tuberculosis treatment unit (Huong et al., 2007; Needham et al., 2004; Grover et al., 2003; Ouedraogo et al., 2006; Rajeswari et al., 2002a; Yimer et al., 2005; Tobgay et al., 2006) and first contact at Tuberculosis dispensaries rather than chest clinics (Cheng et al., 2005) contributed to longer patient's delay. Moreover, difficulty in accessing government health facilities (Selvam et al., 2007; Asch et al., 1998), and long waiting times for care (Sarmiento et al., 2006; Asch et al., 1998) were associated with longer patient's delay.

Patient's beliefs and attitudes towards physical sickness and Tuberculosis symptoms also contributed to longer patient's delay. Studies in different countries illustrated that patient's sometimes held attitudes like 'hoped to recover without treatment' (Maamari, 2008; van der Werf et al., 2006; Calder et al., 2000; Demissie et al., 2002), 'symptoms not considered serious' (van der Werf et al., 2006; Sarmiento et al., 2006; Waidyaratne, 2005; Golub et al., 2005; Cheng et al., 2005; Okur et al., 2006) or 'fear of diagnosis Tuberculosis or something serious' (Maamari, 2008; Sarmiento et al., 2006; Calder et al., 2000) would contribute to longer patient's delay. Besides attitudes, patient's perceptions regarding the Tuberculosis disease might be associated with longer patient delay. Some studies demonstrated that patients perceived Tuberculosis as 'a dangerous disease' (Liefooghe et al., 1995), an 'infectious and sensitive disease difficult to diagnosis and treat' (Liefooghe et al., 1997; Liam et al., 1999; Edginton et al., 2002; Hashim et al., 2003; Zhang et al., 2007), as associated with 'close interaction such as sharing foods and utensils with Tuberculosis patients' (Liam et al., 1999; Edginton et al., 2002; Hashim et al., 2003; Zhang et al., 2007), 'hereditary' (Liefooghe et al., 1995; Liefooghe et al., 1997; Zhang et al., 2007; Hoa et al., 2009), 'curable but difficult to cure' (Liam et al., 1999; Hashim et al., 2003; Zhang et al., 2007; Hoa et al., 2009), an 'incurable disease' (Liefooghe et al., 1995) and a 'disease of a king' i.e. a dangerous and costly disease which only a king or the rich can afford to suffer (Croft and Croft, 1998). All these would also contribute to patient's delay. A focus group study in rural China reported that farmers and village doctors perceived Tuberculosis as hereditable and discouraged patients from having children (Zhang et al., 2007). Some other studies also mentioned that self medication and home remedies (Grover et al., 2003; Long et al., 1999; Ouedraogo et al., 2006; Yimer et al., 2005; Asch et al., 1998; Tobgay et al., 2006) contributed to longer patient's delay. Reviewed studies also demonstrated that some other factors like ethnic minority (Huong et al., 2007; Golub et al., 2005), fear of family problem and separation (Ahsan et al., 2004), no information on Tuberculosis prior to diagnosis (Wandwalo et al. 2000; WHO, 2006a), uncertainty about where to go to get free treatment (Asch et al., 1998; Odusanya et al. 2004) and fear of authority due to illegal immigration (Asch et al., 1998) would contribute longer patient's delay.

Lastly, social stigma might also have some contributing role in relation to health seeking and delays (Ahsan et al., 2004; WHO, 2006a). The effect of stigma was more obvious among female patients. A study demonstrated that stigma may lead to delays for both sexes in seeking care, but more so for females if the physical, geographical, and economic access to health care are limited (Diwan, 1999). One of the reasons that stigmatization might increase among females might be an age factor as lot of studies mentioned the lower median age of female Tuberculosis patients against their counterparts. For example, the median male female age ration in Botswana study was 43:33 years (Steen et al., 1999) and 36:30 years was in Gambian study (Lienhardt et al., 2001b).

3.3. Health system delay

Tuberculosis is common in the developing world, but a significant problem lies with the fact that many cases remain undiagnosed (WHO, 2004a). This could be due to a number of factors, principally found within the categories like patients delaying seeking healthcare or failure of the health care systems to diagnose and initiate treatment to the patients in a timely manner. If the health system's delay was defined as the time interval from the first consultation until date of Tuberculosis diagnosis (Demissie et al., 2002) then a very important component of treatment initiation delay is actually missing. Diagnosing Tuberculosis is not just the aim of the control activities. Many patients, even if they get diagnosed, suffer either from another long period before they start treatment or they receive no treatment at all would be a disaster.

The longest median health system's delay of 87 days was documented in Pakistan a high endemic country study (WHO, 2006a). But surprisingly, the second highest delays were in medium to low prevalence countries like in Tehran in Iran 75 days (Mirsaeidi et al., 2007) and in Anuradhapura in Srilanka 65.7 days (Waidyaratne et al., 2005). Factors associated with those surprising health system's delays were 'contacting the local non-formal or formal health providers and delayed referral of patient by them to a proper Tuberculosis treatment unit' and 'the lack of Tuberculosis knowledge of first contacted health professionals'. The shortest median time between medical consultation and initiation of treatment of 2 days was documented in three studies in China (Cheng et al., 2005), Iraq (WHO, 2006a) and Kenya (Ayuo et al., 2008) and was mainly because patients directly contacted a Tuberculosis treatment unit or a qualified professional health provider who treated or referred the patients immediately to a proper Tuberculosis treatment unit. The rest of the reviewed studies can be divided into three groups of 30.1 - 63 days (Lonnroth et al., 1999; Gagliotti et al., 2006; Lambert et al., 2005a; Lawn et al., 1998; Kiwuwa et al., 2005), 20 – 29.5 days (Leung et al., 2007; Chiang et al., 2005; Golub et al., 2005; Selvam et al., 2007; Paynter et al., 2004) and 4 – 19.6 days (Salaniponi et al., 2000; Demissie et al., 2006; Pronyk et al., 2001; Zerbini et al., 2008; Wandwalo et al., 2000; Rojpibulstit et al., 2006) according to the median duration of reported health system's delay as shown in *Table 3.1*. This variation was actually due to the different definitions used in different studies.

3.3.1. Factors influence Health system's delay

The problem of delay within the health system is a reflection of different dialectical relations and factors such as; prevalence of Tuberculosis, accessibility of health facilities, patient's socio-demographic characteristics, symptoms on presentation, presence of refined suspicion index, infrastructures and organization of the health system.

Females had lower access, were more slowly diagnosed and had a lesser notification rate than males were demonstrated in several studies (Huong et al, 2007; Long et al., 1999; Karim et al., 2007; Ward et al., 2001; Lawn et al., 1998; Pronyk et al., 2001; Cheng et al., 2005; Yamasaki-N et al., 2001; Guneylioglu et al., 2004) as longer delay factors. A range of studies found that middle and older aged patients experienced longer health system's delay than the younger age group patients (Huong et al, 2006; Diez et al., 2005; Leung et al., 2007; Karim et al., 2007; Ward et al., 2001; Golub et al., 2005; WHO, 2006a), while one study found the opposite (Demissie et al., 2006). Two studies mentioned the longer health system's delay in rural settings (Lawn et al., 1998; Golub et al., 2005) whereas one study illustrated the opposite of longer health system's delay in urban settings (Huong et al, 2007). Other studies found that patients born in low prevalence country (Paynter et al., 2004 and Gagliotti et al., 2006) and residing alone (Kiwuwa et al., 2005) had longer health's system delay. However, two studies demonstrated that migrants and indigenous people have shorter delays in comparison to their counterparts (Ward et al., 2001 and Pronyk et al., 2001).

Several studies found living a distance of 2-10 km. from a clinic as well as the mode of transport, caused longer health system's delay in many developing and developed countries (Huong et al, 2006; Rajeswari et al., 2002a; Okur et al., 2006; Demissie et al., 2002; Yimer et al., 2005; Selvam et al., 2007; WHO, 2006a). Two studies found that patient's low level of education was associated with longer health system's delay (Xu et al., 2005; Yimer et al., 2005) but one study in Vietnam found that patient's high level of education was associated with longer health system's delay (Huong et al, 2007). Being an uninsured patients (Xu et al., 2005; Rojpibulstit et al., 2006), patient's lower income (Chang et al., 2007) and medical expenditure (Kiwuwa et al., 2005; Tobgay et al., 2006; WHO, 2006a) also were associated with longer health system's delay demonstrated in several studies. However, a study in Estonia illustrated that unemployment status of the patient was associated with a shorter health system's delay (Pehme et al., 2007).

Initial symptoms were also one of the main problems delaying investigation of Tuberculosis. Normally the well known Tuberculosis suspected symptoms like productive cough, fever, night sweating, chest pain, weight loss and haemoptysis pointed health providers towards a Tuberculosis diagnosis. Several studies demonstrated that the presence of non-specific or non-Tuberculosis related symptoms (Diez et al., 2005; Calder et al., 2000) and absence or short duration of cough (Sherman et al., 1999; Rajeswari et al., 2002a; Golub et al., 2005; Pehme et al., 2007; Gagliotti et al., 2006; Selvam et al., 2007) could suggest other diseases and was related to longer health system's delay. Especially failure to perform initial sputum or chest X-ray examination (Leung et al., 2007; Calder et al., 2000; Sherman et al., 1999; Pehme et al., 2007; Chiang et al., 2005) and failure to perform appropriate investigations (Ward et al., 2001) contributed a lot to longer health system's delay. On the other hand, those who underwent investigation but had negative smear or unknown result (Rao et al., 1999; Sherman et al., 1999; Demissie et al., 2002; Paynter et al., 2004; Pehme et al., 2007; Chiang et al., 2005) or absence of cavity in X-ray findings (Zerbini et al., 2008; Rao et al., 1999) or misdiagnosis of chest X-ray (Ward et al., 2001) also experienced longer health system's delay. Some studies also illustrated that absence of haemoptysis in initial symptoms (Rao et al., 1999; Lonnroth et al., 1999; Kiwuwa et al., 2005; Chiang et al., 2005; WHO, 2006a) contributed as a risk factor for longer health system's delay. Some studies demonstrated that patients with extra-pulmonary Tuberculosis experience longer delays than do patients with pulmonary Tuberculosis (Diez et al., 2005). A few studies demonstrated that HIV-positive patients (Greenaway et al., 2002), history of intravenous drug abuse (Diez et al., 2005) and patients' who need hospital admission (Lawn et al., 1998) experienced longer health system's delay. The study in Malawi (Salaniponi et al., 2000) and Maryland, USA (Golub et al., 2005) mentioned antibiotic delay in the process prior to Tuberculosis treatment. Only one study mentioned the contribution of alcohol abuse in shorter health system delay (Pronyk et al., 2001).

Health care seeking processes i.e. quality of contacted health providers also played an important role in health system's delay. In developing countries, mostly the non-qualified health providers such as traditional healer, market drug seller, pharmacist, etc or private practitioners play important roles in the health system. Seeking first care at a non-qualified health provider (Maamari, 2008; Lonnroth et al., 1999; Yamasaki-N et al., 2001; WHO, 2006a) or initial visit to the private health sector like private health professionals irrespective of rural or urban residence (Huong et al, 2007; Lonnroth et al., 1999; Rajeswari et al., 2002a; Golub et al., 2005; Yimer et al., 2005; Selvam et al., 2007; Yamasaki-N et al., 2001; Altet Gomez et al., 2003; Tobgay et al., 2006; WHO, 2006a) or clinics (Chiang et al., 2005) were directly linked with longer health system delay. Some studies also mentioned about several health care encounters before diagnosis at different health facilities (Maamari, 2008; Calder et al., 2000; Golub et al., 2005; Kiwuwa et al., 2005; WHO, 2006a) as associated with longer health system delay.

The longest health system delay of 87 with a range of 10-265 days illustrated in a recent study in Pakistan showed that patients who visited drug stores and traditional healers had longer delay (WHO, 2006a). Type of public health facility used by patients (Zerbini et al., 2008; Diez et al., 2005; Gagliotti et al., 2006; Chang et al., 2007) could also contribute to health system's delay. For example, studies in Vietnam (Huong et al., 2007) and India (Rajeswari et al., 2002a) demonstrated that initial contact at district health center was associated with longer health system's delay than initial contact with a private provider. Some studies also mentioned that laboratory problems (Okur et al., 2006), long waiting time at public health facility (WHO, 2006a) and misdiagnosis (Greenaway et al., 2002; Paynter et al., 2004; Cheng et al., 2005) were associated with longer health system's delay. However, some studies concluded that seeking specialized services leads to a decreased diagnostic delay (Kiwawa et al., 2005; Gagliotti et al., 2006; Sherman et al., 1999), while one study from the USA (Lawn et al., 1998) found the opposite.

3.4. Total delay

Total delay is the combination of patient's delay and health system's delay which varies differently in different settings. Not surprisingly, the longest median total delays of more than 130 days were reported for some high endemic countries (Wandwalo et al., 2000 and Waidyarante et al., 2005), with the exception of the median 126-day delay reported in London, UK (Lewis et al., 2003) and New York, USA (Sarmiento et al., 2006). Most of the studies, whether investigating low or high endemic countries, reported a total median delay within the range of 60 – 90 days (Rajeswari et al., 2002a; Selvam et al., 2007; Gagliotti et al., 2006; Pronyk et al., 2001; Steen et al., 1999; Santos et al., 2005). Another group reported a total median delay within the range of 31 - 58 days (Xu et al., 2005; WHO, 2006a; Ayuo et al., 2008; Leung et al., 2007; Cheng et al., 2005; Maamari, 2008). There was no consistent pattern with regard to the relative contributions of patients and health system delay to the total delay. The main contribution in total delay was patient related in the studies in Tanzania (Wandwalo et al., 2000), London (Lewis et al., 2003), Vietnam (Long et al., 1999a), Nigeria (Odusanya et al., 2004), South Africa (Pronyk et al., 2001), Ethiopia (Demissei et al., 2006), Argentina (Zerbini et al., 2008), Bangladesh (Karim et al., 2007), Somalia (WHO, 2006a), China (Cheng et al., 2005), Kenya (Ayuo et al., 2008), Iraq (WHO, 2006), Yemen (WHO, 2006a), China (Deng et al., 2006), and Vietnam (Huong et al., 2007). The main cause of delay was identified as the healthcare system in the studies of Sri Lanka (Waidyaratne et al., 2005), Ghana (Lawn et al., 1998), Pakistan (WHO, 2006a), Iran (Mirsaeidi et al. 2007), Ethiopia (Yimer et al., 2005), Italy (Gagliotti et al., 2006), Gambia (Lienhardt et al., 2001b), Vietnam (Lonnroth et al., 1999), and Taiwan (Chiang et al., 2005). Some studies reported a nearly equal contribution of patients and health system delay to the total diagnostic delay e.g. in the USA (Golub et al., 2005), Norway (Farah et al., 2006), India (Selvam et al., 2007 and Rajeswari et al., 2002a), Hong Kong (Leung et al., 2007), and Egypt

(WHO, 2006a). The remaining studies did not record the relative importance of these two factors in the diagnostic delay.

3.4.1. Factors influencing total delay:

The factors associated with total delay period might not be the same as the sum of the factors associated with patient's delay and health system's delay, given the diversity of variables and statistical testing methods. Longer total delays were observed by many researchers in middle and older age group patients (Maamari, 2008; Huong et al, 2007; Zerbini et al., 2008; Leung et al., 2007; Rodger et al., 2003; Lawn et al., 1998; Lienhardt et al., 2001; Wandwalo et al. 2000; Paynter et al., 2004; Cheng et al., 2005; Chiang et al., 2005; WHO, 2006a). Some other studies mentioned about gender issue especially the female patient (Deng et al., 2006; Huong et al, 2006; Lambert et al., 2005a; Rodger et al., 2003; Long et al., 1999; Huong et al., 2006; Lawn et al., 1998; Needham et al., 2001; Cheng et al., 2005; Yamasaki-N et al., 2001; WHO, 2006a) mainly contributed in longer total delay with an exception in Argentina study, where male patient's have longer total delay (Zerbini et al., 2008). Patient not attending school or having a lower level of education was associated with longer total delay (Lienhardt et al., 2001; Needham et al., 2001; Cheng et al., 2005; Xu et al., 2005; WHO, 2006a). Patient lived in rural and remote settings was also associated with a longer total delay (Huong et al, 2007; Lawn et al., 1998; Wandwalo et al. 2000; WHO, 2006a), whereas one study in Gambia mentioned that patients who lived in urban areas had a longer total delay (Lienhardt et al., 2001b). Another study noted that patient lived in homeless hostel was associated with longer total delay (Wares et al., 1999).

Living a far distance from the health facility was associated with longer total delay reported in developing country studies (Maamari, 2008; Demissie et al., 2002; Cheng et al., 2005; Ayuo et al., 2008; WHO, 2006a). Unemployment (Lawn et al., 1998; Santos et al., 2005; Asch et al., 1998) and low income and poverty (Deng et al., 2006) were also associated with longer total delay. Uncertainty about where to go for care, anticipated high treatment cost (Asch et al., 1998), uninsured patients (Xu et al., 2005) and financial problem (WHO, 2006a) were also associated factors for longer total delay. One study in Syria demonstrated that inadequate knowledge regarding the disease could contribute longer total delay (Maamari, 2008).

Studies in multiple countries documented that smear negativity (Deng et al., 2006; Sherman et al., 1999; Chiang et al., 2005) or low grading positive sputum smear (Golub et al., 2005; Paynter et al., 2004), no initial sputum or chest X-ray examination (Leung et al., 2007) contributed to longer total delay. A study in London, UK also illustrated that diagnosis of extra-pulmonary Tuberculosis was associated with prolonged total delay (Lewis et al., 2003). Cough as the only initial presenting symptom (Chiang et al., 2005), weight loss (Santos et al., 2005) and co-existence of diabetes mellitus (WHO, 2006a; Wares et al., 1999) also were associated with longer total delay. However two studies documented that haemoptysis was associated with shorter total delay (Leung et al., 2007; Lienhardt et al., 2001b). Patient's bad habits like alcohol abuse (Wares et al., 1999) and smoking (WHO, 2006) were also associated with longer total delay.

There were differences in the type of first visited health providers between patient's delay and health system's delay. However, reviewed studies concluded that factors like seeking first care to a non-qualified provider such as traditional healer, orthodox care, grocery shop, local drug stores or pharmacies (Maamari, 2008; Huong et al, 2007; Salaniponi et al., 2000; Pronyk et al., 2001; Wandwalo et al. 2000; Needham et al., 2001; WHO, 2006a), seeking first care at private practitioners (Waidyaratne, 2005; Lambert et al., 2005; Huong et al., 2007; Ouedraogo et al., 2006; Steen at al., 1999; Rajeswari et al., 2002a; Pronyk et al., 2001; Needham et al., 2001; Selvam et al., 2007; Habibullah et al., 2004; WHO, 2006a) contributed a lot in longer total delay. Some other studies also reported that several health cares encounters of 2-6 times to the same or different health care providers before diagnosis (Maamari, 2008; Waidyaratne, 2005; Ouedraogo et al., 2006; Needham et al., 2001; Asch et al., 1998; WHO, 2006a) contributed to longer total delay. Some studies also illustrated that initial visit to public health facilities except Tuberculosis treatment unit (Ouedraogo et al., 2006; Rajeswari et al., 2002a; Salaniponi et al., 2000) and first visit to private clinics (Pronyk et al., 2001) caused longer total delay. Very few study mentioned that difficulty in getting appointment (Asch et al., 1998) and anticipation of long waiting time (Asch et al., 1998) contributed to longer total delay.

Patient's beliefs and attitudes to Tuberculosis also mentioned as factors of total delay in some studies. Symptoms not considered serious (Waidyaratne, 2005), patient believed that they could treat themselves (Asch et al., 1998; WHO, 2006a) and patient's belief that low cost health services are inadequate for Tuberculosis treatment (WHO, 2006a) caused longer total delay. Some other factors such as patient born in low prevalence country (Paynter et al., 2004), born rather than country of current residence (Rodger et al., 2003), ethnic minority groups (Huong et al, 2007), high degree of stigma (Maamari, 2008; WHO, 2006a) and fear of immigration authority (Asch et al., 1998) caused longer total delay. Moreover, patient's low level of knowledge and awareness about the disease (Odusanya et al. 2004; WHO, 2006a) and lack of information about the source of free treatment (Odusanya et al. 2004) contributed to longer total delay.

Various authors have provided different definitions of an 'acceptable' delay in diagnosis. An acceptable period between onset of symptoms and commencement of treatment has been defined as 1 month. Particular attention was given to the periods between the onset of symptoms and initiation of treatment, and the determination of sputum positivity and initiation of treatment. An expert panel nominated the 'acceptable' periods for diagnosis and initiation of treatment as 30 days and 3 days respectively (Pirkis et. al, 1996). The definition of a reasonable delay in a given situation will depend on the prevalence of Tuberculosis and the nature of the health care system as well as the national Tuberculosis treatment guidelines of the respective country.

The control of Tuberculosis requires prompt diagnosis and effective treatment. However, mere administration of good treatment to diagnosed cases may not control the disease unless accompanied by efficient and timely case finding. According to the reviewed studies, more effective Tuberculosis control interventions require improve awareness in the community regarding Tuberculosis, novel methods of accessing women and less educated people, awareness and active involvement of community health providers etc. Decentralization of public Tuberculosis care and improved integration with private sector health providers may also reduce diagnostic delay and treatment delay.

Bangladesh has a high prevalence of pulmonary Tuberculosis and an incidence estimated at 101 smear positive new cases per 100,000 populations per year with an annual risk of infection of 2.14 percent. The country achieved the WHO recommended target of 70 percent case detection in 2006 and 85 percent of treatment success of new smear-positive cases since 2003 (NTP, 2007). So it is important to identify the different kind of delays related to Tuberculosis treatment in order to formulate the programme more effectively for controlling the disease through cutting the transmission of the disease as early as possible.

3.5. Bangladesh studies

So far I found two gender based studies (from electronic resources) conducted in Bangladesh investigating the diagnosis and treatment delays in relation to Tuberculosis. One study conducted in 12 Upazila health centers (basic Tuberculosis treatment unit) near the capital city had a sample of 355 new smear positive cases. From each health center a maximum number of 14 male and 14 female new Tuberculosis cases of age 15 years or more were selected. The study revealed that 52.4 percent of all respondents had taken prior treatment from various traditional practitioners before presenting to the Upazila health centers, whereas 70 percent of the female patients had prior treatment history. The mean patient's delay for seeking treatment from various traditional healers was 63 days with a range of 14-210 days. Among the females, 50 percent of cases were delayed by more than 60 days while they were infectious and spreading the disease in the community. The study concluded that there was a significant gender difference in treatment seeking behavior in rural Bangladesh (Ahsan et al., 2004).

Another study conducted in 10 Upazilas (sub-districts) of which 6 were from Dhaka division (central) and 4 from Rajshahi division (northern) had a sample of 1000 newly diagnosed smear-positive pulmonary Tuberculosis patients of which 500 were female and 500 were male. From these, an average of 100 patients per sub-districts representing all the 10 sub-districts was 'convenience sampled' from the Tuberculosis treatment register. Study demonstrated that female patient's had significantly longer mean and median delays in most types of delay than male patients. Mean female patients' delay, health system's delay and total delay was 51.9, 11.3 and 63.2 days for female against 48.7, 11.6 and 60.3 days for male patients. Median patients' delay, health system's delay and total delay was 50.0, 4.0 and 61.0 days for female against 42.0, 5.0 and 53.0 days for male patients. However, no significant differences were observed between women and men in doctor's and health system's delays. The multiple linear regression analyses indicated a significant association between the sex of patients and total delay, total diagnostic delay and patient's delay, and the authors concluded that women experienced longer delays at various stages of the clinical process of help seeking for Tuberculosis diagnosis and treatment compared with men (Karim et al., 2007).

3.6. Chapter conclusion

Therefore, the analysis of the reviewed studies had revealed the following summary findings-

- The longest median patient's delay of 120 days was in Tanzania
- The longest median health system delay of 87 days was in Pakistan
- The longest median total delay of 136 days was in Tanzania

All forms of longest delays were mainly from developing countries where various non-formal or formal private health care sectors were prominent and the first choice for majority of the patients.

Major risk factors demonstrated in those reviewed literatures regarding longer patient, health system and total delays were as follows –

- Definition of first contacted health providers
- Gender – female patients had longer delay
- Middle and older aged patients
- Patient lived in rural areas
- Migrant patients born in high prevalent countries
- Poverty and financial problem of the patient
- Distance of the health facilities
- Unemployment of the patient and cost of medical care
- Illiteracy/less education of the patient
- Poorer access of the patients to the health care facility
- Presence of cough as Tuberculosis symptom
- Vagueness of symptoms, absence of haemoptysis and negative smear results
- Lack of knowledge and source of treatment
- Alcohol abuse and smoking by the patient
- Patient first contact to non-qualified/qualified health providers
- Several health care encounter with the same or different health care providers
- Contact public health facility other than Tuberculosis treatment unit
- Patient's perception regarding disease- difficult to cure
- Self medication and home remedies
- Stigma, family problem and fear of separation especially for female patients

The core problem in delay of diagnosis and treatment seemed to be a vicious cycle of repeated visits at the same or different healthcare facility especially in various private sectors, resulting in nonspecific antibiotic treatment and failure to access specialized Tuberculosis services. This sometimes leads to the development of multi-drug resistance Tuberculosis cases especially in developing high prevalence countries.

So far only two studies of delay between the onset of symptoms and treatment in patients with pulmonary Tuberculosis have been carried out in Bangladesh. The first (Ahsan et al., 2004) investigated only diagnostic delay and identified gender as a delay factor with some discussion about non-formal health practitioners especially the traditional healers as first contact of the patient. The second (Karim et al., 2007) investigated all kinds of delay but mainly focused on gender issues and did not look at other risk factors. Moreover, Ahsan et al. examined only the surrounding rural areas of the central division which are mainly highly Tuberculosis prevalence areas. Karim et al. examined mainly rural areas in the central division and northern division, most of which are high Tuberculosis prevalence areas. No study has been done in urban areas so far. So the findings may not be a reflection of the situation in the whole country The international literature shows that in addition to gender, there are also other major socio-demographic, socio-economic, and health system related factors which are responsible for delays need to be explored. Studies should also be conducted countrywide. So both the studies can be located thus –

- Studies mainly conducted in geographical areas of the central division
- High Tuberculosis prevalent areas were selected as study areas
- Gender was the main indentified contributing factor for delay
- No urban based study yet have done

Therefore, I decided to conduct the study countrywide. The aim of this study was to investigate different delays associated with Tuberculosis treatment and factors like social, clinical, life-style and health-care associated with different stage of treatment delays among cases of Tuberculosis in Bangladesh through a quantitative study. The information from this study can be used to develop appropriate strategies to reduce delay and associated morbidity and mortality.

However, delay not only enhances the severity, morbidity and mortality of the disease but also imposes various medical and non-medical costs during treatment both from patients and public health perspectives. So far one cost-effectiveness study has been done in one Upazila (sub-district) in nearby capital city of Bangladesh, where health system expenditures were calculated to compare clinic and community based Tuberculosis treatment interventions (Islam et al., 2002). And a clinic based small scale economic impact study was contacted in a Northern district of Bangladesh which only calculated pre-treatment costs even excluded caregivers costs (Croft et al., 1998). But no detailed study has yet been done regarding the total costs incurred by the patients and its consequences during the whole span of their disease. So the available electronic literatures connected to the Tuberculosis patient's costs and consequences will be reviewed in the next chapter.

Chapter 04: Economic Impact and Consequences of Tuberculosis

> "There is no money coming into the house while you are sitting with death and our children are consumed by Tuberculosis."
>
> - An elderly woman in Mbekweni, Zambia (Bond et al., 2009)

The burden of the disease of Tuberculosis is global, and it also imposes an economic burden on societies and communities and on individuals of all ages, and in all social and economic classes through considerable morbidity and mortality. Patients' tendency to shopping around for care seeking before proper diagnosis and initiation of treatment not only causes delays but also incurs substantial economic burden in the form of out-of-pocket patient expenditure especially for the poor in the developing countries. This situation is also aggravated because Tuberculosis has the ability to cause latent infection early in life and active disease later, during an individual's prime age (WHO, 2000a) and also could further aggravated by health care system delay. When individuals became disabled or die due to Tuberculosis, individual patients, their families and ultimately society pays the price through lost of income, assets and productivity.

Worldwide, Tuberculosis affects the most productive age group and the resultant economic cost for individuals and the society is high. In developing countries, the majority of such patients come from the most economically productive segment of the population (WHO, 1995). On an average, 3-4 months of work time are lost if an adult has Tuberculosis, resulting in a loss of about 20 to 30 percent of annual household income due to lost earnings (Rajeswari et al., 1999). Tuberculosis accounts for almost 20 percent of all deaths and 26 percent of all preventable deaths in the age group of 15 to 49 years. An average of 15 years of income is lost due to an individual patient's premature death from the disease. Tuberculosis is also estimated to deplete the incomes of the world's poorest countries by approximately a total of US$ 12 billion per year (Geethamani et al., 2001). Thus, Tuberculosis causes enormous social and economic disruption and hampers the development of countries despite people being offered free diagnosis and treatment by governments through specialized Tuberculosis control programmes. For example, a study in South India estimated the projected out of pocket expenditure incurred by Tuberculosis patients annually as more than US$ 3 billion (Muniyandi et al., 2005). Another study in Thailand found that patients bear more than 60 percent of the total burden of Tuberculosis treatment costs (Kamolratanakul et al., 1999). Women often face obstacles in gaining access to diagnostic facilities, investigations and in completing adequate treatment. The burden of housework, childcare, unemployment as well as employment, seeking permission to leave and go to a health facility, and lack of money as many of them are not the controller of their own income allows them very little time to access health care and Tuberculosis care for themselves. (Rajeswari et al.,1999).

Household interactions with health services and the costs that they impose for illness and treatment reflects the performance of health care interventions particularly their coverage and equity implications. The existing quality weaknesses or cost burdens and distance of the health care facilities may deter or delay the utilization of public health care systems. Conversely the situation promotes the use of less effective health care sources or practices particularly by the poor (Bloom et al., 2000). So the public health care services are frequently ineffective in reaching the poor rather than and impose regressive cost burdens (Fabricant et al., 1999). For example, a recent review study found that poor households more frequently opted for care outside the modern sector than better off households and that the cost of Tuberculosis treatment, as well as distance to health facilities, were significant barriers to access for poor households (Nhlema et al., 2003). As a result, patients quite often went shopping around for relief and spent lots for privately purchased drugs, travelling and care received in the private sector before they started on treatment under public health Tuberculosis control programmes (Rajeswari et al., 1999). A study in India observed that 48 percent of patients with chest symptoms in rural areas had preferred private health care facilities as their first contact (NFHS-II, 2000). The health care delivery system in Bangladesh consists of a complex arrangement of government, private and nongovernmental organization (NGO) centers. The health expenditure survey of Bangladesh revealed that 63.8 percent of health expenditure comes from patients' households (MoH&FW, 2003). Socio-economic factors such as literacy, perception, decision making process and family income significantly influenced the care seeking behavior and patients switched from private to government providers, invariably due to financial constraints (Muniyandi et al., 2005). Private health services can impose regressive cost burdens as poor households spend a higher proportion of their income on health care than better-off households (Russell, 2003). So it is important to understand patient barriers to accessing and using various resources, especially the public treatment facilities, which include the economic burdens that impose on poor households' budgets and their ability to work.

Moreover, individual patients and their households also mobilized various strategies to cope with unexpected illness costs. Coping strategies can be defined as a set of actions that aim to manage the costs of an event or shock or process that threatens the welfare of some or all of the household members. Ultimately coping strategies are seeking to sustain the economic viability and sustainability of the household (Sauerborn et al., 1996). Moreover, coping strategies are critically important for poor households faced with illness cost shocks. The costs associated with illness can absorb a large proportion of the household budget and therefore require the mobilization of substantial additional resources. These costs can exceed the low and insecure daily or weekly budgets of the poor, who often survive on a daily wage that is barely enough to meet minimum food requirements (Russell, 2003). Ability to cope with these extra costs of illnesses is hence essential for the health and livelihoods of poor households. Patients and their households commonly used various strategies to cope with both direct and indirect costs of illness such as using savings, borrowing from relatives and friends, taking loans from social networks, selling reserve food stocks, reducing consumption of non-essentials and then more essential items, diversifying income sources, pawning or selling unproductive assets such as jewelry, reducing investments such as withdrawing a child from school and selling productive assets such as livestock, land or machinery (Russell 1996). In addition, people also adapt intra-household labour substitution strategies in order to replace the loss of family workforce in order to cope with the indirect costs of illness (Sauerborn et al., 1996). For example, an Indian study reported that 11 percent of Tuberculosis patient's children had discontinued school and 8 percent of them engaged in employment to support their family due to the economic burden of the disease (Rajeswari et al., 1999).

Few studies have been conducted on the economic impact and consequences of Tuberculosis for patients and their family worldwide and mostly these have been done in developing countries. Some have been conducted in Asia especially in India and some in African countries. Respective authors studied the magnitudes of economic costs and consequences for patients and their families especially the women and children and summarized the diversified interesting data in order to make fruitful recommendations. The burden of the cost and consequences differed according to respective countries' socio-economic situation, health system and strategies adopted to conduct the study. So in this chapter, I have tried to review the available online literature so as to summarize the costs in the form of 'direct i.e. expenditure cost', 'indirect i.e. wage and production lost cost' and 'total cost' incurred by patients on diagnosis and treatment on account of Tuberculosis. I have also reviewed factors affecting different kinds of costs, individual as well as household responses to these costs and impact i.e. consequences of these costs on patients and their household' livelihoods and the processes of impoverishment. Analysis of the factors leading to the different costs is crucial for any strategy intended to reduce the economic burden and the vicious cycle of poverty which is associated with Tuberculosis.

4.1: Economic impacts and definitions

The economic impact of Tuberculosis is most often measured as the direct costs of treatment to the health service, which includes the costs of medicines, personnel and facilities used in respective countries. However, the economic impacts of Tuberculosis involve not only public expenditure but are considerably more far-reaching. Very often patients seek treatment from non-qualified or qualified private sector providers before approaching a proper public or non-governmental Tuberculosis treatment facility for accurate diagnosis and initiation of Tuberculosis chemotherapy. The costs of patients and their families that can be quantified are principally in the form of –

Direct costs: Out of pocket expenditures of the patients and their family directly related to the treatment of Tuberculosis defined as direct costs. Again direct costs can be categorized as *medical costs* and *non-medical costs*. Money spent on the consultation fees, investigations, medicines and hospitalization fees if required were classified as *medical direct costs*. On the other hand, money spent on travel to health facilities, lodging, food during travel, special food and expenditure involved for the person accompanying or took care the patient were classified as *non-medical direct costs* (Rajeswari et al., 1999). Both medical and non-medical cost can be occurred during pre treatment and during the Tuberculosis treatment period.

Indirect costs: Lost of earnings from loss of work due to illness or death, decreased earning ability due to illness or long-term disability which caused the patient to change their profession to a lower waged work was classified as indirect costs (Rajeswari et al., 1999). Moreover, the productivity or earning loss by the caregivers is also a part of indirect costs. As with direct costs, indirect costs can be occurred in both pre and during treatment period.

Total cost: Total cost is the sum of direct and indirect expenditures incurred by the patients and their care givers during the whole span of the disease. In addition to these direct treatment and indirect costs, Tuberculosis also imposes intangible costs or consequences in the form of pain, suffering, grief and discrimination.

So, to understand fully the impact of Tuberculosis on the well-being of a nation, the costs to the public health services as well as the costs borne by the individuals, households and communities must be examined. The costs borne by the family will be considered both in the form of direct and indirect. Total costs will cover the expenditure incurred under direct and indirect costs. However, defining and comparing the different costs born by patient's family in the reviewed studies is not so easy as because there were major differences among studies regarding inclusion and exclusion criteria of cases, first contacted health facility and the time covered in the costing calculation. So it is important to discus different factors and criteria used by different authors, which might influence calculation of the amount of expenditure born by the patient and their family.

4.1.1. Criteria and factors influence different costs

Different studies used different case inclusion criteria. Out of 17 reviewed studies, nine of them included all forms of Tuberculosis cases (Aspler et al., 2008; Elamin et al., 2008; Muniyandi et al., 2005; Wyss et al., 2001; Kamolratankul et al., 1999; Croft et al., 1998; Needham et al.,1998; Balambal et al., 1997 and Nair et al., 1997), three studies included only new smear positive pulmonary Tuberculosis cases (Rajeswari et al., 1999; Chand et al., 2004 and Lambert et al., 2005a), and one study included only new Tuberculosis cases (Kemp et al., 2007). The remaining four studies did not specify any inclusion criteria for Tuberculosis cases (Floyd et al., 1997; Simwaka et al., 2007; Peabody et al., 2005; Bevan, 1997) because those studies reviewed the overall country programmes. There were also some exceptional issues. For example, one study included all Tuberculosis cases under treatment for 6-10 weeks (Aspler et al., 2008), one included only new cases whose treatment were started within 5 days of diagnosis and were in the intensive phase of treatment (Kemp et al., 2007), one included all cases with a treatment period of 8-12 months (Wyss et al., 2001), one included only treatment completed Tuberculosis cases (Muniyandi et al., 2005), another one included only new smear positive cases under treatment for 2-6 months (Rajeswari et al., 1999), lastly one included all cases whose treatment was completed in only one month (Croft et al., 1998). The remaining studies did not demonstrate any exceptional criteria. The study exclusion criteria regarding age also varied in different studies. Most of the studies excluded cases below the age of 15 year s (Muniyandi et al., 2005; Rajeswari et al., 1999; Elamin et al., 2008 and Lambert et al., 2005a), two excluded cases below the age of 18 years (Sarmiento et al., 2006; Needham et al., 2004), and one study excluded the re-treatment cases (Muniyandi et al., 2005) but other studies did not noted any specific exclusion criteria.

The treatment strategies of different countries and the geographical setting of studies were related to the economic consequences for Tuberculosis patients and their families. Different countries had different treatment strategies. In the reviewed studies, three countries implemented rural clinic centered, community based, directly observed short course treatments (DOTS) (Aspler et al., 2008; Rajeswari et al., 1999 and Lambert et al., 2005a), four countries implemented community based DOTS (Kemp et al., 2007; Wyss et al., 2001; Muniyandi et al., 2005 and Floyd et al., 1997), five countries implemented hospital centered DOTS (Croft et al., 1998; Kamolratankul et al., 1999; Balambal et al., 1997; Elamin et al., 2008 and Bevan, 1997), two countries implemented Tuberculosis clinic (specialized hospital) based DOTS (Chand et al., 2004 and Needham et al.,1998) and one country implemented NGO facility centered community based DOTS (Nair et al., 1997). Though the strategies are different, but in most cases except community based programmes, patients needed to travel a short to long distance monthly or quarterly to collect medicines from designated health facilities. For example, a study in Tamil Nadu, India noted that the sick person sometimes needed to travel 25 km or more to reach the nearest health facility to collect the drugs (Rajeswari et al., 1999), This factor can cause a considerable amount of travel costs and time loss especially in rural areas of developing countries due to poor transport facilities. Sometimes hospital centered strategies also imposed a huge cost burden on patients due to inpatient care. For example, an urban study in Kenya found that patient must meet US$ 4 daily for inpatient care (Bevan, 1997). Furthermore, geographical setting of study areas also seemed to play an important role in relation to the economic burden due to availability of various types of health facilities in rural and urban settings. Seven studies were conducted in urban areas (Aspler et al., 2008; Kemp et al., 2007; Lambert et al., 2005a; Wyss et al., 2001; Needham et al.,1998; Bevan, 1997 and Nair et al., 1997), four in rural areas (Elamin et al., 2008; Muniyandi et al., 2005; Croft et al., 1998 and Floyd et al., 1997), another four in combined rural and urban areas (Chand et al., 2004; Rajeswari et al., 1999; Kamolratankul et al., 1999 and Balambal et al., 1997) and the remaining two were country programme review and treatment strategy comparison studies (Simwaka et al., 2007 and Peabody et al., 2005).

Official fees may add additional cost burdens to patients and their family, especially to the direct cost. One study cited registration fee for consultation, diagnostic fee for laboratory test and buying radiographic film from outside for conducting X-rays (Aspler et al., 2008). Two studies noted nominal registration fees at NGO clinic services but huge user fees to private for profit services (Rajeswari et al., 1999 and Nair et al., 1997). Another cited the prerequisite of pre-purchase of government subsidized health insurance or immediate payment of consultation fee as mandatory during registration at the Tuberculosis treatment clinic (Needham et al., 1998). Lastly, one study cited an inpatient care cost of about US$4 per day and a cost of syringe for injection of US$10 per month which patients had to pay (Bevan, 1997). Three studies noted unofficial fees charged for laboratory sputum tests, conducting X-rays and getting quick service (Wyss et al., 2001; Kamolratankul et al., 1999 and Croft et al., 1998).

The studies also applied different duration of cost calculations for the range of pretreatment to treatment completion of the patient. One study calculated the cost incurred by patients for the duration of pretreatment to diagnosis to the time of interview counting the intensive phase in between 6-10 weeks of treatment (Aspler et al., 2008). Two studies calculated the cost after reporting to hospital or clinic for diagnosis and treatment (Elamin et al., 2008 and Kemp et al., 2007). Most of the six studies calculated the cost for full duration of pre-treatment to treatment completion (Simwaka et al., 2007; Muniyandi et al., 2005; Chand et al., 2004; Wyss et al., 2001; Kamolratankul et al., 1999 and Balambal et al., 1997). Five studies calculated the patient's cost for the period from pretreatment to diagnosis (Peabody et al., 2005; Rajeswari et al., 1999; Croft et al., 1998; Needham et al., 1998 and Nair et al., 1997). One study only calculated pre-treatment medical costs (Lambert et al., 2005a). Another study calculated only the costs incurred during treatment (Bevan, 1997). Another important factor, named accompanied person or caregiver's costs, also played an important role for indirect costs as well as the overall cost burden. Most of the studies did not included the care giver's cost in calculating indirect as well as total costs (Aspler et al., 2008; Elamin et al., 2008; Simwaka et al., 2007; Muniyandi et al., 2005; Chand et al., 2004; Rajeswari et al., 1999; Croft et al., 1998; Needham et al., 1998; Bevan, 1997; Balambal et al., 1997 and Nair et al., 1997). Only two studies included the caregivers in calculating the total cost burden (Kemp et al., 2007 and Wyss et al., 2001). Another study did not consider either patient's transport or caregiver's cost (Kamolratankul et al., 1999). Another did not calculated unemployed patient's time loss because it was considered difficult to price and convert to monetary form (Rajeswari et al., 1999). Finally, three studies did not include the cost of working time lost by patients i.e. indirect cost to calculate overall cost (Peabody et al., 2005; Lambert et al., 2005a and Bevan, 1997).

The mode of cost calculation was also defined in various ways in different studies. Most studies calculated the cost as a specific amount presented by 'mean' values (Elamin et al., 2008; Kemp et al., 2007; Simwaka et al., 2007; Peabody et al., 2005; Chand et al., 2004; Rajeswari et al., 1999; Kamolratankul et al., 1999; Croft et al., 1998; Bevan, 1997; Floyd et al., 1997; Balambal et al., 1997 and Nair et al., 1997), only two studies used the 'median' values (Aspler et al., 2008 and Lambert et al., 2005a) and one study represented the cost by the inter-quartile range such as the transportation cost was between US$13 and US$20 (Wyss et al., 2001). Two studies presented the cost in both 'median' and 'mean' values (Muniyandi et al., 2005 and Needham et al., 1998).

Factors such as categories of health providers first visited by the patient, economic status of patient such as poor / non-poor, sputum smear status of patient, and mechanism of health expenditure payment by patients might influence the cost burden which also varied in the studies. Most studies noted that the cost incurred by patients depended on the type of health facility visited by them before diagnosis i.e. pretreatment period (Peabody et al., 2005; Lambert et al., 2005a; Rajeswari et al., 1999; Kamolratankul et al., 1999; Croft et al., 1998; Balambal et al., 1997 and Nair et al., 1997). For example, a study in Bolivia noted that cost if first contact was to a private qualified practitioner was higher than to other contacts: US$21.9 vs. US$5.4 respectively (Lambert et al., 2005a). Another study in the Philippines found that private hospital was more costly of US$111.97 than the government and other health centers of US$11.32 (Peabody et al., 2005).

Three studies noted that the poor spent less as a gross amount than the rich for treatment but in terms of percentage of monthly income the poor spent a higher amount than the rich (Kemp et al., 2007; Simwaka et al., 2007 and Muniyandi et al., 2005). For example, a study in Malawi found that the percentage of monthly income spent for Tuberculosis treatment by poor and rich were 248 and 124 per cent respectively (Simwaka et al., 2007). Another three studies found that the mechanism of health cost payment e.g. prepaid insurance, government health card or direct payment had an influence on the cost burden (Needham et al., 1998; Kamolratankul et al., 1999 and Bevan, 1997). Two studies showed that rural patients had lower costs than urban and this was the case for both direct and indirect costs (Rajeswari et al., 1999 and Balambal et al., 1997).

Patient's pre-treatment smear status also was a factor in relation to the cost burden as found in two studies (Aspler et al., 2008 and Kemp et al., 2007). For example, the Malawi study noted that smear-negative patients faced higher direct costs, as they had to visit health facilities more often before obtaining a diagnosis. On the other hand, smear-positive patients lost more days from work due to illness, even though they had fewer visits. The study also noted that smear positive patients spent of US$9.14 against smear negative patients of US$17.20 as direct cost (Kemp et al., 2007). Another study in Nicaragua found the reverse scenario. The study noted that a smear negative patient spent an average US$11.7 against a smear positive patient of US$12.5, though the difference was not statistically significant (Macq et al., 2004). Only one study in Malaysia found that times travelled to hospital for drug collection drastically influenced the cost burden (Elamin et al., 2008).

4.2. Direct cost

Tuberculosis has the potential to impose both direct and indirect financial losses to individual patients and their families. For most people in most countries, including the middle classes, health-seeking behaviour is affected by economic considerations and social costs. The patient incurs direct financial costs in the form of increased personal and/or household expenditure when he or she decides to seek treatment from health facilities. These expenditures most notably come through out-of-pocket for consultation fees of the health providers, medicines, diagnoses and travel of both patient and the caregivers. As noted earlier, direct costs involved with Tuberculosis treatment can be divided into medical and non-medical expenditure. The direct treatment costs of Tuberculosis borne by the patients and their families are often underestimated because only the costs of the public health system are measured. However, the public health system costs sometimes may be the smallest component of total treatment costs. For example, the study in rural Uganda reported only US$95 as health service expenditure in comparison to US$229 as costs borne by the patient and their family (Saunderson, 1995).

Some studies have been done in developing as well as medium developed countries and these reviewed patient-related costs and their consequences. Studies noted the associated factors related to various costs and consequences such as economic status, gender, first contacted health facility, country treatment mechanism and mechanism of treatment cost payment. The amount of cost varies in different settings. Lists of the reviewed studies according to the year of publications are noted in *Table-4.1*.

Table 4.1: Studies reviewed to analyze different costs (in US$) and cosequences related to Tuberculosis episode

Year	Authors	Country	No. of patients	Mode	Direct cost ($)	Indirect cost ($)	Total cost ($)
2008	Aspler A et al.	Zambia (urban)	103 (all cases)	Median	9.34	15.44	24.78
2008	Elamin EI et al.	Malaysia (rural)	201 (all cases)	Mean	608.12	118.78	726.90
2007	Kemp JR et al.	Malawi (urban)	179 (new cases)	Mean	13.16	15.81	28.87
2007	Simwaka BN et al.	Malawi (review)	-	Mean	12.44	15.81	28.25
2005	Muniyandi M et al.	India (rural)	343 (all new cases)	Mean Median	24.47 9.78	39.47 0	63.93 20.36
2005	Peabody JW et al.	Philippines (comparison)	-	Mean	-	-	60.38
2005a	Lambert ML et al.	Bolivia (urban)	144 (new smear +ve cases)	Median	13.2	-	-
2004	Chand N et al.	India (rural & urban)	200 (new smear +ve cases)	Mean	40	90.50	130.50
2001	Wyss K et al.	Tanzania (urban)	191 (all cases)	Mean	32.4-72.5	153.8-1384.1	186.2-1456.6
1999	Rajeswari R et al.	India (rural & urban)	304 (new smear +ve cases)	Mean	58.63	112.4	171.03
1999	Kamolratankul P et al.	Thailand (rural & urban)	673 (all cases)	Mean	114.26	75.58	189.84
1998	Croft RA et al.	Bangladesh (rural)	21 (all cases)	Mean	130.25	115	245.25
1998	Needham DM et al.	Zambia (urban)	202 (all cases)	Mean Median	55.5 25.5	73.5 40.5	129 66
1997	Bevan E	Kenya (urban)	-	Mean	290	-	-
1997	Floyd K et al.	South Africa (rural)	100 (new smear +ve cases)	Mean	91.60	-	-
1997	Balambal et al.	India (rural & urban)	304 (all cases)	Mean	50.18	107.74	157.92
1997	Nair DM et al.	India (urban)	16 (all cases)	Mean	111	44	155

Surprisingly the highest mean direct costs of US$608.12 were reported in Malaysia a medium developed country (Elamin et al., 2008). The second highest costs were in

Kenya a high Tuberculosis prevalent developing country (Bevan, 1997). Factors associated with that surprising cost burden to Tuberculosis patients were 'transportation cost', 'food cost' and 'cost of medical care'. In case of Malaysia, the transportation and food costs were a huge amount of US$516.87 and US$91.25 respectively because patients underwent hospital based directly observed short-course therapy and therefore they had to make frequent visits either daily or twice weekly to the hospital to receive their medicine to continue the treatment. Similarly transportation and inpatient care cost to the designated hospital imposed a cost burden on the Kenyan patients as because they had to spend US$4 and US$1 daily for inpatient care and travel respectively. The lowest median direct cost of US$9.34 was reported in Zambia. This was mainly because of community based urban programmes. Pulmonary Tuberculosis cases had a median higher direct expenditure than extra-pulmonary cases of US$27.38 and US$17.34 respectively (Aspler et al., 2008). The rest of the reviewed studies can be divided into three direct cost groups of US$130-91.60 (Kamolratankul et al., 1999; Croft et al., 1998; Nair et al., 1997 and Floyd et al., 1997), US$58.63-32.4 (Chand et al., 2004; Wyss et al., 2001; Rajeswari et al., 1999; Needham et al., 1998 and Balambal et al., 1997) and US$24.47-12.44 (Simwaka et al., 2007; Kemp et al., 2007; Muniyandi et al., 2005 and Lambert et al., 2005a) according to the cost incurred by patients and their family during the whole diseased period as shown in *Table-4.1*.

4.2.1. Factors influencing direct cost

Factors which influenced the high direct treatment costs for patients and their families were the longer pre-treatment period as it often took more than a month before the final diagnosis was made. Only about one-half of Tuberculosis patients are diagnosed at the first source of treatment or care. So the rest are forced to shop around for diagnosis and treatment before contacting a recognized Tuberculosis treatment facility. For example, a study of adult Tuberculosis patients in Thailand noted that the delay between the onset of illness and diagnosis of Tuberculosis was 61 to 67 days, even though one-third of patients had sought care during that time at government hospitals (Karnolratanakul et al, 1999). Some other factors such as the type of health provider first visited, diagnostic tools such as extensive use of X-ray in pretreatment period, frequent traveling to the health facility before and during treatment, expensive nutritional supplementations and different socio-demographic factors of the studied population also responsible for high direct cost burden as found in the reviewed studies.

Most studies also found that direct costs were mainly incurred by patients during pretreatment period with the exception of Malaysia and Malawi study because both those studies calculated the cost incurred by the patient after reporting to the recognized Tuberculosis treatment unit as noted in *Annex-4.1*. Both the Malaysia and Kenyan studies were conducted after the patient reported to the Tuberculosis treatment facility i.e. diagnosis to treatment period and they had to travel daily or twice a week to collect medicine from the respective health facility. In the Zambian study non-medical cost was high due to frequent traveling of patients including accompanied persons in order to contact the desired health facilities before treatment. However, these kinds of information were not available for other country studies.

4.3. Indirect cost

Sickness especially Tuberculosis can also result in various indirect financial costs, i.e. the associated financial and non-financial losses due to the lack of current income. Indirect costs are incurred both by the patient and the caregivers, and other people in the household may be required to work more or to devote time to the care of the ill household member. Indirect costs thus refer to the value of the resources lost, including reduced levels of work output and loss of productivity resulting from the inability to work or from a change of employment. The cost of care provided by relatives and friends may be direct, if it is reimbursed, but mostly indirect in the form of time spent by household members on care rather than at work. These 'time costs' may represent a significant fraction of the total cost of illness.

Indirect costs can be due to loss of wages during illness, decreased earning ability due to illness or long term disability that forced adjustment to a lower wage earning occupation. Lost earnings resulting from Tuberculosis and death are commonly much greater in total than the direct costs of treatment. Costs arise from the loss of work days or a reduction of productivity due to illness imposes a huge burden for individual Tuberculosis patients and their families. For example, a study in rural Uganda noted that 70 percent of the costs to patients and their families are from lost work time (Saunderson, 1995). Another study in India also found that the average number of work days lost was 83 days. The distribution of work days lost was 48 days before treatment and 35 days during treatment (Rajeswari et al, 1999). Further losses result from earlier mortality due to Tuberculosis. For example, one study showed an average of 15 years of income lost due to the death of the patients from Tuberculosis (WHO, 2000d).

The highest mean minimum indirect cost of US$153.8 was documented in Tanzania a high endemic country (Wyss et al., 2001). But surprisingly, the second highest indirect cost of US$118.78 was in Malaysia an almost developed medium prevalence country (Elamin et al., 2008). Patient's inability to perform their normal activity and loss of time caused by the need to travel frequently to treatment facilities were the main contributor for this huge amount of indirect cost. For example, the study in Tanzania noted that the average decrease of the principal daily activity was 74 percent of one person's working capacity. The lowest mean indirect cost of US$15.44 was found in Zambia a high endemic country study (Aspler et al., 2008) and the second lowest indirect cost of US$15.81 was revealed in the study of Malawi (Kemp et al., 2007). Patients' have to travel less to collect medicine as a consequence of community based directly observed treatment was the main contributor to this lower indirect cost. The rest of the reviewed studies can be divided into three groups of US$115-107.74 (Rajeswari et al., 1999; Croft et al., 1998 and Balambal et al., 1997), US$90.50-73.5 (Chand et al., 2004; Kamolratankul et al., 1999 and Needham et al., 1998) and US$44.0-39.47 (Muniyandi et al., 2005 and Nair et al., 1997) according to the amount of found indirect costs shown in *Table-4.1*.

4.3.1. Factors influencing indirect costs

Factors influencing the high indirect treatment costs for patients and their families were mainly the different treatment strategies implemented in different countries. Patients were bound to spent lot of their wage earning time to travel to collect medicine when a clinic or hospital based treatment strategy was implemented and therefore had a higher indirect cost than in community based strategy countries. For example, Malaysian patients had the highest indirect cost in consequence of frequent travel to the treatment facility.

4.4: Total cost

Total cost is the combination of direct cost and indirect cost which varies in different settings. Surprisingly, the highest mean total costs of US$726.90 were reported from a medium developed medium endemic country, Malaysia (Elamin et al., 2008). However, the second highest total costs of US$245.25 were reported in a high endemic country, Bangladesh as expected (Croft et al., 1998). On the other hand, the lowest mean total costs of US$24.78 and second lowest of US$28.87 were reported in two high endemic countries, Zambia (Aspler et al., 2008) and Malawi (Kemp et al., 2007) respectively. Most of the studies, whether investigating medium or high endemic countries, reported a mean total cost within the range of US$189.84-155 (Wyss et al., 2001; Kamolratankul et al., 1999; Rajeswari et al., 1999; Balambal et al., 1997 and Nair et al., 1997). Another group reported a mean total cost within the range of US$130.50-129 (Chand et al., 2004 and Needham et al., 1998) and last group reported of US$63.93-60.38 (Muniyandi et al., 2005 and Peabody et al., 2005). There was no consistent pattern with regard to the relative contributions of direct costs and indirect cost to the total costs. The main contribution of direct cost to total cost was in Malaysia (Elamin et al., 2008), Bangladesh (Croft et al., 1998), Thailand (Kamolratankul et al., 1999) and India (Nair et al., 1997). The main contribution to total cost was identified as the indirect cost in the three studies of India (Rajeswari et al., 1999; Balambal et al., 1997 and Chand et al., 2004), one study of Tanzania (Wyss et al., 2001) and Zambia (Needham et al., 1998), and another study in India (Muniyandi et al., 2005). Some studies reported a nearly equal contribution of direct and indirect cost to the total cost such as the study in Malawi (Kemp et al., 2007) and Zambia (Aspler et al., 2008). Unfortunately, this kind of information was not available for remaining studies.

4.5. Other Individual and family consequences

The consequences of Tuberculosis are both monetary and psychological and relate to either or both of direct treatment expenditure and loss of working ability and discrimination against those with Tuberculosis and members of their households. Family and friends may reject Tuberculosis patients, they may receive less social support during treatment, or they may lose their jobs. For example, a study in India reported that a total of 15 percent of rural patients and 11 percent of urban patients were not well accepted because of their Tuberculosis disease and not treated well by family members (Rajeswari et al, 1999). Monetary and psychological consequences sometime differed between male and female patients. Some studies also noted the sufferings of the children of the diseased family.

4.5.1. General consequences

The general consequences of Tuberculosis on patients and their families was the financial loss due to either inability to work of the patient or reducing working time of patient and the caregivers. A study in Philippines found that a male and female Tuberculosis patient lost earnings of US$8.15 and US$3.90 per day respectively. The annual income lost due to Tuberculosis morbidity is over approximately US$108 million per year, when these losses are aggregated at the national level (Peabody et al., 2005). An average of 15 years of income is lost due to an individual patient's premature death from the disease (Geethamani et al., 2001). Another Philippine study calculated annual income lost of approximately US$32 million due to premature mortality from Tuberculosis at the national level (Peabody et al., 2005).

Different studies found the general consequences of Tuberculosis on patients and their families in different ways. Some studies noted the work days and earnings lost due to Tuberculosis, while some others noted the percentage of income lost on account of Tuberculosis. A Malawi study reported that patients spent on average US$13 to access diagnosis, which equates to 18 days of income. In addition patients lost an average of 22 days from work, resulting in an average income loss of US$16 (Kemp et al., 2007). An Indian study reported the mean number of 88 work days lost and means debts total of US$48.53 (Chand et al., 2004). Another Indian study reported average workdays lost of 83-82 for males and 85 for females of which 48 were lost during pre-treatment period and the remaining during treatment period (Balambal et al., 1997). A recent Malaysia study noted that the average time away from work was 14.15 days with a range from 0 to 84 days and the average money lost per patient was US$118.78 (Elamin et al., 2008). A study in Tamilnadu, India calculated the average number of work days lost as 83 days with 48 days before treatment and 35 days during treatment. This study also reported indirect costs of US$ 112 for the 159 employed patients which were 26 percent of annual family income. Indirect costs were higher in comparison to direct costs for both rural and urban patients. Both costs were higher among urban patients (Rajeswari et al, 1999).

The proportion of different costs in relation to annual family income was computed in some studies. A Zambian study reported the median total patient costs of $24.78 for diagnosis and 2 months of patient treatment was equivalent to 47.8 percent of patients' median monthly income (Aspler et al., 2008). A study in Tamilnadu, India reported the proportion of various costs in relation to annual family income of 13 percent for direct costs, 26 percent for indirect costs, 40 percent for total cost, and 14 percent for debts (Rajeswari et al, 1999). Another study in Tamilnadu, India also reported the proportion of total cost in relation to annual family income. This proportion was 19 percent and 10 percent among patients whose income was below the poverty line and whose income was above the poverty line respectively. During treatment 12 percent of patients lost more than 60 workdays while 26 percent of patients lost less than 30 days of working time. However 88 percent of patients returned to work at the end of treatment (Muniyandi et al., 2005). A rural study in Bangladesh reported that the patients lost a mean of 14 months of work time during pre-treatment period with a range from 5 days to 5 years. The resulting the loss of income had a mean of US$ 115 with a range of US$ 0 to 500. The mean was equal to one-third of annual household income in Bangladesh. The average total loss of income and expenditure of US$245 represented nearly 4 months of family income (Croft et al., 1998).

Some studies also reported on the working inability of the Tuberculosis patients. A study in urban Zambia reported that 31 percent of patients had stopped working due to Tuberculosis. Among these patients, the mean number of days off work was 48 with a range of 2 to 270 days, which created financial problems in the case of 70 percent of patients (Needham et al, 1998). The Uganda study found that 80 percent of wage earners had stopped work because of their disease and 95 percent of subsistence farmers reported that production had decreased due to their reduced capacity for work. The average time lost from normal activities was 9.5 months with a range of a week to 3 years and the average income lost from inability to work was US$ 161 or 89 percent of GDP per capita (Saunderson, 1995). On the other hand, a study in Thailand found much smaller income reductions averaging 5 percent for poor households, 2.3 percent for households with an income between poverty and the national average, and 3.3 percent for households with an income above the national average (Karnolratanakul et al, 1999). Another study in urban Zambia found that more than 90 percent of patients lost working time when they had worked before the onset of disease and 31 percent of patients had stopped working due to Tuberculosis. Tuberculosis caused on average 18 work days lost before diagnosis and overall 48 days with a range of 2 to 270 days. During this lost work time, 35 percent of employed patients did not receive full sick pay, 87 percent of self-employed patients lost income, while 70 percent of patients faced financial problems as a result of Tuberculosis (Needham et al, 1998). A study in Dar es Salaam, Tanzania found that the average decrease of the principal daily activity was 74 percent and reduction of personal working capacity was 4 months, 8 months and 12 months for low, middle and higher income groups respectively (Wyss et al, 2001).

The number of work days lost has a relation to age, literacy, occupation type, personal income and region. For example, among rural patients the number of mean days lost was lowest at 61 days for patients aged 15–25 years, while it was 94 days for those aged 26–45 years and a maximum of 105 days for patients aged 46 years or more as found in a Tamilnadu, India study. Considering the number of work days lost among rural and urban patients of different occupations, the loss was highest among rural wage earners (Rajeswari et al, 1999). A Malawi study also reported the direct and opportunity costs faced by the poor of US$15 initially appeared to be around three times less than those faced by the non-poor of US$48. The poor spent less on fees, transport and food, and had lower levels of opportunity costs. However, the poor were affected twice as much as the non-poor in relation to total income because the poor spent 244 percent of their total monthly income after a Tuberculosis diagnosis, compared with 129 percent for the non-poor. The study noted that the poor must work for 2.5 months to recover the loss (Kemp et al., 2007). Another Malawi study noted that the costs of seeking Tuberculosis treatment were higher for poor women and men of 240 percent of monthly income in comparison with 126 percent of monthly income for the non-poor (Simwaka et al., 2007).

Literacy, as judged by the years of schooling and geographical distribution of patients had an inverse correlation with the number of work days lost due to Tuberculosis. The study in Tamilnadu, India reported that the lowest working day total lost of 54 days was among urban patients with more than 8 years of schooling. The loss of work days varied from 60 to 75 days irrespective of the type of occupation. The impact was felt more among rural illiterates of 111 days than among rural literates with 8 years or more of schooling of 47 days. The loss of work of 102 days was considerable for rural patients with a personal income of less than US$14.29 (Rajeswari et al., 1999). Another Indian study also noted that the elderly rural illiterates lost maximum of 111 working days. The total treatment and indirect costs of US$102 were 1.2 times more among urban patients as compared to rural patients (Balambal et al., 1997). A study in Tanzania found that total patient costs of US$68 were higher in rural areas in comparison to urban areas of US$58 due to greater transportation expenditures for rural patients (Needham et al., 1998).

Some studies considered the psychological and social costs caused by Tuberculosis. A study in India reported that 33 percent of both the rural and urban patients expressed mental anguish on account of the economic impact of Tuberculosis (Rajeswari et al, 1999). Another Indian study also noted that 69 percent of patients in rural and 67 percent in urban areas expressed mental agony arising from the economic impact and lack of attention by family members (Balambal et al., 1997). Only two studies noted care givers' financial lost. One study in Tanzania reported a projected loss of 29 percent of the working time of one person per patient (Wyss et al, 2001). A Zambian study also reported that the care-givers took time off work to assist about 30 percent of patients. Although few work days were lost, financial problems resulted for approximately half of the care-givers (Needham et al., 1998).

4.5.2. Gender based consequences

Tuberculosis also influences the medical expenditure, work day lost and mental sufferings of male and female patients differently in different socio-demographic settings. A recent study in Zambia noted that women had less total expenditure of US$22.99 than men of US$26.73. On the other hand total direct costs were 92 percent higher for women than for men, when these were expressed as a proportion of median individual income. This is largely a reflection of the lower median wages earned by women of $5.10 compared to $77.82 for males (Aspler et al., 2008). A study in South America reported that the median expenditure of US$17 for the male patients was higher than that for the female of US$11, though the difference was not statistically significant (Lambert et al., 2005a). Another Malawi study found that the men's direct costs of US$ 13 were higher than women's of US$ 12, although the difference is not statistically significant (Kemp et al., 2007). Some other studies also reported the opposite scenario. An Indian study reported that the overall total costs for female patients of US$27.6 were higher than male patients of US$17.5 (Muniyandi et al., 2005). Another Tamilnadu, India study found that the direct cost incurred by female patients was US$65.3 compared to US$54.3 for males (Rajeswari et al., 1999). Gender difference was expressed in terms of working day and income lost in few studies. A study in the Philippines noted that male patients lost earning of US$8.15 and female patients lost US$3.90 per day (Peabody et al., 2005). A Tamilnadu, India study also reported the average number of work days lost was 83 days with 82 days were for females and 85 days for males (Rajeswari et al, 1999). Another study reported the opposite scenario. The urban Zambian study reported that the female patients incurred greater lost income at US$65 than male patients at US$44, possibly due to more lost work of 51 vs. 32 days (Needham et al., 1998). However, this kind of information was not available for other studies.

Tuberculosis also reduced female patients' ability to care for their children, and to perform routine household activities. A study in Tamilnadu, India reported that female Tuberculosis patients' ability to carry out household activities such as cooking, cleaning, washing, and serving food reduced in a range from 79 to 38 percent after diagnosis. Also child care decreased in a range from 69 percent to 34 percent. Moreover, 69 percent of rural females avoided discussing their illness with neighbours (Rajeswari et al, 1999). Tuberculosis reduced female patients' activities by at least 30 percent in urban areas and more than 35 percent in rural areas. Most female patients avoid discussing their illness with neighbours (Balambal et al., 1997). Sixty nine percent of rural women could not discuss the disease with their neighbours as reported in another Indian study (Ramachandran et al, 1997). Another study noted that Tuberculosis in women affected child care ability more than other household activities such as cooking, cleaning, washing and serving food. Child care fell from in a range from 64 percent to 35 percent for rural mothers and from 74 percent to 33 percent for urban female patients (Geetharamani et al., 2001). Women reported more than 70 percent of their activities being replaced by someone else especially a female child compared with only 30 percent of the men reported such replacement in a Malawi study (Kemp et al., 2007).

Discrimination, either experienced or expected, has been found to be associated with increased anxiety and depression and lower life satisfaction, as well as with higher unemployment and lower income among Tuberculosis patients (Markowitz, 1998). A study in urban Bombay, India reported that male patients worried about loss of wages, financial difficulties, reduced capacity for work, poor job performance and the consequences of long absence from work. On the other hand women were concerned and anxious about rejection by husband, harassment by in-laws and the reduced chances of marriage for single women, in addition to concerns about dismissal from work. Married female patients reported that they tried to keep their condition secret, often unsuccessfully (Nair et al., 1997). Such concerns were also well documented in some other studies carried out in India. According to a study in Tamilnadu, India, 93 percent of men reported that their family had accepted their disease in comparison to 82 percent of women especially in rural areas. Women also suffered more adverse reactions or outright rejection of 14 percent against the 4 percent of men and the situation in urban areas was more unpleasant (Ramachandran et al, 1997). Another study carried out in India, reported that 15 percent i.e. yearly more than 100,000 of rural and urban female patients faced rejection by their families (Rajeswari et al, 1999). Another Indian study also noted that 8 percent of both rural and urban female patients faced rejection by their families (Chand et al., 2004). Discrimination against Tuberculosis patients has sometimes taken particularly damaging forms, such as divorce or lowered prospects of marriage. A survey carried out in West Bengal, India found that almost 80 percent of respondents would not negotiate the marriage of their son or daughter to an ex-Tuberculosis patient (Geetakrishnan et al, 1988). Also studies in India and Pakistan found that married women with Tuberculosis were more likely to be divorced than other women and unmarried girls with Tuberculosis would find it difficult or impossible to get married (Liefooghe et al, 1995). Such discrimination represents significant costs because the economic prospects and social status of divorced or unmarriageable women in many societies are miserable.

4.5.3. Consequences on children

Tuberculosis had also a considerable impact on patients' households in terms of health, education and nutrition, particularly if the patient was a wage earner. This impact was especially visible in schoolchildren in terms of discontinuing their education or move to an urban area to find a job or both. Girls, in particular, are often taken out of school in order to help at home, care for sick relatives or find paid work outside the home. A study in India found that 34 percent of patients could not afford to buy adequate food or clothing or books for the children due to loss of income. Eleven percent i.e. around 300,000 children aged 6 to 16 years of Tuberculosis patients had discontinued school as a result of the burden caused by the parent's illness with a variation of 8 percent at rural and 13 percent at urban areas. Furthermore, 8 percent children took up employment to support their family (Rajeswari et al, 1999). A similar study in India among 276 children of 167 Tuberculosis parents found that the child caring on the part of mothers fell in ranges from 64 percent to 35 percent for rural females and from 74 percent to 33 percent for urban females. Moreover, 58 percent of female patients were unable to feed their child or look after their daily needs and their education. In addition, 34 percent of study parents could not buy school books or adequate food because of loss of income and 8 percent of the children were obliged to take up some employment in order to supplement the family income. Overall 20 percent of the children were affected one way or the other and 81 percent of them were children of male patients (Geetharamani, 2001).

Some other studies also reported the consequences of Tuberculosis for children. A recent Malawi study noted that the working time lost by the patients' was replaced by their children. Overall 12.7 percent of all activities were replaced by the children and mostly by the female children. Among female patients, female children had replaced their activities for 65 days, with possibly discontinuation from school (Kemp et al., 2007). An Indian study reported that 12 percent of schoolchildren discontinued their studies and 7 percent of them took up employment to support their family (Chand et al., 2004). Another Indian study also found that more than 50 percent of patients expressed their inability to attend to the needs of their children. About 12 percent of children discontinued studies and another 8 percent took up employment to support the family. Most of them were children of male patients (Balambal et al., 1997). In these circumstances, children may never return to school and will be permanently disadvantaged for the rest of their lives. Moreover, Tuberculosis or death of an adult especially mother or father can increase the morbidity or mortality of the children. In Matlab, Bangladesh, a father's death was associated with an increase in male and female child mortality of six per 1000. On the other hand, a mother's death was associated with increases in male child mortality of 50 per 1000 and female child mortality of 144 per 1000 (Over et al. 1992).

4.6. Household coping strategies

Households face substantial immediate costs of diagnosis, treatment, loss of earnings and household work due to Tuberculosis. The financial burden may lead patients and their households to follow a range of possibilities open to them depending on their social and economic position and capabilities to organize, i.e., the 'entitlements' or 'commodity bundles' they have to cope with the shock. Families cope with the burden of these costs in a number of ways like spending own cash or savings, borrowing money from friends and families, taking different kind of loans, grants, sale or mortgage assets, reduced food consumption, withdrawing children from school, engaging family members in work and expelling individual sufferer from household. Many of these coping strategies reduce the future opportunities of household members, in particular children. Reduction of food consumption may decrease nutritional status as well as increase the risk of infection by Tuberculosis and other diseases. Also withdrawal of children from school to save on school expenditures may jeopardize the future prospects of the child as well as the nation. Borrowing and selling productive assets may increase the household vulnerability as the patients never fully recover their past productivity and the household often enters a long-term debt cycle. On the other hand, expelling Tuberculosis patients especially females from the household may increase social problems.

Coping strategies open to a family depended to some extent on the social organization of the society where they lived. Households' ability to cope with a shock depended on its asset portfolio including tangible assets such as physical and financial capital, less tangible assets such as human capital like education, and social resources. Social networks can be used to obtain other resources, particularly information, opportunities, and support. Social resources include kin and friendship networks, links to influential contacts, and membership in organizations such as credit lending associations. Evidence from developing countries noted that social networks are one of the most important resources mobilized by households to obtain money to pay for treatment costs (Russell, 1996). However, the poor have a more limited set of coping strategies because often the only asset they have to sell is their physical labour. One study suggested that the poorest have the weakest social resources and are more likely to be excluded from inter-household community support mechanisms (Sauerborn et al., 1996). Children of the poor households are more likely to be withdrawn from school in the event of illness of a parent to support them financially.

Tuberculosis related studies have observed a number of coping strategies in households afflicted by Tuberculosis. The most common coping mechanism of money inflow as temporary support from family members and friends or borrowing from others was described in different studies. A study in Zambia reported that 61 percent of patients received financial assistance from family members outside their household during their illness. The mean assistance received represented approximately 40 percent of the total cost of the disease to patients (Needham et al., 1998). Similarly, a study in Thailand noted that 20 percent of patients used transfer payments from relatives, another 20 percent used their own savings and 10 percent took out loans (Karnolratanakul et al. 1999). A study in India also found that 71 percent of patients had borrowed money on account of Tuberculosis and 50 percent of patients had borrowed more than US$ 44 to meet their required family expenses (Muniyandi et al, 2005).

A Tamilnadu, India study noted that 67 percent of rural and 75 percent of urban patients borrowed money to meet the expenditure involved in diagnosis and treatment of the disease. The average debt incurred as a result of the disease was US$ 40 for rural and US$ 79 for urban patients. The average amount was US$ 59 which was equal to 35 percent of the total household cost (Rajeswari et al, 1999). Some other Indian studies also reported that patients incurred average debts of US$61.15 and that urban patients had much higher debts than rural patients (Balambal et al., 1997) and another mean debts was of US$48.53 (Chand et al., 2004). Another study in India found that 20 percent of rural patients and 40 percent of urban patients went into debt as a result of expenses due to Tuberculosis (Uplekar et al. 1998). The average amount borrowed was US$ 59 equivalent to 12 percent of annual household income (Ramachandran et al. 1997) reported in another study. Another small study in Bangladesh reported that 14 percent of patients took out a loan to meet the treatment cost before enrolment in the public treatment facility (Croft et al., 1998).

Another common coping mechanism adopted by the Tuberculosis patients and their families especially the poor who had less ability to mobilize the external resources or social networks was reported in some reviewed studies. A study in Thailand reported that 16 percent of the poor sold assets mostly land in comparison with just over 7 percent of non-poor households to cope with the illness-related expenditures and income reductions (Karnolratanakul et al. 1999). A small study in Bangladesh reported that 40 percent of patients raised money by selling land or livestock to meet the treatment cost before enrolled the public treatment facility (Croft et al., 1998). Another Bangladeshi study found that the initial response of households to a large medical expense is the sale of assets, followed by taking out consumption loans. These loans have very high interest and short repayment periods, which make the economic recovery of the household difficult (Pryer, 1989).

Another devastating coping mechanism that reduces short-term costs but has potentially adverse long-term consequences is the withdrawal of children from school. An Indian study reported that 11 percent of children with a variation of 8 percent in rural and 13 percent in urban dropped out of school and 8 percent of the them were obliged to take up some employment in order to supplement the income loss of the family (Geetharamani et al., 2001). A study in Tamilnadu, India also noted that 11 percent of Tuberculosis patient's children were withdrawn from school and 8 percent of them entered employment. Children were withdrawn from school more often in urban areas and if the patient was the father (Ramachandran et al. 1997). Another two Indian studies noted that 12 percent of schoolchildren discontinued their studies and an additional 7 percent took up employment to support their family (Chand et al., 2004). Also about 12 percent of children discontinued studies and another 8 percent took up employment to support the family (Balambal et al., 1997). In the Uganda study, five children from 32 families studied were withdrawn from school because their families could not afford the school fees (Saunderson, 1995). As noted above, this cost to households is rarely recognized in studies of the cost of Tuberculosis. Withdrawing children from school lowers the child's economic prospects and, if widespread, can have social consequences such as higher fertility and lower production.

Obtaining a replacement to supplement the patient's daily activities is also described in few studies. A Malawi study noted that 70 and 30 percent of the women's and men's activities were conducted by someone else. The time patients spent away from work was attributed to the person replacing them. Children replaced 12.7 percent of all activities of which most were female children (Kemp et al., 2007). Another Bangladeshi urban slum study noted the mechanisms of involvement of women in the work, merging households and moving families to rural areas (Pryer et al, 2003).

Changes in monthly consumption expenditure were noted as a coping strategy in one study. A study in Thailand reported significant increased expenditure for medical treatment, transportation and food, while expenditure for clothing and tobacco or alcohol was significantly reduced. At the same time total monthly expenditure significantly increased after the onset of illness (Karnolratanakul *et al.* 1999). It must be remembered that even when coping strategies mitigate the impact of Tuberculosis on an individual, the social and economic costs are borne by the family and community as a whole. Even if the income of the family does not fall because coping mechanisms have been used to compensate, a member becoming ill with Tuberculosis does reduce the welfare of the family.

Bangladesh has a high prevalence of pulmonary Tuberculosis and an incidence estimated at 101 smear positive new cases per 100,000 populations per year with an annual risk of infection of 2.14 percent. Government ministry of health services provided free treatment in partnership with non-governmental organizations (NGOs) through sub-district health facilities at rural areas and NGO clinics at urban areas since 1994 (NTP, 2007) but Tuberculosis patients still shop around for treatment especially to nearby private health care facilities before reporting to the recognized Tuberculosis treatment facilities. Sometimes patients might also need to pay an amount either as official fees to NGO facilities or un-official fees to public health facilities to enroll or accelerate the diagnosis and initiation of treatment. So it is important to access the amount of direct and indirect costs incurred by patients during pre-treatment and treatment periods so as to formulate the programme more effectively in order to reduce the economic sufferings of the patient and their families.

4.7. Bangladesh study

So far I found only one small scale study from electronic resources conducted in Bangladesh regarding the economic impact of Tuberculosis. The study was conducted in a Northern district NGO clinic far away from capital city with a small sample size of 21 new smear positive cases of which 15 were male and 6 were female patients. Patients were interviewed after completing one month of treatment to assess the pre-treatment cost before attending the clinic. The average total loss of income and expenditure of US$245 as two patients suffered a loss of US$1000. The mean loss was equivalent to nearly 4 months of family income and roughly 30 percent of annual family income based on the average range of annual income for a Bangladeshi family of US$780. Within the total cost, direct cost was US$130 and indirect cost was US$115. Again medicine cost was .US$112, doctor's fee was US$9 and laboratory fee was US$8.50 within the direct cost. Twelve patients out of 21 were unable to work and mean loss of work time was 14 months with a range of 5 days to 60 months. Money needed for treatment was raised in 8 cases by selling land or livestock and in 3 cases by taking out a loan. Geographical distance to clinic was a major problem. Six out of 21 patients were able to walk to clinic. The remaining 15 had spent transportation cost of US$0.25-1.25, which was a relatively higher amount for the family of poor patients (Croft et al., 1998).

4.8. Chapter conclusion

Analysis of reviewed studies revealed that the higher direct, indirect and total cost as economic consequences were found mainly in developing countries with the exception of Malaysia, which is an almost developed country where various non-formal or formal private health sectors were the first choice for majority of the patients. The summary findings are as follows –

- Highest direct cost of US$608.12 reported in Malaysian study
- Highest indirect cost of US$253.8 reported in Malaysian study
- Highest direct cost of US$726.90 again reported in Malaysian study

Risk factors identified in those literatures as associated with different high costs were –

- Perception and inadequate knowledge about Tuberculosis
- Middle and older age of the patients
- Gender-female sex
- Illiterate or less education status of the patient
- Difficulty to access to health care due to living in rural and remote areas
- Distance from health care units
- Hospital or clinic based Tuberculosis treatment mechanism
- Official and unofficial fees demand at treatment facility
- Economic status of the patient i.e. poor or rich
- Pre-treatment smear status of the patient
- Stigma especially for female patients
- Seeking care from private non-qualified and qualified health professionals
- Multiple encounter with same or various health care providers before diagnosis

The core problem in high costs incurred by patients for Tuberculosis treatment seemed to be a vicious cycle of repeated visits at the same or different healthcare providers especially in various private sectors before reporting to specialized treatment facilities and hospital or clinic centered Tuberculosis treatment mechanisms. This imposes a huge amount of direct costs in terms of consultation fees, medicine etc. and indirect costs in terms of transport cost.

Studies also found some other consequences -

- Patients long time working inability or premature death
- Mental anguish due to lost of income and sufferings
- Patients not properly accepted or treated by their family members or neighbors
- Female patient’s inability to care child and perform routine household works
- Joblessness or not gating full payment during illness
- Humiliation of female patients by husband and in-laws
- Temporary separation or divorce particularly female patients

Reviewed studies also noted different coping strategies such as –

- Spending own savings
- Borrowing money temporarily from outside family members and friends
- Borrowing money with interest from different social networks
- Selling household assets especially lands and livestock
- Replacing or engaging other family members in income generating activities
- Changing personal and family consumption pattern

Another devastating coping mechanism was the withdrawal of children from school and engaging them into earning activities to supplement their family financially. This was happened particularly when the patient was a bread winner for a poor family and female children are withdrawn when their mother became ill to replace their household activities. However, some studies did not include caregivers in estimating indirect cost based on lost earnings. Some studies also underestimate the costs to households since they ignore the value of lost household production, adverse impacts on the health and education of family members, costs of suboptimal land use, the value of lost leisure, and the pain and suffering associated with Tuberculosis due to the difficulties of quantifying them.

So far only one small scale study of economic impact of Tuberculosis during pre-treatment period on patient and their family have been carried out in Bangladesh. The study was conducted in an NGO clinic of a northern district of the country and considered economic burdens including direct, indirect and total cost with a sample of 21 rural patients. But the study did not consider the consequences for women and children of the family or intangible impacts. It only noted distance from the clinic as the contributing factor for high costs incurred by patients. No study has been done in urban areas so far. So the findings may not be reflecting the whole country situation. Selling land or livestock and taking loans were the coping strategies described in the study. So the contributing factors of different costs, consequences and coping strategies as noted in the range of studies from other countries remain to be explored in Bangladesh. Costs and consequences of the whole episode i.e. pretreatment and during treatment should be calculated as the study should be conducted countrywide. So I decided to conduct the countrywide study. The aim of this study was to investigate different costs associated with Tuberculosis treatment and consequences at different stage of treatment among cases of Tuberculosis in Bangladesh through a quantitative study and explore relevant associated factors. The information from this study can be used to develop appropriate strategies to reduce delay, the huge cost burdens of the patients and suffering due to different personal, family and social consequences.

To conduct the countrywide study a comprehensive sampling frame was established. Bangladesh 2001 census data containing various basic socio-demographic, economic and health indicator data and 2006 national Tuberculosis case finding data were collated in order to select a national random and representative sample. So the detailed methodological process would be described and discussed in the next chapter.

5.1: Background and Setting

Bangladesh is the most densely populated county in the world and almost 50 percent of the population lives below the poverty line (BBS, 2001). The burden of Tuberculosis is also escalating in Bangladesh and the estimated incidence of Tuberculosis was 101 per 100,000 in 2007 (NTP, 2008). Various reasons including poverty, population growth, rural to urban migration, poor health infrastructure and poor housing are the major probable factors for the continued threat of Tuberculosis, but a significant problem lies with the fact that many cases remain undiagnosed (WHO, 2004). This could be either the patients' healthcare seeking behaviour or the failure of health care systems to diagnose patients in a timely manner which attributed various delays and costs.

5.2: Study design

A retrospective multistage randomized non-interventional cross-sectional study was conducted at the household level in 12 rural Upazilas (sub-district) and 2 urban Thanas (police station area) in Bangladesh to collect the socio-economic data. Subsequently, a combination of both descriptive and analytical approaches has been adopted to address the main research questions and objectives.

A proper research design is crucial but its form depends of the nature of research question being dealt with. The main point of a good research design is to provide a suitable framework of reference and specify a process for collection and analysis of data so that relatively clear-cut statements formulation and conclusion can be made (Bryman, 2004; p543). D. A. de Vaus described various types of research design such as classic experimental design, panel design, retrospective design and cross-sectional design (de Vaus, 1991; p35). All these research designs are basically based on the principle of case-control study normally used in bio-medical research and have some advantages as well as disadvantages.

However, it is difficult to use any of these designs in social research due to difficulties which include getting the same groups to obtain repeated measures, obtaining a similar control group and ethical considerations relating to experimental interventions and in Tukey's (1977) terms many focus on explanation rather than exploration. So in this study it has been necessary to apply a cross-sectional design to gather the required information at one point of time in consequence of resource and time limitations. At the same time information regarding the impact of the disease during its' span can only be obtained by applying a retrospective design. So it was decided to apply a retrospective cross-sectional study design to gather the required information. That is to say information was collected from respondents about their past experience as well as their current condition. Age, gender, geographical areas, educational status, income groups of patients etc. were used as the basis of comparison in relation to retrospective exploration of costs and delay patterns experienced by the patients (see de Vaus, 1991; p 42).

The quantitative research techniques have been applied so as to identify delays and costs and their consequences stemming from becoming ill through to completion of treatment. Approaches of this kind tend to focus on measurement and proof and be based on the premise that something is meaningful only if it can be observed and counted. Their key characteristics include the generation of numerical data that permits a range of statistical analysis to determine the relationship between an independent variable and a dependent or outcome variable in the research population. This study is explicitly descriptive and as such required a large sample of subjects to estimate an accurate relationship between variables. The estimate of the relationship would less likely to be biased if there is a high participation rate in a sample selected randomly (Hopkins, 2000). There are several advantages of quantitative research. It is an effective tool in informing policy, service improvement and future programme planning. Moreover, the research findings can be generalized to the larger population.

The primary focus of the research was on the experience of treatment completed Tuberculosis cases. According to Ragin, the definition of case is very complicated in terms of social science and various social scientists defined it according to their nature and extent of research. He also pointed out that 'casing' is at least as important in social scientific research as the actual operational definition of measurements (Ragin, 1992). So based on the nature of my study, although the individual was the case the data collected extended the case as it were to the household in which individuals were resident. This was because decisions about treatment, expenditure during treatment and coping mechanisms are based on negotiations within the household. Social networks are also involved as friends and neighbours played the caregiver role and they are also sometimes the major element in the coping mechanism. The collection of information was extended outwards so that cases in the form of individuals were also described in terms of some aspects of relevant networks. The case as such was centered on the individual patient but case description included accounts of households in some detail and of use of networks in more limited detail.

The study period was December 2007 to April 2008 for quantitative data collection. The study covered the patients diagnosed as smear positive and negative new cases within the period May 2006 to April 2007 and who had become cured or had treatment completed at the time of sampling. A study period of 12 months was chosen so as to obtain enough cured or treatment completed patients, especially females for analysis. The period also facilitated getting all relevant information on each case from becoming symptomatic to cure or treatment completed and especially information covering the different delays and costs incurred during the whole episode. This approach enabled an exploration of the different costs incurred by patients themselves, their family and caregivers during the whole episode from becoming sick to cure.

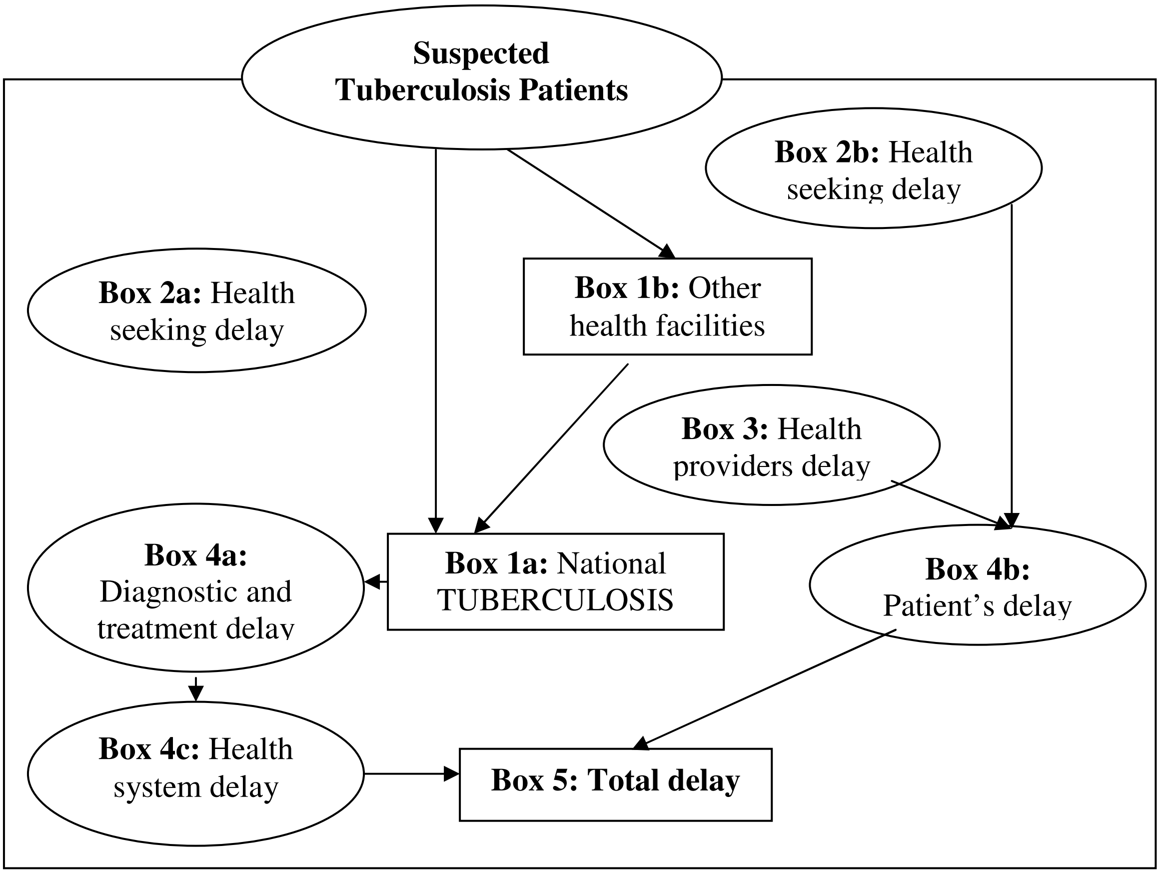
5.3: Conceptual framework of the study

A conceptual framework is a fundamental outline for exploring the research question as appropriately as possible. Various spans of delays and costs occur at different stages during an episode of Tuberculosis disease and arise from either or both the patients themselves and health provider. Here I am dealing with issues of operationalization.

5.3.1: Conceptual framework of delays

During a Tuberculosis illness various delays occur at different stages of the disease from the onsets of symptoms to the initiation of proper treatment. These affect patients and their families in various ways. *Figure-5.1* indicates the conceptual framework describing the inter-relations of the different types of delay and identifies the possible catalogue of use of both formal and non-formal health providers by patients in acquiring diagnosis and treatment for Tuberculosis symptoms. It also indicates the stages at which different delays occur, their operational definitions and different delay periods.

Figure 5.1: Conceptual framework of total and different delays in Tuberculosis control programme (Theme adopted from Yimer, 2005)

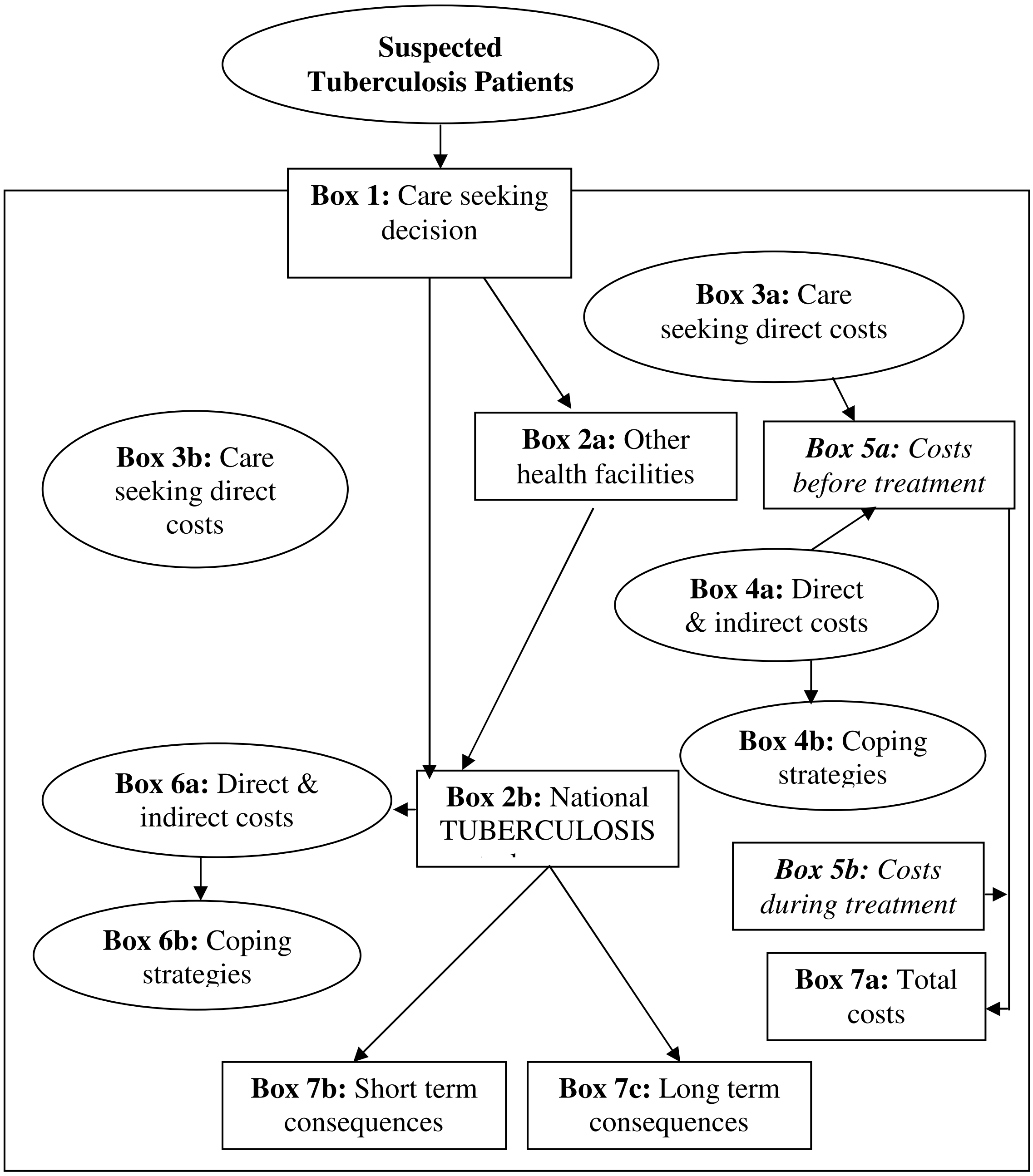


Suspected Tuberculosis patients normally contacted nearby or previously known health providers after feeling sick due to appearance of symptoms indicated in Box-1b. Some of them also contacted Upazila Health Complex (UHC) or NGO clinics in urban areas which are the recognized Tuberculosis treatment facilities indicated in Box-1a. But these contacts depend on the socioeconomic status of the patients and some delay occurred in this stage of the disease, namely Health care seeking delay indicated in Boxes-2b and 2a respectively. So the Health seeking delay is the duration between the recognition of Tuberculosis symptom by the patient and reporting to any kind of health facility to seek care. Many patients shopped around and contacted various health providers several times before reporting to proper Tuberculosis treatment facilities or the providers held the cases before referring them to the proper treatment unit. The duration of such delays, Health provider's delay, is indicated in Box-3. So the Health providers' delay means the duration between the first contact to a nearby health provider either private (qualified or un-qualified) or public by the symptomatic person and the referral of them to a proper Tuberculosis treatment unit. A study in India observed that more than 50 percent of patients chose private providers as their first point of contact. Many of them contacted multiple providers before reporting to a proper Tuberculosis treatment unit (Subramaniam, 1990). The combination of these two delay durations is Patient's delay indicated in Box-4b. Some patients who contacted the proper treatment unit were not diagnosed and started on treatment immediately and some delay occurred here - diagnostic and treatment delay as indicated in Box 4a. The combination of these two delays is Health system delay as it occurred in the proper health system as indicated in Box-4c. So the Health systems' delay means the duration between the reporting of a symptomatic person to a proper Tuberculosis treatment unit and the commencement of proper anti-Tuberculosis treatment irrespective of whether the unit was public or private. The combination of Patient's delay and Health system delay i.e. the total duration from the onset of Tuberculosis symptoms to the initiation of proper anti-Tuberculosis treatment is Total delay as indicated in Box-5.

5.3.2: Conceptual framework of costs

During a Tuberculosis illness various costs are incurred by the patients as well as by caregivers in the period from the first contact to the completion of treatment. These mainly fall on the patients' household budget. *Figure-5.2* presents the conceptual framework of costs incurred due to illness, the coping strategies and their ultimate consequences for the individuals and the household income level of a Tuberculosis patient. In the figure, Box-1 indicates the decision making process of seeking health care by the patient. This process includes the decision as to whether they should seek treatment and how and from which sources to seek treatment. The available private and other public care seeking sources are shown in Box-2a and NTP recognized health facilities in Box-2b (as few patients' directly contacted NTP facilities). Patients or their family decision makers' chose the treatment facility according to their ability to address the problem, level of trust attached to it, and accessibility. Direct costs incurred during first care seeking contact with a health provider are indicated in Boxes-3a and 3b. Normally the lower quality non-qualified health providers are available nearby at rural areas and more qualified expensive providers are situated in urban areas as indicated Box-2a. Delays also occurred here due to contacting various health providers multiple times before reporting to the proper anti-Tuberculosis treatment facilities. This increases the burden of various direct and indirect costs on the patients and their families as shown in Box-4a. Direct and indirect costs are mainly influenced by the severity of illness, the characteristics of the provider(s) contacted by the patient, the frequency of contacting health providers, the costs of accompanying persons and the distance to the health facility. The total costs experienced by the patients before reporting to the proper treatment facilities are indicated in Box-5a. People also adopted various coping strategies here, based on their family's economic status and available resources as indicated in Box-4b.

Figure 5.2: Conceptual framework of economic burden and other consequences of Tuberculosis on patients and their households (Theme adopted from Russell, 2004)



Coping strategies adopted by the patient's household included mobilizing own savings, borrowing from family, or asset sales when the treatment expenditure exceeds their daily or monthly budgets. They also try to mobilize external resources such as borrowing from friends and relatives or from local organizations that offer credit with interest when they failed to manage the costs using own resources. For poor households who struggle to meet daily food and other basic needs and suffer the loss of a daily wage due to illness such strategies can be triggered even for relatively small treatment costs (Wilkes et al, 1997). Patients and their families also experienced huge direct and indirect costs during treatment due to consumption of extra special foods and working days lost as indicated in Box-6a. The total costs incurred by the patients during treatment are indicated in Box-5b. During treatment patients and their families adopted similar coping strategies as described above based on their family socioeconomic circumstances which are indicated in Box-6b. The total costs experienced by the patients and their families during the whole episode of the disease i.e. the summation of costs before and during treatment including direct and indirect costs, are indicated in Box-7a. In addition to total costs, there are some social and psychological consequences as indicated in Boxes-7b and 7c. Social and psychological consequences such as mental anxiety, humiliation, separation/divorce and economic decline are mainly influenced by the behaviors of the neighbors, family members, financial status of the patients, severity of the disease and the length of suffering. Ultimately the illness costs, coping strategies and consequences have both short term and long term implications for patients and their families. The family food consumption, social degradation, temporary separation and reduced household asset portfolio (which may sometimes trigger processes of impoverishment) are the short term implications as indicated in Box-7b. Health care costs hamper the education of children of poor patients by triggering their being withdrawn from school to engage in income generation activities. Longer term impoverishment and changes in healthy family life through family income decrease, permanent separation in some cases particularly for the female patients, are the major long term implications of a Tuberculosis episode as indicated in Box-7c.

5.4. Definition of major variables

The study measured various delays, costs incurred by the patients during treatment, and consequences for patients and their families. So it necessary to define how these things was operationalized.

5.4.1. Health providers

Health providers are defined as any individual consulted by the patient about their illness that gave or prescribed treatment for relief of the symptoms, excluding the family members (Lienhardt et al, 2001a). They can be divided broadly into formal and non-formal categories. Formal medical health providers are qualified doctors, hospitals, health centers and clinics owned by the government, NGOs or the private sector and authorized by NTP to handle Tuberculosis cases. Non-formal health providers are unqualified village doctors, traditional health care providers, drug retail outlets and spiritual healers. Drug retail outlets are pharmacies, drug stores, drug vendors and open market drug sellers.

5.4.2. Diversion

Diversion is the act of turning aside from any course, occupation, or object such as, the diversion of a stream from its channel (Oxford Dictionary – internet source). Based on the above definition, diversion in Tuberculosis treatment is non-contact with National Tuberculosis Programme (NTP) recognized health facilities and instead contact with locally available private non-formal and formal health providers. I did not find any electronic literature regarding *diversion* (specifically identified as such) in Tuberculosis treatment.

5.4.3. Delays

Four different types of delay from onset of Tuberculosis symptoms to treatment initiation were defined. *Patient delay* was defined as the period from first onset of Tuberculosis symptoms to first visit to any NTP authorized Tuberculosis treatment unit for receiving care for those symptoms. Symptoms associated with Tuberculosis are cough of more than three weeks in association with fever, night sweats, anorexia, weight loss, chest pain and haemoptysis. The day when the patient first became aware of symptoms was defined as the onset of symptoms. For example, if the patient felt chest pain for the last 6 months but sought medical advice for coughing having recognized this as an issue only in the previous one month, then the period of onset would be one month. Patient delay can be divided into ‘health care seeking delay’ and ‘health providers’ delay’. *Health care seeking delay* is the duration between the onset of any symptom to the contact with any healthcare provider for advice or treatment. *Provider delay* is defined as the time from first contact with any health care provider to time of reporting or referring to the NTP authorized Tuberculosis diagnostic and treatment facility. *Health system delay* was defined as the interval from the date first visit to a NTP authorized Tuberculosis treatment unit by the patient to the date of first commencement of proper antibiotics or anti-Tuberculosis treatment. Health system delay also can be broken down into 'diagnostic delay' and 'treatment delay'. *Diagnostic delay* referrers to the time from reporting to an anti-Tuberculosis treatment unit to the completion of diagnosis as a Tuberculosis patients and *treatment delay* referrers to the interval between the diagnoses to the initiation of treatment. *Total delay* was defined as the period from the onset of any Tuberculosis symptoms to the initiation of proper antibiotics or anti-Tuberculosis treatment for suspects or confirmed Tuberculosis patients, which was equal to the sum of 'patient delay' and 'health system delay' as shown in figure 1. Although date of diagnosis was not always the same as the date that Tuberculosis treatment was initiated, treatment initiation has been defined as the endpoint. A total delay of one month or less was considered as acceptable, because national guidelines suggest that patients coughing for 3 weeks or more should be investigated further and patients should have treatment within 3 days of diagnosis (NTP, 2006).

5.4.4. Costs incurred

Costs are both direct and indirect. *Direct patient costs* were defined as expenditure for consultation fees, investigation, drugs, hospital fees, transportation, food and paramedical interventions (Rajeshawri et al., 1999). These costs were assessed separately for the period before and after diagnosis of Tuberculosis at the government or NTP recognized health care facilities. Again direct costs can be divided into medical and non-medical costs. Consultation fees and money spent on investigations and drugs were classified as medical expenditure. Conversely, money spent on travel, lodging, special food and expenditure incurred for persons accompanying the patient were classified as non-medical expenditure. *Indirect patient costs* were defined as income reductions resulting from partial or complete inability to work during illness or long term disability that bound the patient to change their nature of profession (Rajeshawri et al., 1999). These costs were assessed both for the patient and for other household members and external caregivers irrespective of gender who provided patient care and were accordingly unable to continue their regular work. This is important in order to avoid male-female bias. Indirect costs were also assessed separately for the period of before diagnosis as a

Tuberculosis patient and during treatment period. *Total costs* covered the expenditure incurred under direct and indirect costs. A framework of different costs and consequences is demonstrated in *Figure-5.2.*

5.4.5. Family and individual impact

The term cost burden is defined as the sum of direct and indirect costs expressed as a percentage of household income before illness. Household income can be also calculated in three different ways as *equivalised income, per earner income* and *per-capita income*. Equivalised income is a point based calculation based on the number and age of the household members which is mainly applicable in developed countries. The technique is inapplicable in the Bangladeshi context as children and old people are a burden in the rich families but a resource in poor and bigger families as lots of people are engaged in income generation in these age groups. Per earner income calculation is also inadequate as the person's level of income within the household is not equal and is not commonly used in the country context. Per-capita income calculation technique is very simple and widely applied in various national censuses. However, per capita is an average income calculation which sometimes does not reflect the actual family economic situation. Some analysts argue that a cost burden greater than 10 percent is likely to be catastrophic for the poor household economy (Ranson, 2002) meaning that it is likely to force household members to cut their consumption of essentials for minimum needs, trigger high levels of debt or productive asset sales, and lead to impoverishment. However, this 10 percent figure may not be catastrophic for high-income households that can manage by mobilizing their savings or cut back on luxuries or for resilient households that can mobilize assets to pay for treatment. An episode of Tuberculosis can also have negative impacts at the family and individual level including reduction of family income due to working inability or separation, neglect by family and society, withdrawal of children from school to engage in income generating activities, and temporary or permanent separation from the family especially for the female patients.

5.5. Sampling technique

A multistage stratified sampling technique was applied to select a representative sample for the quantitative study. The basic approach of multistage stratified sampling is to sample at the first stage from large units which can be categorized (stratified) using data describing those units. Then the final units of interest can be sampled from the selected cases within the categories. It is commonly employed in order to generate a more representative sample when data about the final sampling units is not available (de Vaus, 1991; p67). The first stage units in this study were respectively Upazilas (rural governmental areas) and Thanas (urban governmental areas). All rural Upazilas were classified using cluster analysis procedures into 3 socio-demographic clusters, 2 Tuberculosis clusters and finally 6 combined socio-demographic and Tuberculosis sub-clusters. In the same way, Urban Thanas were classified into 2 socio-demographic and 2 Tuberculosis clusters and 4 combined socio-demographic and Tuberculosis sub-clusters. It is important to emphasize that the clusters were generated in terms of description of key attribute sets and using data which described whole populations or was based on very large N sample surveys. No issues of ecological fallacy arose because there was no assertion of causality in relation to the description of attributes of the clusters. The typology simply described a basis for a multi-stage sample design.

5.5.1. Sampling design

Socio-demographic characteristics of whole population and nationwide Tuberculosis case finding data were used to generate the sample for data collection in order to achieve a geographically, socially and Tuberculosis incidence representative sample. Administratively, Bangladesh is divided into 6 divisions, 64 districts and 507 Upazilas/Thanas (461 Upazilas), each one inhabited on an average by a population of about 22 million, 2 million and 255 thousand respectively. Socio-demographic, economic and cultural factors like literacy and employment status differ regionally. These factors may determine people's behaviour regarding treatment and effect of the disease. Socio-demographic data has been collected from the population census and community series report 2001 published by the Bangladesh Bureau of Statistics (BBS, 2001).

Socio-demographic and Tuberculosis data were collected at the Upazila level because these are the lowest government administrative units and the Tuberculosis control activity details such as diagnostic and treatment details of each patient are collected for this level. The socioeconomic variables considered were population density, literacy rate, health indicators, household structure indicators and household income status as illustrated in *Table 5.1*. Tuberculosis incidence was measured in terms of the rate of new smear positive cases on an annual basis. The details of the variables described below.

5.5.1.1. Population density:

The minimum, maximum and mean area of rural Upazilas was 55.84, 1968.28 and 318.35 square kilometers respectively with a standard deviation of 218.44. Also the minimum, maximum and mean population size was 16,992, 882,971 and 248,146 respectively with a standard deviation of 132,482. Moreover, the minimum, maximum and mean population density in rural areas was 16.65, 8,763.98 and 922.10 with a standard deviation of 589.31. The minimum, maximum and mean population density in urban areas was 1311.6, 131377.2 and 26003.79 with a standard deviation of 25909.31 as shown in *Table-5.1.* Normally the poor people live in a crowed and densely populated areas, which is a very favorable condition for the transmission of Tuberculosis and conducive to the worsening of the condition once acquired. The minimum, maximum and mean household size, population and population density were higher as expected in urban areas in comparison to rural areas. This means that the urban population might be at more risk of Tuberculosis infection, especially the poor who lived in densely populated slums.

5.5.1.2. Literacy rate

Literacy is a key determinant of the lifestyle and status an individual enjoys in a society and affects many aspects of life, including demographic and health behaviours. Educational attainment has also strong effects on mortality, morbidity, and attitudes and awareness related to family health and hygiene. For example, one study shows that under-five mortality declines sharply with the increase of mother's education level. The rate is almost 40 percent lower for children whose mothers have at least some secondary education, compared with those who have no education (BDHS, 2005).

Bangladesh is a low literacy country compared to other developing countries. Based on the definition of a literate person as one capable of writing a letter, the literacy rate among all the population in 2001 was 37.71 percent and among the population aged 15 years and above was 47.85 percent (BBS, 2001). According to the descriptive analysis, the minimum, maximum and mean literacy rate was 15.1, 71.8 and 43.13 percent respectively in the rural areas with a standard deviation of 9.78 in comparison of 42.8, 83.6 and 66.93 with a standard deviation of 8.14 respectively in urban areas. So the educational attainment is higher in urban areas rather than in rural areas as demonstrated in *Table-5.1.*

5.5.1.3. Health status

Total fertility rate (TFR) is defined as the average number of births a woman would have by the end of her childbearing period if she were to pass through those years bearing children at the currently observed rates of age-specific fertility. The TFR is obtained by summing the age-specific fertility rates and multiplying by five. According to the 2001 population census, TFR was 2.56 nationally and 2.84 and 1.73 in rural and urban areas respectively (BBS, 2001). It has an important role in determining Bangladesh's population growth and a huge impact on economic development through the disease burden. According to the descriptive analysis as demonstrated in *Table-5.1*, the area minimum, maximum and mean total fertility rate was 2.41, 7.23 and 4.14 respectively with a standard deviation of 0.79 in rural areas. Conversely, it was 1.74, 3.96 and 2.94 with a standard deviation of 0.57 in urban areas.

Crude death rate (CDR) is defined as the total number of deaths in a population in a year per 1,000 populations. The crude death of a country is influenced by nutrition level, housing standards, access to safe drinking water and sanitation, hygiene levels and levels of infectious disease. Sometimes it is calculated as disease specific so as to judge specific programme performance. According to the 2001 census, in Bangladesh the CDR was 5.10 per thousand populations and 5.40 in rural and 3.80 in urban areas (BBS, 2001). The area minimum, maximum and mean CDR was 2.49, 15.27 and 5.17 respectively in rural areas with a standard deviation of 1.77. Equally, it was 2.2, 8.9 and 4.78 with a standard deviation of 2.04 in urban areas as demonstrated in *Table-5.1*.

Infant mortality rate (IMR) is a reflection of the level of socioeconomic development of a country and its quality of life and is used for monitoring and evaluating population and health programs and policies. The rate is also important for monitoring the progress of the United Nations Millennium Development Goal (MDG) to reduce child mortality. It is defined as the number of deaths of children less than 1 year old per 1000 live births. The infant mortality rate in Bangladesh is still very high compared to that of many other developing countries. According to the 2001 census, IMR was around 56 per thousand live births with a rate of 60 in rural areas and 43 in urban areas (BBS, 2001). The minimum, maximum and mean area IMR was 34, 194 and 66 respectively in the rural areas with a standard deviation of 22.2. Conversely, it was 28, 112 and 60.76 with a standard deviation of 25.57 in urban areas as demonstrated in *Table-5.1*.

As expected, the minimum, maximum and mean of total fertility, crude death and infant mortality rate were lower in urban areas as demonstrated in *Table-5.1*. These differences may be due to a better economy, higher literacy and availability of health facilities in the urban areas.

5.5.1.4. Household structure

Bangladesh is one of the poorest countries in the world. Poor people live in poorly constructed crowded dwellings which can be classified as *Jhupri* and *Kutcha*. Jhupri or shanty is a one room household which has a ceiling of less than four feet and is made of very cheap construction materials like straw, bamboo, grass, leaves, polythene, gunny bags, etc. On the other hand, households whose walls and/or roof are made of materials un-burnt bricks, bamboos, mud, grass, reeds, thatch, etc. are treated as *Kutcha* house (BBS, 2001). The most commonly used floor materials of *Kutcha* household in Bangladesh are earth and in some exceptional cases bamboo. There is a myriad of infectious agents whose transmission is facilitated by unsanitary, overcrowding and muddy floored household conditions. Household environmental conditions can be assessed by the quality of household construction and sources of water.

According to the population census 2001, 8.80 percent of households were dwelling in *Jhupri* and 74.40 percent in *Kutcha* (BBS, 2001). Descriptive statistics demonstrated that only 26.90 percent dwelling households of urban areas were *Kutcha* against 79.98 percent in rural areas. However, 8.62 percent dwelling households of urban areas are *Jhupri* which is little bit less than rural areas of 9.04 percent as demonstrated in *Table-5.1*. Most of the metropolitan slums consist of *Jhupri* and in-migrated people from village areas as well as different kinds of low paid workers from rural areas live there.

Table 5.1: Upazila/Thana wise descriptive statistics of rural and urban socio-demographic variables as per 2001 Bangladesh population census

Variables	Number		Minimum		Maximum		Mean		Std. Deviation	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Area (sq. km)	461	42	55.84	1.93	1968.24	136.59	318.35	18.44	218.44	22.49
Households	461	42	3379	5262	194945	122431	50753.18	49823.36	27097.77	26031.31
Population	461	42	16992	24300	882971	551167	248146.28	237113.57	132482.61	116538.64
Pop. density	461	42	16.65	1311.6	8763.98	131377.2	922.10	26003.79	589.31	25909.31
Literacy rate	461	42	15.1	42.8	71.8	83.6	43.13	66.93	9.78	8.14
TFR	461	42	2.41	1.74	7.23	3.96	4.14	2.94	.79	.57
CDR	461	42	2.49	2.2	15.27	8.9	5.17	4.78	1.77	2.04
IMR	461	42	34	28	194	112	65.82	60.76	22.21	25.57
Household Jhupri	461	42	0	2.38	78	21.32	9.04	8.62	8.15	4.40
Household Kacha	461	42	20.67	2.86	98.06	62.68	79.98	26.90	11.37	12.79
Income Agriculture	461	42	1.98	.27	72.88	8.86	35.45	1.86	12.34	1.90
Income Employment	461	42	.34	17.64	36.83	63.97	7.80	37.13	5.60	9.76
Income Business	461	42	1.29	12.48	33.66	47.75	13.34	23.75	4.56	7.28
Income Agri. labour	461	42	1.18	.08	53.20	10.14	22.37	1.43	7.29	2.21

5.5.1.5. Household income source

Bangladesh is agriculture based country and almost 70 percent of people still live in the rural areas. Almost half of the country households still live below the poverty line of income set at one US dollar per day. However, industrial employment is increasing due to an increase in education and the massive development of a readymade garments industry but still agriculture dominates sources of household income. According to the 2001 population census, percentages of household income from cropping/agriculture, agricultural labour, business and employment was 29.57, 20.29, 15.10 and 10.78 percent respectively (BBS, 2001). Income through business and employment is higher in the municipal and urban areas than in the rural areas. The area statistics show that the percentage of minimum, maximum and mean household income from cropping/agriculture was 1.98, 72.88, 35.44; from agriculture labour was1.18, 53.20, 22.37; from business was1.29, 33.66, 13.24 and from employment was 0.34, 36.83, 7.80 in rural areas. As expected, the source of household income almost reversed in urban areas in comparison to rural areas as demonstrated in *Table-5.1*. Their main source of income was 37.13 percent from employment and 23.75 percent households from business against 7.80 and 13.34 percent respectively in rural areas.

The economic status of a household is likely to affect the health status of that household. Poor health care seeking behaviour as well as higher morbidity and mortality exists in the poorer households. Also, the childhood mortality rates are highest in the lowest wealth quintile households. For example, Under-five mortality drops from a high of 121 deaths per 1,000 live births in households in the lowest wealth quintile to 72 deaths per 1,000 live births in households in the highest wealth quintile (BDHS, 2005). Lower economic status also causes imbalanced food consumption, which causes malnutrition. Malnutrition enhances the risk of infection for Tuberculosis.

5.5.1.6. Tuberculosis data

Bangladesh is one of the highest Tuberculosis prevalence countries in the world. However, the case detection rate is not equal across the country. For example, the highest and lowest new smear positive case detection rates were 90.93 and 61.49 in Barisal and Rajshahi division respectively in 2006 as illustrated in *Table-5.2*. The gap was higher at lower administrative levels. At the district level the highest and lowest case detection rates were

101.03 and 31.07. It was 218.72 and 16.75 at Upazila level, which is the lowest rural administrative level (NTP, 2007). There might be some factors like geographical variation of socio-demographic and other factors behind that variation of case detection and consequent incidence rate. However, different operational strategies adopted by implementation agencies also might play an important role behind this variation in case notification rates.

Table 5.2: Division wise notified new smear positive Tuberculosis cases and detection rate of 2006 (NTP 2007)

Division	Reported +ve new cases			Reported -ve new cases	Estimated cases	Case detection rate (%)
	Male	Female	Total			
Rajshahi	15231	5947	21178	3686	34442	61.49
Khulna	7892	4801	12693	1454	16774	75.67
Barisal	4643	3633	8276	686	9102	90.93
Dhaka	21808	9532	31340	10063	46046	68.06
Sylhet	5210	2246	7456	3402	9105	81.89
Chittagong	14549	6496	21045	5228	28047	75.03
Total	**69333**	**32655**	**101988**	**24519**	**143516**	**71.06**

The National Tuberculosis Control Programme (NTP) in Bangladesh predominantly uses passive case finding as a system for detecting pulmonary Tuberculosis cases. The recommended standard procedure applied in the diagnosis of pulmonary Tuberculosis cases is to collect and examine three sputum specimens from individual patients with respiratory symptoms on two consecutive days. Examination of sputum by direct microscopy for the presence of acid fast bacilli (AFB) is performed at the health facilities designated as diagnostic and treatment centers by NTP. *Smear positive pulmonary cases* are confirmed when there are at least 2 specimens positive for AFB or when one sputum specimen is positive for AFB in addition to radiological abnormalities consistent with active pulmonary Tuberculosis (NTP, 2006). A *Smear negative pulmonary case* is confirmed when three initial smear examination results by direct microscopy for AFB is negative and the patient has failed to respond to a course of broad spectrum antibiotics with a repeated three negative smear examinations by direct microscopy and examination for x-ray abnormalities suggestive of active Tuberculosis as determined by the treating physician. *A new case* is defined as being a patient who has never received anti-Tuberculosis treatment or who have received it for less than 1 month before diagnosis by the government assigned medical providers or centers (NTP, 2006).

Tuberculosis case finding data for the year 2006 was collected from the National Tuberculosis Control Programme (NTP) because they are the official authority under the Ministry of Health and Family Welfare, Government of Bangladesh for implementing the programme in partnership with other Government and Non-governmental agencies. The NTP started its field implementation in November 1993 in four Upazilas and progressively expanded all over the country by mid-1998 and is liable for acquiring, processing, preserving and publishing Tuberculosis data whenever necessary. Upazila wise rural and Thana wise urban Tuberculosis data were collected because these are the lowest government administrative units and the Tuberculosis control activity details such as diagnostic and treatment details of each patient are preserved here.

5.5.2. Sampling procedure

Two separate geographical analyses in rural (Upazila) and urban (Thana) areas were performed using selected 2001 socio-demographic census data variables and 2006 Tuberculosis case finding data by applying a similar approach of TwoStep cluster analysis. The socio-demographic variables utilized for cluster analysis were described earlier. New smear positive case notification rate of the year 2006 (briefly described earlier) were utilized for the Tuberculosis clusters. Cases identified as positive through sputum smear microscopy and never treated with anti-Tuberculosis drug or treated for less than one month were defined as new smear positive cases. The populations as measured by the 2001 census were projected to 2006 by multiplying them by the population growth rate of 1.41 percent per year to provide a base for calculating the estimated incidence and prevalence of Tuberculosis per 100,000 population as well as the case notification rates. Two Upazilas from each rural sub-cluster i.e. in total 12 Upazilas and 1 Thana each from 2 urban sub-clusters i.e. in total 2 Thanas were randomly selected for final sampling of the patients as described below.

5.5.2.1. Cluster analysis

Cluster analysis is a method that is used to arrange a set of cases into clusters. According to a synthesis of electronic resources, Cluster analysis can be defined as a classification method which is also called segmentation analysis and is used to identify homogeneous subgroups of cases in a population or data set (Garson, 2009). It is an exploratory data analysis tool which aims at sorting different objects or variables into groups or clusters in such a way that the degree of association between two objects is maximal if they belong to the same group or cluster and minimal for other clusters. So, cluster analysis can be used to discover structures in data without providing an explanation or interpretation. In other words, cluster analysis simply discovers structures in data without explaining why they exist (StatSoft, 2008). The technique always creates clusters but solutions are not unique since they are dependent on the variables used and how cluster membership is being defined. There are no essential assumptions required for its use except that there must be some regard to a theoretical or conceptual rationale upon which the variables are selected (Chan, 2005). Clustering techniques have been applied to a wide variety of research problems. For example, it can be used in the field of medicine for clustering diseases, cures for diseases or symptoms of diseases and can lead to very useful taxonomies (Hartigan, 1975). So, cluster analysis is of great utility when we need to classify a pile of information into manageable meaningful segments. It is particularly useful when we can classify all relevant cases as no problems of statistical inference occur when we have data describing all cases in the population as was the case in this study.

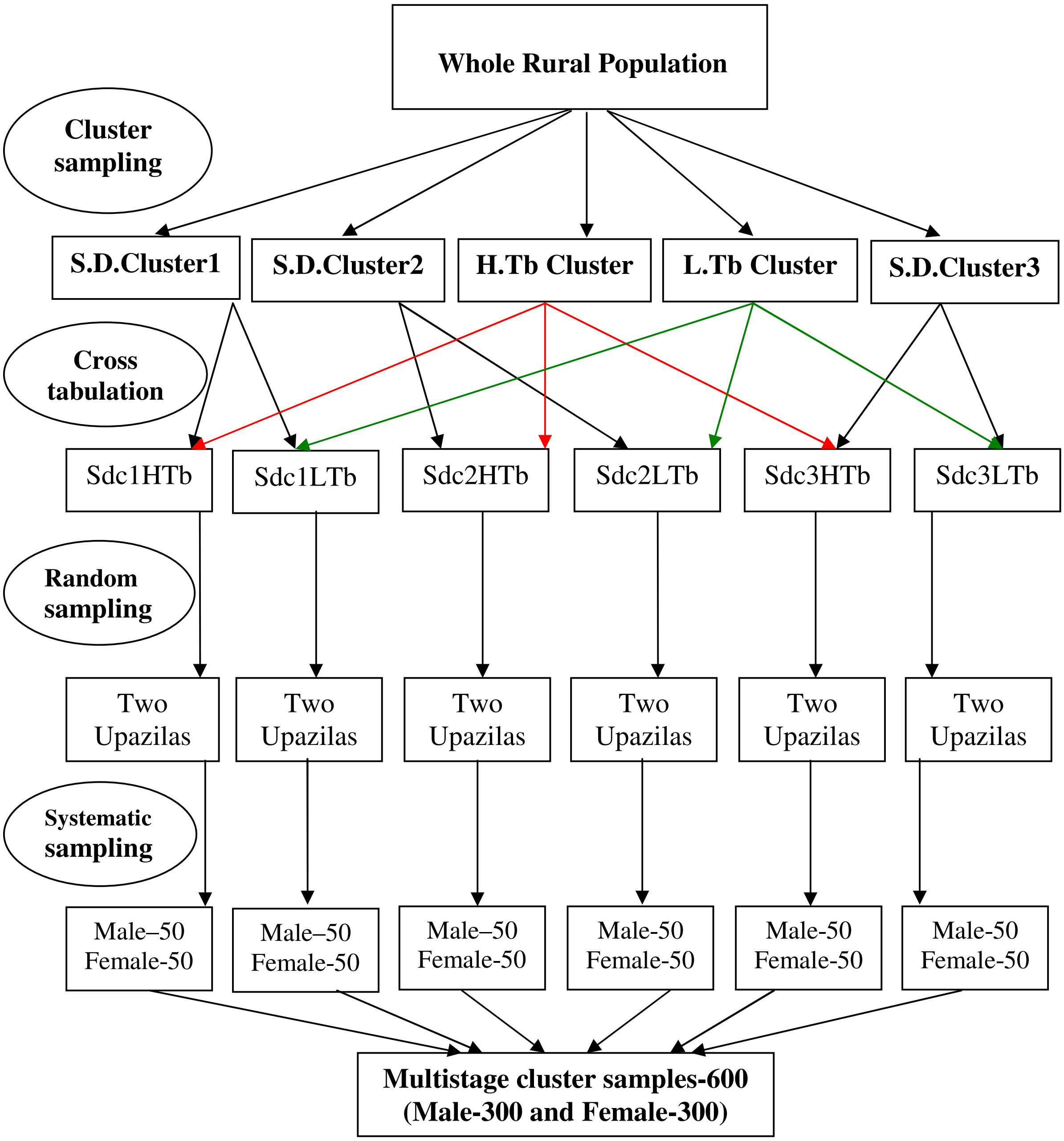
The Statistical Package for Social Science (SPSS) Two Step cluster method is a scalable cluster analysis algorithm designed to handle very large data sets. It can handle both continuous and categorical variables and attributes. It requires only one data pass and has two steps of pre-clustering the cases or records into many small sub-clusters, and then clustering the sub-clusters resulting from pre-cluster step into the desired number of clusters. It can also automatically select the number of clusters. SPSS uses the agglomerative hierarchical clustering method. This system allows the user to fix the precious maximum number of clusters or let the technique automatically choose the number of clusters with either the Bayesian information criterion (BIC) or Akaike information criterion (AIC) (Hamburg University, 2008).

5.5.2.2. Rural sampling

Firstly, Upazila (lowest government administrative unit) wise Tuberculosis case finding data for the year 2006 were merged with the 2001 population census socio-demographic data of the respective geographic units to create a single data file. Secondly, the rural geographical areas were sorted into 3 clusters using TwoStep cluster analysis based on the socio-demographic and economic variables: population density, literacy rate, fertility rate, crude death rate, infant mortality rate and household income from agriculture, employment, business and agricultural labour wages. The socio-demographic variables were selected which might have a significant contribution in relation to health background. In the same way Upazilas were divided into 2 clusters based on new smear positive case detection rate using the same cluster technique. The single variable of case detection rate was used because that is the only parameter to use to measure the performance of Tuberculosis case detection. The three cluster level was identified as appropriate in relation to socio-demographic variables and the two clusters in relation to Tuberculosis incidence. Finally the Upazilas were divided into 6 sub-clusters by cross tabulating socio-demographic cluster membership (3 clusters) against Tuberculosis cluster membership (2 clusters). Then the Upazilas contained minimum 35 male and 35 female cured or treatment completed new smear positive and negative patients were screened out from each sub-clusters based on the theory of *probability proportionate to size (PPS) sampling* (de Vaus, 1991; p70) to obtain the required number of sampled treatment completed patients. Finally, two Upazilas from each sub-cluster i.e. total 12 Upazilas were selected by using a simple random sampling technique using online research randomizer software (www.randomizer.org). The framework of the rural sampling technique is illustrated in *Figure-5.3*.

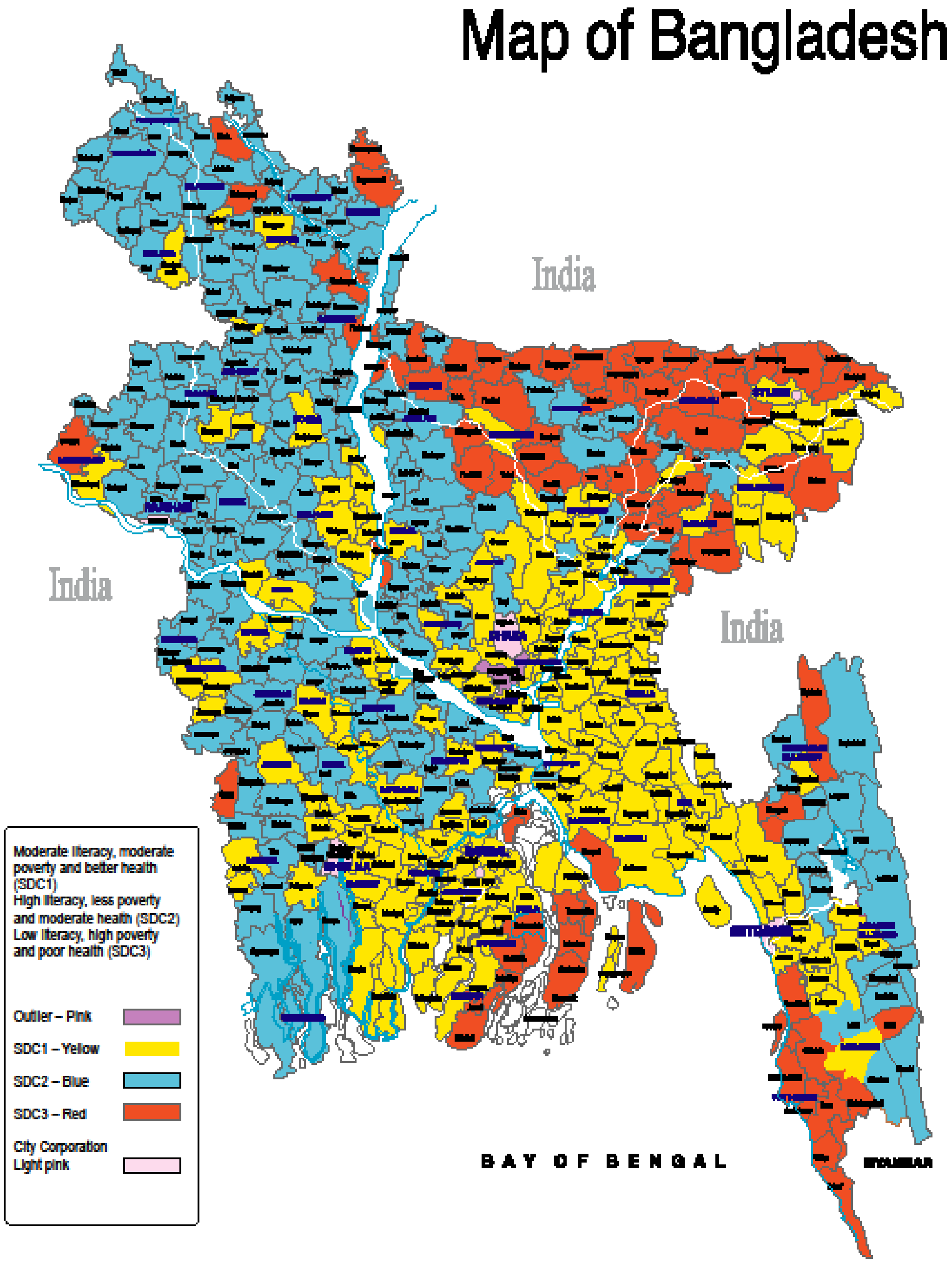
Three socio-demographic patterns were identified from the TwoStep cluster analysis and *Annex-5.1* summarizes data for each cluster. During analysis weight was given to broad socio-demographic variables including literacy, health status and household income. The means for socio-demographic variables for each cluster indicate that the clusters were distinctive. So, according to the *Annex-5.1*, the clusters can be named according to their dominant variable means follows: (1) high literacy - moderate health – less poverty, (2) moderate literacy - better health – moderate poverty and (3) low literacy - poor health – high poverty. Demographic profiles for the entire sample and for each cluster are presented. The demographic variables include the population density, literacy rate, total fertility rate, crude death and infant mortality rate, percentage of household dwellings named *Jhupri* and *Kutcha,* and percentage of household income source from agriculture, employment, business and agricultural labour. Cluster wise Upazilas are listed in *Annex-5.2*.

Figure 5.3: Framework of rural sampling technique (Theme adopted from de Vaus, 2004)



The attached map of Bangladesh (*Figure-5.4*) shows the actual pattern of socio-demographic cluster membership for Upzilas across the country.

Figure 5.4: Rural socio-demographic cluster map



5.5.2.2.1. Rural socio-demographic clusters

Cluster 1: high literacy - moderate health – less poverty (sdc1).

Total 183 Upazilas or 39.7 percent belong to the high literacy - moderate health – less poverty cluster. Compared with the Upazilas in other clusters, these were the highest density populated Upazilas with a mean density of 1136.42. The cluster had the highest mean literacy rate of 50.06 in comparison to other clusters. Population density and literacy rate data showed that most Sadar (district centres) and urbanized Upazilas are in this cluster. The mean crude death rate and infant mortality rate were 5.32 and 67.57 respectively, which was less than cluster 3 but higher than cluster 2. The mortality rate indicates that the health status of the Upazilas was at a moderate level. The mean for household dwelling structures named *Jhupri* was 7.34 which was higher than cluster 2 but lower than cluster 3 and *Kutcha was* 78.31 which was less than cluster 2 but higher than cluster 3. This indicates the better living standard of the population. The percentage sources of household income from agriculture, employment, business and agricultural labour were 26.09, 11.86, 16.72 and 17.55 respectively. The household income from employment and business was higher but income from agriculture and agricultural labour was lower in the cluster than in the other rural clusters. So, the data indicated that the population in this cluster was less poor in comparison to other clusters.

Cluster 2: moderate literacy - better health – moderate poverty (sdc2).

Of the sample Upazilas, 200 Upazilas or 43.4 percent belong to the moderate literacy - better health – moderate poverty cluster. Compared with the Upazilas in other clusters, these were the moderate densely populated Upazilas with a mean population density of 762.68. The cluster had a moderate mean literacy rate of 40.09. Population density and literacy rates for the cluster indicated that the advanced Upazilas were in this cluster. Mean crude death rate and infant mortality rate were 4.24 and 54.17 respectively, which were the lowest for the clusters. The mortality rates indicated that the health status of these Upazilas was better than for the other clusters. The mean for household structures named *Jhupri* was 6.18 which were the lowest among clusters and *Kutcha* was 84.61 which were higher than other clusters. These indices indicated the moderate living standard of the clusters' population. The percentages of household income from agriculture, employment, business and agricultural labour were 42.27, 5.32, 11.29 and 25.85 respectively. Household income was dominated by agriculture and agricultural labour wages but employment and business also influenced the household income in the cluster. So, the data indicated that the population of this cluster's Upazilas was moderately poor in comparison to other clusters.

Cluster 3: low literacy – poor health – high poverty (sdc3).

Of the Upazilas, 76 Upazilas or 16.5 percent belong to the low literacy - poor health – high poverty cluster. Compared with the Upazilas in other clusters, these were the least densely populated Upazilas with a mean population density of 675.53. The cluster also had the lowest mean literacy rate of 34.08 in comparison to other clusters. Population density and literacy rates indicated that more remote and less developed Upazilas were located in this cluster. Mean crude death and infant mortality rates were 7.32 and 92.78 respectively, which were the highest for the three clusters. The mean for household structures named *Jhupri* was 20.80 which were the highest among clusters and *Kutcha was* 72.54 which was the lowest among clusters, indicated the poor living standard of the population of these Upazilas. The percentages of household income from agriculture, employment, business and agricultural labour were 40.90, 4.04, 10.32 and 25.35 respectively. Though household incomes were dominated by agriculture and agricultural labour wages the proportions were lower than for cluster 2. Conversely, the mean contributions to income from employment and business were lowest among the clusters. So, the data indicated that the population of this cluster was the poorest in the set.

5.5.2.2.2. Rural Tuberculosis clusters

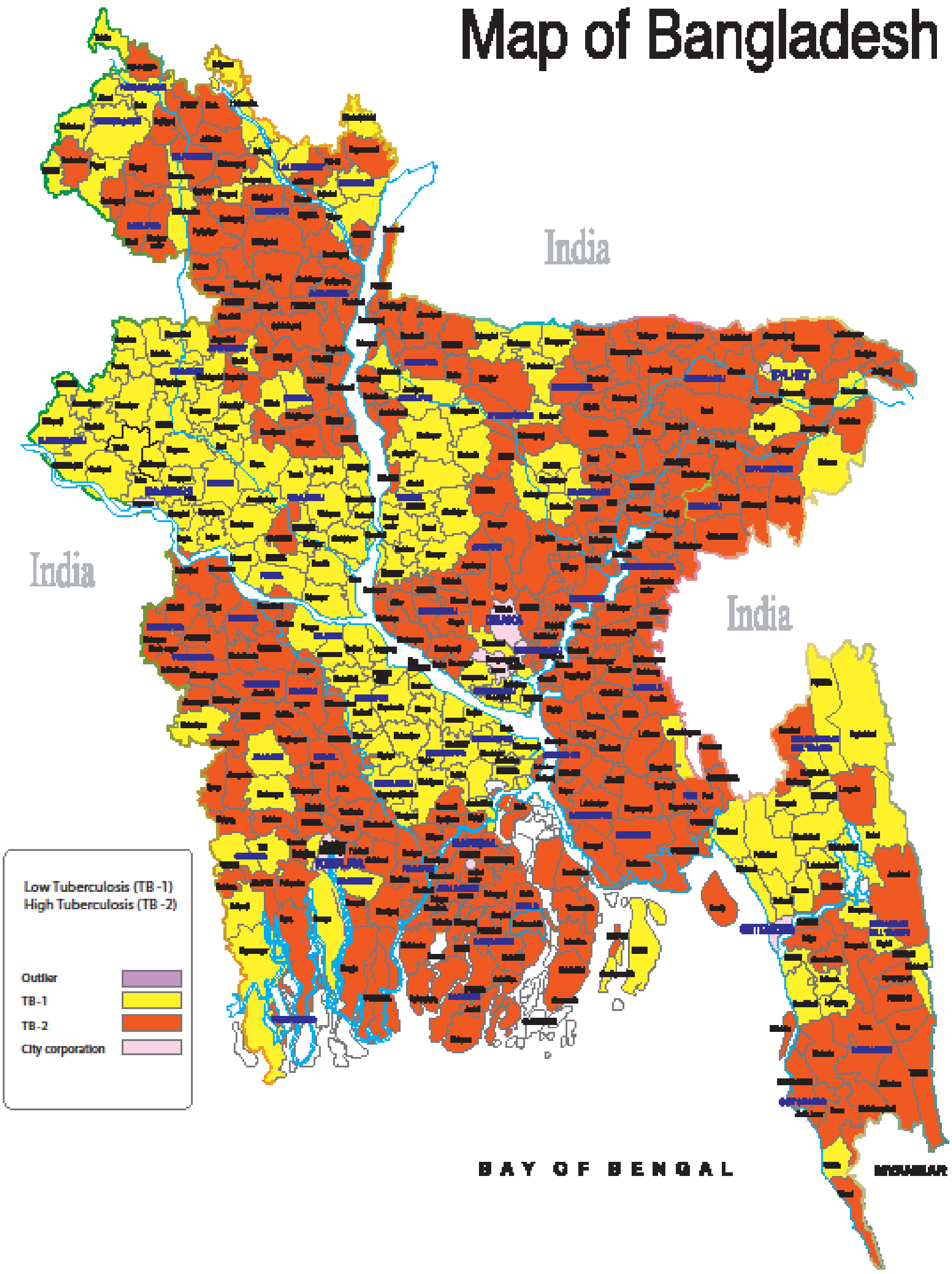
Two Tuberculosis case notification patterns were identified from the TwoStep cluster analysis and *Annex-5.3* summarizes data for each cluster. During analysis weight was only given to the Tuberculosis case notification rate (percent of new smear positive Tuberculosis cases identified against a target based on estimated incidence) because that is the parameter used to assess the Tuberculosis management performance for respective geographical areas. Moreover, the two outlier Upazilas identified during the socio-demographic variables analysis were deleted during the analysis i.e. the Tuberculosis data for 459 Upazilas were analyzed. The means of Tuberculosis notification rate for each cluster indicate that the clusters were clearly distinctive. So, according to the Annex-5.3, the clusters can be named according to mean Tuberculosis case notification rate shares as follows: (1) low Tuberculosis, and (2) high Tuberculosis. Cluster 1 i.e. low Tuberculosis (lTB) contained 167 (36.4 percent) Upazilas with a mean case detection rates of 45.23 (standard deviation of 11.79). The lower case detection rate Upazilas were in this cluster. Conversely, 292 (63.6 percent) Upazilas belonged to the high Tuberculosis (hTB) cluster with a mean case detection rate of 85.59 (standard deviation of 18.23). The high case detection rate Upazilas were in this cluster. Tuberculosis cluster wise Upazila list is illustrated in *Annex-5.4.*

The attached map of Bangladesh (*Figure-5.5*) shows the actual pattern of Tuberculosis cluster membership for Upzilas across the country.

5.5.2.2.3. Rural socio-demographic and Tuberculosis combined clusters

A cross tabulation technique by crossing socio-demographic clusters against Tuberculosis clusters split the Upazilas into six sub-clusters as shown in *Annex-5.5*. Each of the socio-demographic clusters split into two sub-clusters according to the Tuberculosis case detection rate. Out of 183 Upazillas in cluster one (high literacy, moderate health, low poverty), 131 or 71.6 percent and 52 or 28.4 percent went into the high and low Tuberculosis groups respectively. In the second socio-demographic cluster, (moderate literacy, better health, moderate poverty) 101 or 50.5 percent and 99 or 49.5 percent Upazilas went into high and low Tuberculosis clusters respectively. Similarly, 60 or 78.9 percent and 16 or 21.1 percent Upazilas of the third socio-demographic cluster (low literacy, poor health and high poverty) went into high and low Tuberculosis groups respectively. A full list of sub-clustered Upazilas is given in *Annex-5.6*. So, we can define each sub-cluster thus: (i) high literacy, moderate health, less poverty and low Tuberculosis or *sdc1lTb,* (ii) high literacy, moderate health, less poverty and high Tuberculosis or *sdc1hTb,* (iii) moderate literacy, better health, moderate poverty and low Tuberculosis or *sdc2lTb,* (iv) moderate literacy, better health, moderate poverty and high Tuberculosis or *sdc2hTb,* (v) low literacy, poor health, high poverty and low Tuberculosis or *sdc3lTb* and (vi) low literacy, poor health, high poverty and high Tuberculosis or *sdc3hTb*. These sub-clusters were deployed as the stratifying principle in constructing the sample of individual cases for micro-data collection. They enabled me to

Figure 5.5: Rural Tuberculosis cluster map



construct a sample representative in terms of the inter-relationships between the socio-demographic and Tuberculosis incidence characteristics of different areas in Bangladesh.

Surprisingly, nearly two third (71.6 percent) Upazilas of *high literacy, moderate health and low poverty* cluster went into the high Tuberculosis sub-cluster group. Analysis was done based on the 2001 socio-demographic census data conducted by the Bangladesh Bureau of Statistics. This demonstrated that most districts' Sadar (central of the district) and most urbanized Upazilas went into this cluster. Rich people normally live there as well as service holders and poor people who have migrated there. This makes these areas densely populated. So the rich and poor people in these densely populated areas live side by side. Available literature also demonstrated that population density and poverty are the favourable conditions for a high Tuberculosis incidence. That seems to be why most Upazilas from the first cluster went into the high Tuberculosis group.

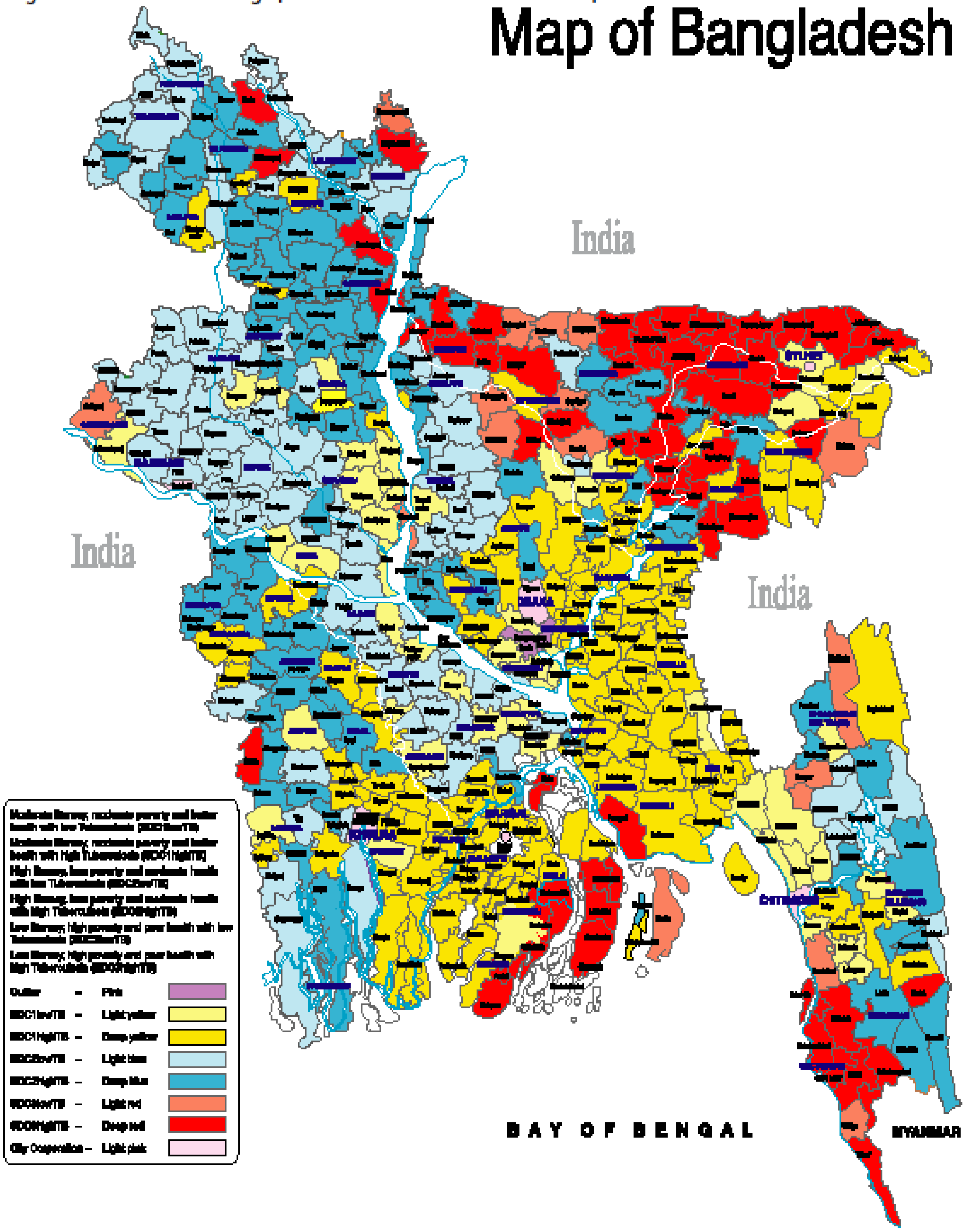
Upazilas of *moderate literacy, better health and moderate poverty* cluster divided almost equally between high and low Tuberculosis sub-groups. Again higher densely populated and relatively poorer areas within the cluster might be clustered into the high Tuberculosis sub-clusters. In the *low literacy, poor health and high poverty* cluster only 21.1 percent Upazilas went into the low Tuberculosis sub-group. This is much what would be expected from our knowledge of the relationship between poverty and Tuberculosis.

The attached map of Bangladesh (*Figure-5.6*) shows the actual pattern of socio-demographic and Tuberculosis sub-cluster membership for Upzilas across the country.

5.5.2.3. Urban sampling

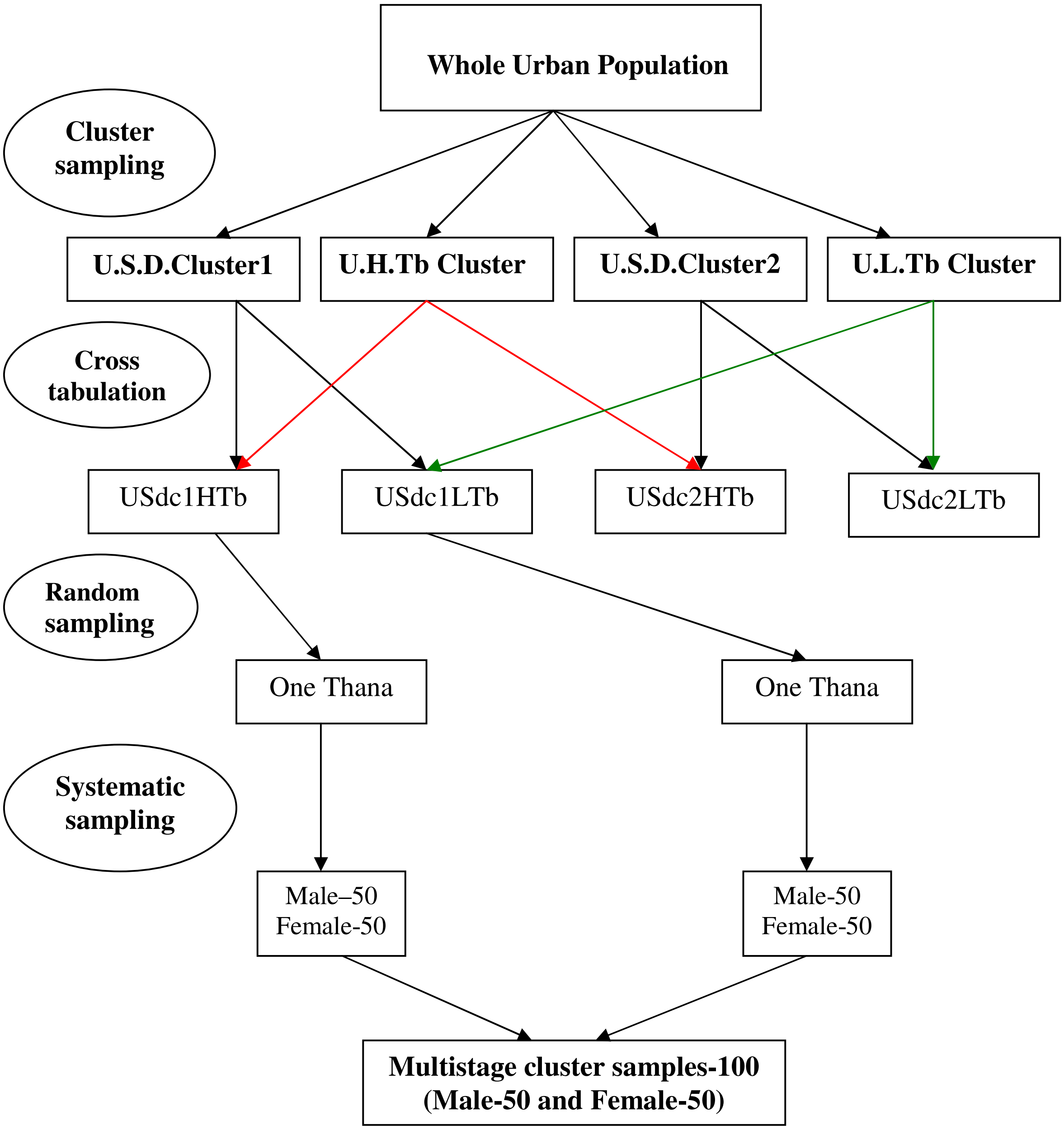
In the same way urban and peri-urban Thanas were first divided into 2 clusters based on the same socio-demographic variables used for rural areas and 2 clusters based on Tuberculosis case detection rate and finally 4 cross tabulated sub-clusters derived from the socio-demographic and Tuberculosis clusters. Then the Thannas containing a minimum of 40 male and 40 female cured or treatment completed new smear positive and negative patients were screened out from each sub-clusters to obtain the required number of sampled cured patients as the in-migration in urban areas is very high and difficult to trace them. Finally, 2 Thanas from 2 different sub-clusters of the capital metropolitan urban and peri-urban areas were

Figure 5.6: Rural socio-demographic and Tuberculosis sub-cluster map



randomly selected as illustrated in *Figure-5.7* because the dominant number of Thanas as well as containing required number of cured and completed cases for sampling came from the capital city. The framework of the urban sampling technique is illustrated in *Figure-5.7*.

Figure 5.7: Framework of urban sampling technique (Theme adopted from de Vaus, 2004)



5.5.2.3.1. Urban (Thana) socio-demographic clusters

Two socio-demographic patterns were identified from the TwoStep cluster analysis and *Annex-5.7* summarizes data for each cluster. During analysis weight was given to broad socio-demographic variables including population density, health status and household income as with the rural socio-demographic variables analysis. The means of the socio-demographic variables for each cluster indicate that the clusters were distinctive. So, according to the *Annex-5.7*, the clusters can be named according to their variable means as follows: (1) high literacy - better health – less poverty, and (2) lower literacy - poorer health – more poverty. Demographic profiles for the set and for each cluster are presented accordingly. The cluster wise list of the Thanas is given in *Annex-5.8*.

Cluster 1: higher literacy - better health – less poverty (usdc1).

Out of 42 Thanas, 27 (64.3 percent) belonged to the higher literacy - better health – less poverty cluster. Compared with the Thanas in other cluster, these were the most densely populated Thanas with a mean density of 34,193.66. The cluster also had a higher mean literacy rate of 68.84 in comparison to other cluster. Population density and literacy rates indicated that most central metropolitan areas accumulated in this cluster. Mean crude death and infant mortality rates were 3.50 and 44.85 respectively. The mean for household structure named *Jhupri* was 7.57% and *Kutcha* was 22.35%which indicated the better living standard of the population. The percentages of household income from agriculture, employment, business and agricultural labour were 1.30, 36.56, 26.59 and 0.80 respectively. Data indicated that the household incomes were dominated by employment and business. So, the population of this cluster was richer in comparison to the other clusters.

Cluster 2: lower literacy - poorer health – more poverty (usdc2).

Fifteen out of 42 Thanas (35.7 percent), belonged to the lower literacy - poorer health – more poverty cluster. These were the less densely populated Thanas with a mean density of 11,262.03. The cluster also had a lower mean literacy rate of 63.48. Population density and literacy rates indicated that most peri-urban areas are in this cluster. Mean crude death and infant mortality rates were 7.07 and 89.40 respectively, which was higher than the other cluster. The mean for household structures named *Jhupri* was 10.52 and *Kutcha* was 35.11 which was higher than the other cluster and indicated that comparatively poorer people lived in these areas. The percentages of household income from agriculture, employment, business and agricultural labour were 2.87, 38.16, 18.64 and 2.54 respectively. Though the household income was highly dominated by employment and business, this was a little less so than for the other cluster. So, the population of these Thanas was poorer in comparison to other clusters.

5.5.2.3.2. Urban Tuberculosis clusters

Applying the same technique of TwoStep cluster analysis, urban Thanas were divided into two Tuberculosis clusters and *Annex-5.9* summarizes data for each cluster. During analysis weight was also only given to Tuberculosis case notification rate (percent of new smear positive Tuberculosis cases identified against a target based on estimated incidence) because this is the main parameter used to assess case detection for respective geographical areas. The mean Tuberculosis notification rates for each cluster indicate that the clusters were distinctive. So, according to the *Annex-5.9*, the clusters can be named according to mean Tuberculosis case notification rate shares as follows: (1) high Tuberculosis, and (2) low Tuberculosis. The high Tuberculosis (uhTb) cluster comprised 18 (42.9 percent) Thanas with a mean case detection rates of 109.22 (standard deviation 30.91). 24 (57.1 percent) Thanas belonged to the low Tuberculosis (ulTb) cluster with a mean case detection rate of 53.50 (standard deviation 14.39). A list of cluster wise Thana is in *Annex-5.10*.

5.5.2.3.3. Urban Socio-demographic and Tuberculosis clusters

The relationship between socio-demographic and Tuberculosis clusters was analyzed through applying a cross tabulation technique which divided them into four sub-clusters as shown in *Annex-5.11*. Each socio-demographic cluster divided into two sub-clusters according to the Tuberculosis case detection rate. Thanas of the first socio-demographic cluster (higher literacy, better health, less poverty) were divided into two sub-clusters of 10 or 37 percent and 17 or 63 percent in the high and low Tuberculosis groups respectively. Eight or 53.3 percent and 7 or 46.7 percent Thanas of the second socio-demographic cluster (lower literacy, poor health, more poverty) went into the high and low Tuberculosis groups respectively. The list of sub-clustered Thanas is attached in *Annex-5.12.* So, the sub-clusters can be defined according to their composition and nature as (i) higher literacy, better health, less poverty and low Tuberculosis or *usdc1lTb,* (ii) higher literacy, better health, less poverty and high Tuberculosis or *usdc1hTb,* (iii) lower literacy, poor health, higher poverty and low Tuberculosis or *usdc2lTb* and (iv) lower literacy, poor health, higher poverty and high Tuberculosis or *usdc2hTb.*

Surprisingly, 37 percent out of 27 Thanas from the *higher literacy, better health and less poverty* cluster went into the high Tuberculosis sub-group. Normally well-off and high ranked employees live in metropolitan areas. However, lots of poor and young people have migrated to the metropolitan cities especially in the capital in recent times in the search of better income especially in the booming readymade garments industry (Personal experience). Most of these people live in unhygienic slum conditions in metropolitan locales called peri-urban areas. Poverty and poor housing conditions favour Tuberculosis transmission. These factors may be causal to the high Tuberculosis incidence as well as high case detection rate in some areas of this cluster. Moreover, rich people prefer private rather than public health facilities for the treatment of Tuberculosis in order to maintain secrecy (Personal experience). On the other hand Thanas from the *lower literacy, poor health and more poverty* cluster divided almost equally into the high and low Tuberculosis sub-groups. These were mainly peri-urban areas and lots of poor migrant people lived in different pockets as mentioned earlier. They also deprived of central tertiary level health facilities because there were no public health facilities in peri-urban areas. So Tuberculosis incidence is high in some areas especially among garment workers who live in these areas (personal experience). Moreover, different operational strategies such as semi-active or passive case finding techniques are applied by different programme implementation agencies because public health facilities are not available in urban and peri-urban areas. That is to say the surprising fact those poorer urban areas are less likely to be in the high Tuberculosis sub group than more affluent urban areas may reflect poor detection rates in those areas. We must always remember that these classifications are of relatively large local government units which may have a high degree of differentiation within them.

5.5.3. Final sampling of required cases

Then individual new smear positive and negative cases of the above mentioned period were identified, sorted by gender, from the respective sampled Upazila and Thana Tuberculosis registers. In this process only those patients who were locally available alive and aged 15 years or more were included. Re-treatment cases were excluded from the study because they have a long treatment history and it would be difficult to record costs for discrete episodes separately. Extra-pulmonary cases were excluded because the number of patients was small and those have a different character and treatment duration. Patients below 15 years of age were excluded because the study focused on the consequences in relation to adults of normal working age in Bangladesh. Finally, the required number of 25 male and 25 female new patients was selected separately by a systematic random sampling technique from each Upazila to make the sample gender representative.

Systematic sampling is a simple form of simple random sampling. To obtain a systematic sampling frame, a sampling fraction or interval was established for each selected area by dividing the gender sorted total number of patients by the required number for the sample size. The first case was selected randomly within the range of the sampling fraction and then the cases were taken within the regular interval as per the sampling fraction (deVaus, 1991; p64). Male and female patients were sampled separately to avoid the problems of periodicity of sampling frames occurred in systematic sampling i.e. possibility of reoccurrence of either male or female patients at regular intervals within the sampling frame as well as in order to get an equal number of male and female patients.

Non-responsiveness from selected sample members in this study was due to death, unavailability and migration of cases or un-interviewable cases. Non-response can create two main problems of unacceptable reduction of sample size and bias. According to de Vaus, there is a chance of 20 percent non-response even when applying good interviewing techniques (de Vaus, 1991; p73). These problems were overcome by careful attention to the data collection method and scheduling the interview according to patient's convenience. In order to achieve an completed large sample 64 cases from each rural Upazilas and 70 cases from each urban Thanas were selected systematically although the required sample size is 50, because there was always a chance of 25-40 percent missing or non-responsive cases which varied between rural and urban areas based on personal experience.

The sample was multi-stage, an absolutely standard approach when seeking to conduct a national level study and use the possibility of classifying at the first stage using information available for sampling units at that stage, in order to enhance the representativeness of the sample at the final stage when stratifying information is not available. It is for example the approach that was adopted for the UK General Household Survey. There has been some discussion raised by Hongjian et al. (1996) regarding the issues in relation to developing in particular logistic regression models using multi-stage survey data. As they stated that there is no issue in relation to the production of descriptive population quantities. However, their concern is focused on the use of area level measures in the causal model, for example incorporating area level air pollution data in a model where the effects are observed for individuals. This is not done at all here. All terms entered into models describe individuals in terms of attributes of themselves or their households and there is no cluster sampling at the household level. There can be an argument that for example such an approach ignores the impact of differential distribution of incomes within households. Bluntly put there is no simple way round this and elaborate random effects models might be statistically elegant but actually seem to offer little advantage in relation to exploratory objectives.

5.6: The Sample as achieved

Patients were chosen applying a systematic random technique from the registration records so as to make the sample gender representative and achieve a sample of the desired size. A total of 908 cases (458 male case and 450 female cases) were sampled to get the finally interviewed 707 cases. The response rate was 77.9 percent and an achieved sample proportion at this level is generally considered entirely satisfactory. A total of 78 cases of which 24 were reported died and 54 migrated out in rural areas and in urban areas it was 5 and 33 cases respectively out of a total of 38 cases during the survey.

The study was conducted among the smear positive and negative new Tuberculosis cured and treatment completed patients registered in sub-districts (Upazila) health complexes at rural and NGO clinics and in the urban areas from May 2006 to April 2007. A total of 707 cured and treatment completed Tuberculosis patients (353 male and 354 female) were interviewed in 14 geographical areas of which 12 from rural sub-districts and 2 from urban and peri-urban areas. Sample size depends on the factors like the degree of accuracy required for population characteristics of the study. A bigger sampling size means a smaller sampling error. However, reducing the sampling error below 3.0 would have required huge increase of sample size. For example, reducing sampling error from 3.0 percent to 2.5 percent requires that the sample be increased by 500 cases. Factors like representation of sufficient numbers drawn from subgroups taking into account age, sex etc. also increase sample size. So the final sample size should be decided based on the compromise among accuracy, cost and sufficient subgroups for meaningful analysis (de Vaus, 1991; p71).

Among the samples of 707 cases, the sampling error was 3.7 percent at a 95 percent confidence interval. Though the sample included only 0.64 percent of reported new smear positive and 0.20 per cent of new negative Tuberculosis cases within the study period, a sufficient number of sex wise subgroups were interviewed with a male and female ratio of 1:1. However, the original case detection ration of male-female in 2006 was 2:1, which means a disproportionate number of female cases were interviewed to make the analysis more fruitful and significant. This means that the presented results must be weighted when describing characteristics of the whole sample so as to take account of the implications of the over representation of female cases. So ‘weighting’ was applied when the whole sample was considered as unit by taking half of the female cases but this was not applicable when the sampled data analyzed on a gender wise (male and female) basis. However, this reduced by 50 percent the number of female patients and 25 percent the number overall of cases, although information from all respondents contributes to the analyses. Necessarily weighting and consequent reduction of total numbers of cases for analyses has an effect on the ability to identify statistical significance of differences but this is not great and will only render small differences statistically insignificant, which differences are not likely to be substantively significant in any event.

5.7: Ethical considerations

Tuberculosis is a major public health problem in Bangladesh and still stigmatizes patients and is a source of discrimination. Prior approval for conducting this study and gathering data from the sampled study units was obtained both from the Ministry of Health, Bangladesh and respective implementing agencies. Data were collected through face to face interviews. The concept of voluntary and informed consent was applied to the community as a whole and to each individual member who was a subject of research. Before conducting the interview, a written consent form was read to the prospective participant irrespective of their socio-economic status and educational levels explaining about the objectives of the study. Clarification was also made whenever necessary. The interview was conducted after the investigator was sure that the participant understood the contents well and that they had no obligation to participate to provide information. A written consent was signed or finger printed by the participants after agreeing to participate. Based on this each participant had the right to enter the study or to refuse, to depart the study even after the consent was signed, and to refuse to answer any of the questionnaire questions. The interviews were conducted in a fair, honest, impartial and transparent manner and records and data will be maintained for a reasonable period. The research was conducted to benefit all human kind and not just the socially better off. The name and address of the patient was entered in the computer only for analysis and kept confidential and will not be disclosed without valid legal reasons. No compensation was given for their time lost. The interviews took place in patients' houses to maintain privacy. Given the sensitive nature of the study, confidentially of the data was maintained throughout the study period and analysis. From the results of the study feed back will be forwarded to the NTP for further action. A sample consent form attached in *Annex - 5.13.*

5.8: Data collection tool

A structured mixed pre-coded and open ended questionnaire was developed to collect quantitative data and is attached in *Annex-5.14*. The development of the questionnaire in English was formatted by the conceptualized pathways of literature review and the practical field experiences of the researcher. The original questionnaire was translated into *Bangla* for pre-testing and finally used as a tool during face-to-face interviews. The instrument was first reviewed for content validity to determine its ability to measure what it was intended to test by researchers and programmers experienced in this field. Then the questionnaire was pre-tested in a village outside the sampled study areas for ascertaining consistency, appropriateness of language, sequencing of the questions and in order to have an insight into the field operation procedure. Modification, rephrasing and editing of the questionnaire was done in the light of received feed-backs from both proceedings. The easily understandable questionnaire was backed up by an instruction manual.

The questionnaire was divided into three parts. The first part of the questionnaire included demographic and socio-economic variables such as age, sex, occupation of the patient and caregiver, education level, earning source and socio-economic status of the family. The second part of the questionnaire included questions concerning the onset of symptoms and their duration, diagnostic history of the disease, health service utilization for the current illness episode as well as detailed information on activities during contacts with each separate health care provider prior to the visit to the NTP authorized facilities, causes and beliefs regarding the choice of various health service providers. The last part of the questionnaire included health service factors linked with consequences of Tuberculosis such as distance to health facilities, costs of travel and medical expenditure on treatment of Tuberculosis related symptoms, impact of the cost on family and the coping strategies. Each interview schedule lasted approximately 60 to 75 minutes per participant and allowed for careful probing of responses to minimize recall bias.

5.8.1. Operationalize the data collection tool

The main findings I intend to explore are the economic and social costs incurred by the Tuberculosis patients and their families, delays prior to receiving proper anti-Tuberculosis treatment, coping strategies adopted by the patients to overcome the economic and social burdens of the disease episode, and the economic and social situation of the patients and their family after completion of the treatment. So the data collection tool (questionnaire) was designed by incorporating relevant socio-demographic, economic, health, costs and consequences related variables as suggested by the literature review and personal experience.

5.8.1.1. Socio-demographic and economic variables

Socio-demographic and economic variables describe the characteristics of the patients and their family and demonstrate their status. The literature review indicated that socio-demographic and economic characteristics might influence treatment seeking behaviour. So the variables in the questionnaire named *age*, *sex*, *marital status*, *religion* and *educational statuses (Q-1 to 5) are* important for exploring the socio-demographic attributes of patients. The variables in the questionnaire named *earners (Q-21 and 22)*, *sources (Q-25 and 26)* and *monthly family income (Q-27)* are important for exploring the nature and extent of patients' family income before illness. Similarly, the variables named *earners (Q-23 and 24)*, *sources (Q-28 and 29)* and *monthly family income (Q-30)* are important for exploring the nature and extent of patients' family income after completion of treatment. Moreover, the questions *(Q-31 and 32)* and *(Q-33 and 34)* explore the nature and extent of patients' personal occupation and income of before illness and after completion of treatment respectively. These variables are also important in enabling comparison of the economic burden, delay and consequences for households of different kinds.

5.8.1.2. Diversion and contacted health providers

People have a tendency to contact nearby and previously known health providers to seek health care first which is the essence of the diversion process. During my programme implementation supervisory visits I became aware that the patients spent lots of money by visiting several health providers before contacting the proper Tuberculosis treatment unit as a result of diversion. They also cited various personal, familial, social and health service related issues as the cause of diversion process. The literature review demonstrated that Tuberculosis patients contacted several health providers multiple times before enrolling proper treatment, although the literature subsumed this under health system delay rather than exploring it in more detail. So the variables named *patients' perception about the disease (Q-9)* and *the causes of contacting other health providers rather than UHC/NGO facilities (Q-16)* in the questionnaire explore the causes of diversion. Moreover, out of pocket expenditure experienced by the patients and their family was directly linked with the nature of and times contacted with health providers. So the variables named *first contacted health provider (Q-13)*, *other contacted health providers (Q-14)* and *times contacted health* *providers (Q-15)* in the questionnaire are important for exploring the nature and extent of patient's route towards seeking treatment and the use of multiple health providers which through the diversion process leads both to higher delay duration and to increase in the various costs incurred by the patients and their families before the proper Tuberculosis treatment enrolment.

5.8.1.3. Delays

Practical experience revealed and relevant literature review demonstrated that Tuberculosis patients had experienced various amounts of delays. Patients experienced delays at different stages from their first experience of Tuberculosis symptoms to the initiation of proper treatment. Delay which is the outcome of diversion is also linked with the severity of the disease and with direct and indirect costs. So the questions named *duration of first symptom appearance (Q-10)*, *duration of first contact after the experience of symptoms (Q-11)*, *duration between first symptom and reporting to the proper treatment (Q-18)*, *cause of first contacting late (Q-12)*, *duration between initiation of treatment after contacting UHC/NGO health facilities (Q-19)* and *cause of treatment start late (Q-20)* are essential for exploring the nature and extent of various kinds of delays: health seeking delay, health providers delay, patients delay health system delay and total pre-treatment delay.

5.8.1.4. Various costs incurred

Both the literature and my personal experience show that multiple contacts with health providers before getting to effective treatment results in substantial costs for patients and their families. So, the questions named *medical costs (Q-36)* and *patients and caregivers non-medical costs (Q-37 and 45 respectively)* before treatment explore the nature and extent of direct costs before treatment. Patients also spent money to treat the associated diseases and complications during the treatment of Tuberculosis. Moreover, there is a belief in the community that Tuberculosis patients should take more nutritious food to cope with the strength of the medicine. So, the questions named *medical costs (Q-46)* and *patients and caregivers non-medical costs (Q-47 and 55 respectively)* in relation to costs incurred during treatment explore the nature and extent of these direct costs. In addition, patients lose productive time due to inability to perform their duties during the disease period as well as caregivers losing time and money when accompanying and caring for the patients. So, the questions named *professional time loss before and during treatment (Q-38 and 48 respectively)* and *professional income loss before and during treatment (Q-39 and 49 respectively)* explore the nature and extent of patients' indirect costs during the whole Tuberculosis episode. Similarly, the questions identifying the *type of caregivers (Q-40 and 41before treatment and 50 and 51 during treatment respectively),* their *professional time loss before and during treatment (Q-43 and 52 respectively)* and *professional income loss before* and *during treatment (Q-44 and 54 respectively)* explore the nature and extent of caregivers' indirect costs during the whole Tuberculosis episode. The data collection instrument contained questions designed to elicit information on all these aspects.

5.8.1.5. Coping strategies and other consequences

Patients and their families try to make up the extra expenses due to contacting multiple health providers before reporting to the proper treatment facilities and special food expenses during treatment through different mechanisms. So, the question named *managing the extra expenses (Q-56)* explores the nature and extent of coping strategies during the whole Tuberculosis episode. There are also sometimes devastating personal consequences for patients including separation and divorce. Patients also sometimes face social and psychological problems. Both the literature review and personal experience suggested that these things matter. So, the questions named *consequences on patient's personal/daily life (Q-35), social and psychological consequences (Q-57) and change in dwelling (Q-58)* explore the nature and extent of various other consequences faced by the patients during the whole Tuberculosis episode. Again the data collection instrument contained questions designed to elicit information on all these aspects.

5.8.1.6. Economic status and consequences

The literature review indicated that the economic status of patients and their families before the Tuberculosis episode was of significance. A major objective of the research was to explore the various costs incurred by the patients and their families and to assess the long term economic consequences patients' households through and after the Tuberculosis episode. Again the data collection instrument contained questions (27 and 30) designed to elicit information on all these aspects.

5.9: Data collection and editing

The questionnaire was administered in face-to-face interviews to elicit the intended information from each of the respondents. The original intention was that interviews for 150 cases would be conducted by me to make the study more reliable and authentic and rest of the interviews would be conducted by the locally recruited independent interviewers. Accordingly two interviewers (one male and one female) from each of the two sampled geographical areas (one rural and one urban area) were recruited through interview, so as to overcome language and cultural barriers during field interview. A two days training of the selected interviewers were conducted in both Bangla and English covering the content of the questionnaire, techniques to elicit more information, and strategies to establish rapport to obtain complete and accurate information. The training consisted of classroom lectures and role-playing, practice session in the village outside the study area and debriefing sessions at the end of each day. However, the plan was given-up after the completion of data collection of the respective two areas conducted by the interviewer and it was decided to conduct remaining interviews by me. The decision was taken based on the review of collected data, direct observation of taking interview by the interviewers, reluctance of interviewers to revisit the clients to collect left-out and incomplete information and unavailability of suitable as well as confident interviewers at remote geographical areas. Recruitment of interviewers centrally was also impossible due to resource and time constraint.

A preliminary interview plan was structured in each of the randomly selected Upazilas or Thanas before conducting interviews so as to complete the actual work as properly as possible within scheduled time. First, the randomly selected probable respondents were divided into 3-4 groups based on their location within the respective geographical area and a route plan with probable interview date was prepared accordingly. Secondly, the probable respondents were informed 2 days prior to interview to stay in their house according to their convenient time and the preliminary interview plan was finalized accordingly with the help of local BRAC staff. Family members or relatives were requested to inform the probable respondent if anybody was absent during pre-contact to ensure their presence on the scheduled date of interview so as to reduce the non-response as much as possible. BRAC staff from the respective area was mobilized to inform interviewees and ensure the presence of the probable respondent at their home. If any probable respondent was identified permanently absent due to death or permanent migration, then the next nearby same status (age, sex and education) probable respondent within the sample was interviewed to fulfil the quota of the respective geographical area so as to avoid the bias. A locally occurred event schedule of the last two years from the interview date was gathered to help the clients to recall different time duration more accurately during interview.

Interviewees were visited in their own homes to conduct the interview as well as visually validate the given information whenever possible. The duration of each interview was 60 to 75 minutes. In this process, all completed questionnaires were checked immediately after the completion of the interview and missing information was collected through revisiting the interviewee whenever necessary. A representative portion of patients were revisited in each geographical area to enhance the reliability and validity of the information.

After obtaining the informed consent, information was collected regarding socio-economic and demographic profiles, delay in diagnosis and treatment, cases of delays, particulars of employment, income and assets of the patients and their family, expenditure incurred during illness, effect of illness on normal activities and employment, source of finance for expenditure during illness and the effect of the illness on family especially on women and children with special reference to schooling. Participants were asked to estimate the time in months or weeks they had been experiencing the major presenting symptoms named cough, chest pain, fatigue, fever, night sweats, chills, anorexia, weight loss along with the initiation of Tuberculosis treatment. The duration of each symptom onset and the treatment seeking pattern was recorded by me after probing it in different way. For example, if a patient had anorexia for over a year, but was seeking medical care for a cough or fever of one-month duration, the latter was taken as the duration of illness. If a participant did not have accurate recall of symptom onset, prior collected validated event calendars of significant local events such as memorable religious and political events and holidays, were offered in an attempt to improve recall. Respondents were also given the opportunity to explore answers in an open-ended fashion. During the interview, particular care was taken to collect information regarding the first point of seeking care, and to identify the various health providers visited by the patient, the type of treatment given, its price and related expenditures to identify various delays and costs.

During the interviews, the date of consultation, type of health facility visited, time to diagnosis, accompanied person, mode of transport and travelling time from the patient's house to the health care provider were determined as reported by the patients. Moreover, each health encounter and the associated expenditures and lost of income incurred by the patient and caregivers while seeking care for Tuberculosis symptoms were also recorded. Patient register cards, Tuberculosis registration books and laboratory registries and other available resources were used as well to crosscheck so as to assure the quality of data. When the patients had documents such as prescriptions or bills issued by their health care provider these were reviewed to confirm the date of consultations and amount of expenditure. Moreover, accompanying persons and available family decision makers were also asked about the encounter with the health providers and relevant cost to crosscheck the quality of the information provided by the patient when ever it was necessary.

Family impact was assessed by obtaining the information regarding the disease burden on individuals and the financing methods that patient or their households use. Information regarding individual sufferings such as avoiding by society, humiliation by in-laws, temporary or permanent separation from family and disability was accumulated during the interview. Information was also obtained to assess the effect of illness on schooling and care of the children. Issues like humiliation by in-laws and separation was also cross-checked with neighbours whenever necessary. Conversely, information on detailed financing methods that patient households used, including out-of-pocket payments, bank loans, the sale of household assets, and transfer payments from private sources other than patients' household members was also elicited during interview. After completion of each interview the consent form was attached to the respective questionnaire.

5.10: Data preparation and analysis

5.10.1. Data preparation

The Statistical package of social science version 14 (SPSS 14.0) was used for data analysis. During and after data entry, rigorous quality control checking was performed in order to

ensure a high degree of completeness and internal consistency. The use of SPSS 14 made the data processing easier in the way of categorizing, coding, and summarizing the data on master sheets. Coding conventions i.e. using the same coding for common responses was followed during data processing. Moreover, the data was double entered into the computer and the two copies of the data verified to ensure the overall quality of the data.
Data were validated throughout the interview by repeated questioning and comparison of patient cost information with known market prices. In order to present costs within the economic context of Bangladesh, data are primarily presented as a percentage of the patients' mean monthly per capita family income. All costs were calculated in terms of Bangladeshi currency and converted to United States dollars based on study period exchange rate of US$1=Tk. 68. A preliminary analysis using descriptive statistics and graphs was also performed. Some contentious variables named age, personal income, family per capita income, times contacted health providers and delays were collapsed into groups and the numbers of other categorical variables were collapsed to analyze the data as per research questions.

Delay in weeks and days were presented as medians, means and proportions. A cut off point of 21 days for patients' and 6 days for health systems' and one month for total delay was employed to dichotomize the sample into either an acceptable or longer delay period. The decision was made based on National Tuberculosis technical guidelines 2006. Another study also employed 30 days and 3 days as cut off points for total delay and health system delay respectively (Pirkis et al, 1996). Results were presented using sentences, tables and graphs.

Incomes were calculated based on the information given by the patients; these were verified with the prevailing rates in the community, wherever available. During the interviews patients were questioned in depth about the loss of work days during their illness. Seasonal or sporadic activities did not interfere with the findings of the study, as costs were calculated from the actual loss of income incurred by the patient. Indirect costs were calculated for both working and non-working male and female patients and their caregivers, in order to avoid a male-female bias. Indirect costs were computed for unemployed men and women using the available local rates their counterparts, as the time lost on account of non-labour activities are difficult to assess in financial terms. For example, costing of time lost by a housewife as a patient or to care a sick person was calculated based on the locally available Maid servant rate for the same time. Costing of student time loss as patient or caregiver was also calculated based on the extra time and money they have to spend at their respective institution.

5.10.2. Data exploration, analysis and description

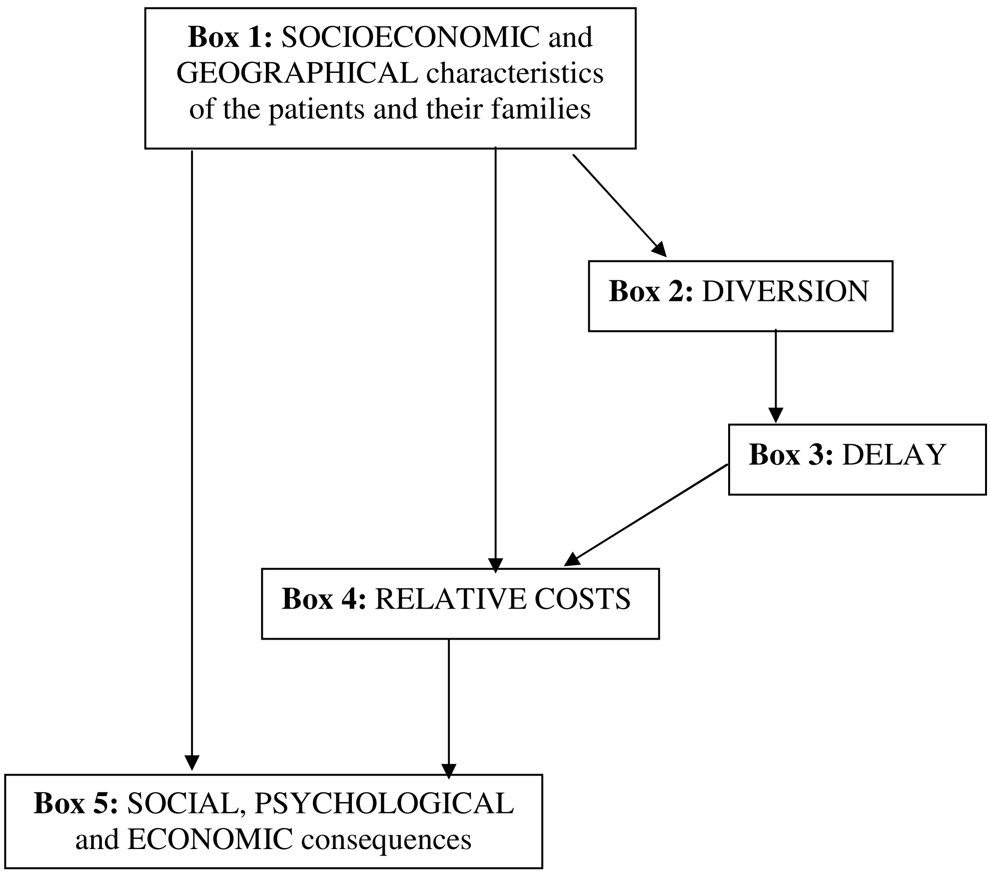
For the purpose of answering the study questions various modes of analysis and presentation were performed both to represent individual variables and for exploring the association and relationship among variables. The purpose of these approaches was three fold. First, and this is important, the socio-demographic data has been used to generate descriptions of the situation. That is to say this large scale and original survey tells us a great deal about patients who get Tuberculosis in Bangladesh in relation to a whole variety of background characteristics. It tells us a great deal about the actual experience and processes of the Tuberculosis episode in terms of diversion, delay, costs, and ultimate economic impact on households. The simple establishment of these things represents an important contribution to knowledge. Second and this can be understood as an intermediate stage, it enables us to differentiate among Tuberculosis patients and their households in relation to a whole variety of background factors in terms of socio-economic and geographical variation on the one hand, and diversion, costs, delays, and economic impact on the other. I would prefer to describe this as an intermediate stage because the establishment of associations is an important precursor of any exploration of causal processes. Finally, I am interested in causality since it is by understanding causal processes that attention can be directed towards appropriate interventions. Based on the above discussion, I am outlining a general conceptual model of causality here thus -

The figure below describes a kind of set of pathways of relationships and the purpose of statistical presentation in this thesis is to describe each of the sets of elements represented by each text box above, to explore relationships among those sets of elements on a bivariate basis, and to try to model the whole set of relationships towards social and economic consequences in a straightforward fashion.

5.10.2.1. Socio-demographic and economic variables

Individual variables in this set (*Box-1*) have been described using statistical and graphical methods appropriate for their level of measurement. Bivariate associations among variables have been explored using appropriate tests for level of measurement including One way ANOVA, Kruskal Wallis ANOVA, and the Non-parametric median tests. Relationships between categorical variables have been explored using cross tabulations and appropriate measures of association. In all cases attention has been paid to the significance level associated with relationships and only those which are statistically significant are discussed in the findings sections. The purpose of these approaches was to enable a comprehensive description of the characteristics of the sample and to explore how several of those characteristics were related to each other.

Figure 5.8: Framework of causality in relation to elements of the experience of Tuberculosis episode.



5.10.2.2. Diversion

Similar approaches were deployed to describe the nature of diversion (*Box-2*) as experienced by the cases in the sample. However, for this and subsequent topics the intention was not only to describe but also to explore for possible causal associations. This latter purpose was addressed through techniques describing strength of association.

5.10.2.3. Delay

The various components of delay (*Box-3*) were described in the same way as previously outlined. Tests of association were deployed in order to establish significant associations with variables which might be considered as causal to elements of delay. Here some variables were measured at a scalar level so tests of association included the use of correlation coefficients. Particular attention has been paid to 'excessive delay' understood in terms of delay of more than 30 days from initial recognition of symptoms to initiation of effective treatment. This has been described in binary terms i.e. did or did not have a delay of more than 30 days. The factors associated with this level of delay have been explored using Binary Logistic Regression.

5.10.2.4. Economic costs and economic and social consequences

The various elements in this set were described in the same way as previously outlined (*Box-4*). Here there was a particular focus on household income change in relation to a set of precursor variables. Of particular interest was the way in which the Tuberculosis episode impacted on households which were at different levels in the income distribution before the Tuberculosis episode. Incomes were operationalized in relation to information about decile levels of income distribution in Bangladesh. The focus was always on total family income because it was inappropriate to use either per capita family income or equivalized family income in the Bangladesh context. This is because of the way in which families at lower income levels rely on mobilizing all members of whatever age and mobilizing resources in a way which is radically different from households at the top end of the income distribution. The factors associated with this level of total costs as percentage of family income have been explored using Multiple Logistic Regression. Particular attention has been paid to family income change after completion of treatment. This has been described in binary terms i.e. family income *decreased* (lowest to 10 percent increase) and *increased* (above 10 percent increase). The factors associated with this level of income change have been explored using Binary Logistic Regression.

The statistical methods employed in the description and analysis of the acquired data has been deliberately kept relatively simple and straightforward. Much of what is given here is simple description of attributes in terms of summary statistics for those measured at a ratio scale level and frequency counts for categorical variables. The tests of significance of difference and association have been applied to facilitate distinctions, particular distinctions by gender, urban / rural location, household income level, educational level, occupation, and marital status. These tests have been applied to see if statistically significant differences exist and to identify those differences which have substantive importance so as to facilitate the development of targeted interventions where appropriate. The use of logistic regression is intended not to develop causal models but rather in line with Goldthorpe's insistence on description as the primary objective of quantitative social research:

… the whole statistical technology that has underpinned the sociological reception of the idea of causation as robust dependence, from Lazarsfeldian elaboration through to causal-path analysis, should be radically re-evaluated. That is to say, instead of being regarded as a means of inferring causation directly from data, its primary use should rather be seen as descriptive, involving the analysis of joint and conditional distributions in order to determine no more than patterns of association (or correlation). Or, at the very most, representations of the data might serve to suggest causal accounts, which, however, will need always to be further developed theoretically and then tested as quite separate undertakings.' (Goldthorpe, 2000; p152-3)

Here the emphasis is on identifying factors which can inform practice by seeing which elements in a model matter and which do not.

It would certainly be appropriate to carry out cluster analyses using attribute data at the individual case level and seeing how the clusters generated are related to delay and costs. This has been done but the typologies generated have little explanatory power that is the differences identified were not significant. This will be noted where appropriate in the findings chapters. More pertinently the data might have been analyzed using a QCA approach and that could certainly be done in a future analysis of the data set. This would require data reduction to generate a much more limited set of attributes for input into the QCA and this will be done in subsequent work. Here the emphasis has been on the use of methods which are straightforward, yield useful information for policy development and practice through enabling targeting, and will be familiar to those who need to be convinced of the value of the findings of the study in relation to development and modification of policy and practice. Interestingly the methods used are similar in kind to those deployed by Bradbury (1933) in his classic study of Tuberculosis and factors associated with it carried out on urban Tyneside in the 1930s when Tuberculosis was an even more severe health problem in the UK than it is now in Bangladesh. The socio-demographic and economic characteristics of the interviewed sample will be discussed in the next chapter.

Chapter 06: Socioeconomic Characteristics of the Patients – Who have had Tuberculosis in Bangladesh

Tuberculosis is a great challenge to public health in Bangladesh. Early case detection followed by the initiation of effective chemotherapy is the key factor for controlling the disease most effectively. Conversely, delays in diagnosis and initiation of treatment enhance morbidity and mortality at the individual level as well as increasing the risk of transmission at the community level. Reviewed studies from the literature have demonstrated different patterns of delay and identified associated factors of significance in relation to it. These include gender, age (especially middle and older age), education, geographical location, the status of migrant from a high prevalence country, severity of symptoms, economic status of the patient, distance from health facility, occupation of the patient (especially unemployment), type of first contacted health provider, number of health care encounters, accessibility to public health facilities, patient's attitude and practices, and patient's perception of the nature of Tuberculosis. Similarly another set of reviewed studies have revealed various kinds of costs and consequences experienced by the patients and their families including the associated factors significantly related to them. The factors were almost similar to delay include gender, age, geographical location, family economic status, distance from health facility, type of first contacted health provider, number of health care encounters, use of expensive diagnostic tools and the delay itself. Taking into account both the findings of the reviewed literature and the author's own field experience as a senior Tuberculosis control public health manager, it is appropriate to investigate whether similar delay and costs patterns and associated factors regarding Tuberculosis treatment exist in Bangladesh.

In this chapter, the socio-demographic characteristics of the interviewed patients including smear status of the patients, household size, age, gender, marital and educational status and economic characteristics named personal occupation and family and personal income of the patients will be explored and presented deploying appropriate statistical tools. When statements are made on the basis of the sample as a whole, the female cases have been weighted at 0.5 as described in the discussion of sampling in Chapter Five. When it is appropriate to treat the sample as composed of two separate samples, that is when making statements only about male or female respondents or in comparing male and female respondents, then weighting is not applied. Patients' household family income before illness varied in relation to household population size but most patients came from nuclear families with 1 or 2 earners with different earning capacity. So the income was calculated as household income and split then into income deciles accordingly. Patient's gender and area of residence (urban-rural) based were examined in detail as the literature has indicated these are generally important factors in relation to Tuberculosis episode experience. The statistical tools of frequency and comparison of means were used to explore gender and urban-rural area wise means and median differences. Also the Independent samples T-test, ANOVA and Nonparametric median tests were used to assess the statistical significance of differences. Cross tabulation was deployed to explore gender and urban-rural area wise patterns of socio-demographic and economic factors including age group, marital and educational status, personal occupation and income quintiles, and family per capita income deciles. Column and row percentages were used to assess the contribution of components of each variable. Pearson Chi-square and Cramer's V were used to assess the significance and strength of bivariate associations. So in this chapter I have a description of the characteristics of the patients complemented by an exploration of differences among the patients in relation to a set of factors which the literature suggests are of importance. The procedures used for exploring difference enable me to establish if observed differences meet the standard criterion for statistical significance. This is the pre-requisite for any consideration of them but of course with a relatively large sample such as is the case here we may find statistical significance for quite small differences which are not substantively significant. So a combination of simple observation and measures of degree of association are deployed here to establish substantive significance.

The main findings have been presented in table form and graphically in the main text using simple tables and bar-charts and the supporting and complex tables and graphs are presented in the annexes. The findings are compared with the available national statistics to assess the relationship of sample and overall national characteristics, so as to identify differences between the population of Tuberculosis patients and the general population of Bangladesh.

Such differences are the first thing to identify in relation to the development of targeting programmes.

6.1. Smear status of the patient

Seven hundred and seven patients from 12 rural and 2 urban geographical areas were interviewed in order to generate a geographically representative sample. These patients were diagnosed mainly in 2006 and out of 530 (weighted) patients 493 i.e. 92.83 per cent were *new smear positive* cases and 38 i.e. 7.17 per cent were *new smear negative*.[i] The pattern of smear status of the interviewed patients was identical to the national case detection pattern.

Table 6.1: Overall and gender wise socio-demographic and economic characteristics of the sample (Weighted 530 cases except gender) and 2001 census data

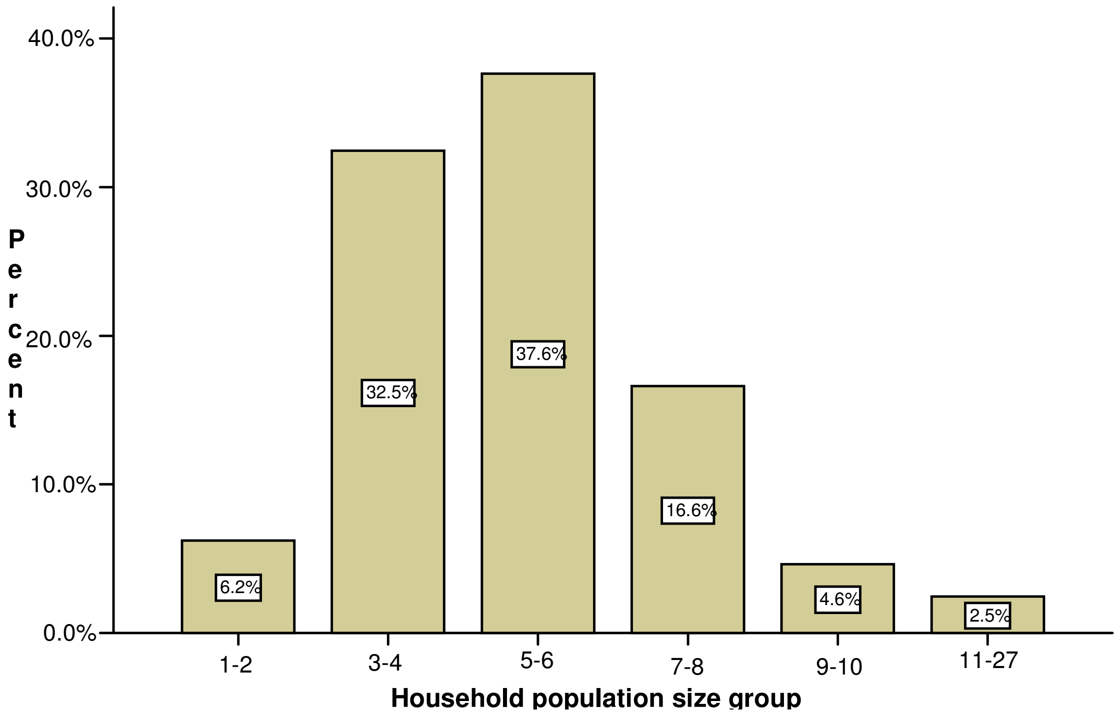
Socio-demo variables	Indica-tors	All		Male		Female		Significance
		Sample	2001*	Sample	2001*	Sample	2001*	
Household size	Mean	5.30	4.9	5.39	-	5.12	-	ISTT- .118
	Median	5.00	-	5.00	-	5.00	-	NMT- .058
Age	Mean	38.80	15.90	40.56	16.8	35.30	15.0	ISTT- .000
	Median	38.00	21.00	40.00	20.0	34.00	21.0	NMT- .000
Personal income before illness	Mean	41.78	-	57.36	-	10.70	-	ISTT- .000
	Median	29.41	-	44.12	-	5.88	-	NMT- .000
Family income before illness	Mean	99.54	112.35	101.52	-	95.59	-	ISTT- .474
	Median	71.58	-	74.26	-	63.60	-	NMT- .005
Family per earner income before illness	Mean	58.24	77.48	56.93	-	60.83	-	ISTT- .572
	Median	40.44	-	43.97	-	35.29	-	NMT- .009
Family per capita income before illness	Mean	19.31	21.69	19.63	-	18.67	-	ISTT- .408
	Median	14.71	-	15.44	-	13.91	-	NMT- .046
Cases evaluated		**530 (weighted)**		**707 (Non weighted)**				

ISTT = Independent-Samples T Test, NMT = Nonparametric Median Test
* Source: Socio-demographic data = 2001 Population census
Economic data = 2000 Household income and expenditure survey (1US$=Tk.52)

6.2. Patient's household size

Household structure is an important element in relation to socioeconomic factors such as patient's per capita family income. The minimum and maximum family sizes of the interviewed patients were 1 and 27 respectively. The median family size (with 123 cases i.e. 23.1 per cent of the weighted sample) was five. More than 70 per cent of patients had a family size of 3-6 persons as shown in *Figure-6.1*. This indicated that most patients came from nuclear families rather than joint families. Mean and median differences by gender for family size were statistically insignificant as shown in *Table-6.1*. However, the mean household population size was higher than the national mean of 4.90 (BBS, 2001). Likewise differences in family size between urban and rural groups were statistically insignificant. Interestingly the urban female patients had lower family size than their male and rural counterparts which might be due to urban young female working groups as shown in *Table-6.2*. However, the mean family sizes for urban and rural areas were higher than the national means of 4.8 and 4.9 respectively (BBS, 2001). A few patients who were interviewed whose family size was exceptionally high were in rural areas.

Figure 6.1: Patient's household size group bar chart (Weighted 530 cases by gender)



6.3. Age and Sex of the patients

Age and sex are important factors that affect morbidity and mortality for Tuberculosis patients. Tuberculosis affects the most productive age group of 15 to 54 years (SEARO, 2008). The literature considers sex differences in mortality and morbidity for Tuberculosis patients. Different authors argue that the differences may be due to biological or socio-economic or behavioural factors in relation to gender.

Table 6.2: Urban-rural area and gender wise socio-demographic and economic characteristics of the sample (Weighted 530 cases except gender) and 2001 census data

Socio-demo variables	Indica-tors	Urban-rural					Urban		Rural	
		Urban	2001	Rural	2001		Male	Fe-male	Male	Fe-male
Household size	Mean	5.11	4.8	5.33	4.9	ISTT- .431	5.22	4.88	5.42	5.16
	Median	5.00	-	5.00	-	NMT- .589	5.00	4.00	5.00	5.00
Age	Mean	34.04	-	39.59	-	ISTT- .001	37.53	27.46	41.05	36.65
	Median	32.00	-	39.00	-	NMT- .001	37.00	23.00	41.50	35.00
Per. income before illness	Mean	51.76	-	40.14	-	ISTT- .061	71.74	14.11	55.05	10.11
	Median	32.35	-	26.47	-	NMT- .091	58.82	7.35	44.12	5.15
Family income before illness	Mean	108.48	189.96	98.07	92.62	ISTT- .411	107.98	109.42	100.48	93.21
	Median	88.24	-	69.12	-	NMT- .001	95.59	75.74	73.53	58.82
Family per-earner income before illness	Mean	70.17	123.35	56.17	64.77	ISTT- .162	69.04	72.28	54.98	58.86
	Median	54.41	-	37.43	-	NMT- .000	61.76	47.79	40.26	33.09
Family per-capita income before illness	Mean	22.14	37.04	18.85	17.84	ISTT- .082	21.72	22.92	19.30	17.94
	Median	18.38	-	14.34	-	NMT- .005	19.12	18.01	15.03	13.49
Cases evaluated		530 (weighted)					101 (non weighted)		606 (non weighted)	

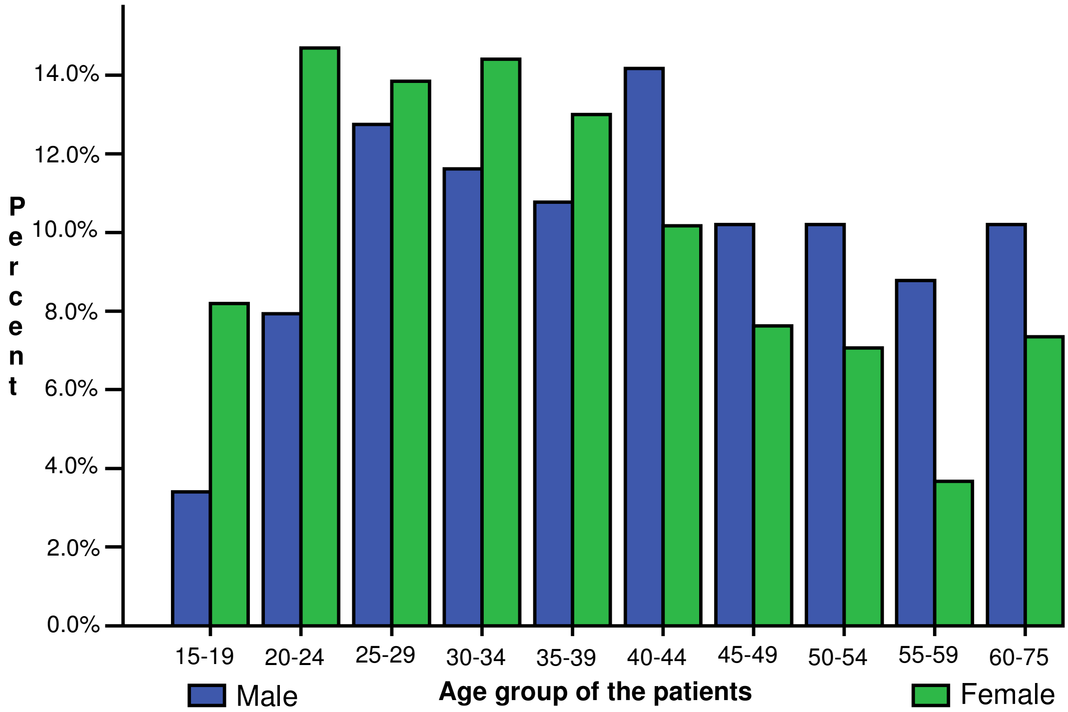
ISTT = Independent-Samples T Test, NMT = Nonparametric Median Test

* Source: Socio-demographic data = 2001 Population census
Economic data = 2000 Household income and expenditure survey (1US$=Tk.52)

The mean and median ages of 38.80 and 38.00 of the weighted study sample confirmed that Tuberculosis is a disease of productive age groups. Female patients had a significantly lower mean and median age than male patients as illustrated in *Table-6.1,* indicating that females were attacked by Tuberculosis comparatively at a younger age. The age of the patients was recoded into age groups for analysis purposes showing that high percentages of the patients came from the productive age groups of 20-24 to 40-44 years. However, the overall percentage of patients in different age groups was higher than for the population of Bangladesh (2001 census) with the exception of the youngest age group 15-19 years, which was 5.0 per cent in comparison to 9.77 per cent for the national census population as demonstrated in *Annex-6.1.* The differences were due to the national statistics being calculated based on the whole population but the minimum age of the interviewed patients was 15 years.

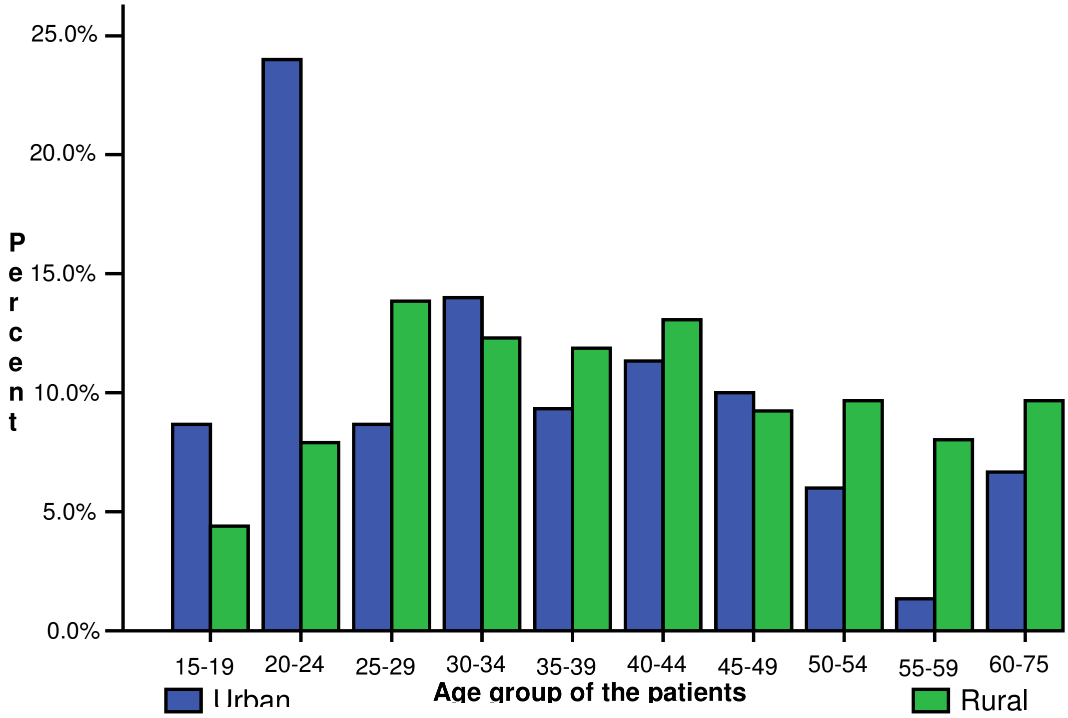
Figure-6.2 shows the gender pattern in relation to age group of the patients (non weighted). The female patients were higher up to the younger age groups of 35-39 years and then the situation was reversed for the older age groups where male patients were higher. This difference was moderately associated and highly significant as illustrated in the *Annex-6.1*. Gender wise patient's age group distribution of the study sample and the national population were not identical. Both the male and female population of the study sample was higher in all age groups except the group of 15-19 years than the national population as illustrated in *Annex-6.1*.

Figure 6.2: Gender wise sample patient's age groups (Not weighted)



The significantly lower mean and median ages of the urban patients indicated the concentration of younger population in urban areas as illustrated in *Table-6.2*. Age group wise urban and rural area wise distribution of patients showed that the proportion of patients in the age groups of 15-19 and 20-24 in urban areas at 9.0 and 23.1 per cent were much higher than the comparative proportions of 4.4 and 7.9 per cent in rural areas as demonstrated in *Figure-6.3*. These differences reflect the consequences of migration of poorer and younger people from rural to urban areas to improve their economic situation. The urban versus rural difference distribution in age groups was moderately associated and highly significant as illustrated in *Annex-6.2*.

Figure 6.3: Urban and rural area wise age groups of patients (Weighted 530 cases by gender)

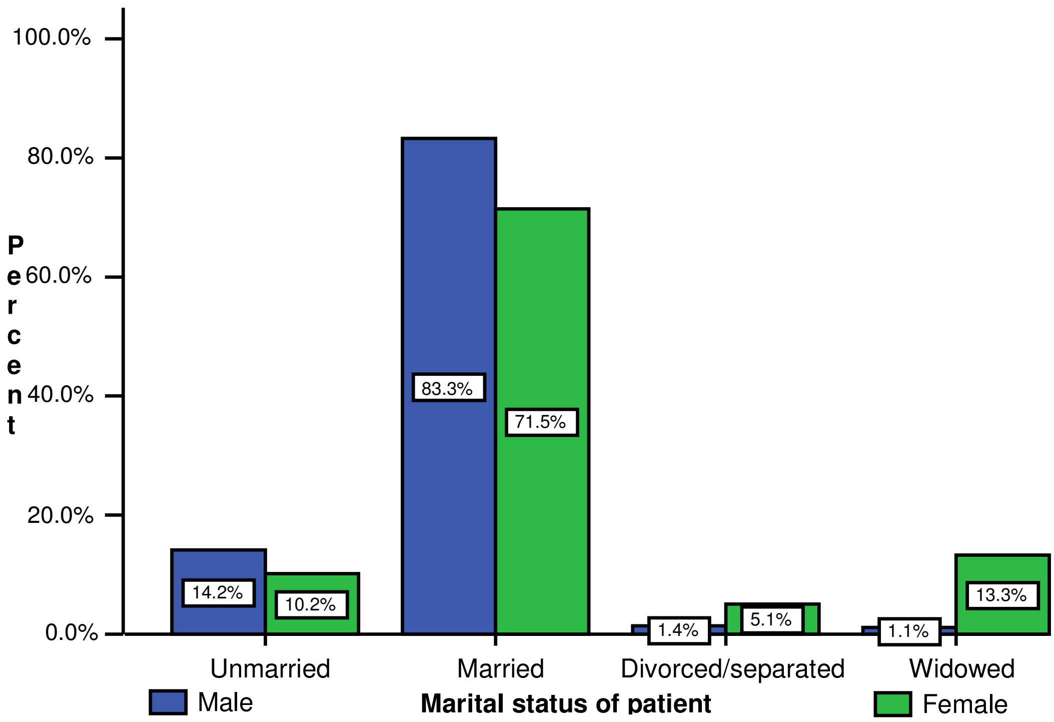


There were also interesting differences in the age group and gender composition of the sample between urban and rural areas. In the urban areas, the younger age groups of 15-19 and 20-24 years were highly dominated by the female and the two oldest age groups were totally dominated by the male patients as detailed in *Annex-6.2* and the differences were strongly associated and statistically highly significant. The pattern is associated with the Bangladesh phenomenon of differential young and particularly young female migration from rural to urban areas which results from the massive development of the garments industry. Conversely, the younger age groups of 15-19 to 35-39 years in rural areas were dominated by the female patients might be due to natural biological differences and was moderately associated and also statistically highly significant as also illustrated in *Annex-6.2*.

6.4. Marital status of the patients

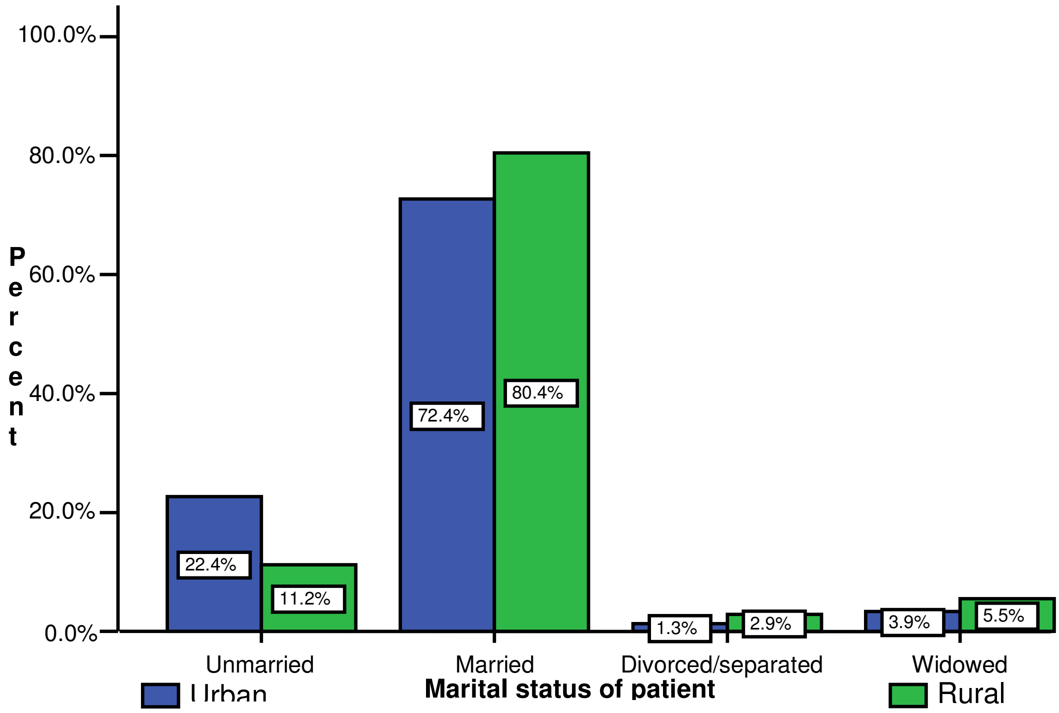
Marital status is another factor which affects morbidity for Tuberculosis patients. One study demonstrated that married people have significantly better health and a lower mortality than their single counterparts (Smith and Zick, 1994). Another study demonstrated that widowed and divorced people were more likely to suffer and die than married people (Mineau et al., 2002). Out of 530 patients (weighted), the majority of 79.3 per cent were married followed by 12.8 per cent were unmarried and 5.2 per cent were widowed. A similar trend also observed in national statistics (2001 census) as demonstrated in *Annex-6.3.* However, the percentage of unmarried was much higher at national level as the national statistics was calculated on 10 years and above populations whereas the study populations were 15 years and above.

Figure 6.4: Gender wise marital status of the patient (Not weighted)



Split of patient's marital status by sex demonstrated that higher proportion of 83.3 percent of male patients were married compared to 71.3 percent of the female patients. Moreover, there was not much difference between male and female unmarried patients but a huge difference for separated/divorced and widowed individuals as illustrated in *Figure-6.4.* This might be due to the social vulnerability of separated/divorced and widowed females in relation to contracting the disease or in relation to the impact of the disease. The distribution was statistically moderately associated and highly significant. However, gender wise marital status was not identical to the national statistics (2001 census) as the percentage of unmarried and married was much higher for males and females respectively as demonstrated in *Annex-6.3*.

Figure 6.5: Urban and rural area wise marital status of patient (Weighted 530 cases by gender)



An examination of the relationship between marital status and urban-rural location showed that 22.4 per cent of unmarried patients were in urban areas in comparison to 11.2 per cent in rural areas as shown in *Figure-6.5*. This reflects the rural urban migration patterns of the young but may also indicate that urban working and living conditions predispose towards Tuberculosis now as they did classically during previous urbanization eras in other countries. The proportions of married patients were almost similar in urban and rural areas but divorced and widowed patients' proportions were higher in rural areas in comparison to urban areas. Separation / divorce may be higher in rural areas in consequence of differential stigma as compared with urban areas. The distribution of urban and rural patients' marital status was statistically moderately associated and highly significant. In the rural areas unmarried and married categories were dominated by the males and divorced and widowed were dominated by females and this was statistically moderately associated and highly significant as demonstrated in *Annex-6.4.* A similar trend also observed for urban-rural areas in national statistics (2001 census – calculated on 10 years and above populations) as demonstrated in *Annex-6.4.*

Most unmarried patients came from the three age groups covering the range of 15-29 years. Conversely, divorced/separated status was most common in the age range of 20-39 years. This might be because divorce or separation occurs in these age groups in consequence of the Tuberculosis episode itself. Most widowed patients were females in the older age groups as illustrated in *Annex-6.5.* There was not surprisingly a strong and highly significant association observed between age groups and marital status as illustrated in *Annex-6.6.*

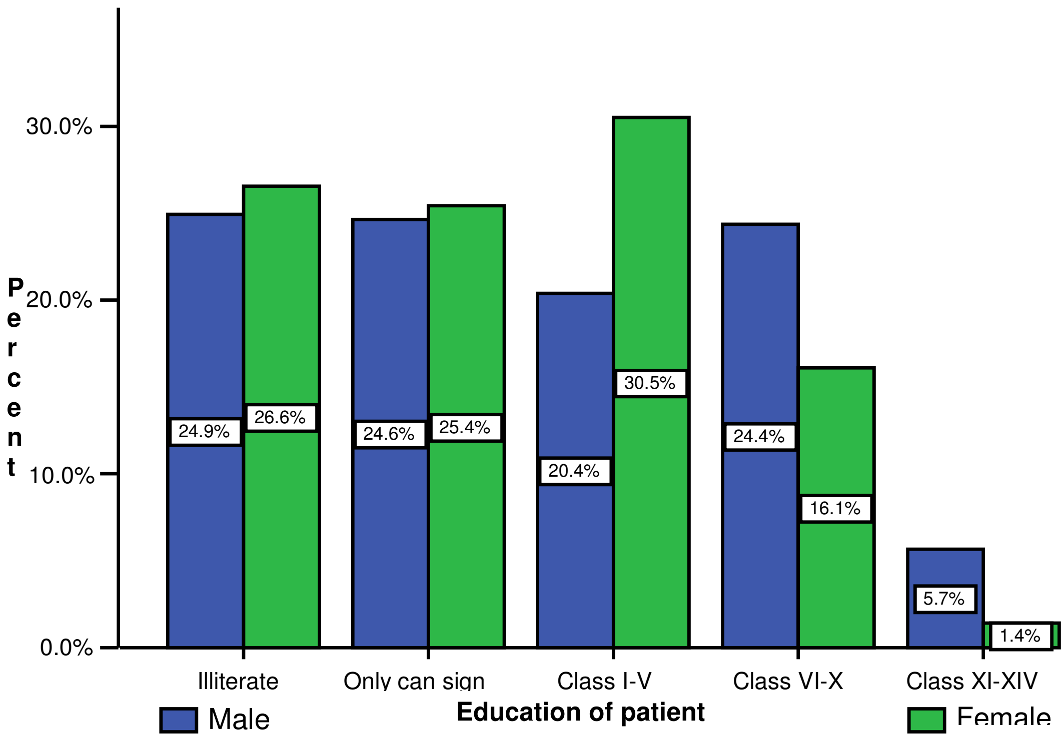
6.5. Educational status of the patients

Education is also one of the most important socioeconomic determinants of morbidity and mortality for Tuberculosis patients. Low educational attainment is strongly correlated with health risks and mortality (Winkleby et al., 1992). Studies in the United States suggest that education affects health, morbidity and mortality through a number of pathways, such as lifestyle, health behaviour, problem-solving abilities, social relations, self-esteem and stress-management, as well as through income or occupation (Pappas et al., 1993). Another study suggested that education is a more significant cause of differential mortality than other differences in socioeconomic status through comparing college students and core–city youth over a long period (Vaillant and Mukamal, 2001).

The weighted educational status of the patients is shown in *Annex-6.7.* Most respondents had not achieved a high educational qualification. Patients with 'no education' and 'only can sign' were the largest groups and contributed more than 50 per cent of patients. Patients from the highest education group of 'class XI-XIV' comprised only 4.2 per cent. The educational status of the patients was different from the overall national literacy rate as indicated by the 2001 population census.

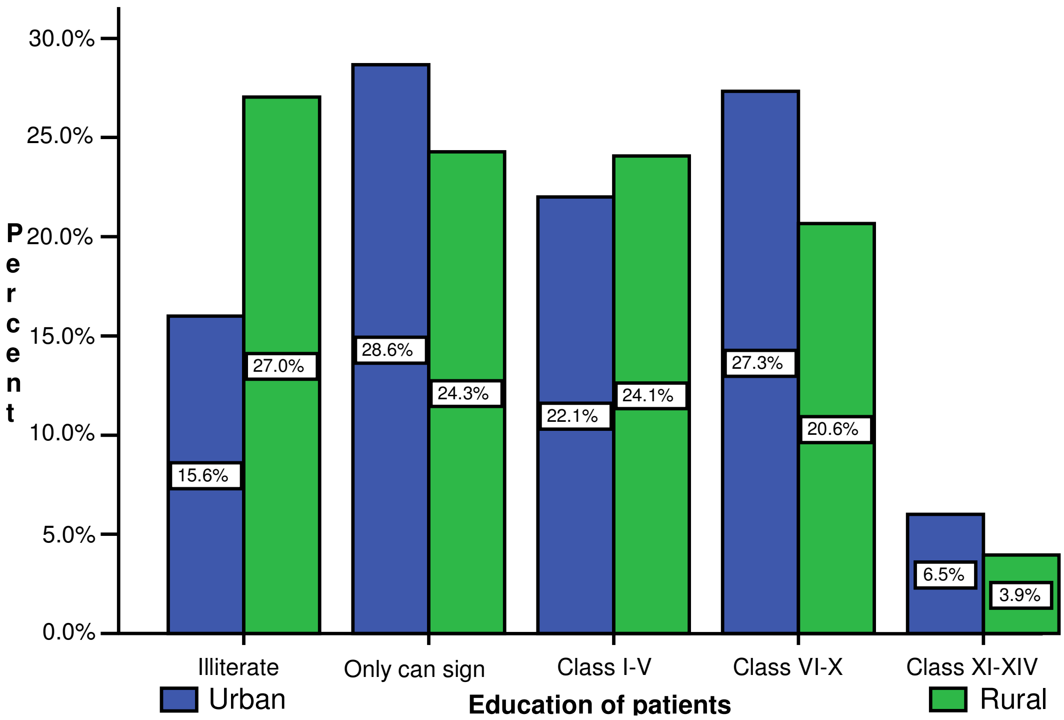
The relationship between gender and educational level was also interesting. The proportions of male and female patients in the education groups of 'illiterate' and 'only can sign' were almost similar as shown in *Figure-6.6.* The proportion of female patients in the education group 'class I-V' were significantly higher at 30.5 per cent in comparison to male patients at 20.4 per cent. This might be due to government's emphasis on female education through free tuition and food for education programmes across the country, but also reflects the different age patterns for males and females. The proportion of female patients was significantly lower in the higher education groups against that of male patients. This gender difference at higher education levels might be due to family reluctance to fund female higher education and/or to early marriage. The relationship between gender and educational level for the sample was moderately associated and highly significant but not identical to that shown in the national 2001 census as illustrated in *Annex-6.7*.

Figure 6.6: Gender wise education status of the patients (Not weighted)



There were also interesting differences between urban and rural areas in relation to educational status. The percentages of 'illiterate' and 'class I-V' education group patients were lower in the urban areas in comparison to the rural areas. For the higher education groups this was reversed and the percentages of patients in the 'class VI-X' and 'class XI-XIV' education groups were higher in urban areas in comparison to the rural areas as demonstrated in *Figure-6.7*. This was the expected pattern. The percentage of patients who could only sign was higher at 28.6 per cent in the urban areas against 24.3 per cent in the rural areas which were unusual. This might be due to migration of workers from rural to urban areas. Urban and rural area wise overall differences in the education status of the patient's were statistically insignificant and interestingly almost identical with the national statistics as illustrated in *Annex-6.8*.

Figure 6.7: Urban and rural area wise patient's educational status (Weighted 530 cases by gender)



The percentages of 'illiterate' and 'only can sign' group male and female patients were almost equal in both urban and rural areas. Percentage in the middle education group of 'class I-V' was higher for females and percentages for the highest education groups were higher for male patients in the rural areas and the distribution was statistically moderately associated and highly significant as illustrated in *Annex-6.8.*

A comparison of educational status with age groups of the patients showed that most (48.0 per cent) 'illiterate' patients came from the age group of 60-75 years. Illiteracy decreased according age group and only 3.7 per cent of illiterate patients came from the youngest age group of 15-19 years as illustrated in *Annex-6.9*. Younger patients of 15-29 years were concentrated in the education group of 'class VI-X'. Most 'illiterate' and 'only can sign' patients were concentrated in the age range of 35-75 years. Moreover, patients' age groups wise distribution and education status were moderately associated and statistically highly significant as demonstrated in *Annex-6.10.*

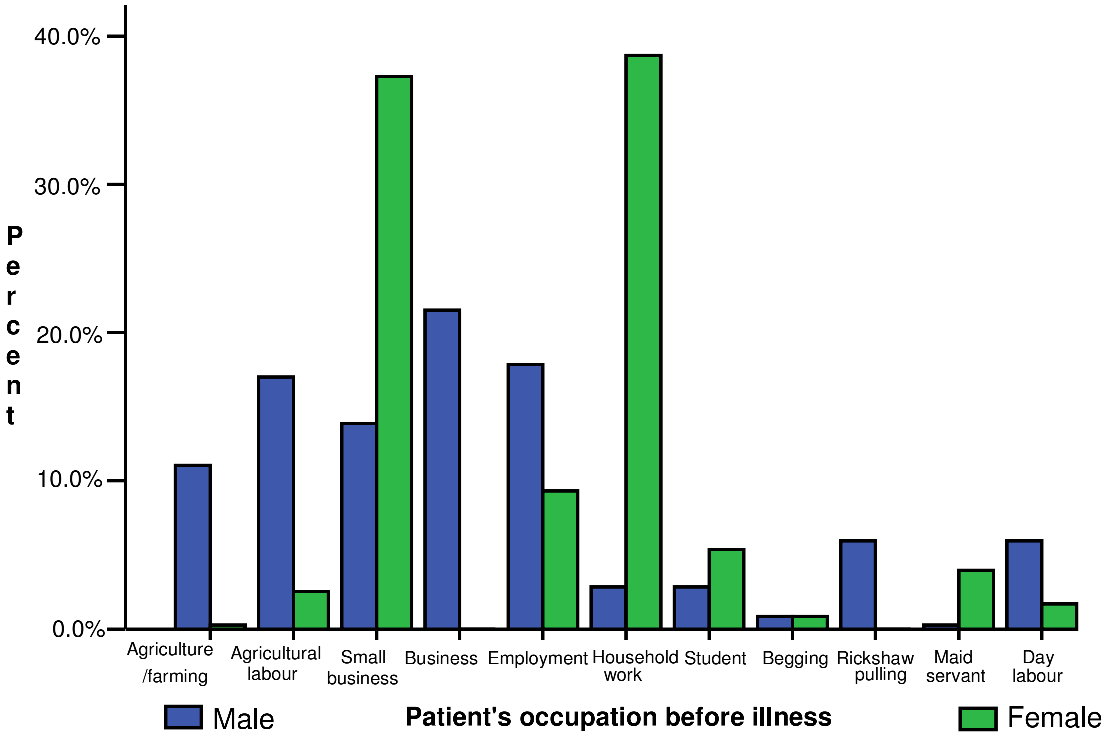
6.6. Occupation of the patients

The occupations and economic statuses of the patient and their families are also important factors in relation to morbidity and mortality associated with Tuberculosis. This is particularly important when the patient him/herself is the main earner of the family. Studies have noted the impact of these factors on patient's health care seeking behaviour. A study in Honk Kong showed that occupational status, particularly unemployment, was independently associated with longer patient delay (Leung et al., 2007). A South Indian study showed that low economic status of the patient was associated with seeking initial Tuberculosis treatment from unqualified providers which led to longer patient delay (Rajeshawri et al., 2002a).

As shown in *Annex-6.11*, most of the patients came from lower occupational groups. None of the interviewed patients were unemployed before illness and the highest percentage of patients came from 'small businesses' might be due to most female patients being in that group. Some similar occupational categories with small percentages of cases have been grouped together for analytical purposes.

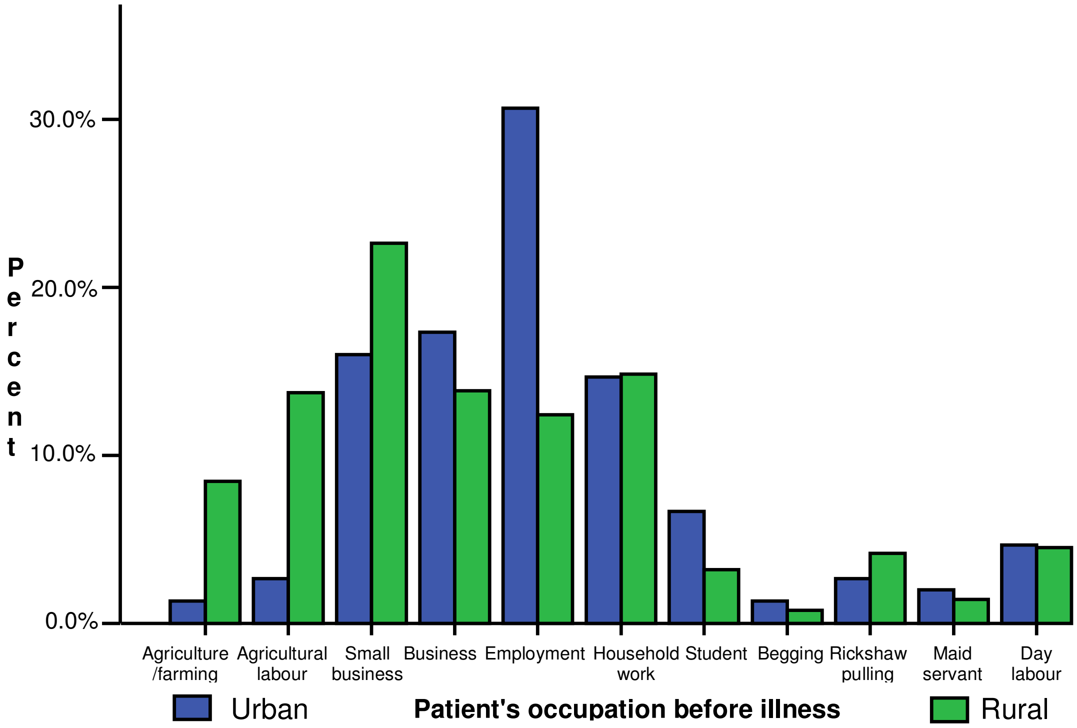
There were major differences by gender in occupational status as illustrated in *Figure-6.8*. Most occupations were dominated by male patients except small business, household work, student and maid servant. However, 17.0 and 5.9 per cent of the males and 2.5 and 1.7 per cent of the female patients came from the agricultural labour and day/construction worker groups respectively. This might be because some tribal and poor women are involved in those occupations. 38.7 per cent female patients came from household work occupational groups which is usual in the Bangladeshi context because women were mainly performing household work especially in rural areas. Interestingly 37.3 per cent female patients came from the small business group against 13.9 per cent of male patients. This is because many rural females raise hens and/or goats in their households to earn their pocket money by selling them. On the other hand, occupations like business and rickshaw/rickshaw-van pulling were wholly occupied by the male patients. Gender and occupation were statistically strongly associated as illustrated in *Annex-6.11.*

Figure 6.8: Gender wise patient's personal occupation (Not weighted)



The urban-rural distribution of occupational groups was also interesting. Some occupational categories were higher in the rural areas, some in urban areas and some were almost equal in both rural and urban areas. A higher proportion of the agriculture, agricultural labourer and small business occupational group patients came from rural areas in comparison to urban areas as illustrated in *Figure-6.9*. Most poor, landless and illiterate or less educated villagers have no other occupational options and lots of rural women earn money by rearing chicken, ducks, goats and cows. Conversely, 30.3, 17.1 and 6.6 per cent of urban patients came from the occupational groups of employment, business and student in comparison to 12.4, 13.7 and 3.3 per cent in rural areas. This reflects the existence of more employment opportunities in urban areas and also that comparatively wealthier people live in urban areas and are generally better educated than rural people. The urban versus rural area wise distinction and patient's personal occupation as demonstrated in *Annex-6.12* were moderately associated and this was statistically highly significant. Gender wise personal occupation of the urban and rural patients were also strongly associated statistically highly significant as illustrated in *Annex-6.12*.

Figure 6.9: Urban and rural area wise patient's personal occupational status (Weighted 530 cases by gender)



Educational qualifications had a direct relationship with patient's occupational status as demonstrated in *Annex-6.13*. The higher the occupational category, the higher the proportion of people that had achieved higher educational levels. For example, most of the 'agricultural labour', 'small business' and 'household work' occupational groups patients came from 'illiterate' or 'only can sign' educational status groups. However, 31.3 percent patients from the occupation group of 'small business' came from the 'class I-V' education group patients. This means that a majority of patients from lower occupational groups were illiterate or had a low educational level. The concentration of patients in lower occupational and educational groups may be due to the way Tuberculosis attacks poorer people who normally have achieved a lower educational level. Conversely, higher educated people who contract Tuberculosis may be less likely to contact the public Tuberculosis treatment system. Both processes of course may operate. However, there was an interesting finding in case of the 'employment' occupational group. A majority 52.2 per cent came from the highest education group but the second highest of 27.6 per cent came from 'class VI-X' and the rest almost equally came from other educational groups. This might be due to the term 'employment' covered a big range from low salaried garments worker to higher salaried public or private officials and most garment workers are less educated especially the females. Educational level and occupational category were statistically moderately associated and highly significant as illustrated in *Annex-6.13.*

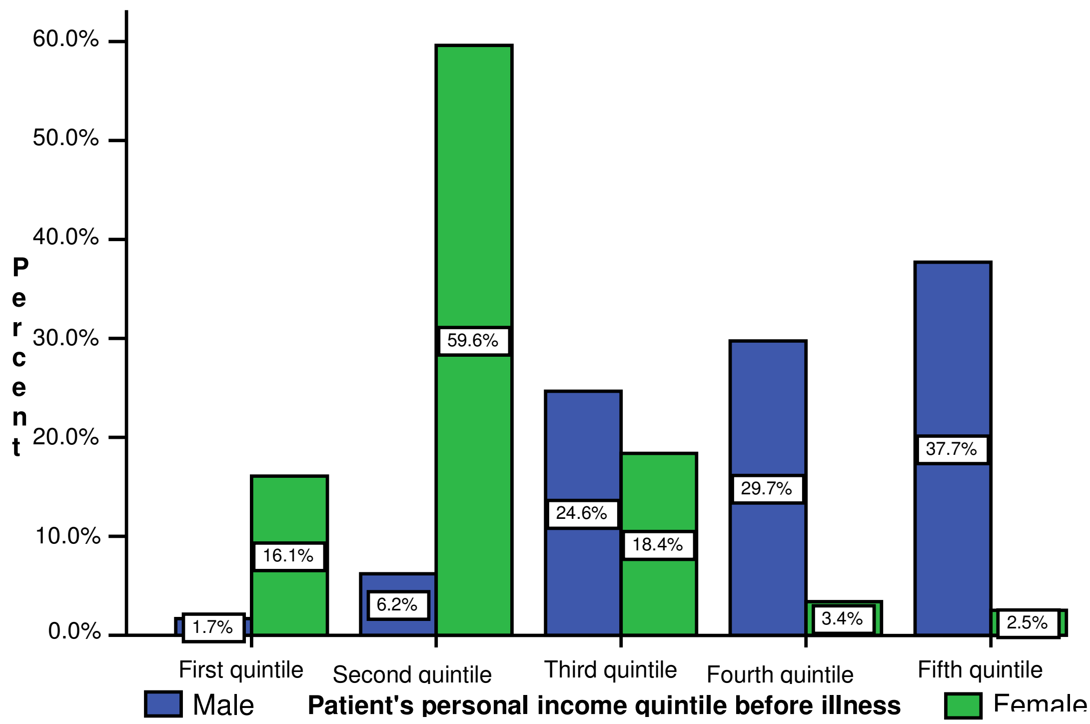
6.7. Economic status of the patients

The literature has reported on the effect of patient's low economic status on morbidity and mortality in relation to Tuberculosis. A study in Ghana reported that low economic status impaired the patient's immune system and increased both likelihood of infection and morbidity (Dodor, 2008). Another Indonesian urban study demonstrated that poor Tuberculosis patients faced more professional and social problems including joblessness and were rejected by the family or neighbours also enhanced Tuberculosis morbidity and mortality (Karyadi et al., 2002). An older accumulative study concluded that poor economic status had a strong correlation with Tuberculosis morbidity and mortality especially among male working class adults (Terris, 1948). So it was important to explore the Tuberculosis patients' personal and family incomes.

The mean and median monthly personal income of the study sample was low which indicated that Tuberculosis mainly attacks the poorer segment of the society. For both rural and urban patients these were well below the national averages. Both the mean and median personal income of male patients was much higher than for the female patients and this difference was significant as illustrated in *Table-6.1.* Mean and median urban patient's personal incomes were higher than rural patients as expected. Urban patients were engaged in waged 'employment' or 'business' with higher incomes and rural patients were engaged in 'agriculture/farming', 'agricultural labour' and 'small business' with lower incomes. Male patients had higher personal incomes in both urban and rural areas than females as expected. Interestingly, urban female patients had higher personal incomes than rural female might be due to the presence of young female garments workers in the urban areas and the differences were statistically significant as illustrated in *Table-6.2.*

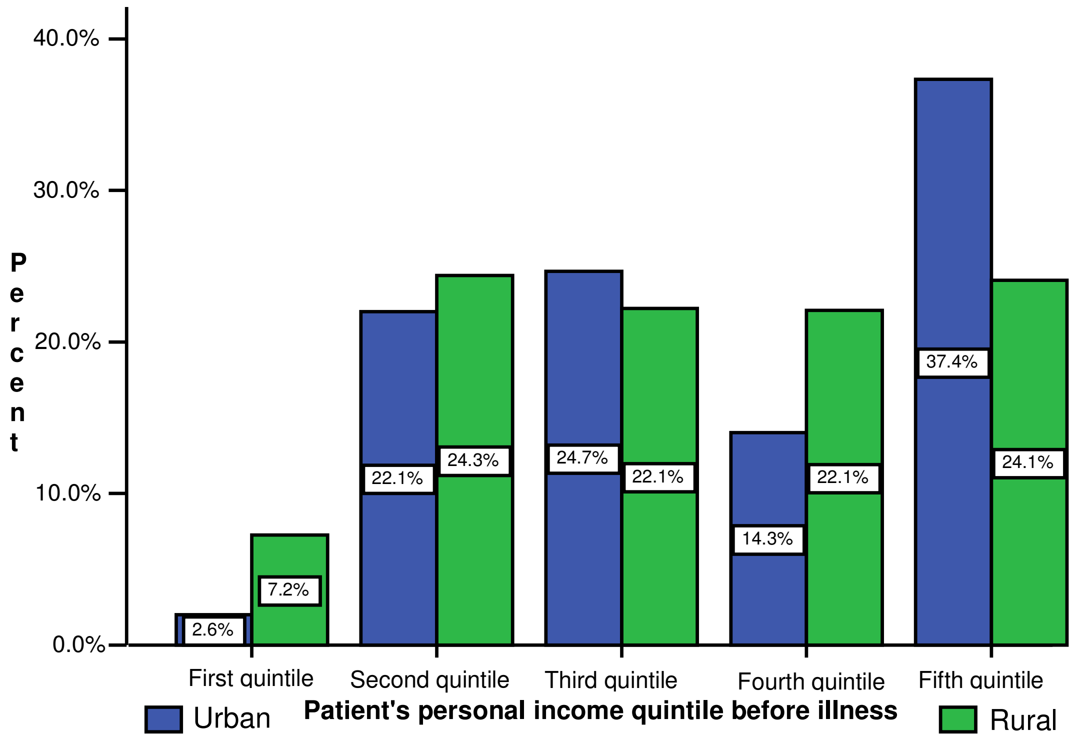
The personal income before illness was compared with national statistical information by quintiles using available 2001 data (the most recent available). Cases were allocated to quintiles in relation to that national distribution. The personal (and household) incomes of the sample were lower than the national averages and this shows up in the distribution of cases by income according to national quintiles and deciles (for households). The highest number of patients came from the fifth quintile personal income group according to the 2001 national personal income distribution as demonstrated in *Annex-6.14*. Income range in fifth quintile was big due to one extreme income. The relationship between patient's personal income quintile (2001 national data) and gender was also interesting. In general women dominated in the lower quintiles and men in the higher as male patients were concentrated in fifth quintile and female patients in second quintile as illustrated in *Figure-6.10*. The inequality in male and female personal incomes is most likely a consequence of female patients' low incomes from household level small businesses like chicken rearing, preparing handicraft items etc. or being on really low wages. This issue needs to be further explored. Gender and income quintile distribution were strongly associated and statistically highly significant as demonstrated in *Annex-6.14*.

Figure 6.10: Gender wise patient's personal income quintile distribution (as per 2001 national data - Not weighted)



An unusual and unexpected pattern was found when comparing urban and rural area wise patients' personal income quintiles as per 2001 national data. The first, second and fourth quintiles were dominated by rural patients. Conversely, the third and fifth quintiles were dominated by urban patients as demonstrated in *Figure-6.11*. Normally urban people have a higher income in comparison to rural people. The way in which the fourth quintile was dominated by rural patients might be due to some rural patients (land holding) higher incomes from agriculture or to urban patients from this quintile group not using the public/NGO health facilities for treatment or both of these factors. This needs to be further explored. The urban versus rural distinction of patient's personal income before illness were statistically insignificant as illustrated in *Annex-6.15*. In urban areas, second and third quintiles were dominated by female and fourth and fifth quintiles were dominated by male patients. This distribution was statistically strongly associated and highly significant. Conversely, the first and second quintiles were dominated by female and other quintiles by male patients in rural areas and the distribution was also statistically strongly associated and highly significant as stated in *Annex-6.15*.

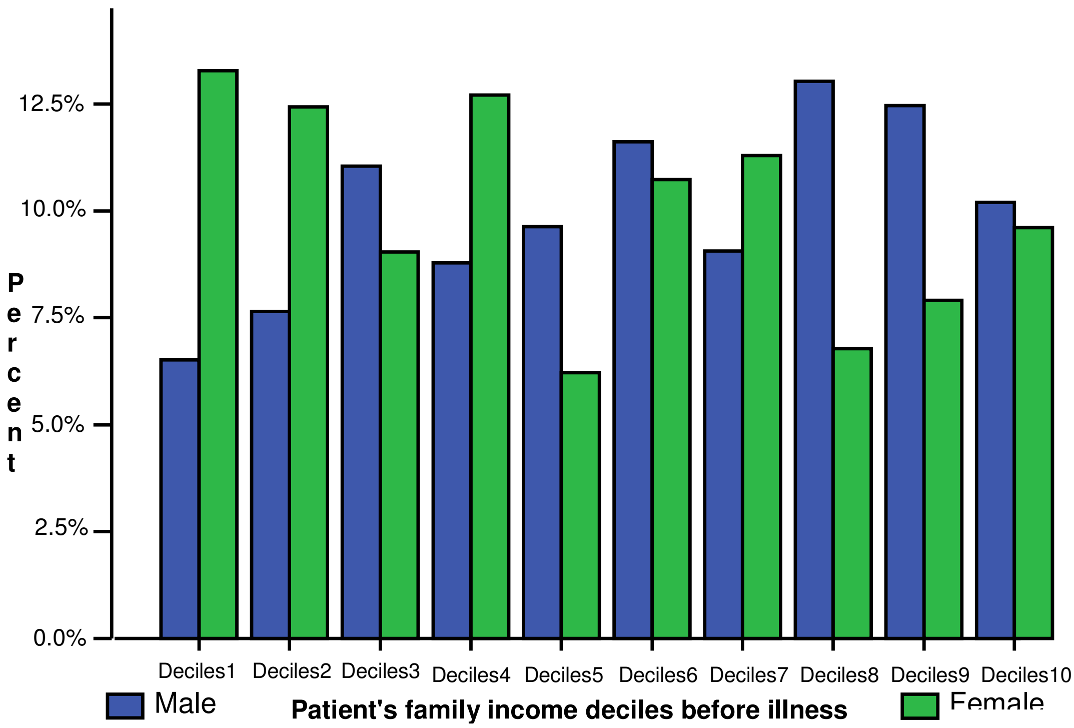
Figure 6.11: Urban and rural area wise patient's personal income quintile distribution (as per 2001 national data - Weighted 530 cases by gender)



Patients' average monthly family income before illness was lower than the national average as illustrated in *Table-6.1*. Moreover, 9.9 per cent had a daily family income below the poverty line of less than US$ 1 per day and 14.6 per cent patients had a daily family income of US$ 5 or less which confirmed the lower economic status of the patients and that Tuberculosis is a disease mainly of the poor in global terms. Male patients had a significantly higher median family income than female patients as illustrated in *Table-6.1*. Female patients' lower family income might be due to their lower personal income or they came from comparatively poorer families. *Table-6.2* shows that median family income in urban areas was higher and statistically significant.

Patients' monthly family income deciles before illness were compared with national income deciles for analysis purpose. Patients almost equally came from all family income deciles except first and fifth deciles and the distribution was almost identical to the national statistics as demonstrated in *Annex-6.16*. Thus Tuberculosis is distributed across the family income scale.

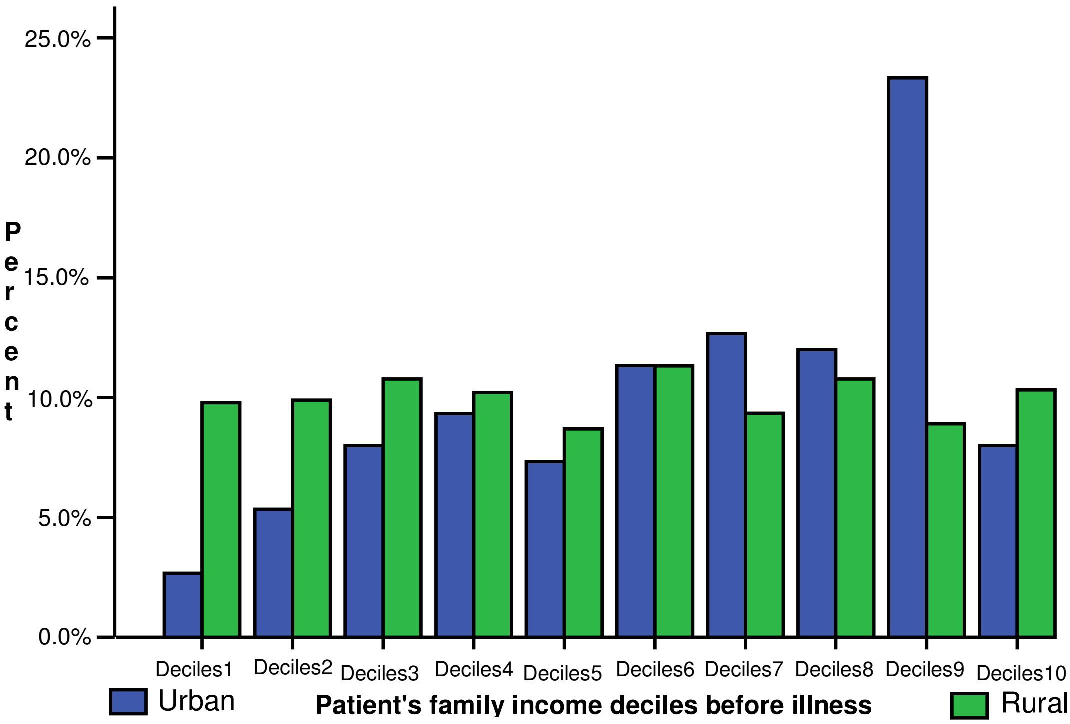
Figure 6.12: Gender wise patient's family income deciles distribution (as per 2001 national data - Not weighted)



Gender wise patient's family income deciles distribution demonstrated an interesting scenario. Lower income deciles were dominated by females and higher deciles by males with the exception of third and seventh deciles as illustrated in *Figure-6.12*. Low income males were concentrated in the third deciles and urban employed females were concentrated in the seventh income deciles. Gender wise patient's family income deciles before illness distribution were moderately associated and statistically highly significant as shown in *Annex-6.16*.

When patients' family incomes were examined for urban-rural location a different pattern was found. Rural patients almost equally came from all income deciles. In contrast, urban patients' incidence gradually increased from the first and reached the extreme at ninth deciles as illustrated in *Figure-6.13*. Urban-rural wise patient's family income deciles before illness distinction were statistically associated and significant as stated in *Annex-6.17*. The pattern in rural areas reflected the national statistics but the urban pattern did not.

Figure 6.13: Urban and rural area wise patient's family income deciles distribution (as per 2001 national data - Weighted 530 cases by gender)



Gender wise distribution of family income deciles before illness in urban and rural areas also demonstrated an interesting scenario. In urban areas, 30.6 per cent male patients were in the ninth income deciles. However, the highest tenth deciles had only 4.1 per cent of males which might indicate that richest male group is less affected by Tuberculosis or is less likely to report to NTP recognized treatment facilities as stated in *Annex-6.17*.

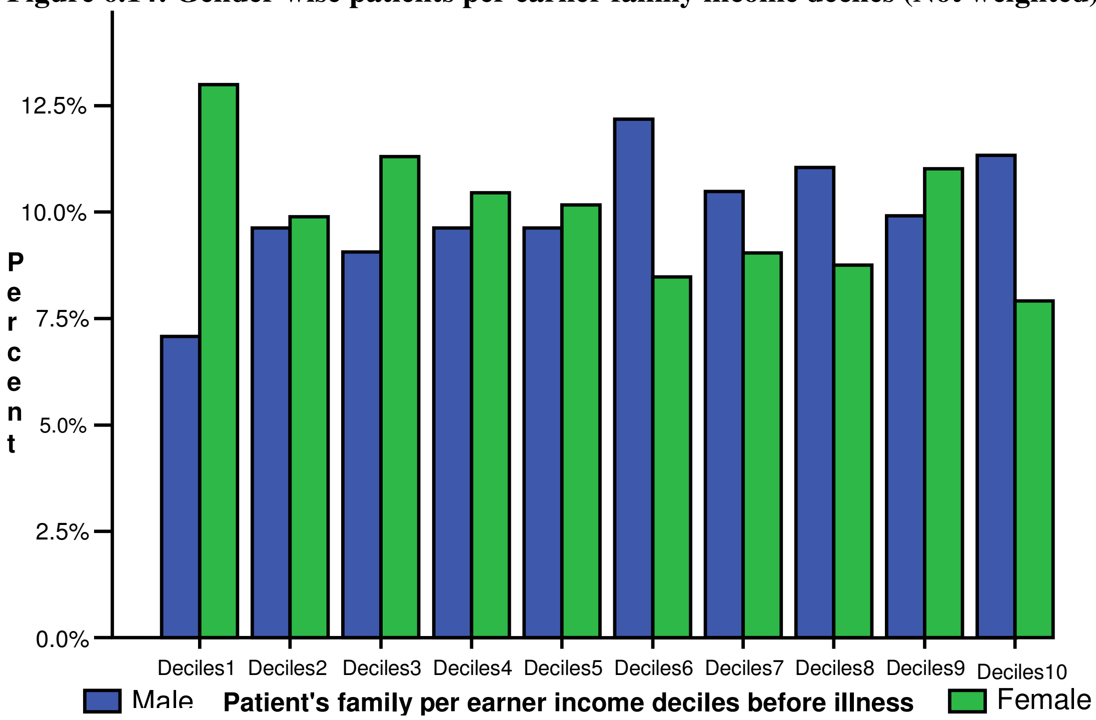
An examination of patient's family income deciles in relation to family size revealed some significant aspects. In general patients in lower income deciles came from the smaller households and those in higher income deciles came from bigger households. Surprisingly 14.3 per cent of highest family size patients were located in the sixth decile. This was due to one patient with a family size of 12 who was a lower income earner. Family size and family income deciles distribution were statistically moderately associated and highly significant as demonstrated in *Annex-6.18*. So the analysis clearly revealed that larger families generally had a higher family income before illness. However, the highest family size groups of 11-27 and 9-10 comprised only 2.64 and 5.09 per cent of weighted patients.

So it is important to calculate the family income at the individual level for more accurate analysis as well as to explore its impacts on different aspects related to Tuberculosis treatment initiation. Family income at an individual level can be calculated in three ways *Equivalised household income*, *Income per earner* and *Per capita income*. *Equivalised household income* is a quite new concept first utilized in the United Kingdom Health Survey in 1997. A score was allocated to each household member, and these were added together to produce an overall household McClements score (detailed scoring system illustrated in *Annex-6.19*). Then the annual household income was divided by the McClements score to derive the equivalised income which was attributed to all members of the household, including children. However this concept is not suitable in the Bangladesh context. Income and expenditure pattern of Bangladesh differ from those in the United Kingdom and most of the families spend money for food and other minimum basic needs.

Income per earner is a concept used in Bangladesh Income and Expenditure surveys. In this process, first the number of earners of each family was identified and estimated family income was divided by this to derive the income per earner. According to NIES 2000, the income per earner was US$77.48 (US$1 = TK.52). However, this system was less suitable for this study because earning capability varied by age and experience of the earners. *Per capita income* is derived through dividing the estimated family income by the number of family members. This system is widely used in the Bangladesh Household Income and Expenditure Survey and it was US$21.69 according to the survey of year 2000 (BBS-NIES, 2003). So I decided to use both the family income per earner and per capita income calculation technique to explore further.

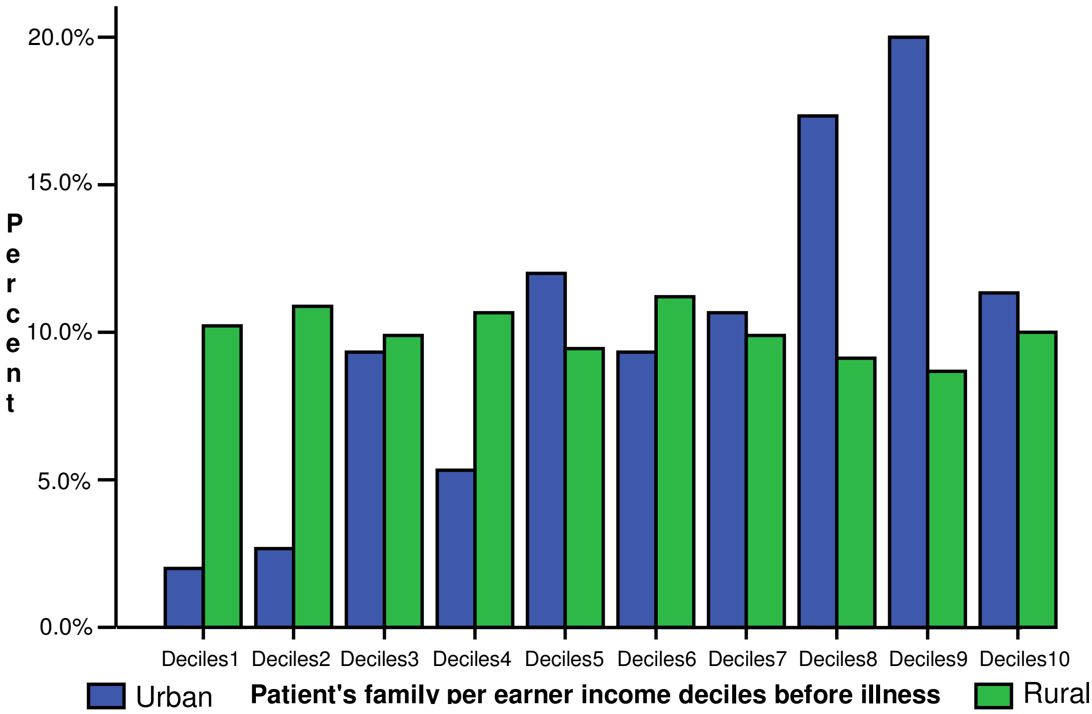
In this study, weighted (530) patient's average per earner family income before illness was US$58.24 lower than national average and the median was US$40.44. Interestingly male patients had slightly lower but insignificantly so mean per earner family income before illness than female patients but median income was significantly higher as demonstrated in *Table-6.1*. This again indicated that overall patients came from lower economic background families though some female patients might came from wealthier families. Per earner family income of the interviewed patients was 24.83 per cent less than the national level according to NIES 2003. The average per earner family income before illness of urban patients of US$70.17 was insignificantly higher than the rural areas of US$56.17. Interestingly both urban and rural female patients had higher per earner family income than males as illustrated in *Table-6.2*.

Figure 6.14: Gender wise patients per earner family income deciles (Not weighted)



The interviewed patients almost equally came from different family per earner income deciles before illness as illustrated in *Annex-6.20*. Gender wise patients per earner family income deciles also demonstrated an interesting scenario. Lower income deciles were dominated by females and higher deciles by males with the exception of the ninth deciles as demonstrated in *Figure-6.14*.

Figure 6.15: Urban and rural area wise patient's family per earner income deciles status (Weighted 530 cases by gender)



Urban-rural patients' family per earner incomes deciles before illness demonstrated a different urban versus rural pattern but unfortunately no national data was available to compare the pattern. Rural patients almost equally came from all income deciles except from the ninth income deciles. In contrast, urban patients' per earner family income distribution demonstrated a mixed jig jag pattern of lowest from first and second deciles and highest from ninth deciles as illustrated in *Annex-6.21*. Conversely, rural patients dominated the lower income deciles and urban patients dominated the higher income deciles with the exception of the fifth income deciles as illustrated in *Figure-6.15*. This might be due to the concentration of medium earning urban patients in the fifth deciles and some patients from rural higher earning families concentrated in the tenth deciles. Urban-rural area and patient's family per earner income deciles before illness distinction were statistically moderately associated and highly significant.

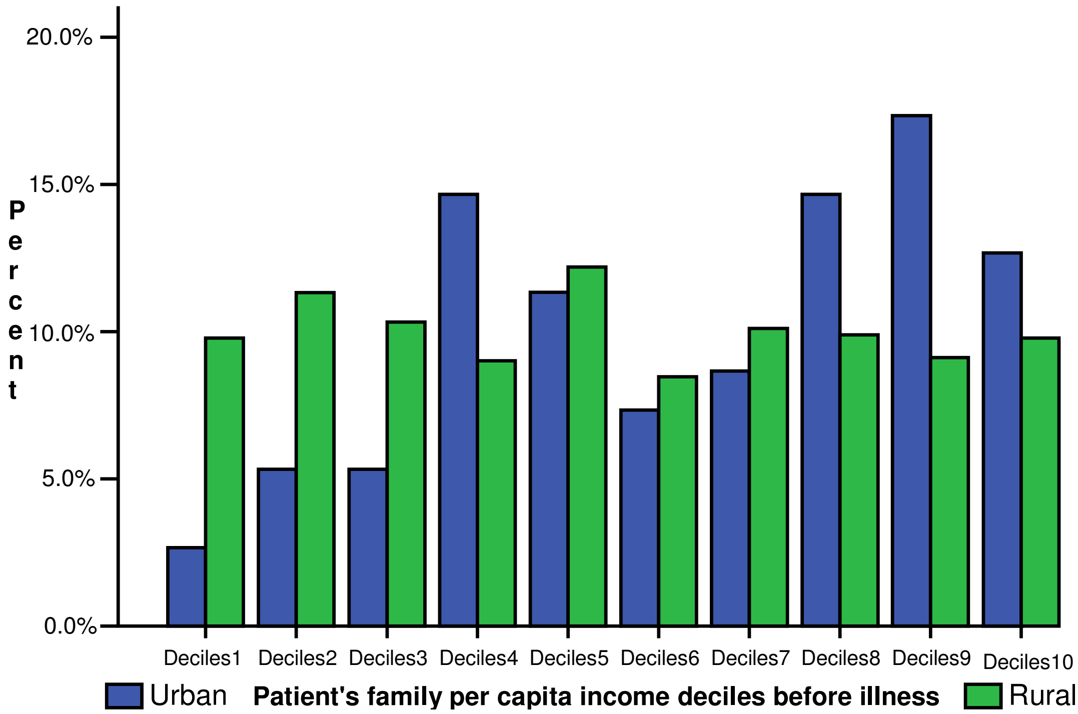
Gender wise distribution of family per earner income deciles within the urban area demonstrated an expected pattern with some exceptions. In general, female patients dominated the lower income deciles and male patients dominated the higher income deciles with the exception of first, second, third and eighth income deciles.

Patient's average per capita household income before illness was US$19.31 for the weighted (530) cases which is lower than the national average. Male patients had higher median per capita income than females and the difference was significantly higher as demonstrated in *Table-6.1.* Per capita income of the interviewed patients was 10.97 per cent less than the national level and 14.97 per cent less than the latest estimated GDP per capita (GDP was US$22.71 according to NIES 2003). The average per capita family income before illness of urban of US$22.14 was insignificantly higher than the rural areas US$18.85. The mean urban per capita family income before illness was less than the national urban average of US$37.04 but surprisingly it was higher in rural areas than national rural average which might be due some rural patients coming from wealthy families. Interestingly urban female patients had higher per capita incomes than males as illustrated in *Table-6.2* which might be due to relatively higher income garments workers presence in small households. The interviewed patients almost equally came from different family per capita income deciles before illness and the pattern was almost identical to the national statistics as illustrated in *Annex-6.22*. Moreover, the data again revealed that the majority of interviewed patients came from poorer households.

Patients' family per capita incomes deciles before illness demonstrated a different urban versus rural pattern. Rural patients almost equally came from all income deciles with the exception of the sixth deciles and the distribution was almost identical to rural national statistics. In contrast, urban patients' tend to come from higher income deciles but this was not identical to urban national statistics as illustrated in *Annex-6.23*. Rural patients dominated the lower income deciles and urban patients dominated the higher income deciles with the exception of the fourth income deciles where the urban percentage was higher as illustrated in *Figure-6.16*. However, urban-rural area and patient's family per capita income deciles before illness differences were statistically insignificant.

Gender wise distribution of family per capita income deciles within the urban and rural areas demonstrated an expected pattern with some exceptions. In general, female patients dominated the lower income deciles and male patients dominated the higher income deciles but the distributions were statistically insignificant as illustrated in *Annex-6.23*.

Figure 6.16: Urban and rural area wise patient's family per capita income deciles status (Weighted 530 cases by gender)



6.8. Chapter summary and discussion

Different socio-demographic and economic variables like household structure, age, marital status, education, occupation and personal and family income of the interviewed patients were explored in this chapter and the main findings are –

▪ Mean and median family size of 5.30 and 5.00 0f the weighted cases. Mean family size was 5.11 in urban areas against 5.33 in rural but the median was equal.

▪ Median and mean age of the patients were 38.00 and 38.80 years respectively. Urban patients consisted of lower mean and median age than rural areas.

▪ Higher amount of female patients came from the lower age groups in both urban and rural areas but it was more prominent in urban areas.

▪ Significantly higher proportion of patients from widowed and divorced/separated groups compare to national statistic and female patients dominated those groups in both urban and rural areas.

▪ Majority of unmarried patients came from younger, divorced/ separated patients from middle and widowed patients from older age group patients.

▪ Majority of 50.4 percent patients came from illiterate and only sign group. Female patients dominated the lower education and male patients dominated the higher education in both urban and rural areas.

▪ Illiterate group patients dominated older age groups and younger age groups were dominated by the higher educated group patients.

▪ Majority of the patients came from lower professional status of which 14.8 per cent of weighted patients had no income generating activity.

▪ Male patients dominated the higher income professions and personal income in both urban and rural areas

▪ Mean family income before illness of US$99.54 was lower than national average. Male patients had higher average family income than females.

▪ Urban patients had higher family income of US$108.48 than rural of US$98.07 0f weighted cases.

▪ Average per earner household income was US$58.24 and higher in urban areas than rural.

▪ Male patients dominated the higher per earner income deciles and females the lower. Similarly, urban patients dominated the higher deciles and rural the lower deciles.

▪ Average per capita household income was US$19.31 and higher in urban areas than rural.

▪ Per capita income deciles were almost equally distributed and were identical to national average.

▪ In general, male patients dominated the higher per capita income deciles and females the lower. Similarly, urban patients dominated the higher deciles and rural the lower deciles.

Analysis revealed that those socio-demographic and economic variables were strongly associated with each other. Analysis also showed that Tuberculosis affects younger and productive age group people in Bangladesh. This finding is in accord with the global trend where Tuberculosis affects the most productive age group of 15 to 54 years in the developing world (SEARO, 2008). Similarly, the mean age of female patients of 35.30 was lower than that for the male patients. Moreover, findings also indicate that the proportion of female patients tended to exceed the males in the lower age groups up to 35-39 years, while the male patients tended to dominate the age groups of 40-44 and above. Urban patients had significantly lower mean and median ages than rural patients. Both gender wise age group distribution and mean age differences were statistically significant and indicate that Tuberculosis affects females comparatively in the younger age groups. This finding agrees with the findings of the study from Botswana (Steen et al., 1999) and Gambia (Lienhardt et al., 2001b).

Another important finding of the study was that more than 23.7 per cent of the weighted interviewed patients shared the same household with 7 to 27 persons and 70.1 per cent cases shared it with 3 to 6 individuals. This is worrisome as a Los Angeles, USA study found that a delay in initiation of treatment of more than two months is enough to spread the disease to the shared household contacts (Asch et al., 1998).

Widowed and divorced/separated patients were much more common in the sample than is the case nationally indicating their vulnerability to the disease and / or its social consequences. The great majority of widowed and divorced patients were female which might indicate their social and psychological vulnerability in relation to the disease. The findings agreed with another study indicating a higher chance of sufferings and death for widowed and divorced persons due to Tuberculosis (Mineau et al., 2002).

Almost 50 per cent of patients were illiterate or only could sign and female patients were less educated than male patients. Though the urban patients were more educated than rural patients still 44.2 percent of urban patients were illiterate or only could sign. A majority of the patients came from lower personal income groups. Analysis showed that younger and female patients had lower personal incomes in comparison to middle aged and male patients. Similarly patient’s average family monthly income of US$99.54, per earner income of

US$58.24 and per capita income of US$19.31 also represented patient's lower family economic status in comparison to national statistics as demonstrated in *Table 6.1*. Though average per earner and per capita income were a bit higher in urban areas they were not significantly higher. Moreover, 63.4 and 9.9 per cent patients were from personal and family income groups with less than US$1 per day. Economic power also plays an important role for decision making as to personal and family needs especially for health care. Hence, younger and female patients face problems regarding early decision making for their health problem as well as in choosing the first contacted health provider which might enhance higher delay, more suffering and mortality. This is in line with findings from other studies elsewhere (Karyadi et al., 2002).

Surprisingly, the analysis has not revealed significant differences of some socio-demographic and economic aspects between urban and rural areas. Normally Tuberculosis is a disease of the poor and comparatively poorer people lived in rural areas. But in practice the situation is not so straight forward. The poorer people live in rural areas with some exceptions. But they live in a better and fresher environment in less congested areas in individual and bigger households. So the community, household as well as per room population density is less. This results in less chance of close contact with the community and household if there is a Tuberculosis patient. They also eat fresher foods and vegetables which sometimes help to heal the health disorders with the help of fresher environment. However, availability of proper treatment facilities in the rural area is very poor. Villagers tend to contact nearby unqualified and non-formal health providers as the qualified providers and public health facilities are situated at the Upazila level and people have to travel long distances through complicated communication and transport facilities. As a result disease is aggravated due to lack of proper treatment. On the other hand, comparatively higher income and richer people live in the urban areas with access to better facilities. However, lots of poor people have migrated in from rural areas for a better income and life. But the majority of them live in congested slum areas in a polluted environment. The youngsters especially the females work in the garments industry for comparatively low salaries. The migrants have to work hard and the living environment of sharing one room by the whole family of 4-6 people and the dusty working environment is favorable to close contact and more exposure. As a public health manager I experienced getting 6 patients (whole family) from several families in the urban areas in comparison to 2 persons (husband and wife) in rural areas. Though the urban people enjoyed nearby better health facilities most are private and sometimes expensive. They also consume less fresh and nutritious food after paying high housing rents, even in slums, from their limited income. This scenario is reminiscent of the 19th century situation of major cities of England where Tuberculosis was the predominant disease of adult life due to over-crowing, malnutrition and unhygienic living conditions (Dormandy, 1999; p77-79). The major difference is that modern drugs and treatment facilities are available now. As a result more new exposed and diseased patients come out. In effect there are factors working in different directions in urban and rural areas with urban life for the poor more conducive to the disease but with this countered by better access to facilities for treatment.

Therefore, comparison of the sample patients' (which is the representative sample of the Tuberculosis patients in Bangladesh) overall socio-demographic and economic characteristics with national statistics showed that the majority of them came from lower socio-economic backgrounds and productive ages. The literature review indicates that socio-demographic and income variations are associated with the different components of delay in seeking treatment. So in the next chapter I will explore the different kind of delay and its outcome process named diversion and their association with patient's different socio-demographic and economic attributes.

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i *New smear positive cases* are confirmed when there are at least 2 specimens positive for acid fast bacilli (AFB) or when one sputum specimen is positive for AFB in addition to radiological abnormalities consistent with active pulmonary Tuberculosis and never being treated or treated less than one month previously.

New smear negative case is confirmed when three initial smear examination results by direct microscopy for AFB is negative and the patient has failed to respond to a course of broad spectrum antibiotics with a repeated three negative smear examinations by direct microscopy and examination for x-ray abnormalities suggestive of active Tuberculosis as determined by the treating physician and never being treated or treated less than one month previously.

Chapter 07: Results – Diversion and Delays

"Without combating Tuberculosis, sustainable development cannot be achieved in the foreseeable future"

WHO Director-General, 2002

Tuberculosis is a major public health hazard both across the developing world and in Bangladesh. Early diagnosis and initiation of effective chemotherapy are critical to minimize morbidity and mortality in the community but the practical situation is not so straight forward in relation to achieving this. Lots of stakeholders are involved in the whole process including suspected patients, decision makers for health care seeking and various health providers. In practice, a '*diversion*' occurs in a majority of cases in initial treatment seeking and as a result a delay occurs in diagnosis and initiation of proper anti-Tuberculosis treatment. Delay in diagnosis and treatment affects the individual, family and the community in various ways. It increases the risk of mortality through prolonging the morbidity of individuals, increases the sufferings of the individual due to morbidity and the family due to both morbidity and mortality, and affects the community due to risks of transmission and infectivity. Studies have shown that diagnosis and treatment delays result in a prolonged period of infectivity from smear positive cases in the community which leads to new infected cases (Lawn et al., 1998). A smear-positive untreated case can infect 10-14 new individuals annually (Murray et al., 1990) and repeated interaction can accelerate the disease process itself. So it is important to know the nature of diversion and its causes, the duration of delays prior to Tuberculosis diagnosis and treatment, and the character of interaction between them as well as to explore the other factors associated with delay.

In this chapter, first I explain the '*diversion*' from proper Tuberculosis treatment. Then I explore the associated factors related to diversion using appropriate analytical tools and compare my findings with other available study findings. After that, I specify all forms of delay across the total pre-treatment period, describe each delay element, and explore total delay in detail in relation to its associated socio-demographic and diversion related factors deploying appropriate statistical tools. This statistical exploration primarily takes the form of identifying substantively significant differences in relation to diversion and delay in terms of socio-demographic and economic attributes of the patients and their households. So most of my statistical work is done in terms of identification of significance of differences and strengths of association of socio-demographic and economic attributes in relation to forms of diversion and extent of delay with a particular focus on delay of more than 30 days as this is identified as the threshold for unacceptable delay in the Bangladesh Tuberculosis treatment programme. Testing for variations in delay is first done by testing for differences of means and medians, although given the influence of extremes on means more substantive significance is attached to median differences. Cross tabulations are used to explore the detail of patterns of differences by categories.[2] Detailed explorations of the components of delay are presented in the Annexes to the thesis. As explained in Chapter Five, the male female Tuberculosis case detection ration was 2:1 but the sex ratio of the interviewed sample was 1:1. So the cases were weighted when this was appropriate. Moreover, it is evident that a combined family has more financial resources than the single earner Tuberculosis patient's household, which means the disease is a real problem for the single earner family. So, both monthly family income and per capita income deciles were used for analysis. All analysis and comparison is done by patient's gender and area of residence (urban-rural) because the reviewed literature regarding delays indicated that these factors are important. The statistical techniques of comparison of means and medians were used to examine gender and urban-rural area differences. One Way analysis of variance (ANOVA), Kruskal-Wallis test, (where variables were ranked in groups), and the Nonparametric median test were used to establish the statistical significance of mean and median differences. Cross tabulations were used to explore the relationship of various socio-demographic, diversion and economic factors including gender, urban-rural area, age group, marital and educational status, personal occupation, number and times contacted health providers and family and per capita income deciles, with different delay periods when those were measured as ranks.[3] Pearson Chi-square and Cramer's V were calculated here to assess significance and strength of association. Delay is a continuous variable if it is measured in days. However, as discussed in Chapter Five, intervention practice distinguishes between acceptable and non-acceptable delay in access to effective treatment. Accordingly, total delay has been divided into acceptable and unacceptable delay and binary logistic regression has been used for modeling. Generally there is an exploration of the differences within the urban and rural respondent groups, particularly in relation to gender. This has been done by 'selecting' for urban and rural groups and then carrying out analyses within the groups. This has exactly the same the effect as constructing a three dimensional table, that is a table in which has demonstrate the relationship between for example gender and the nature of diversion separately for urban and rural groups. The major findings are presented in table form and graphically in the main text using simple tables and bar-charts and the supporting complex tables and graphs are presented in the Annexes to the thesis. In relation to total delay, clustering has been employed so as to explore the relationships of delay to a typology of patients generated using multiple attributes of the patients.

The purpose of all these exploratory procedures is to identify the nature of delay in terms of its components and the relationship of total delay and the components of delay to socio-demographic and economic attributes of the patients and their households, and the relationships of all elements of delay to the health seeking behaviour of the patients. This systematic exploration enables us to identify targets for public health interventions which can facilitate the vital process of reducing delay in seeking effective treatment to an acceptable level.

7.1. Diversion

According to the English Oxford Dictionary, *diversion* is the act of turning aside from any course, occupation, or object such as, the diversion of a stream from its channel. But in the case of Tuberculosis treatment, diversion means failure to contact National Tuberculosis Programme (NTP) recognized health facilities directly and instead contacting locally available private non-formal and formal health providers according to the patient's socio-economic circumstances. Some studies have noted elements of diversion in relation to health system delay but it was not explored in detail in them. So I explored this important issue beginning with a preliminary brief snapshot of Bangladesh's existing health system and its utilization scenario.

Few studies have been done regarding the overall utilization of public health care services in Bangladesh. A study showed the overall utilization rate for public health care services is as low as 30 percent (Ricardo et al., 2004). Another survey based study indicated that the trend of utilization of public health care services had been declining between 1999 and 2003, while the rate of utilization of private health care facilities for the same period had been increasing (CIET Canada, 2004). A World Bank study reported that 70 per cent of the patients seek medical care from unqualified and/or qualified private health care providers in

Bangladesh (World Bank, 2003). The unavailability of doctors and relevant staffs, their negative attitudes and behaviours, practice at public health facilities, and aggressive pursuit of monetary gains are major hindrances to the utilization of public hospitals.

The present study shows that a majority of the patients *diverted* by contacting private health providers. Just 4.2 per cent of weighted cases used public health facilities as their first contact. *Annexes-7.1* demonstrates details of the nature of contacted health care providers. As their first contact, 40.5 per cent of patients consulted a pharmacist/drug seller, followed by 31.0 per cent an allopathic village doctor. Only 26.2 per cent of Tuberculosis suspects contacted only one health provider. For second contacts, the situation changed and patients went to better health facilities. Many (48.5 per cent) chose qualified private practitioners but allopathic village doctors (23.1 per cent) were still the second major contacted health provider and the public health sector was still less utilized. At third contact, a majority of patients contacted qualified health practitioners. Data also indicated that dissatisfaction with private providers in terms of the desired medical outcome usually triggered repeated visits to the same provider or shifted care seeking to another private practitioner. In that process suspected Tuberculosis patients contacted an average of 2.28 with the range of 1 to 5 different health providers before reporting to a proper treatment unit. They also contacted on average 6.55 times with each provider with a range of 1 to 96 times.

7.1.1. Factors enhancing diversion

Different social and cultural contexts of the patients who develop TB have an important impact on diversion to private health care providers. This study indicates that factors including gender, area of residence, accessibility of health facilities, lack of knowledge about Tuberculosis and proper treatment facilities, convenient location of private health providers, and lack of trust in public health treatment were important in relation to diversion.

7.1.1.1 Gender

Both male and female patients visited both qualified and unqualified private health care providers. There was no significant difference by gender in the nature of the first contact made but the situation had changed for the second contact. A higher percentage of female patients contacted unqualified health providers and the difference was statistically significant. Details are given in *Annexes-7.2 and 7.3*. This difference may be due to restrictions on mobility for female patients or complex family health care decision making processes.

7.1.1.2 Area of residence and access

Area of residence is one of the most important factors relating to access to health care facilities in Bangladesh as qualified providers and pharmacy holders are concentrated in urban and peri-urban areas and village doctors predominate in rural areas. Availability and easy physical access to health services is an important determinant of initial health seeking behaviour by the patients. Overall for first and second contacts a higher percentage of urban patients contacted qualified private practitioners and higher level facilities whereas rural patients were more likely to contact village doctors. These differences were statistically highly significant. Details are given in *Annexes-7.4 and 7.5.* For third and fourth contacts the scenario had changed as the rural patients mostly shifted to qualified private practitioners and urban patients to better health facilities. These differences were also statistically highly significant and details are given in *Annexes-7.6 and 7.7.* The gender wise consumption pattern of health services in urban areas was complex. For first contact, a higher percentage of female patients contacted qualified private practitioners but the situation reversed from second contact. Conversely, in rural areas males were more likely to contacted qualified private practitioners and females village doctors and this difference was statistically significant for second contact. This might be due to less mobility of female patients and more availability of village doctors near their residences. So these findings strongly suggest that the area of residence of the patients is an important factor in determining the nature of contacted health provider and that urban and rural gender contact patterns are different.

7.1.1.3 Lack of knowledge and information about treatment of Tuberculosis

Lack of knowledge about the symptoms of the disease is an important factor in the decision making process for care seeking behaviour. Patients might recognize the symptoms as a normal cold cough or fever and contact nearby health facilities rather than specialized Tuberculosis treatment facilities. In the study, 84.4 per cent of weighted patients indicated 'No idea about Tuberculosis disease' as the reason for contacting other health providers. Rural patients had significantly less knowledge than urban patients which might be due to the latter's higher exposure to audio-visual media specially television. Male and female patients in both urban and rural areas had similar levels of lack of knowledge regarding

Tuberculosis. 62.3 per cent of patients indicated 'Lack of information about public/NGO Tuberculosis treatment facility' as a reason for not contacting proper Tuberculosis treatment facilities but there was no significant gender or urban rural differences across the whole and weighted sample respectively. However, urban female patients had significantly less awareness of the treatment facilities than urban male patients and details are given in Annexes-7.8, 7.12 and 7.13. Moreover, 84.1 per cent of respondents indicated 'No idea about Tuberculosis disease' as their first cause and 52.0 per cent cited 'Lack of information about public/NGO Tuberculosis treatment facility' as their second reason for contacting other health providers. There was no gender difference as demonstrated in *Annexes-7.9 to 7.11*. However, a significantly higher percentage of rural patients cited 'No idea about Tuberculosis disease' as their first reason for contacting other health providers. Likewise in relation to second cause of non-contact, a significantly higher percentage of rural patients cited 'Lack of information about public/NGO Tuberculosis treatment facility' and details are given in *Annexes-7.14 and 7.15*. 'No idea about Tuberculosis disease' and 'Lack of information about public/NGO Tuberculosis treatment facility' was the major factors behind diversion through contacting other health providers rather than proper Tuberculosis public/NGO Tuberculosis treatment facilities.

7.1.1.4 Neighbourhood and trustworthiness

Private practitioners especially village doctors live within the village which plays a role in developing interpersonal relationships between the health providers and care seekers. The health providers and care seekers have known each other for a long time. Moreover, their availability for the home visits even during nights, affordability and easy access enhanced patient's trust in them. So both convenience and trust triggered diversion and motivated the patients to contact nearby previously known health providers irrespective of their disease (practical experience). In the study, 89.9 and 52.8 per cent of patients indicated 'Neighbours and previously known' and 'Trustworthiness and confidentiality' as the cause of contacting other health providers as indicated in *Annex-7.8*. There was no significant difference by gender for the overall sample as well as urban and rural patients regarding 'Neighbourhood contact' as stated in *Annex-7.8* and *7.12*. A significantly higher percentage of female as well as rural patients gave 'Trust and confidentiality' as the cause of contacting other health providers as shown in *Annexes-7.8* and-*7.12*. Moreover, female patients in urban areas significantly more often cited 'Trustworthiness and confidentiality' as compared with males but in rural areas both male and female patients cited the cause almost equally as indicated in *Annex-7.13*. This might be due to social stigma and female patients' tendency to hide severe disease and rural patients' social closeness to village health providers. *Annexes-7.14* to *7.18* shows the details of factors associated with these reasons for contacting health providers other than the public health provision in relation to second and subsequent contacts made.

7.1.1.5 Easy payment system

The cost of health care is also a strong determinant of utilization of health care services. Most of the rural families depend upon agriculture as their main source of income and cash availability varies widely over the course of the year. Conversely, though the urban patients have a continuous income through monthly or daily wages, the Tuberculosis patients' incomes were very limited and many lived in very poor unhygienic conditions. Although public health services are intended to be mostly free-of-charge, there are real costs and time loss associated with travel in rural areas and the informal payments are often demanded by middlemen in urban areas. Patients also need to buy medicine and accessories from outside the health system. So the patients require money in hand in order to seek such services. In contrast, rural private practitioners rarely charge high fees and provide payment flexibility if required as their business policy, which attracts poor rural people. Even normal urban qualified practitioners charge moderate fees for their services with payment flexibility if required which makes their services more attractive. Moreover, patients tend to purchase medicines from local drug stores, where the shopkeepers also act as health service providers. They typically are well known by the patients or their families to whom they offer credit for medication purchases and do not pressure them for payment. In many cases, these providers may be relatives or family friends, which further facilitate flexibility of payment (practical experience).

In the study, 59.2 per cent of weighted patients gave 'Less and easy payment system' as a reason for contacting other health providers. Male and female patients almost equally cited this cause and there was no significant difference between urban and rural patients. When the differences by gender for urban and rural areas were examined separately there was a significant difference with males more often citing this factor in urban areas. Details are given in *Annexes-7.8, 7.12 and 7.13*. Details of factors associated with reasons for second and subsequent contacts with health providers, including payment issues, are given in

Annexes-7.14 to 7.18. So the analysis clearly revealed that 'Less and easy payment system' was a major factor in relation to diversion and the initial contacting of other health providers rather than proper Tuberculosis public/NGO Tuberculosis treatment facilities.

7.1.1.6 Transport difficulties and Influence of neighbours and relatives

The ability of patients to travel for treatment (influenced by family decision making processes) is another significant cause of diversion in Bangladesh. Necessity of travel to an Upazila Health Complex (UHC) or any other public health care facility is a substantial burden for rural patients and their families due to complicated transport facilities, huge travel costs and time loss both for travel and waiting to be attended. Similarly, urban patients also need to spend for transport and waiting time loss at public health facilities. Conversely, private sector health providers are available in villages in rural areas or high streets in urban areas. Most importantly, rural health providers commonly make home visits to care for the patients. Moreover, ill people are often influenced by neighbours and/or relatives who have experienced similar symptoms to contact their previously known private practitioners or experienced health providers.

In the study, 12.9 per cent of patients gave 'Distance of public/NGO Tuberculosis treatment facility' as a reason for not contacting proper Tuberculosis treatment facilities and details are given in *Annexes-7.8 and 7.12*. In addition, 26.6 per cent of patients indicated 'Influence by neighbour/relatives' as a reason for contacting other health providers. This reflects my experience that patients are often referred by neighbours and/or relatives to health practitioners previously used by the people suggested them. Male and female patients almost equally cited this cause but a significantly higher percentage of rural patients indicated this as a primary cause. Full details are given in *Annexes-7.8, 7.12and 7.13*. Details as to reasons for subsequent contacts are given in *Annexes-7.9* to *7.11*. These findings strongly suggest that both distance from the household to the public/NGO health facilities and peer influences are important factors in relation to diversion.

7.1.1.7 Less trust on public/NGO treatment

Patient or client satisfaction to health care facilities is a reason for contacting other health facilities rather than public clinics. Poor patients often complained about public health facilities based on long waiting time, improper behaviour of health personnel and staff, unavailability of drugs and above all an expectation of poor outcomes. Moreover, personal experience suggests that patients and their family members are more satisfied with private than public providers. In the study, 7.2 per cent of patients indicated 'Less trust on public/NGO treatment' as a primary cause of contacting other health providers. Male and female patients almost equally cited this cause. Details are given in *Annexes-7.8, 7.12and 7.13.* So the findings suggest that lack of trust in the public/NGO health facilities is another important factor in relation to diversion to private health facilities.

7.2. Delays

Delay is the ultimate outcome of diversion of suspected Tuberculosis patients. Patients diverted for the reasons described above and contacted several private or inappropriate public health facilities repeatedly rather than proper anti-Tuberculosis treatment facilities. Private practitioners tend to hold the cases longer as their business policy and to keep their reputation intact. Patients also sometimes face problems at proper diagnostic and treatment facilities. As a result delay occurs at every step from becoming symptomatic to the initiation of proper treatment. The total pre-treatment delay period comprises two main components *patient's delay* and *health system delay* which can be divided further into sub-components. The *patient's delay* can be sub-divided into *care seeking delay* and *health provider's delay*. Similarly, *health system delay* can be divided into *diagnosis delay* and *treatment delay*. Analysis revealed that there were great differences in the duration of different delays. Moreover, the mean duration of different delays seemed to be higher than the median due to some extreme and outlier high-score values.

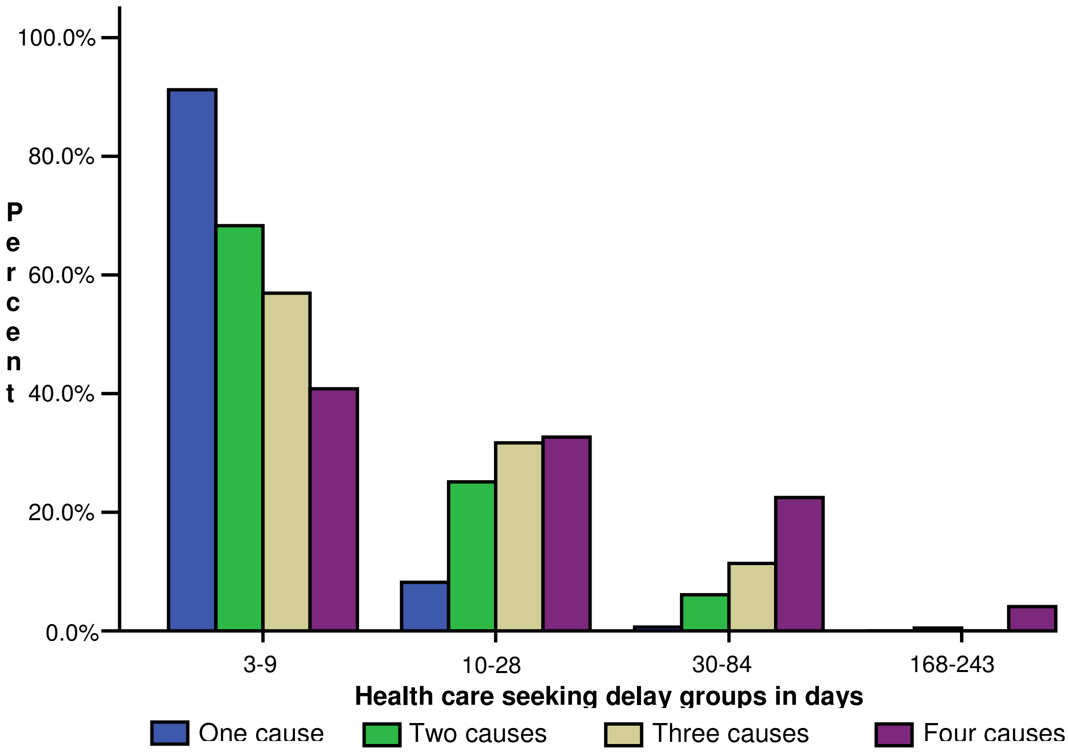
7.2.1. Health care seeking delay

The mean and median health seeking delays of 9.39 and 6.0 days were on average a small portion of patient's delay as shown in *Table-7.1*. Median care seeking delay was lower than mean due to some extreme and outlier values as shown in *Annex-7.20*.

7.2.1.1. Factors associated with health care seeking delay

During the interview patients were asked about the reasons for seeking health care late and most patients indicated multiple factors. Almost all patients mentioned the factor 'Wait and See' often in combination with other reasons as stated in *Annex-7.19*. Financial problems were seldom given as the first cause but often surfaced as a subsidiary cause. For the relevant respondents (because 18.5 percent of weighted patients first contacted any health provider within 2 days of their sickness), details of health seeking delay factors are given in *Annexes-7.21* and *7.22*. *Figure-7.1* shows that delay duration increased as the number of causes increased and the relationship was statistically highly significant as demonstrated in *Annexes 7.23*.

Figure 7.1: Number of cause wise patient's health care seeking delay group in days (Weighted 530 cases by gender)



During the interview, patients were asked about their perceptions regarding Tuberculosis in order to explore any influences in relation to health seeking delay. Respondents indicated multiple perceptions regarding Tuberculosis. A majority of patients described Tuberculosis as '*an awful disease*' and an '*infectious disease*'. Surprisingly there were still some misconceptions like '*contagious disease*' i.e. the disease is caught by touching and sharing of food with the active Tuberculosis patients and '*disease of the king*' i.e. the disease is very expensive to cure. Similarly, '*heredity*' and '*should not get married to a cured patient*' were also cited. A significantly higher percentage of male and female patients indicated '*heredity*' and '*not curable*' respectively. Other perceptions were almost equally given by both sexes.

A significantly higher percentage of rural patients cited wrong perceptions of the disease indicating that health education should be more emphasized in the rural areas and details are given in *Annex-7.24.* However, patients' first perceptions were not statistically associated with the health care seeking delay groups as shown in *Annex-7.25.*

Table 7.1: Socio-demographic and economic factors wise total, mean and medians of health care seeking delay among the study sample in days (Evaluated 530 weighted cases for all variables except gender)

Factors	Components	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Mini	Maxi
Over All		9.39	15.42	-	6.0	-	1	243
Gender	Male	9.22	17.43	ANOVA -NS (.651)	5.0	NPMT -S (.022)	1	243
	Female	9.71	10.34		7.0		1	84
Urban-Rural	Urban	7.85	8.46	ANOVA -NS (.351)	7.0	NPMT -NS (.079)	1	52
	Rural	9.64	16.28		5.0		1	243
Education	Illiterate	11.19	22.28	ANOVA -NS (.214)	6.0	NPMT -NS (.216)	1	243
	Only sign	7.95	8.25		5.0		1	84
	Class I-V	10.83	17.89		7.0		1	168
	Class VI-X	7.78	8.37		4.0		1	45
	Class XI-XIV	7.13	7.07		7.0		1	30
Marital status	Unmarried	7.29	8.91	ANOVA -S (.001)	5.0	NPMT -S (.039)	1	84
	Married	8.88	11.77		7.0		1	168
	Divorced	12.86	12.88		7.0		1	60
	Widowed	20.53	46.08		7.0		1	243
Personal income	1st quintile	8.77	8.30	Kruskal-Wallis Test -S (.000)	7.0	NPMT -S (.005)	1	45
	2nd quintile	9.82	10.99		7.0		1	84
	3rd quintile	11.69	23.55		7.0		1	243
	4rth quintile	8.95	8.67		7.0		1	52
	5th quintile	7.49	15.58		3.0		1	168

Means and medians of health care seeking delay were also analysed against different socio-demographic and economic characteristics of the patients using appropriate analytical tools as shown in the *Table-7.1*. There was no significant mean care seeking delay difference between male and female patients but the median health seeking delay difference was statistically significant. The female patients' higher duration of health seeking delay might be due to various social barriers or financial limitations as the family resources are mainly controlled by the males. There was also no statistically insignificant mean and median care seeking delay difference between urban and rural patients. *Table-7.2* demonstrates patients' socio-demographic and economic characteristics in relation to the pattern of health care seeking delay by groups. Overall, female patients significantly dominated the longer period of health seeking delay groups but there were no statistically significant differences in patient's health care seeking delay pattern between urban and rural patients.

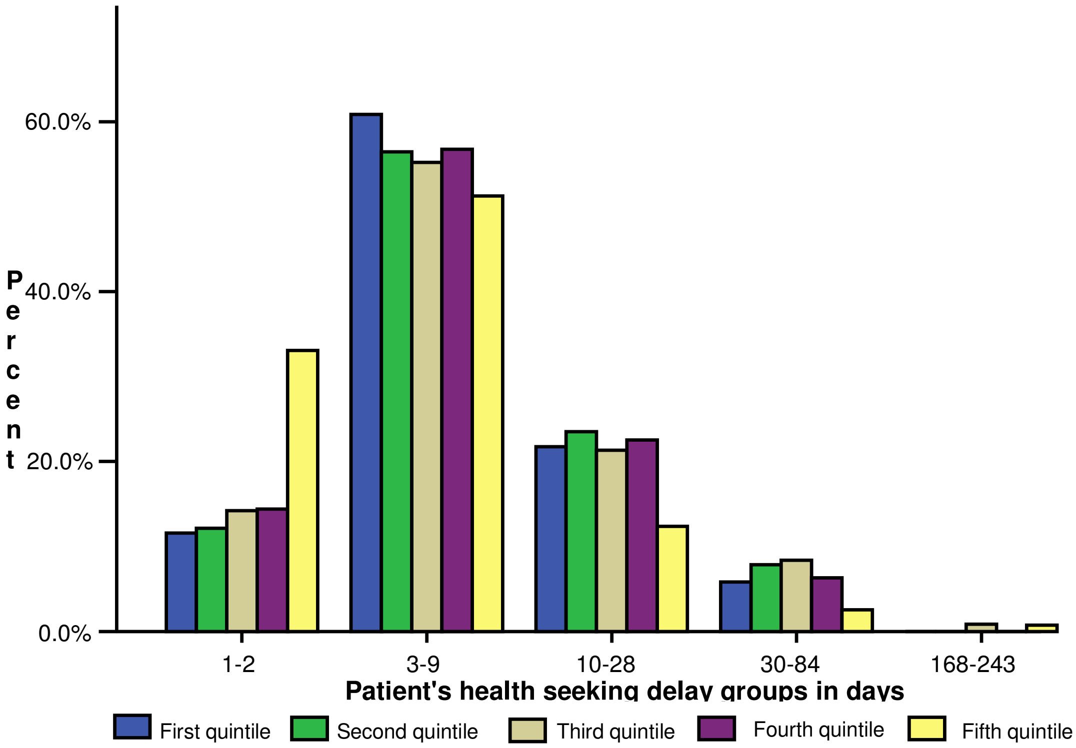
Table 7.2: Patients socio-demographic and economic characteristics wise health seeking delay groups cross-table (Evaluated 530 weighted cases for all variables except gender)

Socioeconomic factors	Health seeking delays in days (row percentage)						Cramer's V	Chi-square
	1-2	3-9	10-28	30-84	168-243	Total		
Gender								
Male	21.0 (74)	55.2 (195)	17.8 (63)	5.4 (19)	0.6 (2)	100.0 (353)	0.130	0.018
Female	13.6 (48)	55.1 (195)	23.7 (84)	7.6 (27)	0.0	100.0 (354)		
Urban-rural								
Urban	19.7 (15)	60.5 (46)	13.2 (10)	6.6 (5)	0.0	100.0 (76)	0.073	0.582
Rural	18.2 (83)	54.3 (247)	20.9 (95)	6.2 (28)	0.4 (2)	100.0 (455)		
Marital status								
Unmarried	26.5 (18)	55.9 (38)	16.2 (11)	1.5 (1)	0.0	100.0 (68)	0.119	0.064
Married	18.2 (77)	55.0 (232)	20.4 (86)	6.2 (26)	0.2 (1)	100.0 (422)		
Divorced	13.3 (2)	46.7 (7)	26.7 (4)	13.3 (2)	0.0	100.0 (15)		
Widowed	6.9 (2)	58.6 (17)	17.2 (5)	13.8 (4)	3.4 (1)	100.0 (29)		

Patients' educational and marital status wise means and medians of health care seeking delay are also given in *Table-7.1.* There was no statistically significant mean and median care seeking delay differences according to the educational status of the patients. Divorced and widowed patients experienced statistically significant longer mean and median care seeking delays than the married or unmarried groups and *Table-7.2* demonstrates details of these relationships.

Patient's personal income quintiles in relation to mean and median health care seeking delay are presented in *Table-7.1.* Interestingly the highest mean health seeking delays were experienced by the third income quintile and the lowest by the fifth income quintile group of patients and the differences were statistically significant. Generally the least delay group was experienced by the highest income quintile group patients and higher delay durations were experienced by the lower and middle income quintile group patients as shown in the *Figure-7.2* and this relationship was moderately associated and statistically highly significant as indicated in *Annex-7.26.*

Figure 7.2: Patients' personal income quintile wise health care seeking delay group's bar chart (Weighted 530 cases by gender)



7.2.2. Health provider's delay

The mean and median provider's delay (the major portion of patient's as well as total delay) of the weighted 530 cases and the range are shown in *Table-7.3*. The mean delay was affected by some extreme and outlier cases as shown in *Annexes-7.28* including group-wise providers' delay details. Only 4.2 percent of patients faced no health provider's delay. They either directly contacted to the NTP recognized health facility or were immediately referred after contact with a different kind of health facility. Unfortunately the majority of the patients experienced a longer duration of health provider's delay which was devastating from the programme's point of view.

Patient's tendency to go shopping around multiple health providers rather than directly contacting NTP recognized health facilities played a crucial role in longer provider's delay. The mean and median numbers of provider contacted by the patients were 2.28 and 2.0 and details are illustrated in *Annex-7.27*. Many patients not only contacted several health providers but also visited providers repeatedly. The mean and median times of contacts were 6.55 and 5.0 times with the range of 1 and 96 as shown in *Annex-7.29*.

7.2.2.1. Factors associated with health provider's delay

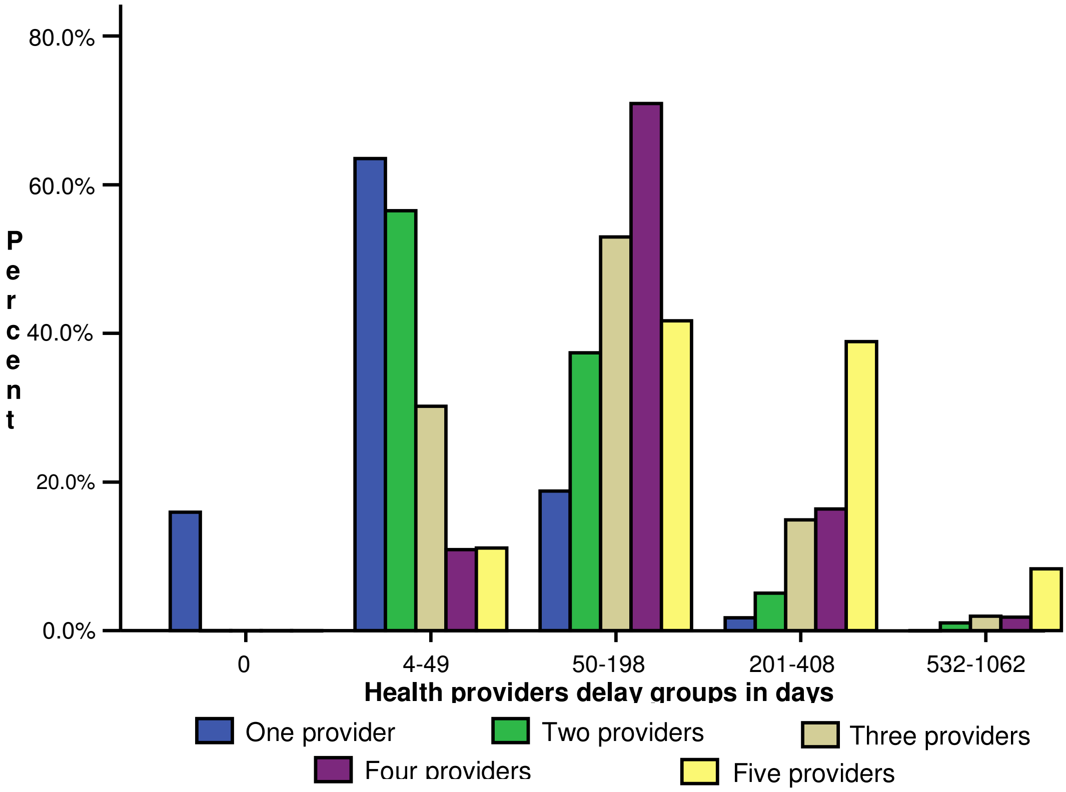
The mean and median health provider's delays in relation to socio-demographic and health seeking attributes of the patients are shown in *Table-7.3*. The patterns of association of health provider's delay groups with the socio-demographic and health seeking behaviour attributes of the patients are demonstrated in *Table-7.4*. The only significant relationships observed are with the health seeking behaviours, although educational differences approach significance and there is evidence that the divorced group suffer particular severe mean provider's delays.

Table 7.3: Socio-demographic and health factors wise total, mean and medians of health provider's delay among the study sample in days (Evaluated 530 weighted cases for all variables except gender)

Factors	Components	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Minni	Maxi
Over All		86.73	113.17	-	49.50	-	0	1062
Gender	Male	81.05	109.15	ANOVA -S (.049)	44.0	NPMT -NS (.123)	0	1062
	Female	98.07	120.16		53.0		0	1030
Urban-Rural	Urban	96.39	117.88	ANOVA -NS (.426)	53.0	NPMT -NS (.140)	0	1030
	Rural	85.14	112.43		48.0		0	1062
Number of contacted health providers	1 provider	35.77	42.91	ANOVA -S (.000)	23.0	NPMT -S (.000)	0	358
	2 providers	71.15	95.54		42.0		6	1030
	3 providers	120.20	138.06		81.0		15	1062
	4 providers	144.01	116.59		110.5		18	716
	5 providers	237.08	174.73		198.0		24	717
Times contacted health providers	1-5 times	47.83	49.08	Kruskal-Wallis Test -S (.000)	29.3	NPMT -S (.000)	4	362
	6-10 times	103.38	93.63		82.0		8	1030
	11-15 times	152.36	105.32		113.5		25	532
	16-20 times	220.97	125.24		178.0		45	540
	22-33 times	459.24	200.34		359.8		86	723
	41-96 times	885.67	431.93		925.8		533	1062

As expected, number of health providers contacted and number of contacts with health providers were both strongly associated (statistically highly significantly) with health provider's delay. The pattern is shown in *Figure-7.3* and this relationship was moderately associated and statistically highly significant as indicated in *Annex-7.32*. A similar pattern was observed for number of times contacted groups against health provider groups as shown in *Annexes-7.31 and 7.32*.

Figure 7.3: Patients' number of contacted health provider wise health provider delay group's bar chart (Weighted 530 cases by gender)



Age group, marital and educational status and monthly family income before illness deciles wise means and medians and their association with provider's delay groups are shown in *Annexes-7.30 and 7.32* respectively. There were no significant mean and median differences and association among the patients in relation to these attributes.

Table 7.4: Patients socio-demographic and health characteristics wise health providers delay groups cross-table (Evaluated 530 weighted cases for all variables except gender)

Socioeconomic factors	**Health providers delays in days (row percentage)**						**Cramer's V**	**Chi-square**
	0	4-49	50-198	201-408	532-1062	Total		
Gender								
Male	4.8 (17)	47.3 (167)	38.2 (135)	8.5 (30)	1.1 (4)	100.0 (353)	0.073	0.441
Female	3.1 (11)	42.7 (151)	42.9 (152)	9.6 (34)	1.7 (6)	100.0 (354)		
Urban-rural								
Urban	0.3 (1)	41.6 (32)	44.2 (34)	11.7 (9)	1.3 (1)	100.0 (77)	0.080	0.487
Rural	4.8 (22)	46.3 (211)	38.8 (177)	8.6 (39)	1.5 (7)	100.0 (456)		

7.2.3. Total patient's delay

As shown in *Table-7.5*, the mean and median patient's delay was 96.12 and 57.0 days and this difference between the mean and median delay was due to a few extreme delay duration figures as shown in *Annex-7.33*. Only 3.9 percent of sample cases reported to NTP recognized health facilities within 18 to 21 days which is the acceptable patient's delay duration as per Bangladesh National Tuberculosis Diagnosis and Treatment Guidelines. Almost 90.23 percent of mean total patient's delay was contributed by the mean health provider's delay.

7.2.3.1. Factors associated with patient's delay

An examination of patient's delay group against first contacted health providers shows that higher delay group was dominated by the patients who first contacted low quality or unqualified health providers as demonstrated in *Annex-7.34*. This pattern was moderately associated and statistically highly significant as indicated in *Annex-7.35*.

The means and medians of patient's delay for female patients were higher than the male patients and these differences were statistically significant as shown in *Table-7.5*. Also more than twice as many male patients reported or were referred directly to NTP recognized health systems in comparison with female patients within the acceptable period. Distribution of patient's delay groups was associated with Gender and this was statistically significant as shown in *Table-7.6.* Differences in patients' delay for urban and rural patients were statistically insignificant as shown in *Table-7.5* although they approached significance. Gender wise mean and medians of urban and rural area's total patients' delay are given in *Annex-7.36*. Gender differences for both mean and median delays for urban patients were not significantly different. Conversely, female patients had a significantly higher mean and median delay in rural areas than males as shown in *Annex-7.37*. Overall, female patients had higher mean and median patients' delay.

When educational status was considered medians of patient's delay according to the educational status were significantly different as shown in *Table-7.5*. Educational level was not significantly associated with delay mean although there was a pattern of longer delay for the less educated. Also the divorced/separated and widowed group patients were strongly represented in the highest patient's delay groups as shown in *Table-7.6*. These delay differences might be due to social sufferings of divorced and widowed patients in the country's context.

Table 7.5: Socio-demographic and health factors wise total, mean and medians of total patients delay among the study sample in days (Evaluated 530 weighted cases for all variables except gender)

Factors	Components	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Minni	Maxi
Over All		96.12	114.47	-	57.0	-	18	1092
Gender	Male	90.25	110.95	ANOVA -NS (.045)	56.0	NPMT -S (.003)	18	1092
	Female	107.78	120.48		59.0		19	1031
Urban-Rural	Urban	104.10	118.72	ANOVA -NS (.514)	58.0	NPMT -NS (.478)	19	1031
	Rural	94.78	113.83		57.0		18	1092
Education	Illiterate	104.12	120.89	ANOVA - NS (0.670)	58.0	NPMT -S (.047)	19	728
	Only sign	100.67	95.70		58.5		18	723
	Class I-V	91.53	93.03		58.0		21	546
	Class VI-X	91.38	148.77		44.0		19	1092
	Class XI-XIV	70.82	83.17		43.0		21	363
Marital status	Unmarried	74.10	104.47	ANOVA -NS (0.148)	44.0	NPMT -NS (0.087)	21	1031
	Married	97.23	112.53		58.0		18	1092
	Divorced	143.93	167.21		74.0		17	723
	Widowed	108.93	130.96		57.0		19	715
Number of contacted health providers	1 provider	49.06	49.91	ANOVA -S (0.000)	28.0	NPMT -S (0.000)	19	363
	2 providers	78.81	95.65		53.8		18	1031
	3 providers	127.77	139.84		88.3		23	1092
	4 providers	153.55	120.35		119.5		25	723
	5 providers	245.81	176.60		212.0		27	727
Times contacted health providers	1-5 times	56.87	53.68	Kruskal-Wallis Test -S (0.000)	41.3	NPMT -S (0.000)	18	365
	6-10 times	110.89	95.23		88.0		23	1031
	11-15 times	162.85	107.34		121.0		27	546
	16-20 times	227.19	123.10		180.0		57	542
	22-33 times	467.71	201.85		363.0		90	728
	41-96 times	908.0	450.71		954.0		540	1092

The means and medians of patient's delay according to the number of contacted health providers showed a sharp ascending pattern and this pattern was statistically highly significant as shown in *Table-7.5*. Distribution of patient's delay groups according to the number of contacted health providers demonstrated the same pattern as shown in *Figure-7.4* and this was moderately associated and statistically highly significant as shown in *Annex-7.37*. Similarly, both the means and medians of patient's delay in relation to the number of contacts with health providers were contacted showed a sharp ascending pattern. Tests also revealed strongly significant differences in the mean and median ranks between the patient's delay and the number of times health providers were contacted as shown in *Table-7.5*.

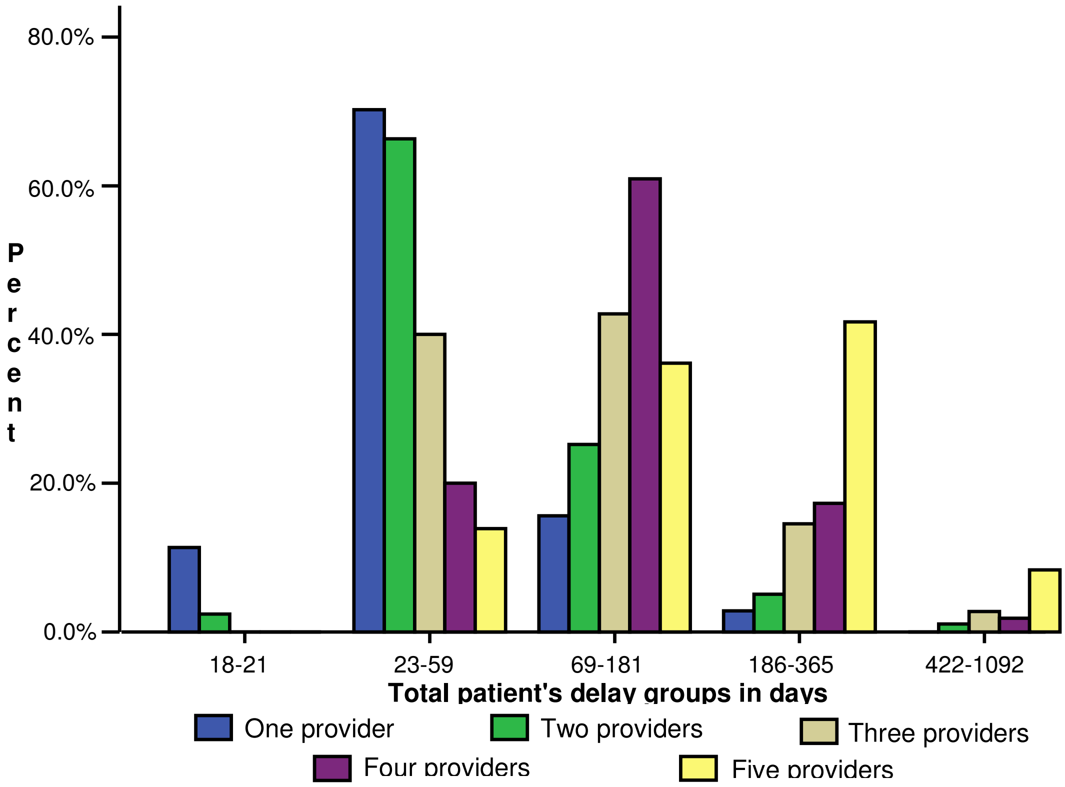
Distribution of patient's delay groups according to the number of times contacted health providers demonstrated a similar pattern as stated in *Annex-7.38*. This distribution pattern was also strongly associated and statistically highly significant as stated in *Annex-7.37*.

Table 7.6: Patients socio-demographic and health characteristics wise total patients delay groups' cross-table (Evaluated 530 weighted cases for all variables except gender)

Socioeconomic factors	Patient's delays in days (row percentage)						Cramer's V	Chi-square
	18-21	23-59	69-181	186-365	422-1092	Total		
Gender								
Male	4.8 (17)	56.9 (201)	28.3 (100)	8.5 (30)	1.4 (5)	100.0 (353)	0.121	0.034
Female	2.0 (7)	49.4 (175)	36.2 (128)	10.7 (38)	1.7 (6)	100.0 (354)		
Urban-rural								
Urban	1.3 (1)	50.0 (38)	35.5 (27)	11.8 (9)	1.3 (1)	100.0 (76)	0.077	0.527
Rural	4.4 (20)	54.9 (251)	30.2 (138)	8.8 (40)	1.8 (8)	100.0 (457)		
Educational status								
Illiterate	2.9 (4)	52.2 (71)	32.4 (44)	10.3 (14)	2.2 (3)	100.0 (136)	0.097	0.221
Only sign	4.5 (6)	47.4 (63)	34.6 (46)	12.8 (17)	0.8 (1)	100.0 (133)		
Class I-V	3.1 (4)	53.5 (68)	34.6 (44)	7.9 (10)	0.8 (1)	100.0 (127)		
Class VI-X	5.1 (6)	60.7 (71)	24.8 (29)	6.0 (7)	3.4 (4)	100.0 (117)		
Class XI-XIV	8.7 (2)	73.9 (17)	8.7 (2)	8.7 (2)	0.0	100.0 (23)		
Marital status								
Unmarried	2.9 (2)	71.0 (49)	21.7 (15)	2.9 (2)	1.4 (1)	100.0 (69)	0.102	0.163
Married	4.3 (18)	51.7 (218)	32.9 (139)	9.7 (41)	1.4 (6)	100.0 (422)		
Divorced	0.0	46.7 (7)	26.7 (4)	20.0 (3)	6.7 (1)	100.0 (15)		
Widowed	3.4 (1)	55.2 (16)	24.1 (7)	13.8 (4)	3.4 (1)	100.0 (29)		

Age group, monthly family income before illness and family per capita income deciles wise means and medians and their association with patient's delay groups are shown in *Annexes-7.36 and 7.37* respectively. There were no significant mean and median differences and association among the patients in relation to these attributes.

Figure 7.4: Patients' number of contacted health provider wise patient's delay group's bar chart (Weighted 530 cases by gender)



Bivariate Pearson Correlation Coefficients were calculated among total patient's delay, provider's delay and health seeking delay for the weighted 530 cases. This revealed significant correlations among patient's delay, provider's delay (Coefficient *r = 0.991, n =530, p = <0.01 and r-square= 0.982*) and health seeking delay (*Coefficient r = 0.150, n =530, p = <0.01 and r-square= 0.023)* at the 2-tailed 0.01 level. This confirmed that the health provider's delay was the main contributor to total patient's delay. Similarly correlations were calculated between number of contacted health providers, number of contacts with health providers and total patient's delay. The test also revealed significant correlations between number of contacted health providers (Coefficient *r = 0.386, n =530, p = <0.01 and r-square= 0.149*) and number of contacts (Coefficient *r = 0.696, n =508, p = <0.01 and r-square= 0.484*) at the 2-tailed 0.01 level as shown in *Annexes-7.39*. Those findings also confirmed that times contacted health provider had higher effect on total patients delay than number of contacted health providers. So I decided to elaborate further by exploring the way these two variables (Number of contacted health providers and number of actual contacts) work together. Therefore, I calculated the multiple R-square (0.488) which is only on trivially grater than multiple R-square of number of contacts and this confirms that the key issue is the holding the patients by the health providers for patient's delay rather than the number of providers contacted by the patients.

7.2.4. Diagnostic delay

The mean and median diagnostic delays were 3.05 and 3.00 days. Most (75.8 percent) patients were diagnosed within the acceptable duration of 3 days. Unfortunately, 24.2 percent patients reported longer diagnostic delay as shown in the *Annex-7.40*.

Since diagnostic delays contribute relatively little to total delay differences, details of diagnostic delay in relation to socio-demographic and economic attributes of the patients are not discussed in detail here but evidence on these differences are attached in *Annexes-7.41* and *7.42*.

7.2.5. Treatment delay

Only 3.96 percent of weighted patients had experienced treatment delay. The mean and median treatment delays were 3.64 and 2.00 days. Unfortunately, 14.3 percent of weighted patient's treatment started within the range of treatment delay of 7-17 days as shown in the *Annex-7.43*. Since treatment delays contribute relatively little to total delay differences, details of treatment delay in relation to socio-demographic and economic attributes of the patients are not discussed in detail here but evidence on these differences is attached in *Annexes-7.44* and *7.45*.

7.2.6. Total health system delay

The mean and median health system delay of weighted 530 cases was 3.20 and 3.00 days. Most (73.1 percent) patients were diagnosed and had treatment started within the acceptable period of 3 days from contacting NTP recognized Tuberculosis treatment facilities. Another 25.5 percent patients was diagnosed and had treatment initiated within 4-7 days. Unfortunately, 1.4 per cent of patients' treatment was initiated with a longer delay of 8-20 days as shown in the *Annex-7.46*. Since health system delays contribute relatively little (only 3.22 percent) to mean total delay differences, details of health system delays in relation to socio-demographic and economic attributes of the patients are not discussed in detail here but evidence on these differences is attached in *Annexes-7.47*and *7.48.*

7.2.7. Total delay

Total delay is simply the equal sum of the 'patient delay' and 'health system delay'. The mean and median total delays were 99.32 and 60.00 days respectively as stated in *Annexes-7.50*. The huge gap between the mean and median delay was due to some outlier extreme duration of total delay cases as shown in *Annex-7.49*. Only 30.3 percent had a total delay period of less than or equal to one month and 44.7 percent had a delay of 1-3 months. Unfortunately, 9.2 and 1.6 percent of patients had total delay durations of 6 months to 1 year and more than one year respectively. The patient's delay contributed 96.78 percent of the total delay period, while the health system delay period contributed only 3.22 percent.

7.2.7.1. Factors associated with total delay

Given the very high degree of association between total delay and patients' delay, the detailed relationships between socio-demographic and economic attributes of patients and total delay are not presented here but can be found in *Annexes-7.50 to 7.53.* In effect these relationships replicated the relationships of patients' delay.

The Pearson correlation coefficient (Bivariate analysis) was calculated for two sets of variables. The first set explored association among total pre-treatment delay, patient's delay and health system delay revealed a significant correlation at the 0.01 level (2-tailed) as the coefficients were (Coefficient $r = 1.000$, $n = 530$, $p = <0.01$ *and* r-square$= 1.00$) for patient's delay and (Coefficient $r = 0.163$, $n = 530$, $p = <0.01$ *and* r-square$= 0.027$) for health system delay as shown in *Annexes-7.54.* Findings confirmed that though the two sub components are part of total delay but the most important aspect here is the patient's delay. Correlations among total delay, patients' number of contacted health providers, and number of actual contacts were also significant at the 0.01 level (2-tailed) as the coefficients were (Coefficient $r = 0.386$, $n = 530$, $p = <0.01$ *and* r-square$= 0.149$) for number of contacted providers and (Coefficient $r = 0.695$, $n = 508$, $p = <0.01$ *and* r-square$= 0.483$) for the actual number of contacts as shown in *Annexes-7.55.* Those findings also confirmed that times contacted health provider had a higher effect on total pre-treatment delay than number of contacted health providers. As for patient's delay, I also calculated the multiple R-square (0.486) which is only on trivially greater than multiple R-square of number of contacts and this confirms that the key factor is the holding the patients by the health providers rather than the number of providers contacted by the patients.

7.2.7.2. Clustering of patients and association with total delay

As an extension of the analyses it was thought useful to explore the relationship between the characteristics of patients classified by a clustering technique and delay. TwoStep cluster analysis was used to identify the patients' patterns using major socio-demographic and economic characteristics of the patients as indicated in *Annexes-7.56.* A pen picture of the resulting clusters is outlined below.

Cluster 1: Middle age - middle income – less educated – rural female patients. Compared with the other clusters, less educated rural female patients were concentrated in this cluster. Their personal occupation was also lower standard with the family income before illness of middle range. So, the data indicated that the patients of this cluster were moderately poor in comparison to other clusters.

Cluster 2: Higher age - lowest income – middle educated – rural male patients. Compared with the other clusters, the middle educated rural male patients were mainly concentrated in this cluster. Their personal occupational status was also moderate and they came from the lowest family income background with a marginal difference with first cluster. So the data indicated that the patients of this cluster were the poorest in comparison to other clusters.

Cluster 3: Lower age - highest income – higher educated – urban-rural male and female patients. Compared with the other clusters, this is an urban- rural and male female mixed cluster. The higher educated patients were mainly concentrated in this cluster. Also patient's personal occupation was higher ranked and patients came from higher family income groups. So, the data indicated that the patients of this cluster came from comparatively affluent groups related to the other clusters.

There was no association between these socio-demographic clusters and the acceptable and unacceptable delay as shown in *Annex-7.57.*

7.2.7.3. Modeling of total delay

A binomial logistic regression analysis was conducted to predict the contribution of different factors to unacceptable total pre-treatment delay defined as delay of up to 30 days as acceptable (0) and delay of 30 days or more as unacceptable (1) for the weighted 530 cases. This distinction reflects the approach of the national programme. The binary attribute was related to socio-demographic attributes of the patients including age group, gender, marital and educational status; patients' monthly family/ per capita income deciles before illness; and the health seeking behaviour factors of number of and times contacted health providers, as predictors. Only the significant and approaching to significant variables/ dummies are included in the 'Variables not in equation' table and I followed Achia et al.'s approach to representing the 'Variable in equation' table of the final model as shown in the Annexes-7.64 and 7.65 (Achia et al., 2010).

The 'variables not in the equation table' (economic variable - family income deciles before illness) indicates that the dummy variable *age group (45-49 years)* against the *highest age group (60-75 years), number of contacted health providers* and *times contacted providers* are significant and the predictive power of the model would be improved by including them as shown in *Annex-7.58*. The same variables were significant when family per capita income deciles instead of family income deciles were used to construct the model and full details are given in *Annex-7.59*.

The *Variables in the Equation* table (containing monthly family income deciles as one of the predictor) has several important elements as demonstrated in *Annex-7.64*. The top entry for each *categorical variable* shows the overall significance level of the multinomial categorical variables. Each category is represented as a dummy in comparison to the last category of the variable. The *Wald* statistic represents the strength of contribution and associated probabilities and provides an index of the significance of each predictor in the equation. In this model, the highest contribution comes from the predictor *times contacted health providers* (p=0.000) followed by *number of contacted health providers* (p=0.000). The age groups and family income deciles demonstrate no overall significant impact but the dummy *age groups* categories of 45-49 years (p=0.004) and 55-59 years (p=0.027) against the highest age group of 60-75 years and *family income deciles* dummy of deciles3 (p=0.041) and deciles5 (p=0.042) against the highest income decile10 have significant impact. The Exp(B) column in the *Variables in the Equation* table presents the extent of odds ratio as the value exceeds 1 then the odds of an outcome occurring increase. For example, the Exp(B) value associated with number of contacted health providers in the model containing the economic factor monthly family income deciles is 2.013. So when the number of providers is raised by one unit (one provider) the odds ratio is 2.0 times as large and therefore the patients are 2.0 more times likely to belong to the *unacceptable delay* group. Inserting per capita family income deciles instead of household income deciles but retaining the other predictors produced a similar kind of findings as shown in *Annex-7.65*.

Table 7.7: Binary logistic regression of total delay (Family income deciles before illness) - Classification table of Step 0 and 1 (weighted 530 cases by gender)

Observed		Predicted (Step 0)			Predicted (Step 1)		
		Binarized total delay in days		Percentage correct	Binarized total delay in days		Percentage correct
		Accep-table	Unaccep-table		Accep-table	Unaccep-table	
Binarized total delay in days	Acceptable (21-30 days)	0	141	0.0	77	64	54.6
	Unacceptable (Other than this)	0	367	100.0	39	328	89.4
Overall percentage				72.2			79.7

a Constant is included in the model, b The cut value is 0.500.

The classification *Table-7.7* presents the results of the model (Step 1 – Enter method) as the above mentioned predictors are included. The table indicates for how many of the cases have the observed values of the acceptable and unacceptable delay categories of total delay respectively been correctly predicted. The table shows that the overall classification error rate has changed from the original 72.2 per cent to 79.7 per cent accuracy of prediction by adding the variables. Moreover, the prediction of *acceptable* and *unacceptable* delay is correctly classified to 54.6 and 89.4 per cent respectively. Inserting per capita family income deciles instead of household income deciles but retaining the other predictors produced a similar classification table as shown in *Annex-7.60*. The overall classification rate improved from the original 72.2 per cent to 81.9 per cent accuracy of prediction and the prediction of *acceptable* and *unacceptable* delay were corrected to 58.9 and 90.7 per cent respectively. Overall, both the models appear good, but it is necessary to evaluate model fit and significance as well. I also tried other analytical methods viz. Forward: Wald and Backward: Wald but obtained similar findings which are not presented here.

The overall significance is tested by *Model Chi square*, which is derived from the likelihood of observing the actual data under the assumption that the model that has been fitted is accurate. The analysis comes out with the model Chi-square 189.748 with 29 degrees of freedom and a significance *p-value* of 0.000 as shown in *Annex-7.61*. Replacing the economic factor by *family per capita income deciles* gave a Chi-square 188.051 with 29 degrees of freedom and a significance *p-value* of 0.000 as shown in *Annex-7.62*. The model is a reasonable fit so I turned to the *Variables in the Equation* table to identify which components of the model were important in relation to the outcome variable of acceptable versus unacceptable delay.

Table 7.8: Binary logistic regression of total delay (Family income deciles before illness) - Model summary and Hosmer and Lemeshow test (weighted by gender)

Step	Model summary			Hosmer and Lemeshow test		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squar	df	Significance
Step 1	410.010(a)	0.312	0.450	4.241	8	0.835

Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

The Model Summary provides some approximations of the coefficient of determination R-squares given in the *Table-7*.8. *Nagelkerke's R-Square* at 0.450 is indicating a moderate relationship of 45.0 percent between the predictors and the prediction and this is a more reliable measure of the relationship than *Cox and Snell's R-Square*.

An alternative to model chi square is the *Hosmer and Lemeshow* test which divides subjects into 10 ordered groups of subjects and then compares the number actually in the each group (observed) to the number predicted by the logistic regression model (predicted). The analysis reveals the *Hosmer and Lemeshow* test significance of 0.835 which means that the model is a very good fit as shown in *Table 7.8.*

Overall, the test of the full model against a constant only model was statistically highly significant, indicating that the predictors as a set reliably distinguished between the *acceptable* and *unacceptable* total pre-treatment delay. Nagelkerke's R-square indicated a moderate relationship between prediction and predictors. Overall prediction success including the accuracy of classification of *acceptable* and *unacceptable* delay was highly satisfactory. The Wald criterion showed that *number of contacted providers*, *times contacted providers*, *higher age groups* and *lower family income deciles* made a significant contribution to higher delay. Conversely, gender and urban-rural area were not significant predictors.

I also conducted binary logistic regressions for male and female cases separately without weighting by applying the same socioeconomic and health behavioral predictors. Both the gender based models delivered little improvement in fit over the weighted total model. There are not so much differences of overall per cent accuracy of prediction classification error and the prediction of correct classification of *acceptable* and *unacceptable* delay between the male and female patients based models but there are different significant predictors. The variables - the number of contacted health providers and times of actual contact to the health providers and the dummy higher age groups variables of 44-49 and 55-59 years against the highest age group of 60-75 years are the significant predictors for male based models containing family income deciles before illness as predictor and the summary of the model is in *Annex-7.66.* The variables - the number of contacted health providers and times of actual contact to the health providers, the higher dummy age group variable of 44-49 years against the highest age group of 60-75 years and dummy marital status variables of married against the widowed patients are the significant predictors in the case of male based models containing family per capita income deciles before illness before illness as predictor and the summary of the model is in *Annex-7.67.* In contrast, the variables namely the number of contacted health providers and times of actual contact to the health providers and the dummy lower and middle age groups of 20-24, 25-29, 30-34, 35-39, 40-44 and 45-49 years against the highest age group of 60-75 years are the significant predictors for female based models and the summaries of the models are in *Annexes-7.68* and *7.69.*

7.3. Chapter summary

Diversion is a quite new concept in relation to the management of Tuberculosis treatment. Based on the interpretation, the main findings regarding diversion among 530 weighted cases are –

▪ Only 4.2 percent patients contacted public/NGO Tuberculosis treatment facilities as their first contact.

▪ Patients on average contacted 2.28 different types of health providers with the range of 1 to 5 before enrolled in the proper treatment unit.

▪ They also contacted on average 6.55 times to each provider with the range of 1 to 96 times before reporting to the proper treatment unit.

▪ More than two-thirds of patients contacted nearby unqualified health providers as their first contact.

The main factors associated with diversion are as follows –

▪ Lack of knowledge about the Tuberculosis disease and the treatment facilities.

▪ Neighbourhood, trust and confidentiality in relation to locally available private providers.

▪ Lower cost and easy payment systems of the contacted providers especially the unqualified ones.

▪ Distance of public health facilities and transport problems of the patients.

▪ Gender and area of residence of the patients

Patterns of delay were explored in relation to socio-demographic and socio-economic attributes of the patients and their households. The main findings were: -

▪ Mean and median health care seeking delays were 9.39 and 6.0 days respectively.

▪ Wait and see, negligence and financial problem were mainly given as direct causes of health care seeking delay.

▪ Patients still have wrong perceptions like heredity, contagious disease etc. regarding the disease.

▪ Female, divorced/separated and widowed and lower personal income quintile patients had significantly higher health care seeking delays.

▪ Mean and median health provider delays were 86.73 and 49.50 days respectively and health provider delays were the main contributor to patients' delay.

▪ Mean and median Patients' delays were 96.12 and 57.0 days respectively and the main contributor to total delay.

▪ Patients who contacted unqualified health providers had higher patient's delay.

▪ Female gender and number of and times contacted with health providers were significantly associated with higher health providers' and patients' delay.

▪ Rural female patients had significantly higher patient's delay

▪ Mean and median diagnostic and treatment delays were 3.05, 3.64 and 3.0, 2.0 days respectively.

▪ Rural, lower educated and divorced/separated and widowed had significantly higher mean diagnostic delay.

▪ Mean and median health system delays were 3.20 and 3.0 days respectively.

▪ Female gender, rural, lower educated and divorced/separated and widowed and lower family income deciles had significantly higher health system delays.

▪ Urban female patients had significantly higher health system delays.

▪ Mean and median total pre-treatment delays were 99.32 and 60.0 days respectively.

▪ For 10.8 percent patients total pre-treatment delay was more than 6 months to 3 years.

▪ Female gender and higher number of and times contacted with health providers were associated with significantly higher total delay.

▪ Rural female patients had significantly higher total pre-treatment delay

▪ Patients with wrong perceptions (not curable and heredity) about Tuberculosis had higher mean total delays.

The relationships among socio-demographic and socio-economic characteristics of patients and their households were explored in order to find out the significant associated and contributing factors associated with the respective delays by applying the appropriate statistical techniques. The key findings are shown in *Table-7.9*.

Table 7.9: Factors having significant impact and contribution on patient's and total delays (Weighted 530 cases analyzed for all variables except gender)

Factors	Patient's delay	Total delay
Gender	Cramer's V = 0.121, *p* value = 0.034	-
Number of contacted health providers	Cramer's V = 0.263, *p* value = 0.000 Pearson correlation = 0.386, *p* value = 0.000	Cramer's V = 0.294, *p* value = 0.000 Pearson correlation = 0.386, *p* value = 0.000
Times contacted health providers	Cramer's V = 0.427, *p* value = 0.000 Pearson correlation = 0.696, *p* value = 0.000	Cramer's V = 0.385, *p* value = 0.000 Pearson correlation = 0.685, *p* value = 0.000

The Table shows that number of and times contacted health with providers were the main contributing factors to patient's and total delay. Binary logistic regression analysis also confirmed these associations in relation to the modeling of pre-treatment delay in terms of acceptable and unacceptable delays and provider's delay is the overwhelmingly important factor in total delay. .

7.4. Chapter discussion

7.4.1. Diversion

Diversion is a common phenomenon occurring in Tuberculosis treatment especially in the developing world. Suspected patients normally contacted various kinds of health providers before reporting to the proper Tuberculosis treatment facilities. There was no available electronic literature regarding diversion from Tuberculosis treatment. So I decided to explore this issue in some detail in this study.

Socio-cultural factors have an important impact on health care service utilization pattern in Bangladesh especially in rural areas. According to the study findings, female patients contacted unqualified health providers more than male patients and this was largely due to the rural female's pattern of contact. Both male and female patients in urban areas contacted qualified health providers almost equally which is probably a function of availability of provision and the independent earnings of urban females. The present large scale national study confirms the findings of a much earlier smaller scale study to the effect that a higher proportion of rural male patients utilized qualified and modern health facilities for seeking care than female patients in Bangladesh (Amin et al., 1989). Normally, the household decision regarding health care seeking and other issues was made by the husband and influenced by in-laws and/or influential relatives/neighbours and female members of the household were bound to follow the decision especially in rural areas. A study also reported that the women's independence in Bangladesh is improving but is still limited and decisions regarding health care seeking are often taken by husband or in-laws especially in rural areas (Levin et al., 2001). Women also face problems in contacting distant public or qualified health facilities due to restrictions on their independent mobility and the lack of a person to accompany them (Practical experience). A study also reported that lack of accompanying person and sometimes the difficulty of getting family permission are the barriers to contacting distant public or qualified health care facilities (Streatfield etal., 2001). The present study shows that these factors seem to be in operation in relation to Tuberculosis patients as well as generally. Area of residence (urban-rural) frequently played a barrier role in physical access to the better health care services. Normally the qualified and better health facilities are situated in urban areas and unqualified providers in rural areas. Few qualified providers are available in rural areas and these are concentrated in rural headquarters (Upazila). Patients need to travel a long distance to contact them thereby losing money and time because of poor transport facilities.

The study shows that both urban and rural patients contacted various health providers but urban patients contacted more 'qualified health providers' than rural patients, rather than an appropriate public health facility, due to the availability of such providers. Another study reported that lack of a nearby public health facility is the main cause of using other health facilities (Streatfield et al, 2001). So some mechanisms need to be developed to contact both the qualified and unqualified prominent private health providers so as to inspire them to refer the suspected or diagnosed Tuberculosis patients to the proper diagnostic and treatment facilities as early as possible.

Knowledge about the disease and source of proper treatment is an important issue causing diversion. People can easily confuse the initial symptoms of Tuberculosis with other diseases. In this study a majority of the patients cited their lack of knowledge about the disease as a reason for diversion. Similarly, the lack of information about proper treatment sources was another important factor given by the patients as a reason for diversion. There were clear urban / rural differences here with rural people citing this factor more often. The sources of information like audio-visual and print media are mainly available in the urban areas, so naturally urban people have more access to the sources than rural. However, a majority of the poor people who are affected by the disease cannot afford access to these media especially in rural areas. Many rural poor people are in any event illiterate. So some alternative mechanism needs to be developed to disseminate information regarding the disease and treatment sources especially in rural areas.

Trust and confidentiality is another issue which reinforces diversion especially in rural areas. The study findings highlighted this issue as another factor leading to diversion through contacting other health providers. People prefer their nearby and already known private providers based on their previous encounters and experience with public health facilities. This pattern was indicated in relation to general health seeking behaviour in Bangladesh by (CIET Canada, 2001). The present study confirms this on a large scale for patients with Tuberculosis where this has particular importance given the natural history of the disease and its modes of transmission. So policy makers have to develop some mechanism to ensure quality services in public health facilities in order regain people's trust. For the urban poor there is reluctance to disclose their severe health problems due to the fear of landlords and eviction. Conversely, the rural people are often reluctant due to social barriers and stigma (Practical experience).

The cost of and payment methods for health care can be strong determinants of health care use due to the poor financial status of many Tuberculosis patients. Study findings show that patients first preferred unqualified private health providers due to their easy payments system. So ability to pay is a particularly important determinant of access to health care services when a high proportion of health care is financed privately as 60 percent of total health expenditure in 2000 was in the form of out-of pocket payments by the patients (WHO, 2003a). Even though the poorer people spend less per episode of illness, a greater proportion of that expenditure goes to private providers, and especially to the unqualified, which confirms the fact that poor patients are more dependent on private care.

Unavailability and distance of public health facilities was reason for diversion as cited by the patients in the study. Primary level public health facilities are not available in urban areas and in rural areas are situated at the Upazila level far away from the majority of the people. People need to travel a long distance through a complicated transport system by spending money and time to access the facility. So people prefer to contact nearby private health facilities in both urban and rural areas. Other studies also confirmed this finding. Women like to contact local health facilities due to lack of a nearby public health facility as reported in one study (Streatfield et al, 2001). Another study also confirmed the significant negative association between both distance to the public health facility and travel time to use the services (Levin et al., 2001). So quality public health services need to decentralize at the community level.

7.4.2. Delay

Delay in the diagnosis and treatment of a Tuberculosis patient can occur at different points from initial development of symptoms until the initiation of proper anti-Tuberculosis chemotherapy. In this study all these components of delay have been identified in order to assess their contribution to total delay. The relationships among the components of delay and a range of socio-demographic, economic and health factors were also explored in order to see how such factors contributed to delay across the Tuberculosis episode.

The mean and median health care seeking delay observed in this study differed from other studies which in part could be due to different definitions of health system delay. A significant proportion of the respondents reported health seeking period of ten days or more. Most patients given ‘wait and see’, and ‘self medication’ as the individual direct cause of delay in seeking medical care, although these single factors were not statistically significant in relation to delay. However, there was a significant relationship between delay duration and whether or not patients gave multiple factors as reasons for delay. Moreover, the study also came across some interesting but statistically insignificant misconceptions and beliefs about Tuberculosis – that it is a contagious disease i.e. sharing food and utensils can cause Tuberculosis; that it is inherited; and that it is a disease of the king i.e. Tuberculosis is a dangerous and costly disease which only the king or rich can afford to have treated. These might have some influence on health seeking delay and would be worth exploration in further studies. Different socio-demographic characteristics of the patients were found to influence health care seeking delay. In particular the finding of a statistically significant association between the patient’s personal income quintile, divorced and widowed female patients, and health seeking delay indicated that economic constraint contributes to longer health care seeking delay.

The high mean and median health provider’s delay observed in this study differed from other studies which could be due to the variation in definition of health providers delay periods. The majority of the interviewed patients had some contacts with various non-qualified and/or qualified health providers before reporting or being referred to the NTP recognized Tuberculosis treatment facilities and analysis confirmed that the patients’ first contact with non/less qualified health providers was associated significantly with longer mean provider’s delay. Like health care seeking delay, different socio-demographic and economic characteristics of the patients had an influence on overall provider's delay. The key statistically significant association was between provider's delay and number of contacted health providers. Similarly, the number of visits to the health providers was also found to be a crucial determinant of longer provider's delay. Moreover, female patients were significantly more likely to have a higher provider delay as they contacted less qualified or unqualified health providers. The delay associated with contact with qualified health providers suggests that general physicians might have less up-to-date knowledge or ability to diagnosis Tuberculosis or that they have a case holding tendency for commercial reasons. Again this suggests the need for further study in relation to their practices.

Considering all kind of health providers as a contact point, the health provider's delay was the main contributor to total patient's delay. Very few of the respondents had experienced an acceptable patients' delay of three weeks or less so most of the patients of this study had reported to the NTP recognized health facilities late. A significant higher mean and median patient's delay was experienced by the female patients which was as a result of contacting late to the health facilities due to social and/or financial constraints and / or shopping around with less qualified health providers. A significant relationship was observed between the number and times patients contacted health providers and the mean and medians of the patient's delay. Both the means and medians patients' delay sharply increased as the number of and times contacted with health providers increased. This key statistically significant association between patient's delay and number and times of contacted health providers was found to be the crucial determinant of longer patient's delay. In addition to case holding by unqualified practitioners there is some indication that qualified general physicians might have less ability to diagnosis Tuberculosis or that they have a case holding tendency for commercial reasons.

Finally, the study found strong correlation between patients' and providers' delay and a moderate correlation between patients' and health seeking delay. The study found no correlation between patient's family income deciles and total patients' delay, but moderate and strong correlations between number of and times contacted health providers and total patients delay.

Almost a quarter of the weighted patients had experienced unacceptable diagnostic delays. However, the majority of the patients were diagnosed within a reasonable time period which was either due to involvement of NGOs at the programme implementation level or the better performance of the respective public health officials through active involvement. Rural patients had a statistically significant higher mean and median diagnostic delay compared with the urban patients. This might be due to the role the NGOs at the urban level acting as a single system in terms of processing all activities from diagnosis to the initiation of treatment. Less educated, divorced/separated, widowed and low family income patients had higher diagnostic delays.

Only a small proportion of the respondents faced treatment delay. Most of the treatment was initiated within a reasonable time which reflects the active involvement of NGO sectors in the total Tuberculosis treatment system. However, it was worrisome to notice that a reasonable proportion of the study cases experienced an unacceptable treatment delay of seven days or more and this element requires further attention.

The mean total health system delay was bit higher than, but the median delay duration was exactly the same as, the acceptable period. Almost three-quarters of the patients were diagnosed and commenced anti-Tuberculosis treatment within the acceptable period of three days from reporting to the NTP recognized Tuberculosis treatment unit. Respondents who experienced four or more days delay have cited *delay in diagnosis*, *his/her absence at home*, *official holiday/absence of respective government officials*, *patient's severe illness/less trust on Tuberculosis treatment* and *unofficial fee demanded by the respective government officials* as the causes of health system delay. Most of these are avoidable and can be solved through interpersonal communication and regular monitoring and supervision by the respective skilled higher authority. Socio-demographic and economic characteristics of the patients were assessed in relation to their influence on total health system delay. Male patients experienced significantly lower mean and median health system delay. Patient's family income had a significant influence on total health system delay and poorer patients faced higher health system delays due to their less control on the facilities. Mean and median delay in urban areas were both significantly less than in rural areas which reflects relative availability of and access to facilities.

The mean and median total pre-treatment periods identified in this study correspond to those of some of the previously reviewed studies. Nearly half of the sampled patients had experienced more than two months of total delay which facilitates spreading of the disease to domestic contacts and leads to higher morbidity and mortality as shown by other studies. So, high pre-treatment delay is very crucial from the programme's point of view. Moreover, more than two-thirds of the total pre-treatment period was due to patients shopping around to various health providers as well as providers' case holding tendencies. As with the patient's delay, the study found significant relationships between the total pre-treatment period and some of the socio-demographic and economic characteristics of the patients. There were significantly higher total mean and median delays for female patients possibly due to their shopping around to less qualified health providers from very beginning which in turn was due to social and financial pressures. Misperceptions and inadequate knowledge regarding the disease were associated with longer delay. The highest total mean delay was observed among the patients who thought that Tuberculosis was not curable followed by those who understood it as being inheritable. Moreover, the study confirmed that the number of health providers consulted before reporting to the NTP Tuberculosis treatment unit was a major factor in relation to longer total delay. The duration of total delay increased as the number of health providers increased and this was statistically highly significant. The study also found that the number of visits to the health providers before reporting to the NTP treatment unit was another main determinant of longer total delay. Overall, it was clear that number of health providers contacted and number of contacts with those health providers were the main contributors to total pre-treatment delay.

Finally, the study found strong correlation between total pre-treatment and patients' delay and a moderate correlation between total and health system delay. Likewise there was a significant correlation between the number of and times contacted with health care providers. There was no significant association between groups of patient as generated by socio-demographic based clustering and total unacceptable delay. Binary logistic regression showed that total delay was associated with multiple health providers contacted, multiple contact with them and higher age groups. Gender wise separate regression also demonstrated that the number of contacted provider and number of contacts was associated with longer delay. However, age groups seem to vary in delay experience as the higher age groups of male patients and the lower and middle age groups of female patients were associated with longer total pre-treatment delay.

The majority of the interviewed patients first consulted various private health facilities rather than NTP Tuberculosis treatment units which led to longer provider's delay. So this is the important preventable period of infectiousness in the community and there needs to be a policy and practice focus on this issue. However, delay not only hampers total health and social system but also creates lots of economic, social and physiological burdens on the patients and their families. So, assessing the economic and social burden of the disease during the whole period of illness and to some extent after the completion of treatment in relationship to delay and other socioeconomic aspects will be the subject of the next chapter.

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[2] When a statistically significant difference is established in the continuous variable this takes advantage of the power associated with level of measurement. So, sometimes differences for medians are significant when differences for categories in cross tabulations are not significant, although, in the examples given here, the latter always approach significance. In an exploratory study we are entitled to pay attention to details of this kind as indications of important factors for policy and practice development.

[3] Kruskal-Wallis non-parametric analysis of variance is appropriate for establishing significance when examining the relationship between a categorical and ordinal variable but cross tabulation, although it loses some power, actually enables us to see patterns more clearly.

Chapter 08: Results – Socioeconomic Impact of Tuberculosis

> '*From a global perspective, the magnitude of the Tuberculosis problem is enormous*'
>
> Snider et al. 1994, 03

Tuberculosis continues to be leading cause of adult morbidity and mortality worldwide especially in the developing countries like Bangladesh. Approximately 95 per cent of the new cases and deaths occurred in developing countries and 75-80 per cent of them came from economically productive age groups (Elamin et al., 2008). More than 2 million human lives were erased from the earth each year which ranked Tuberculosis as the single leading microbial killer of adults (Frieden et al., 2002). Although the causative organism of Tuberculosis was identified over a century ago and most effective anti-Tuberculosis drugs are available worldwide there has been limited impact on the burden of the disease. The incidence and prevalence rates are useful measures for assessing the burden of the disease and in highlighting the seriousness of the epidemic but those indicators may fail to measure the economic and social burdens of the disease (Ogden, 2000). So it is important to address the economic and social barriers that may be also acting synergistically to fuel the Tuberculosis epidemic (McIntyre et al., 2006). I have already noted that the patients in this study experienced the mean and median total delay of 99.32 and 60.00 days respectively and contacted several health providers several times. As a result, patients may incur multiple costs and face social problems at various levels from first experience of Tuberculosis symptoms to the completion of treatment. An earlier Indian study reported that adult Tuberculosis patients lost on an average 3-4 months working time and about 20-30 per cent of the annual household income due to loss of earnings (Rajeswari et al., 1999). The World Health Organization also reported that an individual Tuberculosis patient's premature death resulted in an average of 15 years of income lost (WHO, 2000d).

So it is important to know the various economic and social burdens as these are incurred through an episode of Tuberculosis and to explore the factors associated with them. In this chapter I will first illustrate a snapshot of different components in relation to the total costs experienced by the patients and their percentage of contribution to identify the most important contributing components. As mentioned in Chapter Five, I also converted all forms of costs into percentage of family income before illness. Then I will specify all forms of costs as such percentages, describe each cost element briefly, and explore total costs experienced by the patients and their family/relatives during the whole Tuberculosis episode in detail in relation to associated socio-demographic, economic, health and delay related factors deploying appropriate statistical analytical tools.

This statistical exploration primarily takes the form of identifying substantively significant differences in relation to different costs percentages in terms of socio-demographic, economic and health attributes of the patients and their households. So most of my statistical work is done in terms of identification of significance of differences and strengths of association of socio-demographic, economic, health and most important delay attributes in relation to the extent of different costs Testing for variations in different costs are first done by testing for differences of means and medians, although given the influence of outliers and extremes on means more substantive significance is attached to median differences. Cross tabulations are used to explore the detail of patterns of differences by cost categories.[4] Detailed explorations of the components corresponding to different costs are presented in the annexes to the thesis. As explained in Chapter Five, the male female Tuberculosis case detection ration was 2:1 but the sex ratio of the interviewed sample was 1:1. So the cases were weighted when this was appropriate. Moreover, it is evident that a combined family has more financial resources due to higher number of earner as well as internal and external sources than the single earner Tuberculosis patient's household, which means the disease is a real problem for the single earner family. Conversely, per capita family income is the average income of the family influenced by the family size. That means, a bigger family with lower number of earner has lower per capita income and will not reflect the exact impact of different costs on the respective family. So, both monthly family income and per capita income and their deciles were used for analysis.

All analysis and comparison is done by patient's gender and area of residence (urban-rural) because the reviewed literature regarding costs indicated that these factors are important. The statistical techniques of frequency and compare means were used to look at gender, urban-rural area, other socioeconomic, health and delay factors wise means and median differences. Also, One Way analysis of variance (ANOVA), Kruskal-Wallis test (where delays and other independent variables are ranked in groups) and Non-parametric median tests were used to measure degree of association and the statistical significance of differences. Cross tabulation was employed to assess the association of various socio-demographic, economic, health and delay attributes including gender and urban-rural area, age group, marital and educational status, number and banded times contacted health providers, and family and per capita income deciles, and banded total delay with various costs when those were measured as ranks.[5] Pearson Chi-square and Cramer's V were calculated here to assess significance and strength of association. Delay is a continuous variable if it is measured in days but the exploration of associative patterns in relation to grouped delay gives us a clearer picture of detailed variation. There is an exploration of the differences within the urban and rural respondent groups, particularly in relation to gender. This has been done by 'selecting' for urban and rural groups and then carrying out analyses within the groups. This has exactly the same the effect as constructing a three dimensional table, that is a table in which has demonstrate the relationship between for example gender and the nature of diversion separately for urban and rural groups. Pearson and Spearman (ranks of family and per capita income deciles) correlation coefficients are calculated for all main costs as percentage of family income to assess the contribution of respective significant socioeconomic and health factors farther.

Cost is a continuous variable, so Multiple Regressions are used for modeling factors in relation to total cost as percentage of family income before illness. However, categorical variables containing various categories within the variable are difficult to handle in multiple regression modeling as the numerical expression of categories within the categorical variables does not mean that one category within the variable is bigger than other. So, a method called *dummy coding* needs to be incorporated to create new dichotomous dummy variables from original categorical variables. Dummies indicate if something is present or not, indicated by the values 1= present and 0= not present. Variables with two categories (such as gender containing only male and female category) can be directly entered as predictor by simply creating a dummy variable through coding one category as 1 and other one as 0. But the variables containing more than two categories need to use k-1 formula to create new dichotomize dummies by keeping one of the categories as standard against the all other categories to compare, where k is the number of categories of the original variable. For example, the variable marital status in the study has four levels, so three dichotomous variables would be constructed by keeping married category as the standard of comparison. The regression weights of dummy variables entered as predictor in the model is interpreted by expressing as higher as or lower than the standard category on depending upon whether it is positive or negative.

Secondly, I will examine changes in family income after completion of treatment as percentage of family income before illness. The changes will be divided into three groups. The first two categories will be those for whom family income has decreased up to -10 per cent and those for whom increased by less than ten per cent. The other category will be those for whom family income has increased ten per cent or more subsequent to the Tuberculosis episode. These ordered categories will be related to socioeconomic factors including gender, urban-rural and family income deciles before illness to assess their contribute association by applying appropriate statistical. Binomial logistic regressions are used for modeling factors in relation to family income change as percentage of family income before illness by binarizing the income change as decrease (up to 10 per cent increase to accommodate for inflation over the relevant period) and increase (above 10 per cent increase).

Then, I will discuss the immediate and ultimate consequences on patients' personal occupation including the possible change in dwelling due to the Tuberculosis episode. The social and physiological burdens faced by the patients and their families due to Tuberculosis are highlighted here. Finally, I will discuss the coping strategies adopted by the patients and their families in dealing with the economic loss. Cross tabulations will describe the association of socio-demographic and economic factors including gender urban-rural area, family and per capita income deciles and the income change groups with coping strategies and socio-psychological burdens.

The major findings are presented in table form and graphically in the main text using simple tables and bar-charts and the supporting complex tables and graphs are presented in the annex to the thesis. In relation to total costs, clustering has been employed so as to explore the relationships of total costs to a typology of patients generated using multiple attributes of the patients. The purpose of all these exploratory procedures is to identify the nature of various costs in terms of its components and the relationship of them to socio-demographic, economic, health and most importantly delay attributes of the patients and their households. This systematic exploration enables us to identify targets for public health interventions which can facilitate the vital process of reducing costs and consequences experienced by the patients and their families during the whole episode of Tuberculosis.

8.1. Costs

Various costs are incurred through diversion and delay by suspected Tuberculosis patients. Patients diverted for various reasons described in Chapter Seven and contacted several private or inappropriate public health facilities repeatedly rather than proper anti-Tuberculosis treatment facilities. Private practitioners tend to hold the cases longer as their business policy and so as to keep their reputation intact. Patients also sometimes face problems at proper diagnostic and treatment facilities. As a result they experienced various costs in every step from contacting initial provider to the initiation of proper treatment. The total costs comprise two main components *direct costs* and *indirect costs*. Total costs can also be differentiated as *patient's costs* and *caregiver's costs* as expressed in *Table-8.1*.

Table 8.1: Main components and its contribution to total costs (Weighted 530 cases by gender)

Components	**Mean**				**Median**			
	Actual cost		% of monthly family income		Actual cost		% of monthly family income	
	Amount US$	% total cost	Percen-tage	% total cost	Amount US$	% total cost*	Percen-tage	% total cost*
Total costs	321.11	-	395.36	-	195.15	-	300.34	-
Direct costs	99.43	30.96	138.16	34.94	65.32	33.47	83.02	27.64
Indirect costs	221.68	67.04	257.21	65.06	109.52	56.12	179.26	59.69
Patient's costs	291.06	90.64	354.21	89.59	170.39	87.31	267.79	89.16
Caregiver's costs	30.05	9.36	2.40	-	16.89	8.66	1.00	-

* As per nature of medians

Analysis revealed that there were great differences in amount and percentage as family income before illness of different costs and the mean of different costs seemed to be higher than the median due to some extreme and outlier high-score values. Analysis also demonstrated that direct and indirect costs are the main components of total costs, so I will discuss the significant socioeconomic and health related components associated with them before the full discussion of total costs. However, patient's costs are almost identical to the total costs, so the details of socio-demographic, economic and health related factors associated with patient's costs are attached as *Annex-8.31*.

8.1.1. Direct Costs

Direct costs consist of medical and non-medical costs, so I will briefly discuss them first.

8.1.1.1. Medical costs

The mean and median total medical costs incurred by the patients and families were US$51.65 and US$26.60 respectively. Mean medical cost were almost twice median costs due to some extreme outlier values. The total medical costs were dominated by the pre-treatment medical costs as the patients had shopped around in this period. Means, medians and other details of pre-treatment and during treatment medical costs are shown in *Annex-8.1*. The mean total medical cost can be broken down with the main components being 19.67 per cent diagnostic and 71.21 per cent medicine costs as illustrated in *Annex-8.2*. The total medical costs were also measured as a percentage of patient's family income before illness so as to assess the impact properly and socio-demographic characteristics wise mean and medians are illustrated in *Table-8.2*.

Table 8.2: Total, gender and urban-rural area wise means and medians of medical costs as percentage of family income before illness (Evaluated 530 weighted cases except gender)

Factors	Compo-nents	Mean			Median		Per cent range	
		Per cent	S.Devi	Signific.	%	Signific.	Minni	Maxi
Total medical cost		73.48	129.78	-	35.01	-	0.48	1280.69
Gender	Male	65.48	123.20	ANOVA -S (.020)	31.76	NPMT -S (.035)	0.86	1221.78
	Female	89.15	140.64		40.00		0.48	1280.69
Urban-Rural	Urban	72.64	117.40	ANOVA -NS (.952)	39.54	NPMT -NS (.987)	0.83	725.00
	Rural	73.63	131.92		34.34		0.48	1280.69

8.1.1.2. Non-medical costs

During the interview, patients were asked about the accompanying persons during consulting health providers and about caregivers before and during Tuberculosis treatment and most patients mentioned multiple persons as demonstrated in *Annex-8.3 and 8.4* respectively. Only 3.0 per cent of the patients went alone and 48.8 per cent were accompanied as well as cared for by the husband/spouse during first contact. Details of times of patients were accompanied and care given by the types of persons before and during reporting to the NTP recognized Tuberculosis treatment facilities are illustrated in *Annex-8.5*.

The mean and median total non-medical costs incurred by the patients and families were US$47.78 and US$31.74 respectively. The gap between the mean and median non-medical costs was due to some extreme outlier values experienced by the patients. The total non-medical costs were dominated by the during-treatment costs due to patients' consumption of extra food as well as expensive nutritious foods during this period. Details of pre-treatment, during treatment non-medical costs are shown in *Annex-8.1*. The mean total non-medical cost can be broken down with the main components being 67.06 and 12.39 per cent patient's special food and transport costs respectively and details are illustrated in *Annex-8.6*. Analysis also showed that 0.8 per cent of patients had experienced no non-medical costs. As for medical costs, socio-demographic characteristics wise mean and medians of total non-medical costs are illustrated in *Table-8.3*. The huge difference between mean and median percentages was due to some extreme outlier values.

Table 8.3: Total, gender and urban-rural area wise means and medians of non-medical costs as percentage of family income before illness (Evaluated 530 weighted cases except gender)

Factors	**Compo-nents**	**Mean**			**Median**		**Per cent range**	
		Per cent	S.Devi	Signific.	%	Signific.	Minni	Maxi
Total medical cost		64.68	86.92	-	40.02	-	0.00	967.56
Gender	Male	62.23	82.07	ANOVA -NS (.291)	39.07	NPMT -NS (.234)	0.00	967.56
	Female	69.46	95.65		43.00		0.00	800.00
Urban-Rural	Urban	52.38	69.04	ANOVA -NS (.187)	29.91	NPMT -S (.005)	0.00	480.00
	Rural	66.79	89.54		42.13		0.00	967.56

8.1.1.3. Total Direct Costs

The mean and median total direct costs incurred by the patients and their families were US$99.43 and US$65.32 respectively as illustrated in *Annex 8.1*. The major components of the total direct cost were the patient's medical cost before treatment due to shopping around followed by the patient's non-medical costs during treatment due to consuming more nutritious and expensive foods as indicated in *Annex-8.7*. The mean total direct cost was slightly higher than that of the sampled patient's average family monthly income of US$98.55 and was equivalent to 16.60 per cent of the annual family per capita income based on the average per capita income of a Bangladeshi family of US$599 in the financial year of 2007-08 (BBS, 2009). The mean and median total direct costs as a percentage of patient's monthly family income before illness were 138.16 and 83.02 per cent respectively as illustrated in *Table-8.4*. The huge difference between the mean and median percentages was due to some outlier and extreme cases.

8.1.1.3.1. Factors associated with total direct costs

Various socio-demographic, economic, health care characteristics of the patients and other important factors including total pre-treatment delay were explored in terms of their relation with total direct costs as percentage of family income before illness using appropriate statistical techniques. Female patients had experienced higher significant mean but insignificantly higher median total direct costs as percentage of patient's family income before illness than males as indicated in *Annex-8.8*. Distribution of direct costs as percentage of family income before illness groups against gender also demonstrated an insignificant scenario as illustrated in *Annex-8.9*. Conversely, there was gender wise no statistically significant mean and median differences of direct costs as percentage of patient's family income before illness between urban and rural areas as stated in *Annex-8.8*. Overall, female patients had higher mean and median total direct costs as percentages of family income which might be due to contacting nearby low quality health providers repeatedly due to familial and social barriers as well as their lower familial economic status.

The means and medians of total direct cost as a percentage of patient's household income before illness and the graphical presentation of their groups according to the patient's family income deciles before illness followed a significant pattern as shown in *Annexes-8.8, 8.9* and *8.10* respectively. The analyses strongly indicated that the poorer patients had spent more on direct costs as a percentage of their family income before illness and suffered more accordingly i.e. richer patients economically suffered less than poor patients during the diseased period. A similar kind of scenario of means and medians of total direct costs as percentage of patient's family income before illness and the graphical presentation of their groups in relation to the patient's monthly family per capita income before illness deciles was also observed as illustrated in *Annexes-8.8, 8.9* and *8.11* respectively.

Table 8.4: Means and medians of direct costs as a percentage of patient's family income before illness in relation to health and delay characteristics of the study sample (Evaluated 530 weighted cases by gender)

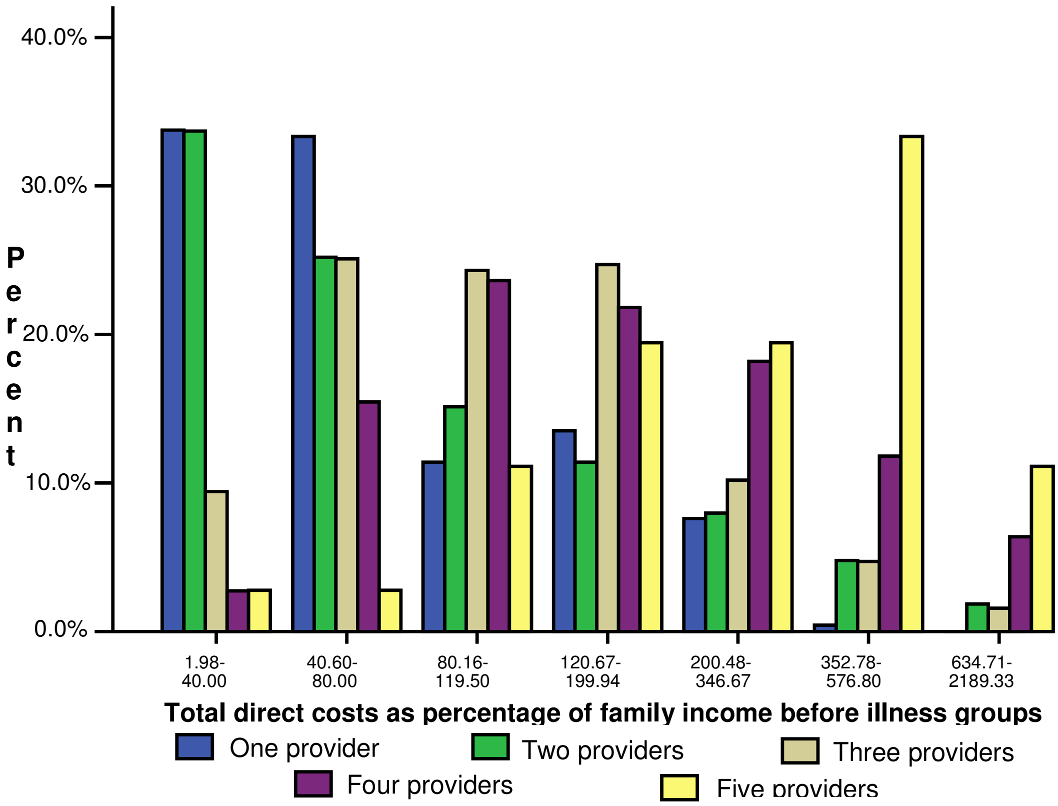
Factors	Compo-nents	Mean			Median		Delay range	
		Per cent	S.Devi	Signific.	%	Signific.	Minni	Maxi
Over All		138.16	199.88	-	83.02	-	1.98	2189.33
Number of contacted health providers	1 provider	75.84	65.63	ANOVA-S (0.000)	56.74	NPMT-S (0.000)	4.07	386.60
	2 providers	117.75	171.78		66.13		1.98	1550.00
	3 providers	140.13	126.58		101.96		13.10	1032.48
	4 providers	244.74	294.76		148.61		19.10	1774.21
	5 providers	422.52	534.61		282.71		26.93	2189.33
Times contacted health providers	1-5 times	86.94	103.56	Kruskal-Wallis Test-S (0.000)	60.48	NPMT-S (0.000)	1.98	1550.00
	6-10 times	153.74	153.22		108.11		4.29	1172.00
	11-15 times	299.68	420.15		160.12		9.14	2189.33
	16-20 times	233.93	316.13		140.71		30.70	1831.70
	22-33 times	464.11	400.62		403.15		92.34	1774.21
	41-96 times	151.61	152.70		167.19		26.93	213.95
Total delay groups	21-30 days	67.44	65.83	Kruskal-Wallis Test-S (0.000)	45.45	NPMT-S (0.000)	1.98	408.67
	31-60 days	115.16	117.97		80.24		4.62	785.76
	61-91 days	147.33	225.13		92.45		7.29	1831.70
	92-182 days	176.79	193.19		115.02		6.90	1172.00
	189-365 days	284.34	363.92		182.85		9.14	2189.33
	372-1095 days	416.81	430.78		400.77		26.93	1774.21

The means and medians of total direct cost as percentage of family income before illness and the graphical presentation of their groups in relation to the number of contacted health providers by the patients before effective treatment followed a significant pattern as demonstrated in *Table-8.4, Figure-8.1* and *Annex-8.9* respectively. Overall, the patients who contacted more health providers before enrolment in the proper anti-Tuberculosis treatment had higher out-of-pocket direct expenditure as a percentage of their family income before illness. A similar kind of pattern of means and medians of total direct costs as percentage of patient's family income before illness in relation to the number of times patients contacted health provider groups was also observed as illustrated in *Table-8.4* and *Annex-8.9* and *8.12* respectively.

The distribution of the means and medians of total direct cost as percentage of percentage of household income and the graphical presentation of their groups against the total pre-treatment delay groups also followed a sharp significant ascending pattern as indicated in

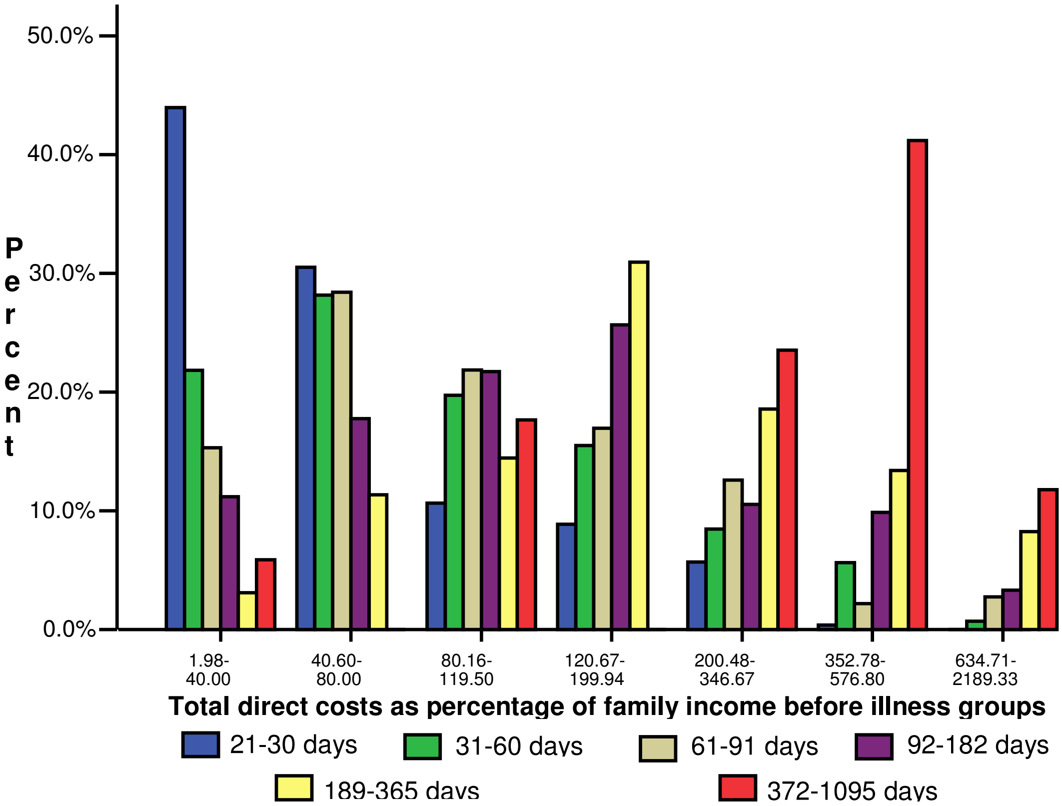
Table-8.4, Figure-8.2 and *Annex-8.9* respectively. Analysis revealed that pre-treatment delay had a huge impact on total direct costs i.e. the patients who experienced higher duration of pre-treatment delay had much higher direct costs as percentage of household income before illness.

Figure 8.1: Patient's number of contacted health providers' wise distribution of direct costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



From the above analysis, it is clear that patient's family and per capita income deciles, pre-treatment delay and number of and times contacted for health providers were the most important contributing factors in relation to direct costs as a percentage of patient's household income before illness. However, other socio-demographic factors had no significant relationship as stated in *Annexes-8.8* and *8.9*. So a further analysis, comprising Pearson's correlation of total direct costs as percentage of family income before illness in relation to the significant contributing factors, was conducted.

Figure 8.2: Patient's pre-treatment delay groups' wise distribution of direct costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



The Pearson correlation coefficients (Bivariate analysis) were calculated for two sets of weighted variables. The first set explored association among total direct costs as percentage of family income before illness, family income and per capita income before illness and revealed significant correlations at the 0.01 level (2-tailed) as the coefficients were (Coefficient *r = -0.188, n =508, p = <0.01 and r-square = 0.035*) for family income and (Coefficient *r = -0.215, n =508, p = <0.01 and r-square = 0.046*) for family per capita income as illustrated in *Annex-8.13.* These relationships are not strong but they exist. However, family incomes were influenced by some outliers, so I also calculated the Spearman's correlation coefficient by using the ranks (deciles) of the family and per capita income before illness to control the influence of the outliers and both the income deciles have negative significant correlation as illustrated in *Annex-8.14*. Analysis confirmed that family income and per capita income before illness as well as their deciles had significant negative correlations with total direct costs percentages means higher incomes corresponded to lower costs as a proportion of family income.

Correlations among total direct costs as percentage of family income before illness, patients' number of contacted health providers, number of actual contacts and total pre-treatment delay were also significant at the 0.01 level (2-tailed) as the coefficients were (Coefficient $r = 0.324$, $n = 508$, $p = <0.01$ and r-square $= 0.105$) for number of contacted providers, (Coefficient $r = 0.291$, $n = 508$, $p = <0.01$ and r-square $= 0.085$) for the actual number of contacts and (Coefficient $r = 0.377$, $n = 508$, $p = <0.01$ and r-square $= 0.142$) for pre-treatment delay as demonstrated in *Annex-8.15.* Analysis confirmed that number and times contacted health providers and pre-treatment delay had positive significant correlations with total direct costs but total pre-treatment delay had a higher effect than the others although of course total pre-treatment delay is a consequence in large part of number of contacted providers and number of contacts with them.

8.1.2. Indirect Cost:

Like direct costs, indirect costs were also calculated for both the pre-treatment and during treatment periods. Indirect costs were directly linked with occupational time loss of the patients and the accompanying persons or caregivers during contacting other health providers and during proper anti-Tuberculosis treatment. So first I will analyze the professional time loss of patients and their caregivers and calculate their earning loss based on their respective monthly wages or earnings so as to calculate the total indirect costs.

8.1.2.1. Occupational time loss

The mean and median total occupational time lost by the patients both before the initiation of and during Tuberculosis treatment were 159.55 and 150.00 days respectively. Patient's workdays lost was much higher during Tuberculosis treatment due to weakness of the patients after long pre-treatment sufferings. Total mean and median occupational time losses experienced by the caregivers' were 27.71 and 22.00 days respectively and details are illustrated in *Annex-8.16*. Only 2.3 per cent of caregivers experienced no occupational time loss as shown in *Annex-8.18*. The total mean and median occupational time lost by the patients and caregivers during the whole episode of the disease were 187.26 and 169.00 days respectively as illustrated in *Annex-8.16*. Details of contributions of different time losses to total occupational time loss are indicated in *Annex-8.17*.

8.1.2.2. Patient's indirect costs

The total mean and median total indirect costs experienced by the patients in both before the initiation of and during Tuberculosis treatment were US$191.63 and US$ 88.24 respectively as shown in *Annex-8.19*. The huge difference between mean and median cost is due to some extreme values as shown in *Annex-8.20.* Patient's indirect cost was much higher during the Tuberculosis treatment period due to higher workdays' loss because of weakness as illustrated in *Annex-8.21*. Socio-demographic characteristics wise mean and medians of patient's indirect cost as a percentage of patient's monthly family income before illness are illustrated in *Table-8.5*. The huge difference between mean and median percentages was due to some extreme outlier values as shown in the table.

Table 8.5: Overall, gender and urban-rural area wise means and medians of patient's indirect costs as percentage of family income before illness (Weighted 530 cases except gender)

Factors	**Compo-nents**	**Mean**			**Median**		**Percent range**	
		Per cent	S.Devi	Signific.	%	Signific.	Minni	Maxi
Patient's indirect cost		216.06	232.60	-	129.67	-	0.00	1495.84
Gender	Male	276.22	246.51	ANOVA -S (0.000)	212.33	NPMT -S (0.000)	0.00	1495.84
	Female	98.19	141.86		42.86		0.87	782.61
Urban-Rural	Urban	222.73	240.34	ANOVA -NS (.800)	127.60	NPMT-NS (.526)	2.13	1092.68
	Rural	214.97	231.51		130.44		0.00	1495.84

8.1.2.3. Caregiver's indirect costs

The mean and median indirect costs experienced by the caregivers' were US$30.05 and US$16.89 respectively. Caregivers lost their income more during the patient's pre-treatment period as this was associated with males accompanying patients when traveling whereas female family members delivered care during the treatment period as illustrated in *Annex-8.19*.

8.1.2.4. Total indirect costs

The total mean and median indirect costs experienced by the patients and caregivers during the whole episode of the disease were US$221.68 and US$109.52 respectively and details are illustrated in *Annex-8.19*. However, 53.24 and 33.21 per cent of the total indirect cost was contributed by the patients' during and before Tuberculosis treatment income loss respectively as indicated in *Annex-8.21*. Overall, patients' experienced higher earning loss as expected due to their longer sufferings before reporting to the proper anti-Tuberculosis treatment unit. The total indirect costs were also measured as percentage of patient's family income before illness as 86.44 per cent of total mean family indirect costs were patient's own costs. The mean and median total indirect cost as a percentage of patient's monthly family income before illness were 257.21 and 179.26 per cent respectively as illustrated in *Table-8.6*. The difference between the mean and median percentage was due to some outlier cases.

8.1.2.4.1. Factors associated with total indirect costs

Various socio-demographic, economic, health care characteristics of the patients and other important factor including total pre-treatment delay were explored in terms of their relation with total indirect costs as percentage of family income before illness using appropriate statistical methods. The mean and median of total indirect costs as percentage of patient's family income before illness for male patients was significantly more than twice that of female patients as indicated in *Table-8.6*. Distribution of indirect costs as percentage of family income before illness groups against gender also demonstrate a similar scenario as illustrated in *Table-8.7*. Normally male patients are the main bread earner as well as the main source of family income, so their sickness related to higher income loss and therefore the findings reflected the actual scenario. Both urban and rural male patients had higher mean and median total indirect costs as percentage of patient's family income before illness than female patients and these difference were statistically highly significant as shown in *Annexes-8.22* and *8.23* respectively. Interestingly, urban male patients had slightly higher mean and median indirect costs percentage than rural males which might be due to their higher wages.

Table 8.6: Means and medians of indirect costs as a percentage of patient's family income before illness in relation to the socioeconomic, health and delay characteristics of the study sample (Weighted 530 cases except gender)

Factors	Compo-nents	Mean			Median		Delay range	
		Per cent	S.Devi	Signific.	%	Signific.	Minni	Maxi
Over All		257.21	251.36	-	179.26	-	1.28	1761.77
Gender	Male	309.99	265.88	ANOVA-S (0.000)	228.86	NPMT-S (0.000)	9.14	1761.77
	Female	153.79	180.00		87.50		1.28	1200.00
Marital status	Unmarried	148.63	160.82	ANOVA-S (0.002)	95.89	NPMT-S (0.004)	1.31	672.00
	Married	272.99	257.19		195.61		1.28	1761.77
	Divorced	314.11	257.56		255.67		18.33	933.91
	Widowed	251.72	282.19		129.54		3.11	1200.00
Times contacted health providers	1-5 times	208.45	204.75	Kruskal-Wallis Test-S (0.000)	137.41	NPMT-S (0.000)	1.28	1200.00
	6-10 times	283.77	256.27		201.03		10.75	1248.17
	11-15 times	339.93	256.96		268.57		22.93	957.00
	16-20 times	335.69	271.49		219.33		5.46	840.12
	22-33 times	732.38	522.72		676.54		18.33	1761.77
	41-96 times	45.93	32.75		52.62		32.56	72.67
Total delay groups	21-30 days	186.77	171.35	Kruskal-Wallis Test-S (0.000)	123.64	NPMT-S (0.000)	2.78	725.42
	31-60 days	228.27	221.04		153.14		1.28	960.42
	61-91 days	263.87	240.67		197.20		3.11	957.00
	92-182 days	340.38	307.77		252.00		5.46	1248.17
	189-365 days	321.54	246.48		255.48		10.75	1173.37
	372-1095 days	726.55	559.46		795.62		32.56	1761.77

Means and medians of total indirect costs as percentage of patient's family income before illness and the distribution of their groups against marital status demonstrated a highly significant pattern as shown in *Tables-8.6* and *8.7* respectively. The highest and lowest mean and median indirect cost percentages were experienced by the divorced/separated and unmarried patients respectively. As so often in this study the divorced and widowed groups are shown to be particularly vulnerable to negative impacts of a Tuberculosis episode. Similarly, age groups wise means and medians of total indirect costs as percentage of patient's family income before illness and their distribution also demonstrated a significant pattern as illustrated in *Annex-8.22* and *8.23* respectively. The highest mean and median of total indirect cost percentage was experienced by the higher and middle age group patients.

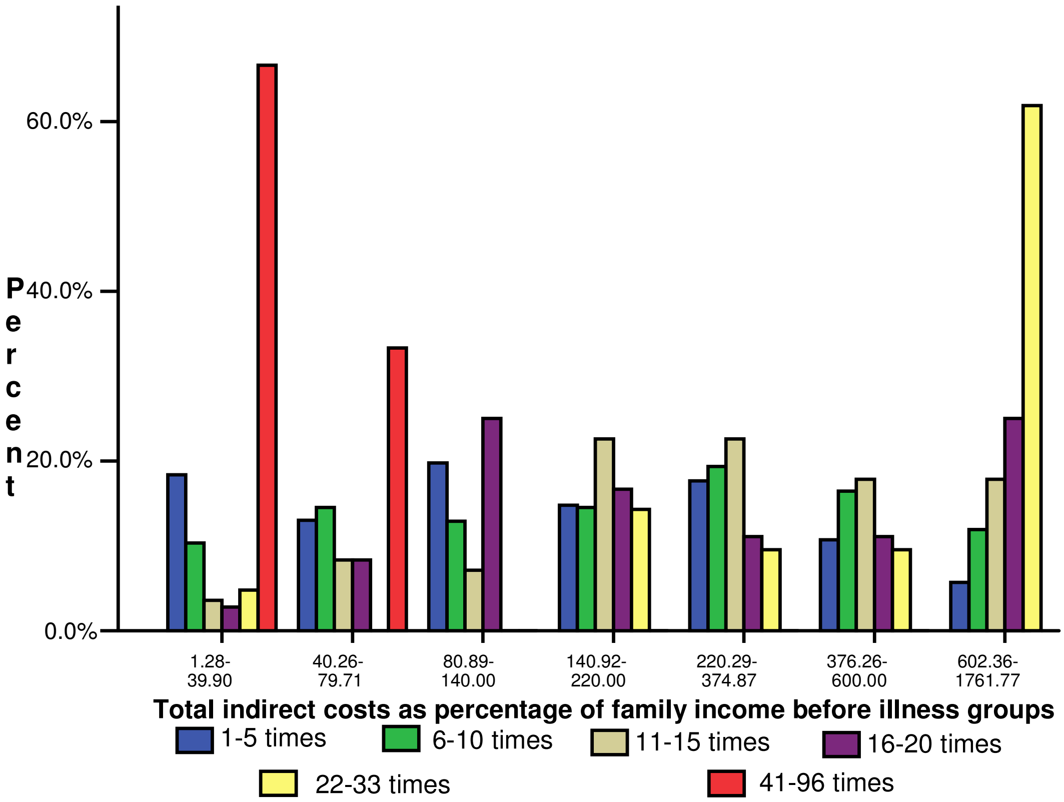
The means and medians of total indirect cost as a percentage of patient's household income before illness and the graphical presentation of their groups according to the patient's family income deciles before illness demonstrated a highly significant pattern as shown in *Annexes-8.22, 8.23* and *8.24* respectively. The analysis strongly indicated that the poorer patients had lost comparatively more income as well as incurred higher indirect costs as a percentage of their family income before illness and suffered more accordingly. A similar kind of scenario of means and medians of total indirect costs as percentage of patient's family income before illness and the graphical presentation of their groups in relation to the patient's monthly family per capita income before illness deciles was also observed as illustrated in *Annex-8.22, 8.23* and *8.25* respectively.

Table 8.7: Patients socio-demographic characteristics wise total indirect costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases except gender)

Factors	Indirect costs percentage groups (row percentage)							Significance	
	1.28-39.90	40.26-79.81	80.89-140.00	140.92-220.00	220.29-374.87	376.26-600.00	602.36-1761.77	Cramer's V	Chi-squire
Gender									
Male	8.8 (29)	7.7 (26)	15.8 (53)	15.5 (52)	21.7 (73)	17.0 (57)	13.7 (46)	0.385	0.000
Female	24.5 (84)	22.4 (77)	17.5 (60)	15.2 (52)	11.1 (38)	5.2 (18)	4.1 (14)		
Marital status									
Unmarried	27.3 (18)	15.2 (10)	24.2 (16)	12.1 (8)	7.6 (6)	10.6 (7)	3.0 (2)	0.146	0.018
Married	12.1 (49)	11.6 (47)	14.9 (60)	16.1 (65)	20.3 (82)	13.6 (55)	11.4 (46)		
Divorced	12.5 (2)	12.5 (2)	12.5 (2)	12.5 (2)	12.5 (2)	25.0 (4)	12.5 (2)		
Widowed	10.7 (3)	25.0 (7)	17.9 (5)	10.7 (3)	14.3 (4)	3.6 (1)	17.9 (5)		

The means and medians of indirect costs as a percentage of household income before illness and the graphical presentation of their groups against the number of times patients contacted health providers before illness groups demonstrated a statistically significant pattern as indicated in *Table-8.7, Figure-8.3* and *Annex-8.23* respectively. In general, analysis revealed that higher indirect costs as a percentage of household income before illness were incurred by the patients who contacted health providers more times. A similar kind of scenario of means and medians of total indirect costs as percentage of patient's family income before illness and the graphical presentation of their groups in relation to the number of contacted health providers by the patients before effective treatment was also observed as illustrated in *Annex-8.22, 8.23* and *8.26* respectively.

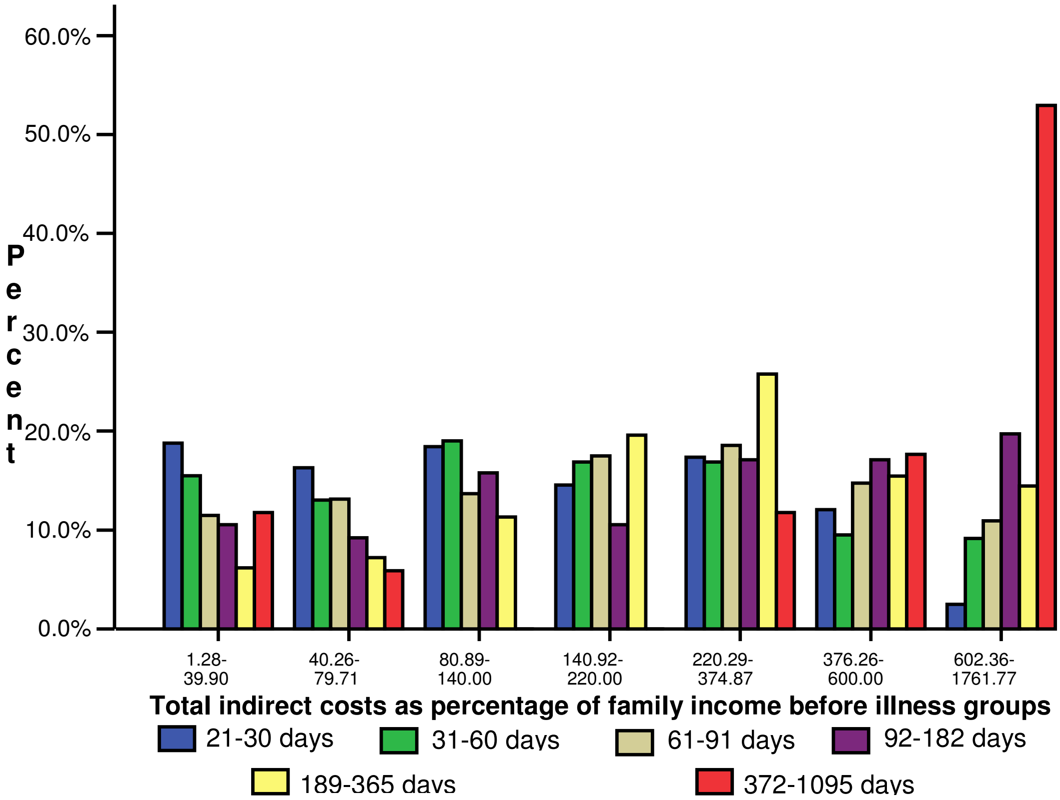
Figure 8.3: Patient's times of contacted health providers' wise distribution of indirect costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



The distribution of the means and medians of total indirect cost as percentage of household income before illness and their groups against the total pre-treatment delay group also followed a significant pattern as indicated in *Table-8.7, Figure-8.4* and *Annex-8.23* respectively. Analysis revealed that pre-treatment delay had a huge impact on total indirect costs i.e. the patients who experienced higher duration of pre-treatment delay had much higher chance of became unable to earn for longer period.

From the above analyses, it is clear that patient's gender, marital status, age groups, family and income deciles, pre-treatment delay and times contacted for health providers were the most important contributing factors in relation to indirect costs as a percentage of patient's household income before illness. However, other socio-economic factors had no statistically significant impact as demonstrated in *Annexes-8.22* and *8.23*. So a further analysis, comprising Pearson's correlation of total indirect costs as percentage of family income before illness in relation to other contributing factors, was conducted.

Figure 8.4: Patient's pre-treatment delay groups' wise distribution of indirect costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



The Pearson correlation coefficient was calculated for two sets of variables. The first set explored association among total indirect costs as percentage of family income before illness, family income and per capita income before illness revealed a significant correlation at the 0.01 level (2-tailed) as the coefficients were (Coefficient *r = -0.137, n =508, p = <0.01 and r-square = 0.019*) for family income and (Coefficient *r = -0.086, n =508, p = <0.01 and r-square = 0.007*) for per capita income as illustrated in *Annex-8.27*. These are weak but real relationships. However, family incomes were influenced by some outliers, so I also calculated the Spearman's correlation coefficient by using the ranks (deciles) of the family and per capita income before illness to control the influence of the outliers and both the income deciles have negative significant correlation as illustrated in *Annex-8.28*. Analysis confirmed that family income and per capita income before illness as well as their deciles had negative correlations with total indirect costs which meant that when we looked at ranked family incomes then there was a negative relationship with lower income families more severely affected. .

The second set of correlation analyses were conducted among total indirect costs as percentage of family income before illness, patients' number of contacted health providers, number of actual contacts and total pre-treatment delay and also revealed significant correlation as the coefficients were (Coefficient *r = 0.179, n =508, p = <0.01 and r-square = 0.032*) for number of contacted providers, (Coefficient *r = 0.203, n =508, p = <0.01 and r-square = 0.041*) for the actual number of contacts and (Coefficient *r = 0.299, n =508, p = <0.01 and r-square = 0.089*) for pre-treatment delay as demonstrated in *Annex-8.29.* Those findings confirmed that all three factors had effect on the indirect costs as percentage of family income before illness but total pre-treatment delay had a higher effect than the others although of course the other variables are causal elements in relation to delay.

8.1.3. Patient's Cost

Like direct and indirect costs, total patient's and caregiver's costs were calculated separately. The mean and median total patient's cost experienced by the patients and their families were US$291.06 and US$170.39 respectively. The total patient's costs contributed 90.64 per cent of total costs incurred by the patient's and their families. Moreover, the major components of the total patient's cost were the patient's total indirect cost followed by the patient's total medical costs as indicated in *Annex-8.30.* The mean total patient's cost was almost three times patient's average family monthly income before illness of US$98.55, much higher than the patient's mean personal income before illness of US$34.00 and was equivalent to 48.59 per cent of the annual family per capita income based on the average per capita income of a Bangladeshi family of US$599 in the financial year of 2007-08 (BBS, 2009).

8.1.3.1. Factors associated with total patient's costs

Given the very high degree of association between total costs and patient's costs, the detailed relationships between patient's socio-demographic, economic and health care attributes and patients' costs are not presented here but can be found in *Annex-8.31.* From the analysis, it is clear that gender, age groups, marital status, family and per capita income deciles, pre-treatment delay and number of and times contacted with health providers were important contributing factors to higher patient's costs as a percentage of patient's family income before illness. So a further analysis, comprising Pearson's correlation of total patient's costs as percentage of patient's family income before illness in relation to other contributing factors, was conducted.

The Pearson correlation coefficient (Bivariate analysis) was calculated for two sets of variables. The first set explored association among total patient's costs as percentage of family income before illness, family income and per capita income before illness revealed a significant negative correlation at the 0.01 level (2-tailed) as the coefficients were (Coefficient $r = -0.183$, $n = 508$, $p = <0.01$ *and* $r\text{-square} = 0.033$) for family income and (Coefficient $r = -0.173$, $n = 508$, $p = <0.01$ *and* $r\text{-square} = 0.030$) for per capita income as illustrated in *Annex-8.32*. However, family incomes were influenced by some outliers, so I also calculated the Spearman's correlation coefficient by using the ranks (deciles) of the family and per capita income before illness to control the influence of the outliers and both the income deciles have also negative significant correlation as illustrated in *Annex-8.33*. Analysis confirmed that family income and per capita income before illness as well as their deciles had negative correlations with total patient's costs which higher income corresponded to lower effect. This is not a surprising finding since the costs of treatment are more circumscribed in range than the range of family incomes because there are no fixed costs for Tuberculosis treatment. This means that poorer patients spent higher proportion of their family income and suffer more than the richer patients.

Correlations among total patient's costs as percentage of family income before illness, pre-treatment delay, patients' number of contacted health providers and number of actual contacts were also revealed significant correlations as the coefficients were (Coefficient $r = 0.402$, $n = 508$, $p = <0.01$ *and* $r\text{-square} = 0.162$) for pre-treatment delay, (Coefficient $r = 0.300$, $n = 508$, $p = <0.01$ *and* $r\text{-square} = 0.090$) for number of contacted providers and (Coefficient $r = 0.302$, $n = 508$, $p = <0.01$ *and* $r\text{-square} = 0.091$) for the actual number of contacts as demonstrated in *Annex-8.34*. Analysis confirmed that number and times contacted health providers and pre-treatment delay had positive correlations with the patient's costs, which means if number and times of contacted provider and duration of delay increased, the amount of patient's costs would increase.

8.1.4. Caregiver's total Costs

The mean total caregiver's cost (only the indirect costs experienced by the patients) was US$30.05 and the median cost was US$16.89. Interestingly, 2.3 per cent patients indicated that there were no caregiver's cost which means that these patients took care of themselves during the whole span of the disease. Moreover, the mean total caregiver's cost contributed only 9.36 per cent of the mean total costs. The mean caregiver's cost was almost two thirds of the patient's caregivers' average personal monthly income before illness of US$48.30.

8.1.4.1. Factors associated with total caregiver's costs

Since caregivers' costs contribute relatively little to mean total cost differences, details of caregivers' costs in relation to socio-demographic, economic and health care attributes of the patients are not discussed in detail here but evidence on these differences is attached in *Annex-8.35.*

8.1.5. Total Costs

The mean pre-treatment total cost was almost twice the median cost which is a consequence of some very high outlier values as shown in *Annex-8.36*. The pre-treatment total cost was contributed by 31.56 per cent of medical cost, 10.05 per cent of non-medical cost and 58.38 per cent of indirect costs. Overall, the contribution of pre-treatment indirect costs was almost 1.5 times direct costs to total mean pre-treatment costs. Conversely, the mean during treatment total cost experienced by the patients and their families was more than 1.5 times the median costs and the huge range was responsible for the big gap between mean and median during treatment total costs.

Finally, the mean total cost incurred by the patients and families was US$321.11 and median was US$195.15. *Annex-8.37* demonstrates a more detailed composition of overall total costs and shows that half of the total costs were contributed by the patient's indirect costs. The mean total cost was more than three times patient's average family monthly income of US$98.55 and was equivalent to 53.61 per cent of the annual family per capita income based on the average per capita income of a Bangladeshi family of US$599 in the financial year of 2007-08 (BBS, 2009). The mean total costs as percentage of patient's monthly family income before illness was 395.36 per cent and median was 300.34 per cent as illustrated in *Table-8.8*.

8.1.5.1. Factors associated with total costs

Various socio-demographic characteristics of the patients including age groups, gender, area of residence, level of education and marital status; economic characteristics including patient's family income, per capita family income deciles before illness and family income change; health variables including number and times contacted health providers along with other important factor including total pre-treatment delay were examined to assess their relationships with total costs as percentage of family income before illness using appropriate analytical tools.

The mean and median total costs as percentage of male patient's family income before illness for male patients was significantly higher than for female patients as indicated in *Table-8.8*. Distribution of total costs as percentage of family income before illness groups against gender also demonstrated a similar scenario as illustrated in *Table-8.9*. Both urban and rural male patients had significantly higher mean and median total costs as percentage of patient's family income before illness than respective female groups as shown in *Annex-8.38*. Gender wise distributions of total costs percentages for groups in urban and rural areas were also strongly associated and statistically highly significant and details are illustrated in *Annex-8.39*. Overall, male patients had higher mean and median total costs as percentage of patient's family income before illness which might be due to contacting better quality health providers, emphasis on consuming better food during treatment and higher indirect costs due to higher personal monthly income status.

The means and medians of total costs as percentage of patient's family income before illness and the distribution of their groups against marital status demonstrated a significant pattern as shown in *Table-8.8* and *8.9* respectively. Analysis shows that the lowest total costs as percentage of patient's family income before illness groups were dominated by the unmarried patients and the middle and higher cost percentage groups by divorced and widowed patients confirmed the vulnerability of divorced and widowed patients yet again.

Table 8.8: Means and medians of total costs as a percentage of patient's family income before illness in relation to the socioeconomic, health and delay characteristics of the study sample (Weighted 530 cases except gender)

Factors	Compo-nents	Mean			Median		Delay range	
		Per cent	S.Devi	Signific.	%	Signific.	Minni	Maxi
Over All		395.36	359.05	-	300.34	-	9.95	2621.56
Gender	Male	437.71	365.58	ANOVA-S (.000)	346.88	NPMT-S (.000)	21.09	2621.56
	Female	312.40	330.80		204.77		9.95	2563.86
Marital status	Unmarried	274.24	307.76	ANOVA-S (.033)	182.77	NPMT-S (.001)	17.33	1660.33
	Married	413.94	366.01		321.48		9.95	2621.56
	Divorced	443.57	301.88		464.00		41.12	1348.12
	Widowed	382.60	353.63		258.13		11.62	1491.00
Number of contacted health providers	1 provider	289.48	217.21	ANOVA-S (.000)	245.47	NPMT-S (.000)	20.20	1098.67
	2 providers	347.93	323.00		257.22		9.95	2141.67
	3 providers	421.05	325.66		325.11		29.25	2165.10
	4 providers	605.75	491.85		456.45		62.83	2563.86
	5 providers	764.36	641.14		603.03		99.60	2621.56
Times contacted health providers	1-5 times	295.39	249.67	Kruskal-Wallis Test-S (.000)	238.48	NPMT-S (.000)	9.95	2141.67
	6-10 times	437.50	332.32		357.29		29.25	1907.00
	11-15 times	639.62	506.88		520.89		42.93	2621.56
	16-20 times	569.62	421.01		513.94		100.78	2052.74
	22-33 times	1196.49	679.18		1316.78		110.67	2563.86
	41-96 times	197.54	119.95		209.79		99.60	246.51
Total delay groups	21-30 days	254.21	192.43	Kruskal-Wallis Test-S (.000)	206.36	NPMT-S (.000)	11.62	863.33
	31-60 days	343.43	278.18		257.21		9.95	1504.09
	61-91 days	411.20	347.25		340.88		41.12	2052.74
	92-182 days	517.17	389.89		421.53		29.25	1907.00
	189-365 days	605.91	486.83		459.46		75.33	2621.56
	372-1095 days	1143.36	764.23		1126.31		99.60	2563.86

Based on the above findings I explored the socioeconomic characteristic of the divorced and widowed patients further. Analysis demonstrated that 87.8 per cent of the divorced and widowed patients were female and 93.2 per cent of them came from rural areas. Analysis also further showed that 45.9 per cent of them came from lower educational groups and a higher proportion of female patients were illiterate and/or less educated than males. Moreover, 42.4 per cent of them were engaged in *Household work* followed by *Small business* and *Begging* occupations and details are illustrated in *Annex-8.43*. Moreover, maid servant and begging occupation were totally and other occupations of household work and small business were predominantly dominated by the female patients and all are very low income professions in the country context. So the analysis clearly confirmed the economical vulnerability of the divorced and widowed patients was due to their personal poor socioeconomic status and most of them were female.

Age group wise means and medians of total costs as percentage of patient's family income before illness demonstrated a significant pattern as illustrated in *Annexes-8.38* and *8.39* respectively. Analysis demonstrated that middle age group patients had higher total costs as percentages of patient's family income before illness which might be due to their higher indirect costs as they are the main earning source for the family.

The lowest and highest mean and median total costs expressed as a percentage of patient's family income before illness were experienced by the highest and lowest family income deciles respectively and the relationships were statistically highly significant as indicated in *Annex-8.38* and the graphical presentation of their groups demonstrated a similar significant pattern as illustrated in *Annexes-8.40* and *8.39.* The analyses strongly demonstrated that poorer patients had experienced a higher amount of total costs as a percentage of their monthly family income before illness i.e. the poor patients were most economically affected by the whole span of a Tuberculosis episode. A similar kind of scenario of means and medians of total costs as percentage of patient's family income before illness and the graphical presentation of their groups in relation to the patient's monthly family per capita income before illness deciles was also observed as illustrated in *Annexes-8.38, 8.41 and 8.39* respectively.

Means and medians of total costs as percentage of patient's family income before illness and the graphical presentation of their groups according to the number of contacted health providers demonstrated a significant pattern as indicated in *Table-8.8, Figure-8.5* and *Annex-8.39* respectively. Analysis revealed that, the patients who contacted higher numbers of health providers before enrolling in the proper anti-Tuberculosis treatment had experienced higher total costs as a percentage of their monthly family income before illness. A similar kind of scenario of means and medians of total costs as percentage of patient's family income before illness and the distribution of their groups in relation to the number of times patients contacted health providers was also observed as illustrated in *Annex-8.38, 8.39* and *8.42* respectively.

Figure 8.5: Patient's number of contacted health providers' wise distribution of total costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)

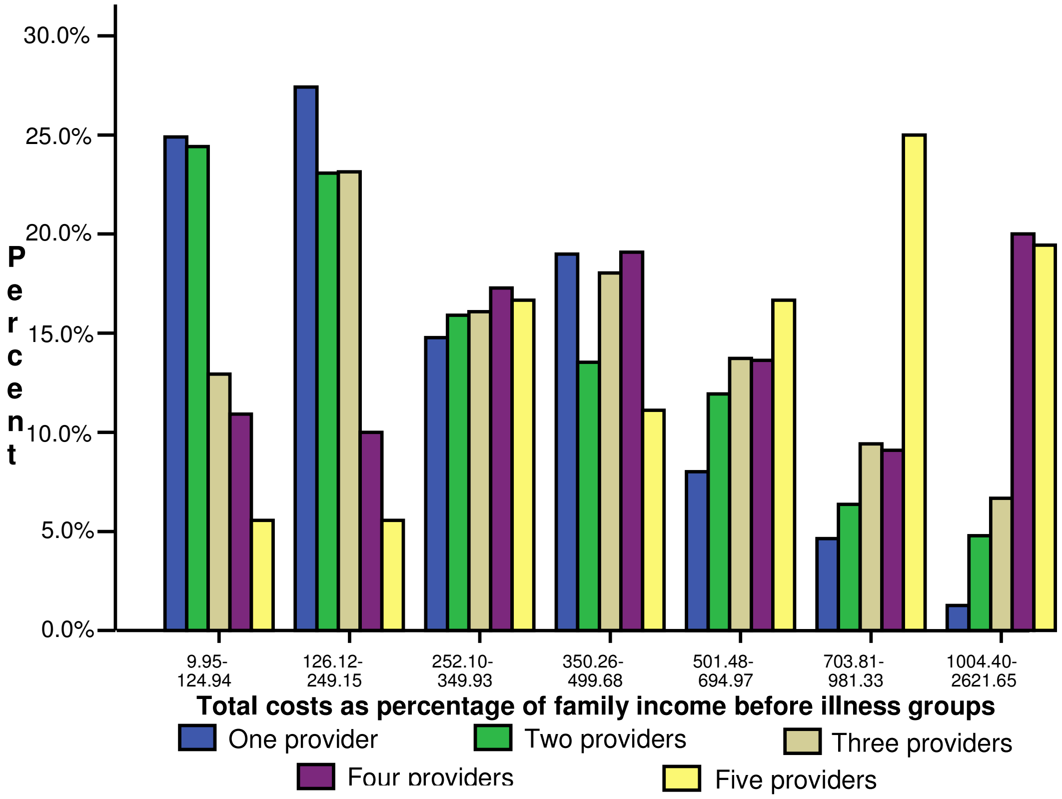
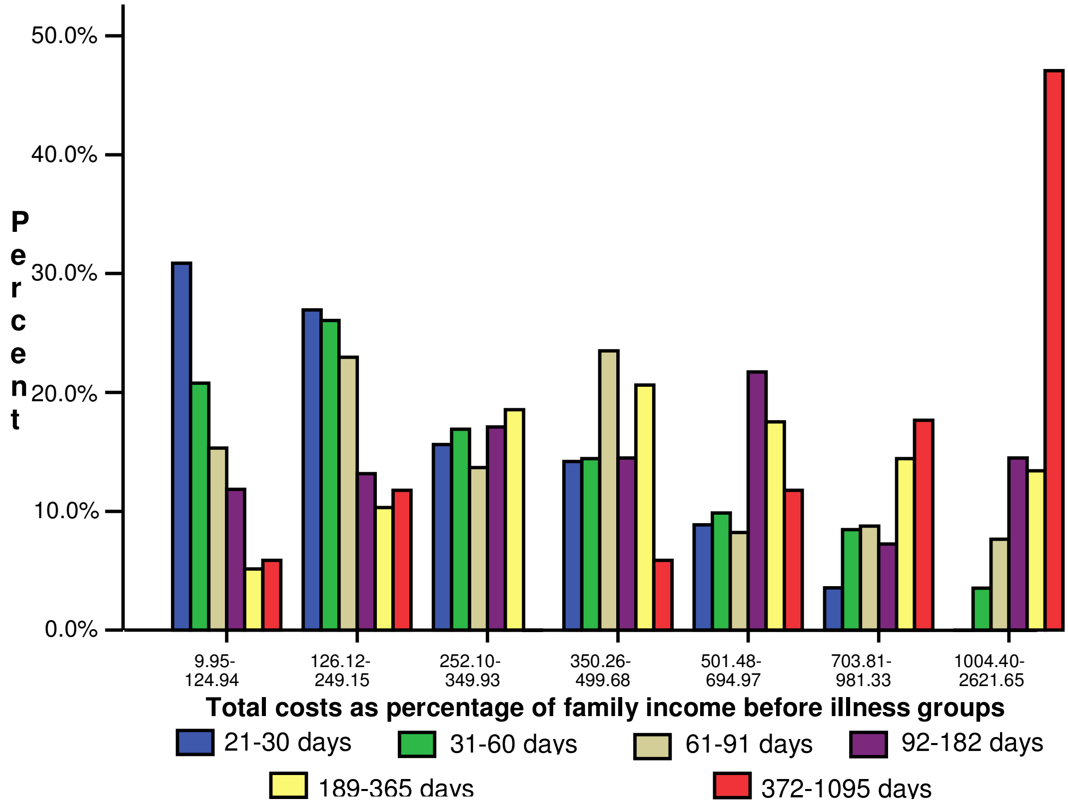


Table 8.9: Patients socio-demographic and health and delay characteristics wise total costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases except gender)

Factors	Total costs percentage groups (row percentage)							Significance	
	9.95-124.94	126.12-249.15	252.10-349.93	350.26-499.68	501.48-694.97	703.81-981.33	1004.40-2621.56	Cram-er's V	Chi-squire
Gender									
Male	11.9 (40)	22.0 (74)	16.7 (56)	19.9 (67)	13.1 (44)	8.3 (28)	8.0 (27)	0.292	0.000
Female	34.4 (118)	22.2 (76)	14.3 (49)	9.6 (33)	9.3 (32)	6.4 (22)	3.8 (13)		
Marital status									
Unmarried	36.4 (24)	28.8 (19)	10.6 (7)	7.6 (5)	9.1 (6)	3.0 (2)	4.5 (3)	0.140	0.037
Married	16.6 (67)	21.0 (85)	16.3 (66)	18.6 (75)	12.4 (50)	7.9 (32)	7.2 (29)		
Divorced	18.8 (3)	6.3 (1)	18.8 (3)	12.5 (2)	25.0 (4)	12.5 (2)	6.3 (1)		
Widowed	21.4 (6)	25.0 (7)	17.9 (5)	7.1 (2)	7.1 (2)	14.3 (4)	7.1 (2)		

Figure 8.6: Patient's total pre-treatment delay groups' wise distribution of total costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



The highest and lowest mean and median total costs as percentage of patient's monthly household income before illness were contributed by highest and lowest total delay group patients respectively and the differences were statistically highly significant as shown in *Table-8.8.* Similarly, the graphical distribution of total costs as percentage groups against the total pre-treatment delay groups also demonstrated a statistically highly significant pattern as indicated in *Figure-8.6 and Annex-8.39*. Analysis revealed that pre-treatment delay had a major impact on total costs i.e. the patients with longer pre-treatment delays experienced higher total costs as a percentage of their household income before illness.

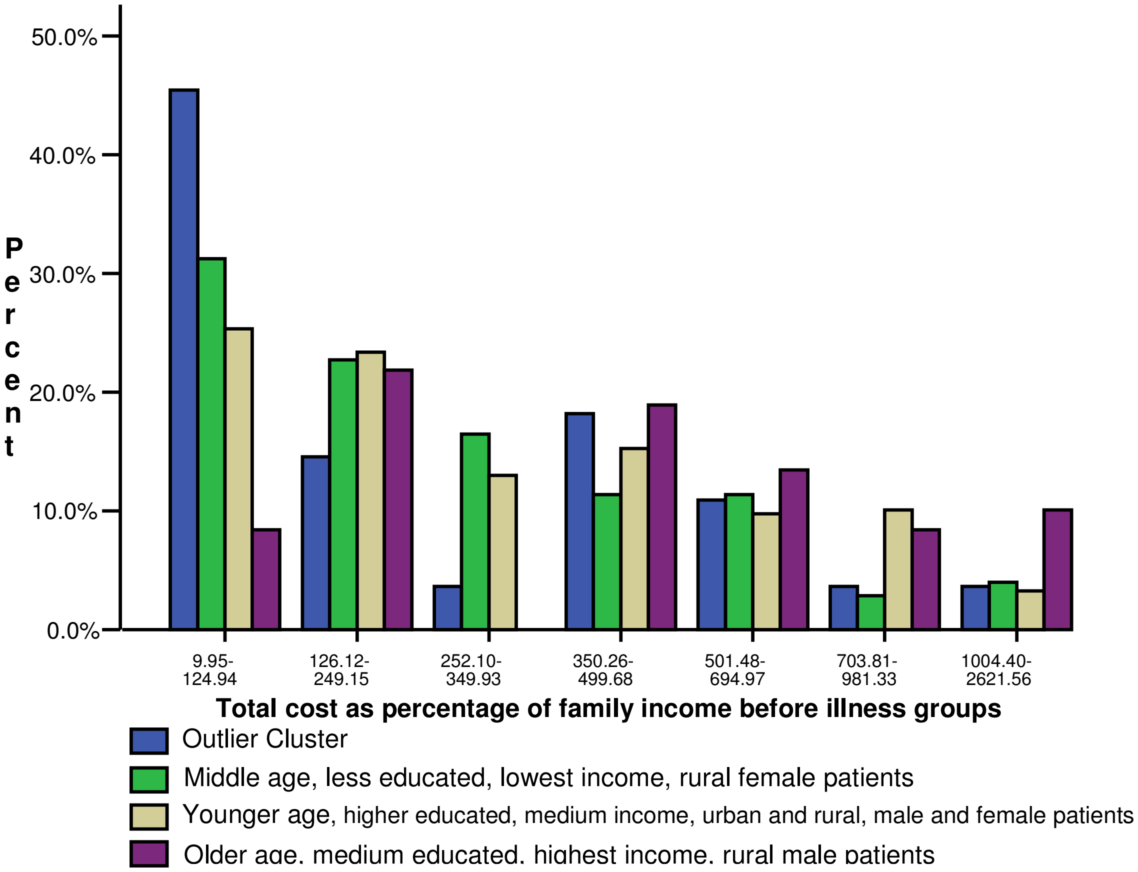
The relationship between total costs percentage and change in family income over the disease episode is interesting. The highest mean and median total costs as a percentage of family income were experienced by the patients whose family income reduced during the disease period. Conversely, the lowest mean and median of total costs were experienced by the patients whose family income was almost static during the disease period. These differences were statistically significant as indicated in *Annex-8.38*.

From the above analysis, it was clear that patient's gender, age groups, marital status, monthly family income deciles before illness, family per capita income deciles before illness, pre-treatment delay and both number and times of health providers contacted were significantly associated with higher total costs as a percentage of patient's household monthly income before illness. So a further analysis, comprising Pearson's correlation of total costs as percentage of family income before illness in relation to the significant contributing factors, was conducted.

The Pearson correlation coefficient (Bivariate analysis) was calculated for two sets of variables. The first set explored association among total costs as percentage of family income before illness, family income and per capita income before illness revealed a significant negative correlation at the 0.01 level (2-tailed) as the coefficients were (Coefficient *r = -0.200, n =508, p = <0.01 and r-square = 0.040*) for family income and (Coefficient *r = -0.180, n =508, p = <0.01 and r-square = 0.032*) for per capita income as illustrated in *Annex-8.44.* These relationships were weak. However, family income was influenced by some outliers, so I also calculated the Spearman's correlation coefficient by using the ranks (deciles) of the family and per capita income before illness to control the influence of the outliers and both the income deciles have negative significant correlation as illustrated in *Annex-8.45*. Analysis confirmed that family income and per capita income before illness as well as their deciles had negative correlations with total patient's costs means higher income corresponded lower effect.

Correlations among total costs as percentage of family income before illness, patients' number of contacted health providers, number of actual contacts and total pre-treatment delay were also significant as the coefficients were (Coefficient *r = 0.306, n =508, p = <0.01 and r-square = 0.094*) for number of contacted providers, (Coefficient *r = 0.304, n =508, p = <0.01 and r-square = 0.092*) for the actual number of contacts and (Coefficient *r = 0.419, n =508, p = <0.01 and r-square = 0.176*) for pre-treatment delay as demonstrated in *Annex-8.46.* Analysis confirmed that number and times contacted health providers and pre-treatment delay had positive correlations with total costs means if number and times of contacted provider and duration of delay increase, the amount of total costs as well as the effect would increase. Those findings also confirmed that total pre-treatment delay had a higher effect than the others. Since delay was in large part itself a consequence of diversion this is what we would expect.

Figure 8.7: Graphical presentation of total costs as a percentage of family income before illness groups according to patient's socio-demographic clusters (Weighted 530 cases by gender)



Cluster membership was related to costs to find out which were the most economically affected patients groups. The means and medians of total costs as percentage of family income before illness were highest for the 'highest income moderately educated rural male' and lowest for the 'lowest income less educated rural female' patients clusters and the differences were statistically highly significant as stated in *Annex-8.47*. Similarly, the cluster wise graphical distribution of total costs as percentage of family income groups demonstrated an expected pattern as stated in *Figure-8.7*. The 'lowest income less educated rural female' patients had experienced comparatively lower total costs groups as percentage of family income before illness compared with the 'highest income moderately educated rural male' patients and the distribution was statistically significant as indicated in *Annex-8.48*.

8.1.5.2. Modelling of total costs

A multiple regression analysis was conducted to predict the contribution of different socio-demographic, economic, health and delay predictors to total costs as a percentage of family income before illness. The technique was preferred as multiple regressions can examine the effects of the multiple independent predictors on a single dependent variable. The technique also can explain the proportion of the variance of independent variables in the dependent variable at a significant level through a significance test of R-square and also can indicate the relative predictive importance of each independent variable by comparing beta weights.

Two sets of modeling were done using various predictors and the total costs as percentage of family income before illness as dependent variable. The first one was conducted using socio-demographic variables of the patients including age and dummy variables including gender, marital and educational status; economic factor including patients' monthly family income before illness, health related factors including number and times contacted health providers and delay factor including total pre-treatment delay as predictors. The second one was conducted using per capita family income as predictor instead of family income before illness with the remaining other predictors constant to compare the strength of impact.

Model summary table

In the first model summary table, the R value is the measure of correlation between the predicted and observed values of the independent variable. The R-square is the proportion of variation or overall contribution as percentage in the dependent variable explained by the independent variables in the model. The first model set gave a correlation value R of 0.547 and R square of 0.299 as shown in *Table-8.10*. So the above mentioned nine independent predictors contributed 29.9 per cent of the variation in overall cost increase. In the second set (Using per capita family income remaining other predictors same as first model set), the R square value was 0.285 as illustrated in *Annex-8.49*.

Table 8.10: Regression model summary of total costs as percentage of family income before illness using above mentioned predictors (Weighted 530 cases by gender)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.547(a)	0.299	0.279	304.77305

a Predictors: (Constant), Class XI-XIV, Total times contacted health providers by patients, Combined urban and rural, Widowed, Only can sign, Divorced, Patient's family income before illness in US$, Sex, Unmarried, Class I-V, Total number of providers contacted by the patients, Age of patient, Total pre-treatment delay in days, Class VI-X

ANOVA table

The ANOVA table shows whether the proportion of variance explained in the model summary table is significant. It also indicates whether the overall effect of the independent variables entered in the model on overall contribution is significant. *Table-8.11* indicates a significance value of 0.000 which is below the 0.05 level. Details of second set attached in *Annex-8.49*

Table 8.11: Regression ANOVA table of total costs as percentage of family income before illness using above mentioned predictors (Weighted 530 cases by gender)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19548614.860	14	1396329.633	15.033	0.000(a)
	Residual	45746657.867	493	92886.615		
	Total	65295272.727	507			

a Predictors: (Constant), Class XI-XIV, Total times contacted health providers by patients, Combined urban and rural, Widowed, Only can sign, Divorced, Patient's family income before illness in US$, Sex, Unmarried, Class I-V, Total number of providers contacted by the patients, Age of patient, Total pre-treatment delay in days, Class VI-X
b Dependent Variable: Total cost as a percentage of family income before illness

Coefficients table

The coefficient table indicates the contribution of individual independent predictors (and their significance level) to overall variance. The 'Unstandardized beta column' of the table represents the strength and direction of the relationships of each independent predictor. This indicates that the number of contacted health providers (Beta = 71.619, $p < .001$) and total pre-treatment delay (Beta = 1.146, $p < .001$) were most important in relation total costs as percentage of family income. Conversely, monthly family income demonstrates a negative significant correlation (Beta = -0.666, $p < .001$). For details see *Annex-8.50*. Details of modeling using percentage of family per capita income are given in *Annex-8.51*. The pattern was very similar to the results of model using percentage of total family income.

8.2. Other consequences

Patients and their families not only faced huge cost burdens but also experienced other financial, social and psychological consequences as outlined below.

8.2.1. Impact on Family Income

Tuberculosis reduces the working ability of the patients. It affected the family income of the patients if he/she was the main income source for the family. To explore these, changes in family income were calculated as percentage of family income before the onset of the disease. The mean change of family income percentage was 45.18 and the median was 32.87. On the other hand, the range of income change was -73.85 to 1066.67 which indicated that some patient's family income after completion of treatment decreased, some increased and some remained static. 11.8 per cent households' incomes decreased and 73.5 per cent household's income increased as indicated in *Annex-8.52*.

8.2.1.1. Factors associated with family income change

As with costs, different socio-demographic, economic and health characteristics of the patients were explored in relation to their influence on change in family income subsequent to the total Tuberculosis episode.

Male patients had experienced a significant mean but insignificant median lower family income change as percentage of patient's family income before illness than the female patients as indicated in *Table-8.12*. The gender wise distribution of family income change group was interesting. A higher proportion of male patients' monthly family income had decreased and a higher proportion remained static. Conversely, a higher proportion of female patient's family income had increased and these differences were statistically significant as indicated in *Table-8.13*. The findings suggested that female patients' households were economically less affected in terms of income loss during the Tuberculosis episode. This might due to males being the main bread earner of the family or to female patients' re-engagement in work as early as possible or both may apply.

Rural patients had experienced insignificant mean but significant median higher family income changes as percentages of patient's family income before illness than the urban patients as indicated in *Table-8.14*. The urban-rural area wise distribution of family income change group was interesting. A higher of proportion rural patients' monthly family income had increased. Conversely, a higher proportion of urban patient's family income decreased or remained static and these differences were statistically significant as indicated in *Table-8.15*.

Table 8.12: Means and medians of family income change as a percentage of patient's family income before illness in relation to the socioeconomic characteristics of the study sample (Weighted 530 cases except gender)

Factors	**Compo-nents**	**Mean change**			**Median**		**Delay range**	
		Per cent	S.Devi	Signific.	%	Signific.	Minni	Maxi
Over All		39.51	61.95	-	31.34	-	-73.85	1066.67
Gender	Male	33.84	45.91	ANOVA-S (.001)	29.87	NPMT-NS (.164)	-73.85	239.98
	Female	50.83	84.24		33.33		-55.98	1066.67
Urban-Rural	Urban	29.56	59.07	ANOVA-NS (.133)	20.00	NPMT-S (.017)	63.64	400.00
	Rural	41.15	62.32		33.00		-73.85	1066.67

Table 8.13: Percentage and number of patient's family income change as a percentage of monthly family income before illness according to the patient's socio-demographic factors (Weighted 530 cases except gender)

Factors	Income fell Row (%)	Income same Row (%)	Income rose Row (%)	Total (Row %)	Signifi-cance	Cramer's V
Gender						
Male	13.6 (48)	15.3 (54)	71.1 (251)	100 (353)	0.042	0.095
Female	8.2 (29)	13.6 (48)	78.2 (277)	100 (354)		
Urban-rural areas						
Urban	14.5 (11)	23.7 (18)	61.8 (47)	100 (76)	0.034	0.113
Rural	11.4 (52)	13.4 (61)	75.2 (343)	100 (456)		

Overall, urban patients were significantly more affected in relation to income than rural patients. The findings can be compared with the national statistics on income change over the period as the average nominal income increased by 58.27 per cent in rural areas and 57.48 per cent in urban areas in 2010 relative to 2005 (HIES, 2010. This indicates a higher income increase in rural areas but the difference was minimal Average family income change 25.723 and 29.031 per cent in urban and rural areas respectively in the study sample suggests that a higher proportion of rural richer patients reported to public Tuberculosis treatment facilities than was the case for the more affluent in urban areas. Rapid increases in the rice price over the period explain the rise in rural incomes on average.

The means and medians and the distribution of income change groups against the patient's family income deciles before illness demonstrated an interesting and significant pattern as show in *Annexes-8.53* and *8.54*. Patients in the lower family income deciles experienced a significantly lower percentage income loss and were more likely to have experienced a monthly family income increase in comparison to patients in higher family income deciles as indicated in *Annex-8.55.* The same patterns was observed in relation to changes in patient's per capita in households incomes as shown in *Annexes-8.53, 8.54* and *8.56* respectively.

The lowest and highest mean significant percentage of family income changes were experienced by the *business* and *begging* personal occupation group patients respectively. Similarly, the lowest and highest median income change as percentage of patient's monthly household income were experienced by the *business* and *agriculture/farming* group patient's respectively as indicated in *Annex-8.53*. The lowest and highest monthly family income decreases were experienced by the *agriculture* and *business* persons respectively. Interestingly, family incomes for the *beggars* had not decreased at all. Those engaged in *farming/ agriculture* and *business* had experienced the highest and lowest family income increases respectively and full details are given in *Annex-8.54*. The findings revealed that the male dominated occupations had experienced a higher family income decrease probably because they were the main bread earner of the family. On the other hand *agriculture/farming* family incomes had increased which might be due to rapid increases in rice prices.

However, other patient's socio-demographic characteristics have no significant impact on family income change percentage as family income before illness as shown in *Annexes-8.53 and-8.54*. From the analysis, it can be concluded that Tuberculosis had imposed a heavy economic burden on patients and their families for a particular time period but this did not persist over a longer time period. Most patients regain their working ability and bounced back to join the income generating activities and that is the expectation of a fruitful treatment and control programme. Analysis also confirmed that gender, urban-rural, patient's monthly family income deciles or per capita family income deciles before illness and patient's personal occupation were the main contributing factors for higher income changes as a percentage of patient's household monthly income before illness. So a further analysis through 'Bivariate correlation' was conducted to assess the relationship more precisely.

The Pearson correlation coefficient analysis revealed a significant negative correlation at the 0.01 level (2-tailed) as the coefficients were (Coefficient $r = -0.205$, $n = 530$, $p = <0.01$ *and r-square* $= 0.042$) for family income and (Coefficient $r = -0.269$, $n = 530$, $p = <0.01$ *and r-square* $= 0.072$) for per capita income as illustrated in *Annex-8.58.* However, patient's family income was influenced by some outliers, so I also calculated the Spearman's correlation coefficient by using the ranks (deciles) of the family and per capita income before illness to control the influence of the outlier income changes and both the income deciles have negative significant correlation as illustrated in *Annex-8.59.* Analysis confirmed that higher income corresponded to a negative effect.

The analyses also demonstrated that urban patients were more affected as their incomes were more likely to have decreased. So I analyzed the socio-demographic characteristics of the urban patients to identify the characteristics of the real sufferers through binarizing the family income change as 'decreased' (lowest to +10 per cent of family income change) and 'increased' (above 10 per cent of family income change) as percentages of monthly family income before illness. The analysis demonstrates no significant associations between the socio-demographic characteristics of urban patients and the income change as shown in *Annex-8.57*. However, from the analysis it can be concluded that higher income urban patients and their families were more likely to have experienced an income reduction.

8.2.1.2. Modelling of overall family income change

A binomial logistic regression analysis was conducted to predict the contribution of different factors to family income change as percentage of family income before illness using socio-demographic, economic, health care, total cost related and total pre-treatment delay period as predictors. Family income change percentage was binarized as mentioned above. The presentation technique of final 'Variable in equation' table is adopted from Achia et al.'s study (Achia et al., 2010).

The 'variables not in the equation table' indicates that the variables including *second highest age group, urban and family income deciles before illness (first, second, seventh and ninth deciles)* are significant – details in *Annex-8.60*. But this changes when family per capita income deciles is used instead of family income deciles. *Second highest age group, urban* and *family per capita income deciles (first, second, third and ninth)* then have significant predicting power - details in Annex-*8.61*.

The classification *Table-8.14* presents the results of the model (Step 1 – Enter method) as the above mentioned predictors are included and demonstrates that overall classification error rate has changed from the original 73.5 with all cases assigned to the largest category of outcome to 77.9 per cent accuracy of prediction. Moreover, the predictions of *decrease* and *increase* of family income are correctly classified to 31.6 and 94.6 per cent respectively. Using per capita family income deciles instead of total income deciles with other predictors the same demonstrates a changed classification error rate from the original 73.5 to 78.0 per cent accuracy of prediction and the predictions of *decrease* and *increase* of family income change are corrected to 32.7 and 94.4 per cent respectively as shown in *Annex-8.62*. Overall, both the models appear good but we need to evaluate model fit and significance level as well.

Table 8.14: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness) - Classification table (a) of Step 1 (Weighted 530 cases by gender)

Observed			Predicted		
			Binarized family income change		Percentage correct
			Decreased	Increased	
Step 1	Binarized family income change percentage	Decreased (Lowest to 10%)	43	92	31.6
		Increased (Above 10%)	20	353	94.6
	Overall percentage				77.9

a The cut value is 0.500.

The overall significance yields a *p-value* of 0.000 as illustrated in *Annex-8.63*. Replacing the economic factor by *family per capita income deciles* gives a significance *p-value* of 0.000 as shown in *Annex-8.64*. Both models are significant so I examined the *Variables in the Equation* table to specify the significant individual predictors.

Table 8.15: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness) - Model summary and Hosmer and Lemeshow test (Weighted 530 cases by gender)

Step	Model summary			Hosmer and Lemeshow test		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squire	df	Significance
Step 1	500.660(a)	0.156	0.228	3.680	8	0.885

a Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

The Model Summary provides some approximations of the coefficient of determination R-square as illustrated in the *Table-8.*16. *Nagelkerke's R-Square* 0.228 indicates a moderate strength of relationship of 22.8 per cent between the predictors and the outcome. Replacing the economic factor by *family per capita income deciles* gives a *Nagelkerke's R-Square* of 0.262 indicating a moderate relationship of 26.2 per cent between the predictors and the prediction as shown in *Annex-8.65.* An alternative to model chi square is the *Hosmer and Lemeshow* test with a significance level of 0.885 which means that the model is a good fit as demonstrated in *Table-8.16*. Replacing the economic factor by *family per capita income deciles* gives a *Hosmer and Lemeshow* test significance of 0.759 that that model is also a good fit as shown in *Annex-8.65.*

The *Variables in the Equation* table (containing monthly family income deciles as one of the predictor) is shown in *Annex-8.66*. The *Wald* statistic in this model demonstrates that family income deciles have an overall significant effect and the significant contribution is made by the dummy predictors *family income deciles1* (p=0.000) followed by *deciles2* (p=0.000), *deciles4* (p=0.000), *deciles3* (p=0.002), *deciles5* (p=0.003), *deciles6* (p=0.004), *and deciles8* (p=0.028) with an ambiguity of *deciles7* against the highest income *deciles10*. In addition, although the *total costs as percentage of family income before illness groups* has no overall significant impact the dummy *group1* (p=0.004), *group2* (p=0.020) and *group3* (p=0.030) indicates a significant threshold effect against the highest costs percentage *group7*. The *Variables in the Equation* table (using monthly family per capita income deciles as the predictor) shows similar *Wald* statistics as stated in *Annex-8.67*. In this model the *per capita income deciles* demonstrates an overall significant effect and the significant contributions are made by the dummy predictors *income deciles1* (p=0.000) followed by *deciles2* (p=0.000), *deciles3* (p=0.000), *deciles4* (p=0.002), *deciles5* (p=0.0041) and *deciles6* (p=0.052) with threshold effects against the highest income *deciles10*. The total cost percentage *group1* (p=0.008), *group2* (p=0.013), *group3* (p=0.029) have a threshold effect against the highest cost percentage *group7*, although the *total costs as percentage of family income before illness* has no overall significant effect.

The Exp(B) column in the *Variables in the Equation* table gives the odds ratio as the value exceeds 1 then the odds of an outcome occurring increase. For example, the Exp(B) value associated with lower (group1) total cost percentage group in the model containing the economic factor including monthly family income deciles is 5.810. So when the cost percentage is raised by one unit the odds ratio is 6 times as large and therefore the patients 6 more times likely to belong to the *income decrease* group.

Overall, the test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between the *decrease* and *increase* of family income change percentage. Nagelkerke's R-square indicated a mild to moderate relationship between prediction and predictors. However, the overall prediction success including the accuracy of classification of *decrease* of family income was not so good. The Wald criterion demonstrated that the *family income deciles and total lower cost percentages* are the main significant contributing predictors. Findings also indicate that the higher income group patients are comparatively economically more adversely affected in the longer run than poorer patients. Also, and not surprisingly, there is an association between costs incurred and negative effects for patients in the lower income categories.

8.2.1.3. Modelling of urban-rural family income change

A binomial logistic regression analysis was also conducted for urban and rural weighted patients separately to explore the contribution of different socio-demographic, economic, health care, total costs related and total pre-treatment delay period factors as predictors on family income change as percentage of family income before illness. The final model in the rural areas was excellent fit and the test of the full model against a constant only model was statistically significant, indicating that the predictors reliably distinguished between the *decrease* and *increase* of family income change percentage. Nagelkerke's R-square of 0.236 indicated a mild to moderate relationship between prediction and predictors. The Hosmer and Lemeshow test ratio of 0.916 indicated that the model has a very good fit. However, the overall prediction success including the accuracy of classification of *decrease* of family income was not as good at only 32.1 per cent as indicated in *Annex 8.68*. Conversely, the test of the full model against a constant only model in the urban areas was statistically significant, indicating that the predictors as a set reliably distinguished between the *decrease* and *increase* of family income change percentage. Nagelkerke's R-square of 0.393 also indicated a moderate relationship between prediction and predictors. The Hosmer and Lemeshow test ratio of 0.441 indicated that the model has good fit. The overall prediction success including the accuracy of classification of *decrease* of family income was excellent. The Wald criterion and Odds ratio table demonstrated the similar pattern as rural areas reflecting the negative longer term impact of Tuberculosis episodes on the higher income group patients and their families. Brief details are given in *Annex 8.69*. The analysis demonstrated that the negative impact was experienced by *higher family income deciles before illness* group patients. In addition, findings also revealed that *middle age groups* and *lower cost percentages groups* were also experienced the negative impact. Overall analysis also revealed that younger and middle age group patients at urban and older age group patients at rural areas were the main sufferers.

8.2.1.4. Gender wise modelling of rural family income change

I also analysed the rural male and female patients' separately using binomial logistic regression, however I did not perform similar analysis in urban areas due to the small number of sampled cases. The test of the full model against a constant only model in the rural male patients was statistically significant, indicating that the predictors as a set reliably distinguished between the *decrease* and *increase* of family income change percentage. Nagelkerke's R-square of 0.30 indicated a moderate relationship between prediction and predictors. The Hosmer and Lemeshow test ratio of 0.588 indicated that the model has a good fit. The overall prediction success including the accuracy of classification of *decrease* of family income was also good at 45.5. The Wald criterion and Odds ratios demonstrated that the *family income deciles (1-6 and 8) before illness* with some ambiguity against the highest income *deciles10* are the main significant contributing predictors reflecting the sufferings of the higher income patients and their families. Conversely, the significant contribution of lower cost percentage groups also confirmed the experience of negative impact by the higher income group patients. Brief details are demonstrated in *Annex 8.70*.

On the other hand, the final model for the rural female patients was not so good fit as for males although the test of the full model against a constant only model was statistically significant, indicating that the predictors reliably distinguished between the *decrease* and *increase* of family income change percentage. A Nagelkerke's R-square of 0.317 indicated a mild to moderate relationship between prediction and predictors. The Hosmer and Lemeshow test ratio of 0.260 indicated that the model has a reasonable fit. However, the overall prediction success including the accuracy of classification of *decrease* of family income was not as good at just 32.8 percent. The Wald criterion and Odds ratios demonstrated that the *lower family income deciles (1-4) before illness* have threshold significant contributing predictors reflecting the experience of negative impact by higher income patients and their families. Brief details are demonstrated in *Annex 8.71*.

In addition to the overall family economic consequences, Tuberculosis might also lead to other personal, social and physiological consequences for patients and their families as described below.

8.2.2. Immediate consequences on patient's profession

Patients were asked about the immediate overall consequences of Tuberculosis for their personal and daily lives during interviews and most patients mentioned their inability to do their normal activities or work and this was followed by reducing working time and female patients' inability to perform household work as indicated in *Annex-8.72*. The major immediate consequences were also related to the socio-demographic and economic characteristics of the patients to assess their association (if any) by applying appropriate analytical tools.

Gender wise distribution of immediate of consequences of Tuberculosis on patient's daily life demonstrated some interesting statistically highly significant differences. *Inability to do household work* (obviously) and *discontinuation of study* were more commonly experienced by the female patients. Conversely, the consequence of *reducing working time* was nearly double for male patients and details are given in *Table-8.16*. The consequences of *reduced working time* and *unable to work* were more common for the rural patients. In contrast, *loss of job*, *irregularity at work* and *discontinuation in study* were more often experienced by the urban patients. This distribution was also moderately associated and statistically highly significant.

Table 8.16: Socio-economic factors wise immediate consequences of Tuberculosis on patient's personal life (Weighted 530 cases except gender)

Factors	Loss of job	Red-uce work time	Una-ble to work	Irregu-lar at work	Unable to do H.hold work	Less care of child	Dis-con-tinue study	Total	Sig.	Cra-mer's V
Gender										
Male	6.8 (24)	18.4 (65)	67.4 (238)	3.1 (11)	1.4 (5)	0.0	2.8 (10)	100.0 (353)	0.000	0.353
Female	6.2 (22)	9.6 (34)	56.4 (204)	0.0	19.5 (69)	2.0 (7)	5.1 (18)	100.0 (354)		
Geographical area										
Urban	13.0 (10)	9.1 (7)	49.4 (38)	10.4 (8)	9.1 (7)	2.6 (2)	6.5 (5)	100.0 (77)	0.000	0.297
Rural	5.7 (26)	16.4 (75)	66.3 (303)	0.7 (3)	7.2 (33)	0.4 (2)	3.3 (15)	100.0 (457)		

There were also differences in the immediate consequences by age groups of the patients as indicated in *Annex-8.73*. Overall, higher percentages of lower and middle age group patients had experienced *loss of job*, *reducing working time* and *discontinuation of study*. Conversely, higher percentages of higher age group patients had experienced of *inability to perform normal* and *household work* properly. These differences were also moderately associated and statistically highly significant. However, other socioeconomic and delay factors have no significant association as stated in *Annex-8.73*.

8.2.3. Longer term impact on patients' occupational status

An examination of the patient's occupational status after completion of the treatment against the occupational status before illness generated some interesting insights. The main consequences were the patients became unemployed or shifted to a lower level occupational status due to long term suffering or disability. Interestingly, some patients also shifted to higher occupational statuses after completion of the treatment. Overall, 3.9 per cent of weighted patients became unemployed or had to retire. For those in farming occupations, 10.0 per cent respondents became unemployed, 75.0 per cent remained the same and 7.5 per cent shifted to became landless agricultural labourers. Similarly, out of previously employed patients, 2.5 per cent became unemployed, a majority of 59.5 per cent remained the same, 7.6 per cent shifted to small businesses, 8.9 per cent shifted to business and another 7.6 per cent patients turned to household activities. Patterns here demonstrated high degrees of association and significance and details are demonstrated in *Annex-8.74*.

8.2.4. Social and psychological consequences

During interviews, respondents were asked about the social and psychological consequences experienced during the disease episode. The responses were divided into social and psychological sub-groups according to their nature. Overall, 47.5 per cent of the weighted patients reported that *neighbours became afraid* due to their disease, 30.8 per cent experienced *teasing or rejection by the neighbours or society*, 3.0 per cent faced *humiliation by husband or the family members*, 3.2 per cent patients were *sent temporarily to their father's house for treatment* and 1.0 per cent experienced permanent *divorce or separation*. 61.2 per cent *felt fear of telling neighbours* about their disease, 3.0 per cent patients' felt *fear of not getting married* and 0.4 per cent *felt fear of getting divorced*. However, 26.4 per cent of the total respondents faced no problem at all.

Consequences were different according to gender and urban-rural location. Overall female patients experienced both social and psychological problems more often than the male patients as indicated in *Annex-8.75*. In particular the devastating consequence of *divorce/separation* was mainly experienced by the female patients. Some other consequences including *humiliation by husband/in-laws* and *sent back father's house for treatment* were only expressed by the female patients. However, most other associations were statistically insignificant by gender apart from *fear of not getting married* which was significantly higher for female patients.

In relation to the urban rural split, rural patient's experienced more social problems and urban patient experienced more psychological problems. A higher percentage of rural patients faced the *humiliation by husband or family members* and *being sent back father's house for treatment*. However, the majority of the associations were statistically insignificant as indicated in *Annex-8.75* except that a higher proportion of rural patients faced *teasing or social neglect*. This difference was moderately associated and statistically significant.

Patient's monthly family income deciles had a statistically insignificant relationship with the distribution of majority of these social and psychological consequences of the weighted cases. However, a higher percentage of lower income deciles group patients expressed their concern regarding *teasing or social neglect* and this difference was statistically significant as indicated in *Annex-8.76*.

As female patients suffered socially and psychologically more and a majority of 87.84 per cent of divorced and widowed patients were female, e the social and psychological consequences separately they suffered were explored separately. Analysis showed that binarized marital status against the majority of the sufferings was statistically insignificant and details are stated in *Annex-8.77*. However, *daughter became afraid not got married* was significantly higher for divorced and widowed patients. *Humiliation by family members, being sent back father's house for treatment, teasing or social negligence* and *neighbours became afraid* was dominated by divorced and widowed patients. So analysis indicated that divorced and widowed patients were socially and psychologically more vulnerable.

8.2.5. Consequences for dwelling status

Tuberculosis also affects the dwelling status of the patients on a small scale but significantly so. Overall 90.1 per cent of weighted patients remained in the same dwelling but 9.9 per cent patients were obliged to change their dwelling. Of these the majority were forcibly shifted to their father's or relatives' house for treatment, next in order were those who shifted from urban location to the village level and then those who shifted from a better house to a worse house during the diseased episode as indicated in *Annex-8.78*.

There was an interesting pattern in relation to dwelling shift by gender. Overall, female patients were significantly more affected in terms of dwellings. A higher percentage of the female patients shifted from a better to a worse house or were sent-back to their father's house for treatment. Similarly, the urban/rural area wise dwelling differences during Tuberculosis episode demonstrate that the urban patients were affected more than the rural patients. A higher proportion of rural patients remained in the same dwelling rather than urban patients. In contrast, a significantly higher percentage of urban patients shifted from better to worse houses during the diseased period. However, family income deciles wise dwelling status shift of the patient's during the diseased period indicated no significant association as stated in *Annex-8.79.*

8.3. Coping Strategies

Multiple options or strategies were reported by the respondents as they were also asked about the coping strategies adopted to accommodate the daily expenditure and income loss during the whole span of the disease. The options could be divided into short-term less devastating, medium and long-term more devastating according to their nature of impact. As short term less devastating options, majority of the respondents drew on their own savings, followed by borrowing money from other family members/friends and taking donations from family members or relatives to accommodate the extra expenditures and income loss. Medium impact strategies reported by the patients were borrowing money from others with interest, using microfinance or bank loans and mortgaging land or gold or other properties. Finally, the most devastating options reported by the respondents were selling animals and land/other property as indicated in *Annex-8.80*. The most dangerous option was withdrawal of children from school and engaging them into income generating activities which might have a long term effect on the individual and society.

All the coping strategies were adapted by the both sexes but some were dominated by the male and some by the female patients. The engagement of wife in income generating activities was necessarily a male only strategy. The most common coping technique of using savings was almost equally adopted by the male and female patients. The strategies of borrowing from other family members or friends, selling household assets, selling land or other properties, microfinance or bank loans and mortgage land or gold or other property were dominated by the male patients but all the differences were not statistically significant as indicated in *Annex-8.81*. In contrast, taking donations from other family members or friends was more common for female patients and was statistically highly significant. There also a significant gender difference in relation to borrowing from others with interest.

There were also urban rural differences in relation to coping strategies. Overall a higher percentage of urban patients adopted a variety of coping strategies. Using own savings was adapted to the almost the same extent by the urban and rural patients. A significantly higher percentage of urban patients adopted the strategies: borrowing from family and friends, sold household assets and engaging spouse into income generating activities. In contrast, selling animals was significantly predominantly a rural strategy for obvious reasons. Borrowing money from others with interest, and microfinance or bank loans were predominantly adopted by the urban patients but the differences were statistically insignificant as indicated in *Annex-8.81*. There was no statistically significant difference in relation to withdrawing children from school.

The relationship of coping strategies to the patient's family income deciles before illness gave an interesting picture. The most common coping strategy of using own savings was adopted by all income deciles but dominated by the higher family income deciles and this was moderately associated and statistically highly significant. Conversely, the strategies of borrowing from family and friends, borrowing from others with interest and microfinance/bank loans were also adopted by all income deciles but more by lower and middle income deciles patients but only the association of borrowed with interest was statistically significant. Likewise selling animals and taking donations from others were mainly adopted by the lower income deciles and this pattern was moderately associated and statistically highly significant as indicated in *Annex-8.82*. Overall, poorer patients adapted more devastating strategies due to their limited internal and external extra resources.

The relationship between coping strategies and change in family income were also explored. The coping strategy of engaging spouse in income generating activities and selling household assets were mainly adopted by the patients whose family's income remained static and whose income decreased and the association was statistically significant. Interestingly, the medium devastating coping strategy of selling animals and mortgage land/other properties and the devastating one of sold land property were adopted by patients whose income also decreased but the difference was statistically insignificant. For other strategies there were no significant differences as indicated in *Annex-8.83.*

8.4. Chapter summary

Means and medians of different kinds of costs experienced by the patients and their families were analyzed. Major costs were calculated as percentage of family income before illness and different socio-demographic, economic, health and delay related factors wise means and medians of different costs percentages were compared applying appropriate statistical procedure. Similar independent factors were related to different kinds of costs percentage groups to find out the significant associated and contributing factors related to the respective costs by using the appropriate analytical tools demonstrated in *Table-8.17*. Overall the main findings are-

Medical costs

▪ Mean and median medical cost was US$51.65 and US$26.60, dominated by pre-treatment medical costs due to shopping around of the patients.

▪ Nearly two thirds of the medical costs were contributed by the medicine costs.

▪ Female patients had significantly higher medical costs as percentage of family income before illness.

Non-medical costs

▪ Mean and median non-medical cost was US$47.78 and US$31.74, dominated by the costs of extra foods consumed by the patients during treatment.

Total direct costs

▪ Total mean and median direct costs was US$99.43 and US$65.32, dominated by the before treatment medical costs.

▪ Total direct cost was slightly higher than patient's monthly family income and 16.60 per cent of national annual per capita family income.

▪ Female patients had significantly direct costs as percentage of family income before illness.

▪ Lower monthly family income deciles, higher number and times contacted health providers and higher pre-treatment delay were associated with significantly higher direct costs as percentage of family income before illness.

Indirect costs

▪ Mean patient's and total working day loss were 159.55 days and 187.26 days respectively which were much higher during treatment of the patients.

▪ Mean and median patient's indirect costs were US$191.63 and US$88.24 which were much higher during treatment of the patients.

▪ Male patients had significantly higher patient's indirect costs as percentage of family income before illness

▪ Mean and median total indirect costs were US$221.68 and US$109.52 which were much higher during treatment of the patients.

▪ Male, middle age groups, divorced, lower income deciles, higher times contacted health providers and higher pre-treatment delay had significantly higher indirect costs as percentage of family income before illness.

Patient's costs

▪ Mean patients cost was US$291.06 which contributed 90.64 per cent of total costs.

▪ Patient's indirect costs were the main contributor of total patients' costs and were almost double of their monthly family income before illness.

▪ Male, middle and higher age groups, divorced, lower family income deciles, higher number and times contacted health providers and higher pre-treatment delay group patients had significantly higher mean total indirect costs as percentage of family income before illness.

Caregiver's costs

▪ Caregiver's mean working day loss and indirect costs were 27.71 days and US$30.05 which were much higher during pre-treatment period.

▪ Male, rural, higher times contacted and higher pre-treatment delay patients' caregivers had significantly higher indirect costs as percentage of their personal income before illness.

Total costs

▪ Mean and median total costs incurred by the patients and their families were US$321.11 and US$195.15 which was more than 3 times monthly family income and 53.61 per cent of national per capita family income. Almost half of the total costs were contributed by indirect costs.

▪ Male, middle age groups, divorced, lower family income deciles, higher number and times contacted health providers and higher pre-treatment delay group patients had higher significant mean total costs as percentage of family income before illness.

▪ Divorced and widowed patients were the most vulnerable group and suffered more due to Tuberculosis.

Table-8.17 clearly shows that family income deciles, times of contacted health providers and total pre-treatment delay were the main significantly associated factors for direct, indirect and total costs as percentage of family income before illness. Moreover, gender, age groups and marital status had a significant association with indirect and total costs as percentage of family income before illness. Similarly, per capita family income deciles and number of contacted health providers had a significant association with direct and total costs as percentage of family income before illness. Multiple logistic regression analysis confirmed that number of contacted health providers, total pre-treatment delay, gender and family income before illness had significant contribution on total costs as percentage of family income before illness as discussed earlier in the modeling of total costs.

Table 8.17: Factors having significant impact and contribution on direct, indirect and total costs as percentage of family income before illness

Factors	Direct costs percentage	Indirect costs percentage	Total costs percentage
Gender	-	Cramer's V- 0.385, P value - 0.000	Cramer's V-0.212, P value - 0.000
Age groups	-	Cramer's V- 0.166, P value - 0.003	Cramer's V- 0.155, P value - 0.029
Marital status	-	Cramer's V- 0.146, P value - 0.018	Cramer's V- 0.140, P value - 0.037
Family income deciles	Cramer's V- 0.214, P value - 0.000	Cramer's V- 0.155, P value - 0.029	Cramer's V- 0.173, P value - 0.001
Per capita family income deciles	Cramer's V- 0.191, P value - 0.000	-	Cramer's V- 0.152, P value - 0.048
Number of contacted health providers	Cramer's V- 0.236, P value - 0.000	-	Cramer's V- 0.168, P value - 0.000
Times contacted health providers	Cramer's V- 0.233, P value - 0.000	Cramer's V- 0.168, P value - 0.000	Cramer's V- 0.218, P value - 0.000
Pre-treatment delay	Cramer's V- 0.228, P value - 0.000	Cramer's V- 0.142, P value - 0.008	Cramer's V- 0.189, P value - 0.000

Tuberculosis also creates some other family, social and psychological consequences and the main findings regarding them are as follows –

Family income change

▪ Mean change of family income as percentage of family income before illness was an increase of 45.18 per cent. Conversely, 11.8 per cent of patients' family income decreased and 14.7 per cent remained static.

▪ Female, lower personal occupational status, and lower family and per capita income deciles were significantly associated with a higher positive mean change in family income as percentage of family income before illness.

▪ Family income decrease as percentage of family income before illness was significantly associated with male, urban, higher personal income occupation and higher family and per capita income deciles patients.

▪ Binary logistic regression also confirmed that family income deciles and lower total cost as percentage of family income before illness were the significant contributing factors of family income change as percentage of family income before illness.

Immediate and long term consequences

▪ More than 64 per cent patients were unable to perform their normal work, 6.6 per cent patients lost their jobs temporarily and 15.5 per cent patients needed to reduce their working time.

▪ Gender, urban-rural and age groups were significantly associated with immediate consequences.

▪ Nearly 4 per cent patients became unemployed or had to retire permanently due to the sufferings of the disease. Also some had to change their occupation into lower income generating activities.

Social and psychological consequences

▪ A significant proportion of female as well as rural patients had experienced social and psychological problems.

▪ A higher proportion of poorer patients faced social and psychological consequences.

▪ A higher proportion of divorced and widowed patients faced social and psychological problems.

▪ Female and urban patients significantly faced more dwelling problems during the disease episode.

Coping strategies

▪ The common coping strategies adopted by the patients and their families were 'mobilizing own savings' followed by 'borrowed from family and friends' and 'borrowed with interest'.

▪ Patient's adoption of devastating coping strategies was significantly associated with their family income change during the diseased episode.

So far, some studies have been conducted in developing countries especially in India regarding different kind of costs, the associated factors linked with higher costs and the coping strategies. So the study findings will be discussed in relation to those previous reviewed studies.

8.5. Chapter discussion

Both the literature and personal experience indicate that the whole span of a Tuberculosis episode imposes a significant economic and social burden on patients and their families. This has been a major focus of this study. So, the different components of cost have been calculated in order to assess their contribution to total cost and relationships with other consequences. Costs were also calculated as percentages of monthly family income before illness so as to assess relative impact. Both exploration of trajectories as established in this study and earlier personal experience indicated that various socio-economic factors, the nature and number of health providers consulted by the patients, and the pre-treatment delay were very important factors in relation to the socio-economic impact of Tuberculosis. So, I tried to explore how much and in what ways these socio-demographic factors, contacts with health providers, and delay contributed to the different costs and consequences incurred by the patients and their families.

The mean total indirect costs experienced by the patients and caregivers were nearly double the direct costs and more than two thirds of these costs were contributed by the patients. The huge indirect costs were due to total high professional time loss and the mean during treatment indirect costs were much higher than the pre-treatment costs and patients were the main contributors in the both cases. The male patients had experienced significantly higher indirect costs both before and during the treatment period. Similarly, urban patients experienced significantly higher indirect costs as compared with rural patients before the treatment period but there was no significant difference during the treatment period. Analysis also revealed that the amount of indirect costs increased according to the family income deciles which indicated that higher income patient's lost more income in absolute income form because they had higher incomes to lose. However, poorer patients suffered relatively more because they lost a significantly higher percentage of their family income.

Indirect costs significantly increased in relation to number of health providers contacted and number of such contacts. . Patients became sicker day by day due to shopping around before reporting to the proper Tuberculosis treatment unit. This hampered them in their normal activities and contributed to the huge indirect costs both before and during treatment. The amount of the indirect costs also increased as the duration of the total delay increased. More delay causes more sickness and patients had to give-up or reduce their normal activities which led to higher indirect costs. Correlation analysis also confirmed that number of and times contacted for health providers and delay were contributing factors for higher indirect costs.

Direct costs were much lower than was found in a previous small scale Bangladeshi study (21 patients in a northern district). This might be either due to the an increase of awareness of the patients as to public provision or to lower transport costs during treatment due to the decentralization of the programme at the community level. However, the present study found that pre-treatment medical expenditure accounted for more than half of the total direct costs occurred due to multiple consultations with various health providers. This was particularly important in relation to contacts with unqualified practitioners due to their easy availability and accessibility. The qualified practitioners deliver both diagnosis and medicine but the unqualified professionals were more interested in selling medicine. The major share of the non-medical costs was due to the special food and transport costs and these accounted for nearly half of total direct costs. Higher transport costs can arise when there are combined transport costs of patients and caregivers in consulting multiple health providers especially the qualified ones situated normally in the urban areas. Patients spent extra money to consume expensive rich foods because they believed that they were taking powerful medicines and extra body strength was required to absorb them as well as to become cured more quickly.

Costs for female patients were significantly higher as a percentage of family income. The higher medical costs incurred by the female patients were related to their more frequent contact with non-qualified health providers. In contrast, the higher non-medical costs incurred by the male patients related to higher transport costs to health facilities. Similarly, statistically significant higher direct costs were incurred in urban areas. Urban patients' higher medical costs were related to urban patients' more numerous contacts with qualified health providers other than the free system. Findings also demonstrated that divorced and widowed patients were more vulnerable economically and socially as nearly 90 per cent of them were female came from rural areas with lower economic background. Examining the relationship between direct costs and household incomes it was found the poorer patients and their families had suffered more in terms of direct costs though the actual amount was less.

Direct costs as percentage of family income increased in relation to the number of health providers contacted, number of actual individual contacts with them and total pre-treatment delay period. Pearson correlation analysis revealed these aspects were major correlated factors to direct costs. Moreover, both absolute amounts of direct costs as percentage of family income increased according to the increase of the pretreatment period. Analysis revealed that the patients consulted various health providers multiple times within the pre-treatment period. So the higher delay was related to multiple consultations with health providers and repeated expenditure on medicine costs, consultation and diagnostic fees and transport costs which ultimately increased total direct costs.

Significant total costs incurred by the patients were split almost equally between the pre-treatment and during treatment costs. Costs found in this study were slightly higher than in a previously conducted Bangladeshi study due to that study not including a caregiver's cost calculation. More than ninety per cent of the total costs were patient's costs. The calculation of patient's cost as percentage of monthly family income established relative economic burdens. The major proportion of total costs came from costs associated with medicine, diagnosis, transportation and special foods. Male patients experienced a significantly higher percentage of monthly family income as total costs. The lowest income deciles patients had experienced the highest mean and median total costs as percentages of their monthly family income. So the poorest suffered most in relative terms.

Contact with multiple health providers and multiple contacts with those providers were associated with higher costs. Pearson correlation analysis suggested that the combined number and times of contacted health providers contributed more than one tenth of the total costs. Similarly, total costs were increased in line with the duration of the total pre-treatment period due to repeated contact with health providers and longer inability to work. Regression analysis suggested that number of contacted health providers in combination with pre-treatment delay, household income before illness and gender contributed a bit more than one third of the total costs. This has considerable policy implications which will be explored in the conclusion.

Family income change across the Tuberculosis episode was examined. A higher proportion of male patients' family incomes decreased or remained static. This reflected the country's pattern of male headed households where the males are the main income earners for the family. Interestingly, a higher proportion of higher income deciles family income decreased. This might be due to poor patients' reengagement with earning activities as quickly as possible or their replacement as earner by another family member. More affluent patients can draw on existing resources to convalesce before reengaging in income generating activities. However, overall Tuberculosis is a big hit in a resource poor country like Bangladesh. Most people are very poor and when hit by Tuberculosis do to experience high associated costs but economically came back rather quickly. In contrast, the higher income deciles patients are less adversely affected during the Tuberculosis episode but are more adversely affected in the longer term.

Moreover, urban patients economically suffered more than the rural patients. Rural patients were mainly farmers, so they benefitted from the considerable increase in rice prices over the period. Conversely, urban patients were mainly cash earners and their incomes were reduced or lost due to loss or interruption of jobs and suffered economically more than rural patients.

Binomial Logistic Regression analysis also demonstrated that both lower and middle family income deciles and lower costs as percentage of family income groups were attributes that seemed to have significant threshold effects in relation to family income change. Lower income deciles demonstrated much higher odd ratios of family income having increased. Higher income group patients demonstrated a negative effect in relation to longer term family income if they had incurred lower costs in relation to family income during the episode, but this seems to reflect the way in which higher income group patients generally incurred lower costs during the episode simply because of their higher household incomes.

Separate Binary Logistic Regression models were run for urban and rural patients. In rural areas it was there was a significant association of two middle and higher age groups with negative income change. Again lower family income deciles (with some ambiguity) and lower total costs as percentage of family income groups had significant associations with negative family income change. So, higher income patients were affected negatively but poorer patients' household incomes were much more likely to have improved. The regression model for urban patients also demonstrated the similar pattern as rural areas of likelihood that higher income people were more likely to experience longer term negative family income change. Again lower total costs as a percentage of family income during the episode was associated with negative income change but see the point made above are the cost experiences by higher income groups during the episode. In urban areas membership of lower age groups was significantly associated with negative income change reflecting the role of patients of this age in contributing to higher household incomes in the urban context. However, the number of weighted cases in urban area was low (only 75) guided to incorporate the groups of continuous variables as continuous rather categorical in the model, so the final model lost some detail but still it was a powerful model. So larger scale study in urban areas would solve this problem and might demonstrate more details regarding family income change as rural areas. Separate regression models for rural male and female patients demonstrated a bigger impact on higher income male patients in terms of negative family income change. The same pattern was found for rural female patients with those from the lowest household income deciles very unlikely to have experienced longer term reduction in household income.

Patients also faced social, psychological and personal problems in addition to the economic burden. These included negligence and teasing by the neighbours, humiliation by the family members and the most devastating one of separation or divorce. They also incurred psychological burdens in terms of feeling weak, fear of telling neighbours, fear of not getting married and fear of getting separated or divorced. Overall, the female patients reported higher social and psychological consequences especially the devastating ones of being sent back to father's house for treatment and divorce or separation. Similarly, the rural patients experienced higher social and psychological consequences, especially the devastating ones like divorce or separation. These findings indicated that misconception and stigma regarding

Tuberculosis still exist in the society. This suggests a need for repeated and continuous community education and special attention needs to be given by the programme implementers at the community level. Similarly the poorer patients faced more severe social and psychological problems. .

Patients also faced problems in their personal lives. Most patients were unable to perform their normal activities and some them lost their jobs, shifted to lower earning activities or were forced to retire. As a result their personal income reduced and families suffered if the patients were the main income earner of the family. Sometimes patients had to shift to inferior housing due to financial problems. Overall, the male patients' families economically suffered due to discontinuation of work and female patients' households suffered due to their inability to take care of the family, especially of the children.

Patients had mobilized various options to cope with the economic consequences. Male patients utilized a higher proportion of internal resources like own savings, borrowing from family and friends, selling household assets or land and engaging their spouse in the income generating activities. Female patients were more likely to mobilize external resources like donations from relatives and borrowing from others with interest. So the analysis indicated that female patients were more vulnerable in terms of coping with economic loss. A higher proportion of urban patients had withdrawn children from school and engaged them in work. The study findings confirmed that longer pre-patient delays were highly associated with higher total costs and consequences and two possible explanations might be advanced for this. The first was that the delay in presenting to the NTP recognizes treatment facilities led to more severe illness and therefore higher treatment costs. The other relates to more workdays lost and hence higher indirect costs. Of course both can operate together. The findings also confirmed that patients spent considerable time shopping around for diagnosis and treatment and this led to higher expenditures and longer morbidity. Findings also clearly demonstrated that male and female and urban and rural patients were affected differently by Tuberculosis both economically and socially. Female patients were more vulnerable in terms of coping options. Urban patients were affected more in terms of dwelling and rural patients in terms of coping mechanism. So, more emphasis should be given gender and geographical area based sensitive issues at the community level during the initiation of the treatment.

A very clear finding is that delay which was a byproduct of diversion through contacting multiple health providers before the initiation of proper anti-Tuberculosis treatment matters and the policy implications of this in relation to associated causal factors will be considered in detail in the conclusion to the thesis.

[4] When a statistically significant difference is established in the continuous variable this takes advantage of the power associated with level of measurement. So, sometimes differences for medians are significant when differences for categories in cross tabulations are not significant, although, in the examples given here, the latter always approach significance. In an exploratory study we are entitled to pay attention to details of this kind as indications of important factors for policy and practice development.

[5] Kruskal-Wallis non-parametric analysis of variance is appropriate for establishing significance when examining the relationship between a categorical and ordinal variable but cross tabulation, although it loses some power, actually enables us to see patterns more clearly.

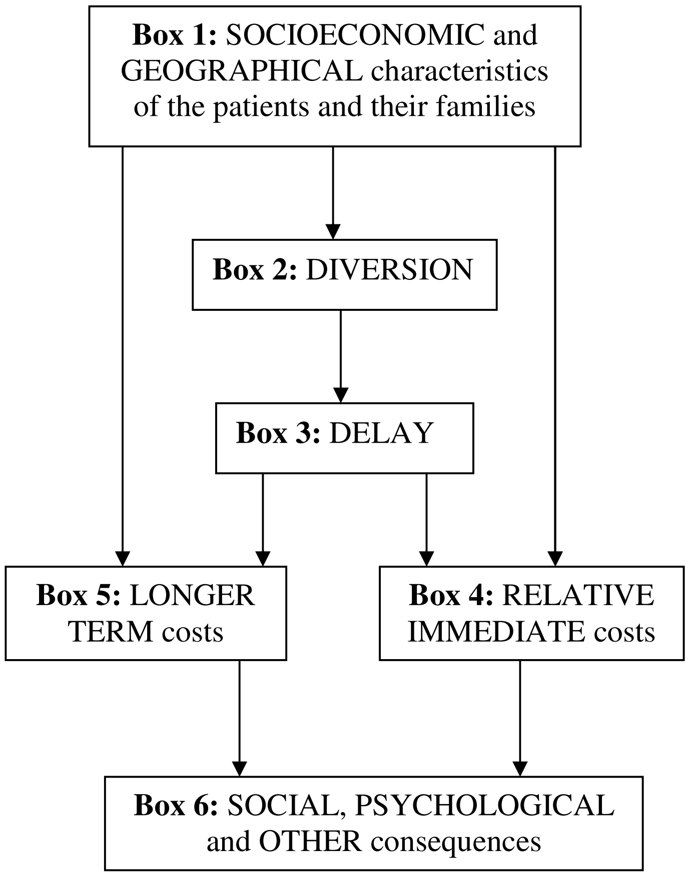
Chapter 09: Conclusions and Recommendations

This study addressed the following research questions -

1. What is the nature of diversion and what attributes of patients and their households are associated with diversion?
2. What are the attributes of patients and their households, and what are the health care seeking behaviours of patients, which are associated with delay, and in particular with delays greater than that specified as acceptable by the Bangladesh Tuberculosis Control Programme?
3. What are the tangible and intangible costs, both during the Tuberculosis episode and in the longer term, incurred by patients and their households as a consequence of an episode of Tuberculosis and what are the attributes of patients and their households which are associated with variation in these costs and with the longer term impact of a Tuberculosis episode?

This is a study in Applied Social Science and the whole point of this exercise is to inform the development of policy interventions through relevant and appropriate recommendations which are useful to the relevant programme implementing agencies. It is the first study of the experience of Tuberculosis carried out across the whole of Bangladesh. Bangladesh is one of the world's largest countries in terms of population but is remarkably homogenous with the great majority of its people being Muslim Bengalis. It is a predominantly rural country where more than 90 percent of people live in rural areas but there are also some mega cities where poor and rich people live side by side. Tuberculosis is a huge burden in Bangladesh and control of it through enrolling infected cases under proper treatment as quickly as possible is a public health priority. Diversion from that enrollment is a public issue in terms of the continued presence of infectious cases in the community which leads to transmission to new cases. It is an issue for patients and their households in relation to the actual costs of a TB episode and, for some, in its consequences for their economic future. So, a key *original* feature of this study is its focus not simply on the duration of delay but also on the diversion process which is causal to delay. The identification of the nature of diversion is crucial for development of evidence as a basis for the formulation of policy and practice. In this conclusion it is useful to return to the *Figure-5.8* presented in *Chapter-5* which outlined the actual causal processes in relation to delay, costs, and longer term economic implications of an episode of Tuberculosis. Note that this diagram has been modified in relation to the actual findings of this exploratory study. That is to say the way in which longer term economic implications are primarily a consequence of original economic position of households is now indicated in it.

Figure 9.1: Modified framework of causality based of study findings in relation to elements of the experience of Tuberculosis episode.



9.1. Conclusions

All the findings of this study, as I have stated in the introduction to this thesis and in my discussion of methodology and methods, have been interpreted in the light of my own 15 years' experience as a Public Health practitioner focusing on Tuberculosis control and the same applies to the framing of the conclusions presented here. I will begin with a reference back to the actual methods employed in interpreting the findings and how those methods have been deployed to answer the key research and practice questions.

9.1.1. Exploration of patterns through banding.

A very important part of my task has been the identification of details in terms of how the attributes of patients and their households relate to all of: diversion, delay, immediate costs, social consequences, and longer term economic consequences. This requires an attention to detail which would be lost if for example I simply modeled delay against costs treating both as continuous variables. Instead I have broken these variables into categories. Sometimes the categories are conventional as with income deciles and age bands. Sometimes the category is a consequence of administrative definition as with unacceptable delay defined as delay of more than 30 days. Sometimes I have simply banded a variable, for example costs, in an appropriate fashion. By looking at these 'broken up' continuous variables and the relationships among them through cross tabulation and binary logistic regression I have been able to identify 'significant components' in relation to all the issues of interest for this study. We find that often it is not the attribute overall which is significantly related to something of practice and policy significance or substantive scientific interest, for example unacceptable delay or real decline in household income in the longer term. Instead we find some of the categories within the continuous attribute are significant. Identifying these 'components' of continuous attributes is vitally important both for understanding complex and interactive causality and for developing policies and practices for deployment in a targeted fashion. Banding makes this possible.

9.1.2. Patients socioeconomic status

This study was conducted on a sample drawn from representative localities across Bangladesh. The sample included 707 smear-positive and negative pulmonary tuberculosis cases in both urban and rural settings that have had full treatment under the modern tuberculosis treatment strategy - Directly Observed Treatment Short-course (DOTS). Overall, the socioeconomic characteristics of the sample revealed that most of the cases were of young productive age groups and of low socioeconomic. Comparison of sample and national socio-demographic and economic data demonstrated that Tuberculosis is a disease of poor people in Bangladesh which is a poor country. However, it is not confined to the disease of poor. Because of its infectious capacity it can also reach other social groups and this is particularly true in urban areas where people are in close contact across the social spectrum.

9.1.3. Diversion

As demonstrated in the *Figure-9.1(Box-2)*, diversion (the exploration of the first research question) is the primary process which leads to delay and increased costs. Diversion through contacting multiple health providers multiple times was the main cause of extended and unacceptable delay. Patient's socio-demographic attributes, knowledge about Tuberculosis, and health care seeking behaviours all had significant associations with extended delay. People with Tuberculosis generally visited health practitioners who were local and known to them in some way as their first point of contact when seeking health care. Normally the rural people contacted the village doctors available on their doorsteps and the qualified private providers were contacted by the urban people. The village doctors are mainly unqualified and not able to diagnosis Tuberculosis. The initial symptoms of Tuberculosis are almost similar to the common cold and cough and other self-limiting respiratory infections. Rural patients contacted unqualified health providers based on their previous experience of them and / or their reputation with neighbours and family. People also visited them because they are cheap, convenient, easy to access, have low and flexible charges and because travel to Upzilla level facilities is difficult and expensive. Qualified practitioners are concerned with maximizing their own incomes and lots of them even do private practice work during time which should be devoted to the public health system. This enhances diversion. Female patients, given cultural constraints on independent out of community mobility and their perceived lesser economic contribution were particularly likely to seek treatment from unqualified local providers, particularly in rural areas. Divorced and widowed female patients, (divorce sometimes being a consequence of the Tuberculosis episode), were particularly liable to divert in this way, especially in rural areas. Even in urban areas similar processes where in play although difficulty of travel to distant TB focused services was not an issue. However, there is no primary public health structure in urban areas and lots of people did not know about the specialized public Tuberculosis treatment facilities. This means lack of knowledge and unavailability of public health facilities played an important role in diversion in urban areas.

Higher income group and urban patients were more likely to make first contact with qualified private practitioners making charges and linked with private diagnostic facilities which are also costly. Urban patients also tended to make first contact with providers previously known to them. So, it is clear that the lack of knowledge regarding Tuberculosis, availability and functionality of health facilities and social circumstances all played an important role in *diversion* indicating the need for increased public education and awareness campaigns.

9.1.4. Delay

The study has explored different delays associated with Tuberculosis episode as per the second research question. The found mean and median total delays of 99.32 and 60 days respectively and 42.5 percent of the weighted cases reported delays of more than two months before commencing proper anti-tuberculosis treatment. As indicated in *Figure-9.1(Box-3)*, delay was the product of diversion. So in fact exploring total delay and the delay over 30 days, we are actually exploring the factors which cause diversion. The key issue is diversion to providers who are inappropriate in relation to delivery of effective treatment. Moreover, divorced and widowed patients also experienced higher delay durations on account of their personal and social vulnerability. So the key focus here is on delay, and in particular on delays of more than 30 days as per the Bangladesh TB controls system's specification of acceptable delay. Diversion is the source of delay and diversion is a consequence of interactions between patients and inappropriate providers. This study has identified the nature of this interactive process, highlighted the attributes of patients and their families which contribute to it, and thereby provides us with evidence to inform interventions directed at reducing delay and hence infectivity in the community and costs to patients and their households.

9.1.5. Costs

As demonstrated in *Figure-9.1(Box-4 and 5)*, the diversion / delay imposes a significant economic burden on patients and their families in terms of immediate and, for some, longer term costs. The study has explored different costs associated with Tuberculosis episode as per the third research question. The lion's share of the expenditures occurs before the patient is actually diagnosed and started on proper anti-tuberculosis therapy. Overall, the study demonstrated mean and median total costs of US$321.11 and 195.15 respectively and these were 395.36 and 300.24 percents respectively of WHICH family income before illness. Higher costs related to higher delay duration, in part as a function of payments to inappropriate providers, in part as a consequence of lost economic activity, and in part in relation to other expenditures incurred. Overall, male and lower family income group patients had experienced higher direct, indirect and total costs as percentage of monthly family income before illness. So avoidable costs represent a huge burden for the poor patients and their families but they recovered economically by re-engaging themselves into income generating activities rather quickly. Divorced patients' especially the females had experienced significantly higher costs as percentage of family income and for this category a higher percentage saw family income also reduced after completion of treatment which indicated both immediate and long term suffering.

Longer term costs

As demonstrated in *Figure-9.1(Box-5)*, the study also found some very interesting findings in relation to family income change after completion of treatment as higher income group patients suffered economically more in the longer term in comparison to poorer patients. Poorer patients in a poor country were able to get back to what was always a low level of income. Those patients with higher incomes were more likely to experience a disruption to career and income earning capacity with longer term consequences. This pattern was particularly marked in urban areas. A significantly higher percentage of male patients' family incomes decreased as they were the main breadwinner of the family. Farmers' family incomes increased due to the rapid increase of rice prices. Conversely, higher income group patients are mainly urban based professionals and waged workers and unfortunately the higher income groups reported less to the public health facilities. Attention must be paid to getting these groups quickly into contact with the effective public treatment system.

9.1.6. Other consequences

Figure-9.1(Box-6) indicates the significance of patients' inability to perform their normal activities or work and reduction of their work time as an immediate consequence of tuberculosis. As a result patients lost their personal income and family income was reduced, especially if the patient was the main bread earner of the family. Female patients became unable to take care of their family properly especially the children. Some patients also experienced dwelling changes and changes in personal occupation. Some patients retired permanently and some shifted to lower income professions. Sometimes patients and their families also faced teasing and social negligence especially the poor and rural patients.

9.1.7. Coping strategies

During the Tuberculosis episode poorer households were more adversely affected. Richer families mobilized their savings or borrowed from their friends to tackle their economic loss during the disease period and the larger families engaged extra manpower in income generation to maintain the income flow. Some poorer families lost their land and other fixed assets as they had no savings to mobilize to maintain their daily life expenditures. Poorer patients tended to live in nuclear families and particularly for males their Tuberculosis had a negative impact.

From the above discussion it is clear that *diversion* causes *delay* and delay causes huge unnecessary *cost* burdens as these components are linked like a chain. Diversion is a social process associated with lack of knowledge about the disease and lack of knowledge about proper treatment facilities coupled with the nature of engagement with inappropriate health providers. It is this engagement with inappropriate health providers which is the crucial factor in delay. In turn delay imposes costs on patients and their families, both in direct costs for health care and in very large indirect costs in terms of forgone earnings etc. Understanding the patient-related economic impact and social burden is important in recognizing the true impact of tuberculosis and in designing appropriate policy interventions to maximize prompt early case finding so as to reduce the total pre-treatment delay, transmission of the disease, economic loss and social suffering faced by the patients and their families.

9.2. Recommendations

In this section, first I am going to outline evidence based policy formulation. Then I will make policy recommendations based on the study findings as interpreted in relation to my expertise as public health manager. The intention is to deploy the findings of this study to develop policy and practice.

9.2.1. Evidence based policy

Evidence based policy has been defined as an approach that helps people make well informed decisions about policies, programmes and projects by putting the best available evidence from research at the heart of policy development and implementation (Davies, 1999). However, all research does not produce a sufficient quality of evidence which is crucial to form the basis of sound policy making (Davies et al., 2000). So evidence based policy requires a more systematic approach to searching for appropriate evidence, the identified critical appraisal of study and a clear understanding of what the research evidence is saying and of its strengths and weaknesses (Davies, 2003). In other words, evidence-based policy is a rigorous approach that draws on careful data collection, experimentation, and analysis to answer the questions of exact nature of the problem, possible ways to address the problem and the probable impacts and costs of each (Dunworth et al., 2008). But, policy making is also influenced by other factors in addition to evidence such as the experience, expertise and judgment of decision makers. These factors often constitute valuable human and intellectual capital and include the tacit knowledge that has been identified as an important element of policy making although they may not be based on sound evidence (Nutley at al., 2003). Consequently, a major goal of evidence based policy is to ensure that policy making integrates the experience, expertise and judgment of decision makers with the best available external evidence from systematic research. Here as someone who is both researcher and experienced practitioner I am seeking to combine these elements in my discussion of development of proposals.

9.2.2. Policy recommendations

The implication of my findings is the engagement of different stakeholders – patients and the private practitioners visited by them during the process which constitute diversion is crucial for the Tuberculosis control programme. Diversion happens because Tuberculosis patients seek health care in the wrong place and those from whom they seek health care to not redirect them promptly to the proper location for effective treatment.

In addressing diversion the first element is that strategies should be implemented to increase public awareness about tuberculosis with an emphasis on description of symptoms and routes of transmission. Publicity must be give about the available tuberculosis services including the locations of nearby treatment units and the availability of free access to diagnosis and treatment so as to encourage symptomatic individuals to self report early to the nearby NTP recognized health facilities. Therefore the following recommendations are made addressed to the respective policy makers as a basis for a public awareness and behavioral change campaign-

- Enhance the use of mass media (Radio and television) through reality based popular drama or comedy shows to pass the message regarding tuberculosis signs and symptoms, the availability of free diagnosis and treatment, the bad effects of delay in terms of economic and social consequences, physical sufferings and social stigmas.
    - Supporting findings:

      ○ Only 4.2 per cent of weighted cases used public health facilities as their first contact (Source: Chapter-07, page-178).

      ○ Lots of people were not aware about the sign and symptoms about the Tuberculosis disease and proper treatment facilities (Source: Chapter-07, page-179 and 180).

      ○ People have misconception like *heredity*, *disease of king*, etc. about Tuberculosis disease enhance higher delay (Source: Chapter-07, page-184).

      ○ Patients' less trust on public/NGO treatment facilities (Source: Chapter-07, page-183)

- Disseminate tuberculosis message using regional/local popular folk themes at the weekly community market place.

- Supporting findings:

○ Rural people had less knowledge regarding Tuberculosis disease and proper treatment facilities than urban people (Source: Chapter-07, page- 179).

○ Rural patients were more likely to contact village doctors (Source: Chapter-07, page- 179).

○ Rural people has less access to the mass media especially Television (Source: Practical experience).

- Engage and encourage local governments to post information on the symptoms of tuberculosis and locally available treatment facilities in different locations in rural areas.

- Supporting findings:

○ Same as above

- Use mobile networks to disseminate message regarding tuberculosis symptoms and free treatment facilities.

- Supporting findings:

○ There is a mobile revolution recent times which may help to discriminate Tuberculosis related messages especially to the higher income groups (Source: Practical experience)

Awareness development and behavioral change in the community is a long term process. The patients will continue to contact the private practitioners as they convenient, less costly and closely available in the community especially in the rural areas and this causes huge delay duration. So it is important to interrupt this chain in some way. Therefore the second key focus should be on private practitioners so as to engage them in the programme because they are the key interrupters and their role here is income driven. The following recommendations are addressed to the respective policy makers so as to encourage the private practitioners to refer the suspected Tuberculosis patients to appropriate treatment facilities, especially in rural areas:

- Arrange awareness and education forums on a regular basis so as to increase their awareness of and initial diagnostic capability in relation to Tuberculosis.

    - Supporting findings:

      ○ Higher proportion of rural people contacted unqualified village doctors (Source: Chapter-07, page-179)

      ○ Female patients contacted more unqualified providers than males (Source: Chapter-07, page-178)

- Establish a clear policy that regulates the relations between different private practitioners and formal NTP services and stress early referral of tuberculosis suspects as well as diagnosed cases to the nearby NTP recognized proper anti-tuberculosis treatment unit.

    - Supporting findings:

      ○ People contacted on an average 2.28 private health providers with the range of 1 to 5 providers before enrolling proper Tuberculosis treatment facilities (Source: Chapter-07, page-178)

- Consider the provision of some financial incentive to private practitioners to refer possible Tuberculosis to NTP facilities within less than a 30 days period from first contact with suspected patients.

    - Supporting findings:

      ○ Health providers case holding tendency of average of 6.5 contacts over this period due to inability to diagnose and their income driven case holding tendency (Source: Chapter-07, page-178).

      ○ Patients' contact with higher number of providers and higher number of contacts significantly related to higher pre-treatment delay (Source: Chapter-07, page-195) and higher total costs (Source: Chapter-08, page-234).

In urban areas people have more access to the mass media which may enhance self awareness. Nonetheless the absence of public health services means they are more likely to engage with qualified private practitioners in the first instance. Therefore, a referral mechanism needs to be developed between the urban private practitioners and the programme and this issue requires further study. The concept of 'notifiable disease' – that is diseases where there is a legal obligation in qualified practitioners to inform public health authorities of cases of the condition, may be of relevance here.

- Supporting findings:

  ○ Urban patients contacted more qualified health providers than rural from the beginning of their Tuberculosis episode (Source: Chapter-07, page-179).

Tuberculosis patients suffer economically during the Tuberculosis episode and the key factor in reducing this is to reduce delay through eliminating diversion. During the episode the higher costs relative to household incomes were experienced by the poorer patients and their households. In the longer term this study has presented an important finding in relation to longer term economic impact which is surprising but interesting. The finding was not necessarily as expected of a worse long term impact on poorer patients. To the contrary it was the households of higher income patients who were more likely to be experiencing a negative economic impact in the longer term. These patients were more likely to have diverted through engagement with qualified private parishioners. So mechanisms need to be developed to bring them into the public/NGO Tuberculosis treatment system as early as possible, in order to reduce the duration of the episode and its potential damaging consequences in the longer term.

- Mobilize the higher income group patients using mass media communication to quick self reporting.

  - Supporting findings:

    ○ Higher income groups has more access to the mass media especially Television. Urban people who mainly belong to higher income groups have also access to print media (Source: Practical experience).

- Although Tuberculosis is primarily a disease of the poor the presence of a pool of infective people, particularly in urban areas, exposes the more affluent to the disease. They both should be treated as quickly as possible and can be mobilized through an awareness of their own risks in terms of health and economic position to support the whole control programme.

- Supporting findings:

  ○ Tuberculosis patients untreated in the community create more patients due to repeated exposure (Source: Practical experience and epidemiological evidence on the natural history of the disease)

Female patients especially the poor and divorced/separated group patients felt vulnerable about sharing their problem in the community and sometimes neighbours and family members reject them due to negative public attitudes regarding Tuberculosis. The most devastating consequence was separation or divorce and female patients were the main sufferers. So the following strategies may constructed to increase public awareness and reduce the sufferings of this vulnerable group -

- Introduce and enhance health and community education during the initiation of treatment so as to reduce local social stigma. There should be a focus on the needs of female patients.

  - Supporting findings:

    ○ Patients and their families faced various social and psychological consequences. A higher proportion of rural patients faced social negligence and teasing. Female patients faced humiliation and temporary or permanent separation (Source: Chapter-08, page-251 and 252).

- Mobilize local government to sanction the availability of vulnerable group development (VGD) cards for the vulnerable poor especially the females.

  - Supporting findings:

    ○ Divorced and widowed patients (majority of them are rural female) experienced higher delay durations (Source: Chapter-07, page-201) and as a result higher costs as percentage of their family income (Source: Chapter-08, page-232).

- Develop a partnership between Tuberculosis treatment and control and NGOs working on female rights so as to address the issues of separation and divorce.

- Supporting findings:

○ Female patients faced humiliation by their husband and in-laws and more devastating of temporary or permanent separation (Source: Chapter-08, page-251)

9.3. Study contributions

This study has developed the applied social science of Tuberculosis control beyond the existing literature in the following ways:

Overall

The detailed account developed of the nature of diversion and of the attributes of patients and their families which contribute to diversion is the primary contribution made by this study, both generally and in the specific context of Bangladesh. Previous studies have reported on some of the elements of diversion as contributing factors to delay but have not engaged with either the full set of attributes of patients and households in relation to delay – having addressed gender of patients but not other attributes – or with the detail of engagement with inappropriate providers. Previous studies have also not addressed the total costs of the Tuberculosis episode to the patients and their households, particularly in relation to care giver’s costs. Caregivers play an important role throughout a Tuberculosis episode and their care for patients’ results in costs from loss of work time and earnings. So the calculation of caregivers’ professional time loss and loss of earnings is another contribution of this study. Previous studies have focused only on the immediate cost burden of Tuberculosis. The calculation of family income change and exploration of associated contributing factors is another original contribution of the study. Previous studies addressed some aspects of this but none explored the details of occupational change and change in dwelling location.

National

The study has explored issues which have general significance in relation to our understanding of the issues surrounding Tuberculosis control but of course it has been conducted in a specific context in a very large country where Tuberculosis is a major public health problem. Whilst is has made original contributions generally as indicated above, its primary focus has been on Bangladesh itself, taking into account country context and interpreting findings in the light of my general knowledge based on my own professional experience.

In Bangladesh there have previously been only two small studies conducted to identify delay in relation to Tuberculosis. One was carried out in rural Upazilas near the capital city and another in the rural Upazilas of North Bengal. One small scale study on the economic impact of Tuberculosis was conducted in an NGO clinic in the Northern part of Bangladesh. So this is the first countrywide representative large scale study of delay and economic impact related to Tuberculosis episodes in both rural and urban areas. Moreover, both previously conducted delay studies dealt only with gender issue as a contributing factor to delay. So this the first study in Bangladesh which analyzed other significant socioeconomic and health seeking behaviour factors in relation to delay. The previous economic impact study only calculated the pre-treatment costs and did not analyze social and psychological consequences. So this is the first study in Bangladesh to explore all forms of costs and significant socioeconomic and health factors and to explore the social consequences of a Tuberculosis episode.

9.4. Strengths and Weakness of the study

The current study has potential strengths and weakness which described below.

9.4.1. Strengths of the study

► The main strength of this study is the sampling technique and sample size. It is a large scale national study across the whole country organized in a proper systematic way to achieve a representative sample of 707 cases. National socio-demographic census and tuberculosis secondary data were used to construct a multi-stage sample and achieve a sample representative of Bangladesh as a whole.

►This is the first original study which systematically explores the social processes involved in diversion and the attributes of patients and their households in relation to diversion. Epidemiological studies have studied delay but they have not actually conceptualized diversion and explore the details of diversion as has been done here.

►Nearly 86 percent of interviews were conducted by the researcher himself. This reduces interviewer's perception bias and strengthens the quality of the data.

►The study has been able to relate diversion to delay and delay to the costs. Moreover, total pre-treatment delay and total costs and consequences as experienced by the patients were calculated based on patient's response. That is to say the study generated real rather than estimated measurements of delay and costs.

9.4.2. Weaknesses of the study

► The major problems of multistage designs is that the study sample might not be representative of the study population. In order to overcome this limitation, the number of clusters was increased in the first stage (selection of Upazilas).

► Estimates of loss of productivity and income are inevitably approximate, especially for occupations such as household work, where the product cannot easily be measured in financial terms.

► The measurements of different pre-treatment periods depended on patients' recalls, which might be imprecise and liable to recall bias. In fact, very specific measurements of the pre-treatment periods are almost impossible due to the absence of concrete patients' records. To minimize this problem, questions about the onset of the major symptoms and how long after these symptoms they consulted a health provider were specifically asked. Moreover, the local calendar listing of the main religious and national events was used to estimate the date of onset of symptoms.

►Different costs reported by patients in this retrospective study may have been also biased due to patients' failure to recall certain expenditures or the time spent in seeking care. We would expect in most cases that this type of recall bias would lead to an underestimation of patient costs. Given the sufficiently detailed assessment of unit costs, the cost estimates represent a relatively reliable distribution of costs between patients.

► The family income change after completion of treatment was compared with the national statistics on a small scale due to unavailability of appropriate detailed national survey data during the study period.

Chapter 04: Economic Impact and Consequences of Tuberculosis

Annex 4.1: Country wise different costs classification table in US$ experienced by the patients in the whole Tuberculosis episode.

Country	Pretreatment cost		During treatment cost		Direct cost	
	Direct	Indirect	Direct	Indirect	Medical	Non-medical
Zambia (urban)	9.34	8.31	0.00	7.13	3.89	5.45
Malaysia (rural)	-	-	608.12	118.78	0.00	608.12
Malawi (urban)	-	-	13.16	15.81	7.69	5.47
India (rural)	19.42	21.13	5.04	18.33	-	-
Bolivia (urban)	13.2	-	-	-	13.2	-
Tanzania (urban)	-	-	-	-	19.0-52.4	13.4-20.1
India (rural & urban)	-	-	-	-	33.86	24.77
Thailand (rural & urban)	76.56	-	37.70	-	-	-
Bangladesh (rural)	-	-	-	-	129.5	0.75
Zambia (urban)	55.5	69.00	-	-	12.0	43.5
Kenya (urban)	-	-	-	-	140	150
India (rural & urban)	-	-	-	-	39.79	10.38

Annex 5.1: Three clusters of Upazilas (rural) as per socio-demographic characteristics of the patients

Socio-demographic variables		Cluster 1	Cluster 2	Cluster 3	Outlier (-1)	Combined
Upazila population density per squire kilometer	Mean	1136.42	762.68	675.53	6622.50	922.10
	Std. Deviation	485.15	292.25	319.32	3028.51	589.31
Literacy rate of the Upazila	Mean	50.06	40.09	34.08	56.25	43.13
	Std. Deviation	8.717	6.88	6.85	3.61	9.78
Total fertility rate of the Upazila	Mean	4.02	3.99	4.84	2.44	4.14
	Std. Deviation	0.67	0.72	0.85	0.04	0.79
Crude death rate of the Upazila	Mean	5.32	4.24	7.32	3.57	5.17
	Std. Deviation	1.35	0.78	2.47	0.08	1.77
Infant mortality rate of the Upazila	Mean	67.57	54.17	92.78	45.50	65.82
	Std. Deviation	16.70	9.655	31.374	.707	22.21
Percentage of household structure- Jhupri	Mean	7.34	6.18	20.80	4.75	9.04
	Std. Deviation	4.95	3.93	11.71	3.22	8.15
Percentage of household structure- Kacha	Mean	78.31	84.61	72.54	52.35	79.98
	Std. Deviation	11.84	8.13	11.50	20.43	11.38
Percentage of household income from agriculture	Mean	26.09	42.27	40.90	2.72	35.45
	Std. Deviation	10.57	8.11	9.50	1.05	12.33
Percentage of household income from employment	Mean	11.86	5.32	4.04	29.38	7.81
	Std. Deviation	6.17	2.27	1.62	0.47	5.60
Percentage of household income from business	Mean	16.72	11.29	10.32	24.39	13.34
	Std. Deviation	4.23	2.85	3.33	1.29	4.56
Percentage of household income from agricultural labour sell	Mean	17.55	25.85	25.35	2.97	22.37
	Std. Deviation	6.46	5.76	5.37	1.06	7.29
Number of Upazilas		183 (39.7%)	200 (43.4%)	76 (16.5%)	2 (0.4%)	461 (100%)

Annex 5.2: Rural socio-demographic cluster wise Upazila list

Socio-demographic cluster 1	Socio-demographic cluster 2	Socio-demographic cluster 3
1. Dinajpur Sadar	1. Atwari	1. Dimla
2. Hakimpur	2. Boda	2. Kishorganj
3. Sayedpur	3. Debigonj	3. Bhurungamari
4. Rangpur Sadar	4. Panchagarh Sadar	4. Nageshwri
5. Adamdighi	5. Tetulia	5. Fulchari
6. Bogra Sadar	6. Thargoan Sadar	6. Sundarganj
7. Shajanpur	7. Baliadangi	7. Shibganj
8. Naogaon Sadar	8. Haripur	8. Chauhali
9. Nawabganj Sadar	9. Pirgonj	9. Sarsa
10. Belkuchi	10. Ranisankail	10. Hizla
11. Kamarkhanda	11. Birol	11. Burhanuddin
12. Kazipur	12. Birampur	12. Char Fasson
13. Raygonj	13. Birganj	13. Lalmohan
14. Shahjadpur	14. Bochaganj	14. Tajumuddin
15. Sirajgonj Sadar	15. Chiribandar	15. Dahsmina
16. Ullapara	16. Fulbari	16. Galachipa
17. Bera	17. Ghoraghat	17. Kalapara
18. Iswardi	18. Kaharol	18. Amtali
19. Pabna Sadar	19. Khansama	19. Barhatta
20. Kumarkhali	20. Nowabganj	20. Durgapur
21. Kushtia Sadar	21. Parbatipur	21. Kalmakanda
22. Chuadanga Sadar	22. Domar	22. Modan
23. Damurhuda	23. Jaldhaka	23. Dhubaura
24. Jiban Nagar	24. Nilphamari Sadar	24. Fulbaria
25. Magura Sadar	25. Aditmari	25. Gauripur
26. Mohammadpur	26. Hatibanda	26. Haluaghat
27. Lohagara	27. Kaligonj	27. Ishwarganj
28. Abhaynagar	28. Lalmonirhat Sadar	28. Muktagacha
29. Jessore Sadar	29. Patgram	29. Nandail
30. Debhata	30. Bodorgonj	30. Phulpur
31. Satkhira Sadar	31. Gangachara	31. Trisal
32. Digholia	32. Kownia	32. Nakla
33. Fultala	33. Mithapukur	33. Nalitabari
34. Paikgacha	34. Pirgacha	34. Sherpur Sadar
35. Rupsa	35. Pirganj	35. Sreebardi
36. Terokhada	36. Taraganj	36. Dewanganj
37. Bagerhat Sadar	37. Chilmari	37. Islampur
38. Chitalmari	38. Fulbari	38. Astogram
39. Fakirhat	39. Kurigram Sadar	39. Itna
40. Kachua	40. Rahumari	40. Mithamoin
41. Mollahat	41. Rajibpur	41. Tarail
42. Mongla	42. Razarhat	42. Bishambarpur
43. Morelganj	43. Ulipur	43. Chatak
44. Rampal	44. Gaibandha Sadar	44. Dharampasha
45. Sarankhola	45. Gobindaganj	45. Dirai
46. Bhandaria	46. Palasbari	46. Dwarabazar
47. Kawkhali	47. Sadullapur	47. Jagannathpur
48. Matbaria	48. Shaghata	48. Jamalganj

Socio-demographic cluster 1	Socio-demographic cluster 2	Socio-demographic cluster 3
49. Nazirpur	49. Akkelpur	49. Sulla
50. Nesarabad	50. Jaipurhat Sadar	50. Sunamganj Sadar
51. Pirojpur Sadar	51. Kalai	51. Tahirpur
52. Jhalakati Sadar	52. Khetlal	52. Companiganj
53. Kathalia	53. Panchbibi	53. Gowaingath
54. Nalchiti	54. Dhunot	54. Jointiapur
55. Rajapur	55. Dupchachia	55. Kanairghat
56. Agoiljhara	56. Gabtali	56. Kulaura
57. Babuganj	57. Kahalu	57. Rajnagar
58. Bakerganj	58. Nandigram	58. Bahubal
59. Banaripara	59. Shariakandi	59. Baniachang
60. Barisal Sadar	60. Sherpur	60. Chunarughat
61. Gournadi	61. Sibganj	61. Lakhai
62. Mehendiganj	62. Sonatola	62. Madhabpur
63. Muladi	63. Atrai	63. Ramgati
64. Uzirpur	64. Badalgachi	64. Hatiya
65. Bhola S.	65. Dhamoirhat	65. Banskhali
66. Daulatkhan	66. Mahadebpur	66. Chakaria
67. Bawphal	67. Manda	67. Coxs Bazar Sadar
68. Mirzaganj	68. Niamatpur	68. Kutubdia
69. Patuakhali Sadar	69. Patnitala	69. Moheshkhali
70. Bamna	70. Porsha	70. Ramu
71. Barguna Sadar	71. Raninagar	71. Teknaf
72. Betagi	72. Shaparar	72. Ukhia
73. Patharghata	73. Bagatipara	73. Dighinala
74. Gafargaon	74. Baraigram	74. Ramgar
75. Mymensingh Sadar	75. Gurudashpur	75. Nakhyangchari
76. Pakundia	76. Lalpur	76. Ruma
77. Tangail Sadar	77. Natore Sadar	
78. Bajitpur	78. Singra	
79. Bhairab	79. Bholahat	
80. Karimganj	80. Gomostapur	
81. Katiadi	81. Nachole	
82. Kishoreganj Sadar	82. Charghat	
83. Kuliarchar	83. Durgapur	
84. Manikganj Sadar	84. Godagari	
85. Dohar	85. Mohanpur	
86. Keraniganj	86. Paba	
87. Nawabganj	87. Putia	
88. Savar	88. Tanora	
89. Gazipur Sadar	89. Bagha	
90. Kaligonj	90. Bagmara	
91. Kaliakar	91. Tarash	
92. Kapasia	92. Atgharia	
93. Sreepur	93. Chatmohar	
94. Belabo	94. Faridpur	
95. Narsinghdi Sadar	95. Santhia	
96. Polash	96. Sujanagar	
97. Raipura	97. Vangura	
98. Shibpur	98. Bheramara	
99. Araihazar	99. Daulatpur	

Socio-demographic cluster 1	Socio-demographic cluster 2	Socio-demographic cluster 3
100. Rupganj	100. Khoksha	
101. Sonargaon	101. Mirpur	
102. Gazaria	102. Gangni	
103. Lohajang	103. Meherpur Sadar	
104. Munshiganj Sadar	104. Alamdanga	
105. Serajdikhan	105. Harinakunda	
106. Sreenagar	106. Jhenaidah Sadar	
107. Tongibari	107. Kaliganj	
108. Alfadanga	108. Kotchandpur	
109. Bhanga	109. Moheshpur	
110. Faridpur Sadar	110. Sailakupa	
111. Goalanda	111. Salikha	
112. Rajbari Sadar	112. Sreepur	
113. Gopalganj Sadar	113. Kalia	
114. Madaripur Sadar	114. Narail Sadar	
115. Damudya	115. Bagerpara	
116. Naria	116. Chougacha	
117. Shariatpur Sadar	117. Jhikorgacha	
118. Balaganj	118. Keshobpur	
119. Beani Bazar	119. Monirampur	
120. Biswanath	120. Ashasoni	
121. Fenchuganj	121. Kalaroa	
122. Golapganj	122. Kaliganj	
123. Sylhet Sadar	123. Shyamnagar	
124. Zakiganj	124. Tala	
125. Baralekha	125. Batiaghata	
126. Kamalganj	126. Dacope	
127. Moulvibazar Sadar	127. Dumuria	
128. Sreemangal	128. Koira	
129. Ajmiriganj	129. Monpura	
130. Habiganj Sadar	130. Atpara	
131. Akhaura	131. Kendua	
132. Bancharampur	132. Khaliajuri	
133. Brahmanbaria Sadar	133. Mohanganj	
134. Kashba	134. Netrakona Sadar	
135. Nabinagar	135. Purbodhola	
136. Barura	136. Bhaluka	
137. Brahmanpara	137. Jhinaigati	
138. Burichang	138. Bokshiganj	
139. Chandina	139. Jamalpur Sadar	
140. Chauddagram	140. Madarganj	
141. Comilla Sadar	141. Melandaha	
142. Daudkandi	142. Sharishabari	
143. Dewidwar	143. Basail	
144. Homna	144. Bhuapur	
145. Laksam	145. Delduar	
146. Muradnagar	146. Ghatail	
147. Nagalkot	147. Gopalpur	
148. Chandpur Sadar	148. Kalihati	
149. Faridgonj	149. Madhupur	
150. Haziganj	150. Mirzapur	

Socio-demographic cluster 1	Socio-demographic cluster 2	Socio-demographic cluster 3
151. Kachua 152. Matlab 153. Shahrashti 154. Lakshmipur Sadar 155. Raipur 156. Ramgonj 157. Begumganj 158. Chatkhil 159. Companiganj 160. Noakhali Sadar 161. Senbag 162. Chhagalnaiya 163. Daganbhuiyan 164. Feni Sadar 165. Parshuram 166. Sonagazi 167. Anwara 168. Boalkhali 169. Chandanaish 170. Fatikchari 171. Hathazari 172. Lohagara 173. Mirsharai 174. Potiya 175. Rangunia 176. Rauzan 177. Sandwip 178. Satkania 179. Sitakunda 180. Khagrachari Sadar 181. Kaptai 182. Rangamati Sadar 183. Bandarban Sadar	151. Nagarpur 152. Shakhipur 153. Hossainpur 154. Nikli 155. Daulatpur 156. Ghior 157. Harirampur 158. Saturia 159. Sibalaya 160. Singair 161. Dhamrai 162. Monohardi 163. Boalmari 164. Charbhadrasan 165. Modhukhali 166. Nagarkanda 167. Sadarpur 168. Baliakandi 169. Pangsa 170. Kasiani 171. Kotalipara 172. Muksudpur 173. Tungipara 174. Kalkini 175. Rajoir 176. Sibchar 177. Bhedarganj 178. Goshairhat 179. Zanjira 180. Nabiganj 181. Nasirnagar 182. Sarail 183. Haimchar 184. Laksmichari 185. Manikchari 186. Matiranga 187. Mohalchari 188. Panchari 189. Baghaichari 190. Barkal 191. Beliachari 192. Jurachari 193. Kawkhali 194. Langadu 195. Naniarchar 196. Rajasthali 197. Alikadam 198. Lama 199. Rowangachari 200. Tanchi	

Annex 5.3: Two Upazila (rural) tuberculosis clusters as per new smear positive tuberculosis case detection rate

Tuberculosis variables		Cluster		
		1	2	Combined
Case detection rate of new smear positive cases in 2006	Mean	45.23	85.59	70.91
	Std. Deviation	11.79	18.23	25.29
Total Upazila		167 (36.4%)	292 (63.6%)	459 (100%)

Annex 5.4: Rural tuberculosis cluster wise Upazila list

Low Tuberculosis (1)		High Tuberculosis (2)	
1. Atwari	85. Dhubaura	1. Debigonj	147. Bhaluka
2. Boda	86. Fulbaria	2. Ranisankail	148. Ishwarganj
3. Panchagarh Sadar	87. Gafargaon	3. Birol	149. Mymensingh S.
4. Tetulia	88. Gauripur	4. Birampur	150. Phulpur
5. Thargoan Sadar	89. Haluaghat	5. Birganj	151. Trisal
6. Baliadangi	90. Muktagacha	6. Bochaganj	152. Jhinaigati
7. Haripur	91. Nandail	7. Dinajpur Sadar	153. Nakla
8. Pirgonj	92. Jamalpur Sadar	8. Fulbari	154. Nalitabari
9. Chiribandar	93. Melandaha	9. Ghoraghat	155. Sherpur Sadar
10. Khansama	94. Basail	10. Hakimpur	156. Sreebardi
11. Hatibanda	95. Delduar	11. Kaharol	157. Bokshiganj
12. Kaligonj	96. Ghatail	12. Nowabganj	158. Dewanganj
13. Lalmonirhat Sadar	97. Gopalpur	13. Parbatipur	159. Islampur
14. Patgram	98. Kalihati	14. Dimla	160. Madarganj
15. Gangachara	99. Madhupur	15. Domar	161. Sharishabari
16. Taraganj	100. Mirzapur	16. Jaldhaka	162. Bhuapur
17. Bhurungamari	101. Nagarpur	17. Kishorganj	163. Astogram
18. Kurigram Sadar	102. Shakhipur	18. Nilphamari Sadar	164. Bajitpur
19. Razarhat	103. Tangail Sadar	19. Sayedpur	165. Bhairab
20. Ulipur	104. Hossainpur	20. Aditmari	166. Itna
21. Khetlal	105. Kishoreganj Sadar	21. Bodorgonj	167. Karimganj
22. Adamdighi	106. Pakundia	22. Kownia	168. Katiadi
23. Bogra Sadar	107. Keraniganj	23. Mithapukur	169. Kuliarchar
24. Kahalu	108. Lohajang	24. Pirgacha	170. Mithamoin
25. Atrai	109. Munshiganj Sadar	25. Pirganj	171. Nikli
26. Badalgachi	110. Serajdikhan	26. Rangpur Sadar	172. Tarail
27. Dhamoirhat	111. Tongibari	27. Chilmari	173. Daulatpur
28. Mahadebpur	112. Alfadanga	28. Fulbari	174. Ghior
39. Manda	113. Bhanga	29. Nageshwri	175. Harirampur
30. Naogaon Sadar	114. Boalmari	30. Rahumari	176. Manikganj S.
31. Niamatpur	115. Charbhadrasan	31. Rajibpur	177. Saturia
32. Patnitala	116. Faridpur Sadar	32. Fulchari	178. Sibalaya
33. Porsha	117. Modhukhali	33. Gaibandha Sadar	179. Singair
34. Raninagar	118. Nagarkanda	34. Gobindaganj	180. Dhamrai
35. Shaparar	119. Sadarpur	35. Palasbari	181. Dohar
36. Bagatipara	120. Baliakandi	36. Sadullapur	182. Nawabganj
37. Baraigram	121. Goalanda	37. Shaghata	183. Savar
38. Gurudashpur	122. Pangsa	38. Sundarganj	184. Gazipur Sadar

Low Tuberculosis (1)		High Tuberculosis (2)	
39. Lalpur	123. Rajbari Sadar	39. Akkelpur	185. Kaligonj
40. Natore Sadar	124. Gopalganj Sadar	40. Jaipurhat Sadar	186. Kaliakar
41. Singra	125. Kasiani	41. Kalai	187. Kapasia
42. Bholahat	126. Kotalipara	42. Panchbibi	188. Sreepur
43. Gomostapur	127. Muksudpur	43. Dhunot	189. Belabo
44. Nachole	128. Tungipara	44. Dupchachia	190. Monohardi
45. Nawabganj Sadar	129. Kalkini	45. Gabtali	191. Narsinghdi S.
46. Shibganj	130. Madaripur Sadar	46. Shajanpur	192. Polash
47. Charghat	131. Rajoir	47. Nandigram	193. Raipura
48. Durgapur	132. Sibchar	48. Shariakandi	194. Shibpur
49. Godagari	133. Bhedarganj	49. Sherpur	195. Araihazar
50. Mohanpur	134. Damudya	50. Sibganj	196. Rupganj
51. Paba	135. Goshairhat	51. Sonatola	197. Sonargaon
52. Putia	136. Zanjira	52. Kazipur	198. Gazaria
53. Tanora	137. Naria	53. Chatmohar	199. Sreenagar
54. Bagha	138. Shariatpur Sadar.	54. Bheramara	200. Bishambarpur
55. Bagmara	139.Balaganj	55. Daulatpur	201. Chatak
56. Belkuchi	140. Beani Bazar	56. Khoksha	202. Dharampasha
57. Chauhali	141. Biswanath	57. Kumarkhali	203. Dirai
58. Kamarkhanda	142. Sylhet Sadar	58. Kushtia Sadar	204. Dwarabazar
59. Raygonj	143. Kulaura	59. Mirpur	205. Jagannathpur
60. Shahjadpur	144. Chauddagram	60. Gangni	206. Jamalganj
61. Sirajgonj Sadar	145. Hatiya	61. Meherpur Sadar	207. Sulla
62. Tarash	146. Anwara	62. Alamdanga	208. Sunamganj S.
63. Atgharia	147. Banskhali	63. Chuadanga Sadar	209. Tahirpur
64. Ullapara	148. Fatikchari	64. Damurhuda	210. Companiganj
65. Bera	149. Hathazari	65. Jiban Nagar	211. Fenchuganj
66. Faridpur	150. Lohagara	66. Harinakunda	212. Golapganj
67. Iswardi	151. Mirsharai	67. Jhenaidah Sadar	213. Gowaingath
68. Pabna Sadar	152. Rauzan	68. Kaliganj	214. Jointiapur
69. Santhia	153. Satkania	69. Kotchandpur	215. Kanairghat
70. Sujanagar	154. Sitakunda	70. Sailakupa	216. Zakiganj
71. Vangura	155. Ukhia	71. Magura Sadar	217. Baralekha
72. Moheshpur	156. Dighinala	72. Mohammadpur	218. Kamalganj
73. Jessore Sadar	157. Khagrachari Sadar	73. Salikha	219. Moulvibazar S.
74. Monirampur	158. Laksmichari	74. Sreepur	220. Rajnagar
75. Kaliganj	159. Manikchari	75. Kalia	221. Sreemangal
76. Satkhira Sadar	160. Mohalchari	76. Lohagara	222. Ajmiriganj
77. Shyamnagar	161. Ramgar	77. Narail Sadar	223. Bahubal
78. Tala	162. Baghaichari	78. Abhaynagar	224. Baniachang
79. Batiaghata	163. Barkal	79. Bagerpara	225. Chunarughat
80. Dacope	164. Beliachari	80. Chougacha	226. Habiganj Sadar
81. Bagerhat Sadar	165. Kaptai	81. Jhikorgacha	227. Lakhai
82. Barisal Sadar	166. Naniarchar	82. Keshobpur	228. Madhabpur
83. Durgapur	167. Rangamati Sadar	83. Sarsa	229. Nabiganj
84. Purbodhola		84. Ashasoni	230. Akhaura
		75. Debhata	231. Bancharampur
		86. Kalaroa	232. Brahmanbaria S.
		87. Digholia	233. Kashba
		88. Dumuria	234. Nabinagar
		89. Fultala	235. Nasirnagar

Low Tuberculosis (1)		High Tuberculosis (2)	
		90. Koira 91. Paikgacha 92. Rupsa 93. Terokhada 94. Chitalmari 95. Fakirhat 96. Kachua 97. Mollahat 98. Mongla 99. Morelganj 100. Rampal 101. Sarankhola 102. Bhandaria 103. Kawkhali 104. Matbaria 105. Nazirpur 106. Nesarabad 107. Pirojpur Sadar 108. Jhalakati Sadar 109. Kathalia 110. Nalchiti 111. Rajapur 112. Agoiljhara 113. Babuganj 114. Bakerganj 115. Banaripara 116. Gournadi 117. Hizla 118. Mehendiganj 119. Muladi 120. Uzirpur 121. Bhola Sadar 122. Burhanuddin 123. Char Fasson 124. Daulatkhan 125. Lalmohan 126. Monpura 127. Tajumuddin 128. Bawphal 129. Dahsmina 130. Galachipa 131. Kalapara 132. Mirzaganj 133. Patuakhali Sadar 134. Amtali 135. Bamna 136. Barguna Sadar 137. Betagi 138. Patharghata 139. Atpara 140. Barhatta	236. Sarail 237. Barura 238. Brahmanpara 239. Burichang 240. Chandina 241. Comilla Sadar 242. Daudkandi 243. Dewidwar 244. Homna 245. Laksam 246. Muradnagar 247. Nagalkot 248. Chandpur Sadar 249. Faridgonj 250. Haimchar 251. Haziganj 252. Kachua 253. Matlab 254. Shahrashti 255. Lakshmipur S. 256. Raipur 257. Ramgati 258. Ramgonj 259. Begumganj 260. Chatkhil 261. Companiganj 262. Noakhali Sadar 263. Senbag 264. Chhagalnaiya 265. Daganbhuiyan 266. Feni Sadar 267. Parshuram 268. Sonagazi 269. Boalkhali 270. Chandanaish 271. Potiya 272. Rangunia 273. Sandwip 274. Chakaria 275. Cox's Bazar S. 276. Kutubdia 277. Moheshkhali 278. Ramu 279. Teknaf 280. Matiranga 281. Panchari 282. Jurachari 283. Kawkhali 284. Langadu 285. Rajasthali 286. Alikadam

Low Tuberculosis (1)		High Tuberculosis (2)	
		141. Kalmakanda 142. Kendua 143. Khaliajuri 144. Modan 145. Mohanganj 146. Netrakona Sadar	287. Bandarban S. 288. Lama 289. Nakhyangchari 290. Rowangachari 291. Ruma 292. Tanchi

Annex 5.5: Rural socio-demographic and tuberculosis clusters (row percentages)

Tuberculosis cluster variables →		Tuberculosis clusters		Total
Socio-demographic cluster variables ↓		Low tuberculosis (lTB)	High tuberculosis (hTB)	
High literacy, moderate health, low poverty (sdc1)	Count	52	131	183
	% within Cluster	28.4%	71.6%	100.0%
Moderate literacy, better health, moderate poverty (sdc2)	Count	99	101	200
	% within Cluster	49.5%	50.5%	100.0%
Low literacy, poor health, high poverty (sdc3)	Count	16	60	76
	% within Cluster	21.1%	78.9%	100.0%
Total	Count	167	292	459
	% within Cluster	36.4%	63.6%	100.0%

Annex 5.6: Rural socio-demographic and Tuberculosis sub-cluster wise Upazila list

Sdc1lowTB		Sdc1highTB	
1. Adamdighi	27. Alfadanga	1. Dinajpur Sadar	66. Savar
2. Bogra Sadar	28. Bhanga	2. Hakimpur	67. Gazipur Sadar
3. Naogaon Sadar	29. Faridpur Sadar	3. Sayedpur	68. Kaligonj
4. Nawabganj Sadar	30. Goalanda	4. Rangpur Sadar	69. Kaliakar
5. Belkuchi	31. Rajbari Sadar	5. Shajanpur	70. Kapasia
6. Kamarkhanda	32. Gopalganj Sadar	6. Kazipur	71. Sreepur
7. Raygonj	33. Madaripur Sadar	7. Kumarkhali	72. Belabo
8. Shahjadpur	34. Damudya	8. Kushtia Sadar	73. Narsinghdi S.
9. Sirajgonj Sadar	35. Naria	9. Chuadanga Sadar	74. Polash
10. Ullapara	36. Shariatpur Sadar	10. Damurhuda	75. Raipura
11. Bera	37. Balaganj	11. Jiban Nagar	76. Shibpur
12. Iswardi	38. Beani Bazar	12. Magura Sadar	77. Araihazar
13. Pabna Sadar	39. Biswanath	13. Mohammadpur	78. Rupganj
14. Jessore Sadar	40. Sylhet Sadar	14. Lohagara	79. Sonargaon
15. Debhata	41. Chauddagram	15.Abhaynagar	80. Gazaria
16. Satkhira Sadar	42. Anwara	16. Digholia	81. Sreenagar
17. Bagerhat Sadar	43. Fatikchari	17. Fultala	82. Fenchuganj
18. Barisal Sadar	44. Hathazari	18. Paikgacha	83. Golapganj
19. Tangail Sadar	45. Lohagara	19. Rupsa	84. Zakiganj
20. Kishoreganj Sadar	46. Mirsharai	20. Terokhada	85. Baralekha
21. Pakundia	47. Rauzan	21. Chitalmari	86. Kamalganj
22. Keraniganj	48. Satkania	22. Fakirhat	87. Moulvibazar S.
23. Lohajang	49. Sitakunda	23. Kachua	88. Sreemangal

24. Munshiganj Sadar	50. Khagrachari Sadar	24. Mollahat	89. Ajmiriganj
25. Serajdikhan	51. Kaptai	25. Mongla	90. Habiganj Sadar
26. Tongibari	52.Rangamati Sadar	26. Morelganj	31. Akhaura
		27. Rampal	92. Bancharampur
		28. Sarankhola	93. Brahmanbaria S.
		29. Bhandaria	94. Kashba
		30. Kawkhali	95. Nabinagar
		31. Matbaria	96. Barura
		32. Nazirpur	97. Brahmanpara
		33. Nesarabad	98. Burichang
		34. Pirojpur Sadar	99. Chandina
		35. Jhalakati Sadar	100. Comilla Sadar
		36. Kathalia	101. Daudkandi
		37. Nalchiti	102. Dewidwar
		38. Rajapur	103. Homna
		39. Agoiljhara	104. Laksam
		40. Babuganj	105. Muradnagar
		41. Bakerganj	106. Nagalkot
		42. Banaripara	107. Chandpur Sadar
		43. Gournadi	108. Faridgonj
		44. Mehendiganj	109. Haziganj
		45. Muladi	110. Kachua
		46. Uzirpur	111. Matlab
		47. Bhola Sadar	112. Shahrashti
		48. Daulatkhan	113. Lakshmipur S.
		49. Bawphal	114. Raipur
		50. Mirzaganj	115. Ramgonj
		51. Patuakhali Sadar	116. Begumganj
		52. Bamna	117. Chatkhil
		53. Barguna Sadar	118. Companiganj
		54. Betagi	119. Noakhali Sadar
		55. Patharghata	120. Senbag
		56. Gafargaon	121. Chhagalnaiya
		57. Mymensingh S.	122. Daganbhuiyan
		58. Bajitpur	123. Feni Sadar
		59. Bhairab	124. Parshuram
		60. Karimganj	125. Sonagazi
		61. Katiadi	126. Boalkhali
		62. Kuliarchar	127. Chandanaish
		63. Manikganj Sadar	128. Potiya
		64. Dohar	129. Rangunia
		65. Nawabganj	130. Sandwip
			131. Bandarban S.
Sdc2lowTB		**Sdc2highTB**	
1. Atwari	50. Tarash	1. Debigonj	52. Kaliganj
2. Boda	51. Atgharia	2. Ranisankail	53. Kotchandpur
3. Panchagarh Sadar	52. Faridpur	3. Birol	54. Sailakupa
4. Tetulia	53. Santhia	4. Birampur	55. Salikha
5. Thargoan Sadar	54. Sujanagar	5. Birganj	56. Sreepur
6. Baliadangi	55. Vangura	6. Bochaganj	57. Kalia
7. Haripur	56. Moheshpur	7. Fulbari	58. Narail Sadar
8. Pirgonj	57. Monirampur	8. Ghoraghat	59. Bagerpara

9. Chiribandar 10. Khansama 11. Hatibanda 12. Kaligonj 13. Lalmonirhat Sadar 14. Patgram 15. Gangachara 16. Taraganj 17. Kurigram Sadar 18. Razarhat 19. Khetlal 20. Ulipur 21. Kahalu 22. Atrai 23. Badalgachi 24. Dhamoirhat 25. Mahadebpur 26. Manda 27. Niamatpur 28. Patnitala 29. Porsha 30. Raninagar 31. Shaparar 32. Bagatipara 33. Baraigram 34. Gurudashpur 35. Lalpur 36. Natore Sadar 37. Singra 38. Bholahat 39. Gomostapur 40. Nachole 41. Charghat 42. Durgapur 43. Godagari 44. Mohanpur 45. Paba 46. Putia 47. Tanor 48. Bagha 49. Bagmara	58. Kaligonj 59. Shyamnagar 60. Tala 61. Batiaghata 62. Dacope 63. Purbodhola 64. Jamalpur Sadar 65. Melandaha 66. Basail 67. Delduar 68. Ghatail 69. Gopalpur 70. Kalihati 71. Madhupur 72. Mirzapur 73. Nagarpur 74. Shakhipur 75. Hossainpur 76. Boalmari 77. Charbhadrasan 78. Modhukhali 79. Nagarkanda 80. Sadarpur 81. Baliakandi 82. Pangsa 83. Kasiani 84. Kotalipara 85. Muksudpur 86. Tungipara 87. Kalkini 88. Rajoir 89. Sibchar 90. Bhedarganj 91. Goshairhat 92. Zanjira 93. Laksmichari 94. Manikchari 95. Mohalchari 96. Baghaichari 97. Barkal 98. Beliachari 99. Naniarchar	9. Kaharol 10. Nowabganj 11. Parbatipur 12. Domar 13. Jaldhaka 14. Nilphamari S 15. Aditmari 16. Bodorgonj 17. Kownia 18. Mithapukur 19. Pirgacha 20. Pirganj 21. Chilmari 22. Fulbaria 23. Rahumari 24. Rajibpur 25. Gaibandha Sadar 26. Gobindaganj 27. Palasbari 28. Sadullapur 29. Shaghata 30. Akkelpur 31. Jaipurhat Sadar 32. Kalai 33. Panchbibi 34. Dhunot 35. Dupchachia 36. Gabtali 37. Nandigram 38. Shariakandi 39. Sherpur 40. Sibganj 41. Sonatola 42. Chatmohar 43. Bheramara 44. Daulatpur 45. Khoksha 46. Mirpur 47. Gangni 48. Alamdanga 49. Meherpur Sadar 50. Harinakunda 51. Jhenaidah Sadar	60. Chougacha 61. Jhikorgacha 62. Keshobpur 63. Ashasoni 64. Kalaroa 65. Dumuria 66. Koira 67. Monpura 68. Atpara 69. Kendua 70. Khaliajuri 71. Mohanganj 72. Netrakona Sadar 73. Bhaluka 74. Jhinaigati 75. Bokshiganj 76. Madarganj 77. Sharishabari 78. Bhuapur 79. Nikli 80. Daulatpur 81. Ghior 82. Harirampur 83. Saturia 84. Sibalaya 85. Singair 86. Dhamrai 87. Monohardi 88. Nabiganj 89. Nasirnagar 90. Sarail 91. Haimchar 92. Matiranga 93. Panchari 94. Jurachari 95. Kawkhali 96. Langadu 97. Rajasthali 98. Alikadam 99. Lama 100. Rowangachari 101. Tanchi
Sdc3lowTB		**Sdc3highTB**	
1. Bhurungamari 2. Shibganj 3. Chauhali 4. Durgapur 5. Dhubaura 6. Fulbaria 7. Nandail 8. Muktagacha	9.Gauripur 10. Haluaghat 11. Kulaura 12. Banskhali 13. Ukhia 14. Hatiya 15. Dighinala 16. Ramgar	1. Dimla 2. Kishorganj 3. Nageshwri 4. Fulchari 5. Sundarganj 6. Sarsa 7. Hizla 8. Burhanuddin 9. Char Fasson	31. Tarail 32. Bishambarpur 33. Chatak 34. Dharampasha 35. Dirai 36. Dwarabazar 37. Jagannathpur 38. Jamalganj 39. Sulla

		10. Lalmohan 11. Tajumuddin 12. Dahsmina 13. Galachipa 14. Kalapara 15. Amtali 16. Barhatta 17. Kalmakanda 18. Modan 19. Ishwarganj 20. Phulpur 21. Trisal 22. Nakla 23. Nalitabari 24. Sherpur Sadar 25. Sreebardi 26. Dewanganj 27. Islampur 28. Astogram 29. Itna 30. Mithamoin	40. Sunamganj S. 41. Tahirpur 42. Companiganj 43. Gowaingath 44. Jointiapur 45. Kanairghat 46. Rajnagar 47. Bahubal 48. Baniachang 49. Chunarughat 50. Lakhai 51. Madhabpur 52. Ramgati 53. Chakaria 54. Cox's Bazar S. 55. Kutubdia 56. Moheshkhali 57. Ramu 58. Teknaf 59. Nakhyangchari 60. Ruma

Annex 5.7: Two clusters of Thanas (urban) as per socio-demographic characteristics of the patients

Socio-demographic variables		Cluster		
		1	2	Combined
Thana population density per squire kilometer	Mean	34193.66	11262.03	26003.79
	Std. Deviation	28711.28	8533.25	25909.31
Literacy rate	Mean	68.84	63.48	66.93
	Std. Deviation	7.81	7.83	8.15
Total fertility rate	Mean	2.63	3.48	2.94
	Std. Deviation	0.43	0.34	0.57
Crude death rate	Mean	3.50	7.07	4.78
	Std. Deviation	0.72	1.58	2.04
Infant mortality rate	Mean	44.85	89.40	60.76
	Std. Deviation	9.35	19.64	25.57
Percentage of household structure-Jhupri	Mean	7.57	10.52	8.62
	Std. Deviation	3.59	5.17	4.40
Percentage of household structure-Kacha	Mean	22.35	35.11	26.91
	Std. Deviation	11.89	10.20	12.79
Percentage of household income from agriculture	Mean	1.30	2.87	1.86
	Std. Deviation	1.07	2.60	1.90
Percentage of household income from employment	Mean	36.56	38.16	37.13
	Std. Deviation	10.07	9.42	9.76
Percentage of household income from business	Mean	26.59	18.64	23.75
	Std. Deviation	7.09	4.27	7.28
Percentage of household income from agricultural labour sell	Mean	0.80	2.54	1.43
	Std. Deviation	0.98	3.23	2.21
Total Thana		27 (64.3%)	15 (35.7%)	42 (100%)

Annex 5.8: Urban socio-demographic cluster wise Thana list

Socio-demographic cluster 1		Socio-demographic cluster 2	
1. Kotwali Chittagong	15. Motijheel	1. Bayejid Bostami	9. Pahartali
2. Badda	16. Pallabi	2. Bakalia	10. Panchlaish
3. Cantonment	17. Ramna	3. Chandgaon	11. Patenga
4. Demra	18. Sabujbagh	4. Chittagong Port	12. Khalishpur
5. Dhanmandi	19. Shaympur	5. Double Mooring	13. Khanjahan Ali
6. Gulshan	20. Sutrapur	6. Halishahar	14. Rajpara
7. Hazaribagh	21. Tejgoan	7. Karnafuli	15. Shahmakhdum
8. Kafrul	22. Uttara	8. Khulshi	
9. Kamrangirchar	23. Daulatpur		
10. Khilgoan	24. Khulna Sadar		
11. Kotwali.D	25. Sonadanga		
12. Lalbagh	26. Boalia		
13. Mirpur	27. Matihar		
14. Mohammadpur			

Annex 5.9: Two clusters of Thanas (urban) as per new smear positive tuberculosis case detection rate

Tuberculosis variables		Cluster		
		1	2	Combined
Case detection rate of new smear positive cases in 2006	Mean	109.22	53.50	77.38
	Std. Deviation	30.91	14.39	35.94
Total Thanas		18 (42.9%)	24 (57.1%)	42 (100%)

Annex 5.10: Urban tuberculosis cluster wise Thana list

High Tuberculosis (1)		Low Tuberculosis (2)	
1. Bayejid Bostami	10. Cantonment	1. Karnafuli	13. Ramna
2. Bakalia	11. Demra	2. Kotwali Chittang	14. Sabujbagh
3. Chandgaon	12. Hazaribagh	3. Khulshi	15. Shaympur
4. Chittagong Port	13. Kafrul	4. Panchlaish	16. Tejgoan
5. Double Mooring	14. Kamrangirchar	5. Dhanmandi	17. Daulatpur
6. Halishahar	15. Pallabi	6. Gulshan	18. Khalishpur
7. Pahartali	16. Sutrapur	7. Khilgoan	19. Khanjahan Ali
8. Patenga	17. Uttara	8. Kotwali Dhaka	20. Sonadanga
9. Badda	18. Khulna Sadar	9. Lalbagh	21. Boalia
		10. Mirpur	22. Matihar
		11. Mohammadpur	23. Rajpara
		12. Motijheel	24. Shahmakhdum

Annex 5.11: Urban socio-demographic and tuberculosis clusters (row percentages)

Tuberculosis cluster variables →		Urban Tuberculosis clusters		Total
Socio-demographic cluster variables ↓		High tuberculosis (htb)	Low tuberculosis (ltb)	
Higher literacy, better health, less poverty (usdc1)	Count	10	17	27
	% within Cluster	37.0%	63.0%	100.0%
Lower literacy, poor health, more poverty (usdc2)	Count	8	7	15
	% within Cluster	53.3%	46.7%	100.0%
Total	Count	18	24	42
	% within Cluster	42.9%	57.1%	100.0%

Annex 5.12: Urban soci-demographic and tuberculosis sub-cluster wise Thana list

Usdc1lowTB	Usdc1highTB	Usdc2lowTB	Usdc2highTB
1. Kotwali Chittang	1. Badda	1. Karnafuli	1. Bayejid Bostami
2. Dhanmandi	2. Cantonment	2. Khulshi	2. Bakalia
3. Gulshan	3. Demra	3. Panchlaish	3. Chandgaon
4. Khilgoan	4. Hazaribagh	4. Khalishpur	4. Chittagong Port
5. Kotwali Dhaka	5. Kafrul	5. Khanjahan Ali	5. Double Mooring
6. Lalbagh	6. Kamrangirchar	6. Rajpara	6. Halishahar
7. Mirpur	7. Pallabi	7. Shahmakhdum	7. Pahartali
8. Mohammadpur	8. Sutrapur		8. Patenga
9. Motijheel	9. Uttara		
10. Ramna	10. Khulna Sadar		
11. Sabujbagh			
12. Shaympur			
13. Tejgoan			
14. Daulatpur			
15. Sonadanga			
16. Boalia			
17. Matihar			

Annex-5.13

School of Applied Social Sciences

Durham University
32 Old Elvet
Durham, UK

Quantitative Interview Consent Form

Welcome to the research conducting by Bivakar Roy, a senior BRAC stuff as part of his study in Durham University, UK. The researcher want to find out the socioeconomic impact of tuberculosis on patients' and their families through the study, which will help to complete his study as well as formulate effective programme policy. You are randomly selected as a probable participant of this study because you are a cured experienced tuberculosis patient.

If you are agree to participate in this research then I/researcher will ask some questions regarding your profession, nature of work, monthly personal and family income, money spent before and during treatment, present health status and how tuberculosis affect your personal and social life. Approximately 1-1.5 hours is required to complete the interview. You have no risk to answer the questions except little sensitive issue of your personal profession and income. However, I can not guarantee you how much you will be benefited from the research.

The questions are too general and I/researcher will ensure complete confidentiality of your information. The information will only used by the researcher and your name or identification will not be mentioned on any of the publicly presented report. If we record the full or partial interview, then it will be destroyed after analysis which required approximately 4 months.

The participation in this research is totally voluntary. You do not have to answer any questions that you do not want to answer, and you may end this interview at any time you want, which will not hamper your present relation with BRAC or other relevant organization. You also can not demand or expect any financial or medical benefit by participating in this research. However, your honest answers to these questions will help us to understand this problem and to come out with some recommendation that may be useful for the process of tuberculosis control.

I would greatly appreciate your help in responding to this interview. Would you be willing to participate? If you agree to participate please sign here.

Respondent's name: …………………………………………………………………………

Respondent's signature: ……………………………….. Date: ………………………

Witness's name: ……………………………………………Signature: …………………

Annex -5.14

School of Applied Social Sciences
Durham University
32 Old Elvet
Durham, UK

Questionnaire for Quantitative Data Collection

Patient identification no: ………………/ Interviewer/Researcher

Cluster area: sd1lowtb/sd1hightb/sd2lowtb/sd2hightb/sd3lowtb/sd3hightb

Name of the Patient: …………………………………………

Patients registration number: …………/2006/2007 Registration date: ………………..

Address of the patient: Guardian's name: ……………………………………………….

Village/Mahalla: ……………………………………………….

Union/Ward: ……………………………………………………

Upazila/Thana: …………………………………………………

District/City Corporation: ………………………………………

Name of the implementation NGO: ………………………………………………………

Date of interview: ………………………….. Time of interview: ………………..

Name of interviewer: ……………………………………Signature: ………………...

Date of crosscheck: ……………………....... Time of crosscheck: ………………

Name of cross-checker: …………………………………. Signature: ………………...

Action taken by the cross-checker: ………………………………………………………

Patient's General Information

Open ended questions and probable answers	Code	Skip
1. Age of the patient …………………………………........... ☐		
2. Sex of the patient a) Male …………………………………………………………….............. b) Female ………………………………………………………............. c) Others (specify)…………………………………………………………	 1 2 3	
3. Marital status of the patients a) Unmarried …………………………………………………………… b) Married ……………………………………………………………… c) Divorced/separated …………………………………………………… d) Widowed ……………………………………………………………...	 1 2 3 4	
4. Religion of the patients a) Muslim ………………………………………………………............. b) Hindu ………………………………………………………………… c) Buddhism …………………………………………………….............. d) Others (specify) ………………………………………………………	 1 2 3 4	

5. Education of the patient a) Illiterate …………………………………………………………….......... b) Only can sign …………………………………………………………… c) Class I-V …………………………………………………………………… d) Class VI-X ………………………………………………………………… e) Class XI-XIV ……………………………………………………………… f) Above class XIV ……………………………………………………………..	 1 2 3 4 5 6	
6. Smear status of patient a) Positive ………………………………………………………………... b) Negative …………………………………………………………………….	 1 2	

Patient's Social Information

7. How many people live in your household? ……………………… ☐			
8. Age structures of the members a) Children (less than six years) ………………………………………… ☐ b) Children (6 years to 17 years) ……………………………………….. ☐ c) Adult (18 years and above) …………………………………............... ☐			
9. What kind of disease do you thing 'tuberculosis'	a) Not curable b) A awful disease c) Infectious disease d) Heredity e) Should not got married to person/family f) Disease of king g) Others ………………………………………		

Disease and treatment information

10. When did your first symptom appear before treatment (in weeks) …… ☐			
11. When did you first contact health providers after symptom appears (weeks) . ☐			
But if there is no gap between Q10 and Q11 then avoid Q12 and skip to ……...		→	13
12. Why did you contact late	a) Ignorance b) Wait and see c) Self medication d) Financial problem e) Others (specify) ………………………… f) No problem ………………………………..	 999	
13. Where did you first contact after symptom appears a) Spiritual healer …………………………………………………………… b) Herbal practitioner (Kabiraj) …………………………………………….. c) Pharmacist/medicine shop ……………………………………………….. d) Village doctor (allopath) ……………………………………………………. e) Village doctor (homeopath) ……………………………………………… f) Private practitioner (MBBS) ……………………………………………... g) UHC/CDC/NGO clinic ……………………………………………………. h) Others (specify) …………………………………………………………….		 1 2 3 4 5 6 7 8	

If they first contact UHC/CDC/NGO clinics then avoid Q14-18 and skip to …..		→	19
14. Who are the persons you contacted before UHC/CDC/NGO clinics	a) None b) Spiritual healer c) Herbal practitioner (Kabiraj) d) Pharmacist/medicine shop e) Village doctor (allopath) f) Village doctor (homeopath) g) Private practitioner (MBBS) h) UHC/CDC/NGO clinic i) Others (specify) j) Not applicable ………………………………	999	
15. How many times did you contact them (other than UHC/CDC/NGO clinic) ☐ Or, not applicable …………………………………………………………		999	
16. Why did you contact others rather than UHC/CDC/NGO clinics	a) No idea about the TB disease b) Lack of information regarding UHC/CDC/NGO clinics c) Neighbours and previously known d) Trustiness and confidentiality e) Less and easy payment system f) Distance of UHC/NGO clinics g) Official/unofficial fees at UHC/CDC/NGO clinics h) Others (specify) ……………………………………… i) Not applicable …………………………………………	999	
17. What was the diagnosis by the first contacted health provider a) Common cold fever ………………………………………………………… b) Fever with or without chest pain …………………………………………… c) Cold cough …………………………………………………………………… d) Chest pain ……………………………………………………………………... e) Tuberculosis …………………………………………………………………… f) Others (specify) ……………………………………………………………... g) Not applicable ……………………………………………………………….		999	
18. When did you first contact UHC/CDC/NGO clinics after symptom (weeks) ☐			
19. When were you treated after contacting UHC/CDC/NGO clinics (days) ☐			
If there is no gap or gap of 3 or less than e days between Q19 and Q18 then avoid Q20 and skip to ………………………………………………………………		→	21
20. Why your treatment started late	a) Delay in diagnosis b) Absent at home c) Unofficial fee demand d) Severe illness e) Others (specify) …………………………… f) Not applicable ………………………………	999	

Income and employment information

21. Who was the main source of family income before your illness		
a) None specific ………………………………………………………………	1	
b) Patient (yourself) …………………………………………………………..	2	
c) Husband ………………………………………………………………………	3	
d) Spouse …………………………………………………………………………	4	
e) Adult son/daughter ………………………………………………………….	5	
f) Other adults (specify) ……………………………………………………….	6	
g) Children/minors …………………………………………………………….	7	

22. Who were the other sources of family income before your illness	a) None b) Patient (yourself) c) Husband d) Spouse e) Adult son/daughter f) Other adults (specify) …………………….. g) Children/minors		
23. Who is the main source of family income now a) None specific …………………………………………………………… b) Patient (yourself) ……………………………………………………….. c) Husband ………………………………………………………………… d) Spouse …………………………………………………………………… e) Adult son/daughter ………………………………………………………. f) Other adults (specify) ……………………………………………………. g) Children/minors …………………………………………………………….		 1 2 3 4 5 6 7	
24. Who are the other sources of family income now	a) None b) Patient (yourself) c) Husband d) Spouse e) Adult son/daughter f) Other adults (specify) …………………….. g) Children/minors		
25. What was the main source of family income before your illness a) Agriculture/farming …………………………………………………….. b) Agricultural labour ……………………………………………………… c) Small business …………………………………………………………... d) Business ………………………………………………………………… e) Employment …………………………………………………………….. f) House rent ……………………………………………………………….. g) Private tuition …………………………………………………………… h) Others (specify) ……………………………………………………………		 1 2 3 4 5 6 7 8	
26. What were the other sources of family income before your illness	a) None b) Agriculture/farming c) Agricultural labour d) Small business e) Business f) Employment g) House rent h) Private tuition i) Others (specify) ……………………………		
27. How much was the monthly family income before your illness a) Agriculture/farming ………………………………………… Tk. [ ] b) Agricultural labour ………………………………………… Tk. [ ] c) Small business …………………………………………… Tk. [ ] d) Business ………………………………………………….. Tk. [ ] e) Employment ……………………………………………… Tk. [ ] f) House rent ………………………………………………… Tk. [ ] g) Private tuition ……………………………………………….. Tk. [ ] h) Others (specify) …………………………………………...Tk. [ ]			

28. What is the main source of family income now a) Agriculture/farming …………………………………………………….. b) Agricultural labour ……………………………………………………… c) Small business ……………………………………………………... d) Business ……………………………………………………………… e) Employment ………………………………………………………….. f) House rent …………………………………………………………….. g) Private tuition ………………………………………………………… h) Others (specify) ………………………………………………………		 1 2 3 4 5 6 7 8	
29. What are the other sources of family income now	a) None b) Agriculture/farming c) Agricultural labour d) Small business e) Business f) Employment g) House rent h) Private tuition i) Others (specify) ……………………………		
30. How much is the monthly family income now a) Agriculture/farming ………………………………………… Tk. ☐ b) Agricultural labour ………………………………………… Tk. ☐ c) Small business ……………………………………………… Tk. ☐ d) Business …………………………………………………….. Tk. ☐ e) Employment ………………………………………………… Tk. ☐ f) House rent …………………………………………………… Tk. ☐ g) Private tuition ……………………………………………….. Tk. ☐ h) Others (specify) ……………………………………………...Tk. ☐			
31. What was your profession before illness	a) Unemployed/retired b) Agriculture/farming c) Agricultural labour d) Small business e) Business f) Employment g) Private tuition h) Work at home i) Others (specify) ……………………………		
32. How much was your monthly income before illness …...............Tk. ☐			
33. What is your prifession now	a) Unemployed/retired b) Agriculture/farming c) Agricultural labour d) Small business e) Business f) Employment g) Private tuition h) Work at home i) Others (specify) ……………………………		
34. How much are your monthly income now ……………………...Tk. ☐			

35. What were the main consequences of TB in your personal/daily life a) Loss of job ………… b) Reduced working time ………… c) Unable to work ………… d) Became irregular at work ………… e) Unable to do household work ………… f) Less care to child and family members ………… g) Others (specify) …………	 1 2 3 4 5 6 7	

Cost paid before contacting UHC/CDC/NGO clinics

If the first contact UHC/CDC/NGO clinic the avoid Q36-45 and skip to ………	→	46
36. How much medical cost did you pay before contact UHC/CDC/NGO clinics a) Health providers consultation fees ………… Tk. [ ] b) Diagnostic fees ………… Tk. [ ] c) Medicine costs ………… Tk. [ ] d) Other medical costs (specify) ………… Tk. [ ] Total medical costs ………… Tk. [ ] Or, not applicable …………	 999	
37. How much non-medical cost did you pay before contact UHC/CDC/NGO clinics a) Transport ………… Tk. [ ] b) Additional loading costs ………… Tk. [ ] c) Additional food costs ………… Tk. [ ] d) Special food costs………… Tk. [ ] e) Others (specify) ………… Tk. [ ] Total non-medical costs………… Tk. [ ] Or. Not applicable …………	 999	
38. How many days did you loss due to illness before contact UHC/CDC/NGO clinics a) From agriculture/farming ………… [ ] b) From agricultural labour ………… [ ] c) From small business ………… [ ] d) From business ………… [ ] e) From employment ………… [ ] f) From private tuition ………… [ ] g) From household work ………… [ ] h) From others (specify) ………… [ ] Total day loss due to illness ………… [ ] Or, not applicable …………	 999	
39. How much money did you loss due to professional time loss before contacting UHC a) From agriculture/farming ………… Tk. [ ] b) From agricultural labour ………… Tk. [ ] c) From small business ………… Tk. [ ] d) From business ………… Tk. [ ] e) From employment ………… Tk. [ ] f) From private tuition ………… Tk. [ ] g) From household work ………… Tk. [ ] h) From others (specify) ………… Tk. [ ] Total money loss due to illness ………… Tk. [ ] Or, not applicable …………	 999	

40. Who mainly accompany and looked after you during visiting health providers a) None/self …………………………………………………………………… b) Husband …………………………………………………………………… c) Spouse ………………………………………………………………….. d) Son/daughter ………………………………………………………………. e) Brother/sister ………………………………………………………………. f) Others (specify) ……………………………………………………………. Or. Not applicable …………………………………………………………….		 1 2 3 4 5 6 999	
If there were no caregiver then avoid Q41-45 and skip to ……………………..		→	46
41. Any other persons accompany and looked after you during visiting health providers	a) None b) Husband c) Spouse d) Son/daughter e) Brother/sister f) Others (specify) ………………………… g) Not applicable …………………………..	999	
42. How much was caregiver's monthly income a) From agriculture/farming ………………………………….. Tk. ☐ b) From agricultural labour ………………………………. …..Tk. ☐ c) From small business ………………………………………...Tk. ☐ d) From business ………………………………………………Tk. ☐ e) From employment …………………………………………...Tk. ☐ f) From private tuition …………………………………………Tk. ☐ g) From household work ………………………………………Tk. ☐ h) From others (specify) ……………………………………..Tk. ☐ Caregiver's total monthly income …………...Tk. ☐ Or, not applicable ……………………………………………………………...		999	
43. How much time did he/she spend to accompany and care you (days) ☐ Or, not applicable ……………………………………………………………..		999	
44. How much money did caregiver loss due to care you a) From agriculture/farming ………………………………….. Tk. ☐ b) From agricultural labour ………………………………. …..Tk. ☐ c) From small business ………………………………………...Tk. ☐ d) From business ………………………………………………Tk. ☐ e) From employment …………………………………………...Tk. ☐ f) From private tuition …………………………………………Tk. ☐ g) From household work ………………………………………Tk. ☐ h) From others (specify) ……………………………………..Tk. ☐ Caregiver's total money loss …………...Tk. ☐ Or, not applicable ……………………………………………………………...		999	
45. How much non-medical cost did you spend for caregiver a) Transport ………………………………………………… Tk. ☐ b) Additional loading costs …………………………………… Tk. ☐ c) Additional food costs ………………………………….…… Tk. ☐ d) Special food costs…………………………………….…….. Tk. ☐ e) Others (specify) ……………………………………..…. Tk. ☐ Total non-medical costs spent for caregiver………. Tk. ☐ Or. Not applicable …………………………………………………………….		999	

Cost paid during treatment at UHC/CDC/NGO clinics

46. How much medical cost did you pay during treatment at UHC/CDC/NGO clinics a) Official/unofficial consultation fees ……………………….. Tk. [ ] b) Diagnostic fees …………………………………………... Tk. [ ] c) Medicine costs …………………………………………… Tk. [ ] d) Other medical costs (specify) ………………………………. Tk. [ ] Total medical costs ……………………. Tk. [ ] e) No expenditure ………………………………………………………………..		0	
47. How much non-medical cost did you pay during treatment a) Transport ………………………………………………… Tk. [ ] b) Additional loading costs ………………………………… Tk. [ ] c) Additional food costs …………………………………… Tk. [ ] d) Special food costs………………………………………….. Tk. [ ] e) Others (specify) ……………………………………..… Tk. [ ] Total non-medical costs……………………. Tk. [ ] f) No expenditure …………………………………………………………….		0	
48. How many days did you loss due to illness during treatment a) From agriculture/farming …………………………………… [ ] b) From agricultural labour ……………………………………. [ ] c) From small business ………………………………………… [ ] d) From business ………………………………………………….. [ ] e) From employment …………………………………………… [ ] f) From private tuition ………………………………………….. [ ] g) From household work ………………………………………. [ ] h) From others (specify) …………………………………...... [ ] Total day loss due to illness ……………….. [ ]			
49. How much money did you loss due to professional time loss during treatment a) From agriculture/farming ………………………………….. Tk. [ ] b) From agricultural labour ……………………………… …..Tk. [ ] c) From small business ……………………………………...Tk. [ ] d) From business ……………………………………………….Tk. [ ] e) From employment …………………………………………...Tk. [ ] f) From private tuition …………………………………………Tk. [ ] g) From household work ………………………………………Tk. [ ] h) From others (specify) ……………………………………..Tk. [ ] Total money loss due to illness …………...Tk. [ ]			
50. Who mainly accompany and looked after you during treatment a) None/self …………………………………………………………………… b) Husband …………………………………………………………………… c) Spouse …………………………………………………………………….. d) Son/daughter ………………………………………………………………. e) Brother/sister ………………………………………………………………. f) Others (specify) …………………………………………………………….		 1 2 3 4 5 6	
If there were no caregiver then avoid Q51-55 and skip to ……………………..		→	56
51. Any other persons accompany and looked after you during treatment	a) None b) Husband c) Spouse d) Son/daughter e) Brother/sister f) Others (specify) ………………………… g) Not applicable …………………………..	999	

52. How much time did he/she spend to accompany and care you (days) [ ] Or, not applicable …………………………………………………………..	999	
53. How much was caregiver's monthly income a) From agriculture/farming ………………………………….. Tk. [ ] b) From agricultural labour ……………………………… …..Tk. [ ] c) From small business ……………………………………...Tk. [ ] d) From business ……………………………………………Tk. [ ] e) From employment ………………………………………...Tk. [ ] f) From private tuition ………………………………………Tk. [ ] g) From household work ……………………………………Tk. [ ] h) From others (specify) ……………………………………..Tk. [ ] Caregiver's total monthly income …………...Tk. [ ] Or, not applicable ………………………………………………………...	999	
54. How much money did caregiver loss due to care you a) From agriculture/farming ………………………………….. Tk. [ ] b) From agricultural labour ……………………………… …..Tk. [ ] c) From small business ……………………………………...Tk. [ ] d) From business ……………………………………………Tk. [ ] e) From employment ………………………………………...Tk. [ ] f) From private tuition ………………………………………Tk. [ ] g) From household work ……………………………………Tk. [ ] h) From others (specify) ……………………………………..Tk. [ ] Caregiver's total money loss …………...Tk. [ ] Or, not applicable ………………………………………………………...	999	
55. How much non-medical cost did you spend for caregiver during treatment a) Transport ………………………………………………… Tk. [ ] b) Additional loading costs ………………………………… Tk. [ ] c) Additional food costs …………………………………… Tk. [ ] d) Special food costs……………………………………….. Tk. [ ] e) Others (specify) …………………………………….… Tk. [ ] Total non-medical costs spent for caregiver………. Tk. [ ] Or. Not applicable ………………………………………………………….	999	

Coping strategies and consequences

56. How did you manage the extra expenses due to illness	a) From savings b) Borrowing from family/friends c) Borrowing from others with interest d) Microfinance loans e) Engage spouse in work f) Selling household assets g) Selling pet animals h) Withdrawn children from school and engaged into work i) Others (specify) ……………………………		
57. What were the social and psychological consequences	a) Fear of telling to neighbours and society b) Neighbours became afraid c) Teased/hated by the neighbours/society d) Fear of not getting married e) Broken down settled marriage f) Humiliated by husband/family members g) Force wife to collect treatment money h) Divorce/separation i) Others (specify) ……………………………		

58. Any change in dwelling due to illness a) Same as previous ………………………………………………………… b) Shifted from better house to worsen house ……………………………… c) Shifted from urban to village …………………………………………… d) Shifted to in-law's house ………………………………………………... e) Others (specify) …………………………………………………………	 1 2 3 4 5	
59. How were you psychologically during illness in comparison to before illness a) Same as previous ………………………………………………………… b) Little worse ……………………………………………………………… c) Much worse ………………………………………………………………	 1 2 3	
60. How were you socially during illness in comparison to before illness a) Same as previous ………………………………………………………… b) Slightly avoided by the society ………………………………………….. c) Avoided by the society …………………………………………………..	 1 2 3	
61. How were you financially during illness in comparison to before illness a) Same as previous ………………………………………………………… b) Became poorer …………………………………………………………... c) Became much poorer …………………………………………………….	 1 2 3	
62. How are you psychologically now in comparison to during illness a) Same as during illness …………………………………………………… b) Worse ………………………………………………………………………. c) Better ………………………………………………………………………..	 1 2 3	
63. How are you socially now in comparison to during illness a) Slightly avoided by the society ………………………………………….. b) More or less accepted by the society ……………………………………. c) Accepted by the society ………………………………………………….	 1 2 3	
64. How are you financially now in comparison to during illness a) Same as during illness …………………………………………………… b) Worse ………………………………………………………………………. c) Better ………………………………………………………………………..	 1 2 3	
65. How will you be psychologically within next 5 years a) Worse ………………………………………………………………………. b) Better ……………………………………………………………………… c) Very good …………………………………………………………………...	 1 2 3	
66. How will you be socially within next 5 years a) More or less acceptable by the society ………………………………….. b) Acceptable by the society ……………………………………………….. c) Part of the society …………………………………………………………...	 1 2 3	
67. How will you be financially within next 5 years a) Worse ………………………………………………………………………. b) Better ……………………………………………………………………… c) Rich …………………………………………………………………………	 1 2 3	
68. Any concerns or comments for the research/programme …………………………………………………………………………… …………………………………………………………………………… ……………………………………………………………………………		

Chapter 6: Socioeconomic characteristics of the patients

Annex 6.1: Age group wise sample and 2001 census comparison and gender wise age group distribution (Weighted 530 cases except gender comparison)

Age groups	**All**		**Male**		**Female**		**Significance**
	Sample	2001*	Sample	2001*	Sample	2001*	
0-4	-	12.93	-	13.16	-	12.69	P.Chi-squire - 0.000 Cramer's V - 0.209
5-9	-	13.43	-	13.68	-	13.17	
10-14	-	12.71	-	12.97	-	12.43	
15-19	5.0 (27)	9.77	3.4 (12)	9.92	8.2 (29)	9.60	
20-24	10.2 (54)	9.03	7.9 (28)	7.74	14.7 (52)	10.43	
25-29	13.1 (70)	8.84	12.7 (45)	7.84	13.8 (49)	9.93	
30-34	12.5 (67)	6.93	11.6 (41)	6.76	14.4 (51)	7.11	
35-39	11.5 (61)	6.30	10.8 (38)	6.58	13.0 (46)	6.00	
40-44	12.8 (68)	5.01	14.2 (50)	5.36	10.2 (36)	4.63	
45-49	9.3 (50)	3.73	10.2 (36)	4.04	7.6 (27)	3.39	
50-54	9.2 (49)	3.19	10.2 (36)	3.36	7.1 (25)	3.00	
55-59	7.1 (38)	1.91	8.8 (31)	2.04	3.7 (13)	1.78	
60+	9.2 (49)	6.22	10.2 (36)	6.55	7.3 (26)	5.86	
Cases	530 (weighted)		353 (non weighted)		354 (non weighted)		

* Source: Socio-demographic data = 2001 Population census

Annex 6.3: Overall and gender wise merital status of the sample and comparison with national statistics (Weighted by gender)

Marital status	**All**		**Male**		**Female**		**Significance**
	Sample	2001*	Sample	2001*	Sample	2001*	
Unmarried	12.8 (68)	36.55	14.2 (50)	43.68	10.2 (36)	29.05	P.Chi-squire - 0.000 Cramer's V - 0.263
Married	79.3 (421)	59.23	83.3 (294)	55.69	71.5 (253)	62.95	
Divorced	2.6 (14)	0.40	1.4 (5)	0.08	5.1 (18)	0.74	
Widowed	5.2 (28)	3.82	1.1 (4)	0.55	13.3 (47)	7.26	
Cases	530 (weighted)		353 (not weighted)		354 (not weighted)		

PChi = Peason Chi-Squire, CV = Cramer's V

* Source: Socio-demographic data = 2001 Population census (10+ populations)

Annex 6.2: Age group wise urban-rural sample and 2001 census comparison and urban-rural gender wise age group distribution (Weighted 530 cases by gender)

Age groups	Urban				Rural				Significance
	Sample	2001	Male	Female	Sample	2001	Male	Female	
0-4	-	10.64	-	-	-	13.65	-	-	PChi- .002 CV- .220 PChiU- .015 CVU- .450 PChiR- .009 CVR- .190
5-9	-	10.95	-	-	-	14.21	-	-	
10-14	-	12.41	-	-	-	12.80	-	-	
15-19	9.0 (7)	11.15	2.0 (1)	21.2 (11)	4.4 (20)	9.33	3.6 (11)	6.0 (18)	
20-24	23.1 (18)	11.24	20.4 (10)	30.8 (16)	7.9 (36)	8.35	5.9 (18)	11.9 (36)	
25-29	9.0 (7)	10.36	8.2 (4)	9.6 (5)	13.8 (63)	8.37	13.5 (41)	14.6 (44)	
30-34	14.1 (11)	7.96	14.3 (7)	13.5 (7)	12.3 (56)	6.60	11.2 (34)	14.6 (44)	
35-39	9.0 (7)	6.79	10.2 (5)	7.7 (4)	11.8 (54)	6.15	10.9 (33)	13.9 (42)	
40-44	11.5 (9)	5.25	12.2 (6)	9.6 (5)	13.2 (60)	4.93	14.5 (44)	10.3 (31)	
45-49	10.3 (8)	3.76	14.3 (7)	1.9 (1)	9.2 (42)	3.73	9.5 (29)	8.6 (26)	
50-54	6.4 (5)	2.98	6.1 (3)	5.8 (3)	9.6 (44)	3.25	10.9 (33)	7.3 (22)	
55-59	1.3 (1)	1.65	2.0 (1)	0.0	8.1 (37)	1.99	9.9 (30)	4.3 (13)	
60+	6.4 (5)	4.86	10.2 (5)	0.0	9.6 (44)	6.64	10.2 (31)	8.6 (26)	
Cases	78 (weighted)		101(non weighted)				606 (non weighted)		

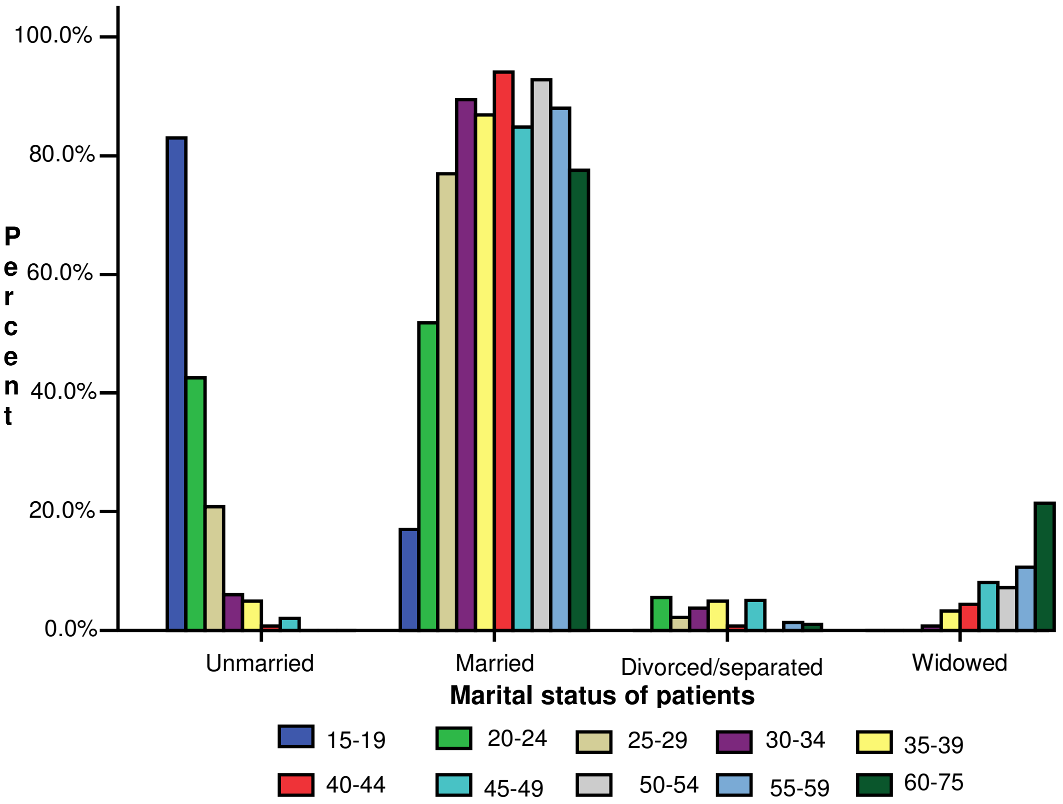
PChiU = Peason Chi-Squire (Urban), CVU = Cramer's V (Urban)
PChiR = Peason Chi-Squire (Rural), CVR = Cramer's V (Rural)
* Source: 2001 = 2001 Population census data

Annex 6.4: Marital status wise urban-rural sample and 2001 census comparison and urban-rural gender wise marital status (Weighted 530 cases by gender)

Marital status	Urban				Rural				Significance
	Sample	2001	Male	Female	Sample	2001	Male	Female	
Unmarried	22.4 (17)	40.96	20.4 (10)	26.9 (14)	11.2 (51)	35.08	13.2 (40)	7.3 (22)	PChi- .000 CV- .156 PChiU- .523 CVU- .172 PchiR- .000 CVR- .320
Married	72.4 (55)	55.65	75.5 (37)	67.3 (35)	80.4 (366)	60.42	84.5 (257)	72.2 (218)	
Divorced	1.3 (1)	0.44	2.0 (1)	0.0	2.9 (13)	0.39	1.3 (4)	6.0 (18)	
Widowed	3.9 (3)	2.95	2.0 (1)	5.8 (3)	5.5 (25)	4.11	1.0 (3)	14.6 (44)	
Cases	76 (weighted)		101 (not weighted)		455 (weighted)		606 (not weighted)		

PChiU = Peason Chi-Squire (Urban), CVU = Cramer's V (Urban)
PChiR = Peason Chi-Squire (Rural), CVR = Cramer's V (Rural)
* Source: 2001 = 2001 Population census data (10+ populations)

Annex 6.5: Age group wise bar chart of marital status of the patient (Weighted 530 cases by gender)



Annex 6.6: Age group wise marital status of the patients (Weighted by gender)

Age groups	Marital status (Row percentage)				Significance
	Unmarried	Married	Divorced	Widowed	
15-19	81.5 (22)	18.5 (5)	0.0	0.0	Cases evaluated – 537 (weighted)
20-24	42.6 (23)	51.9 (28)	5.6 (3)	0.0	
25-29	21.1 (15)	76.1 (54)	2.8 (2)	0.0	
30-34	5.9 (4)	88.2 (60)	4.4 (3)	1.5 (1)	P.Chi-squire - 0.000
35-39	4.9 (3)	86.9 (53)	4.9 (3)	3.3 (2)	Cramer's V - 0.388
40-44	1.4 (1)	92.8 (64)	1.4 (1)	4.3 (3)	
45-49	2.0 (1)	84.0 (42)	6.0 (3)	8.0 (4)	
50-54	0.0	91.8 (45)	0.0	8.2 (4)	
55-59	0.0	86.8 (33)	2.6 (1)	10.5 (4)	
60+	0.0	76.0 (38)	2.0 (1)	22.0 (11)	

Annex 6.7: Overall and gender wise educational status of the sample and comparison with national statistics (Weighted 530 cases except gender comparison)

Educational status	All		Male		Female		Significance
	Sample	2001*	Sample	2001*	Sample	2001*	
Illiterate	25.7 (135)	23.16	24.9 (88)	21.07	26.6 (94)	26.7	P.Chi-squire - 0.000 Cramer's V - 0.178
Can sign	24.9 (132)	22.30	24.6 (87)	21.30	25.4 (90)	25.05	
Class I-V	23.8 (123)	23.28	20.4 (72)	23.93	30.5 (108)	22.60	
Class VI-X	21.6 (115)	25.24	24.4 (86)	26.88	16.1 (57)	21.65	
Class XI-XIV	4.2 (23)	6.02	5.7 (20)	6.82	1.4 (5)	3.97	
Cases	530 (weighted)		353 (not weighted)		354 (not weighted)		

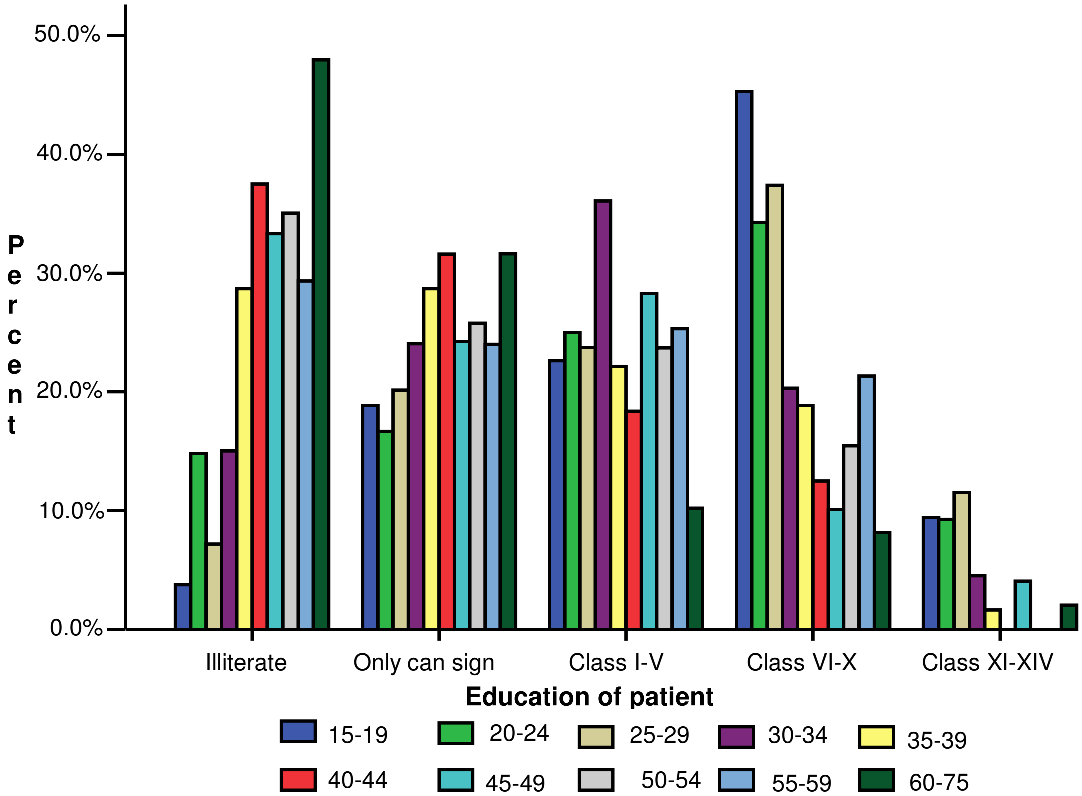
PChi = Peason Chi-Squire, CV = Cramer's V
* Source: Socio-demographic data = 2001 Population census

Annex 6.8: Educational status wise urban-rural sample and 2001 census comparison and urban-rural gender wise educational status (Weighted 530 cases by gender)

Educational status	Urban				Rural				Significance
	Sample	2001	Male	Female	Sample	2001	Male	Female	
Illiterate	15.6 (12)	11.42	16.3 (8)	15.4 (8)	27.0 (123)	27.01	26.3 (80)	28.5 (86)	PChi- .177 CV- .109
Can sign	28.6 (22)	23.24	28.6 (14)	28.8 (15)	24.3 (111)	23.50	24.0 (73)	24.8 (75)	PChiU- .684
Class I-V	22.1 (17)	21.64	20.4 (10)	25.0 (13)	24.1 (110)	23.82	20.4 (62)	31.5 (95)	CVU- .150
Class VI-X	27.3 (21)	31.14	26.5 (13)	28.8 (15)	20.6 (94)	21.64	24.0 (73)	13.9 (42)	PchiR- .000 CVR- .194
Class XI-XIV	6.5 (5)	12.52	8.2 (4)	1.9 (1)	3.9 (18)	4.03	5.3 (16)	1.3 (4)	
Cases	76 (weighted)		101 (not weighted)		455 (weighted)		606 (not weighted)		

PChiU = Peason Chi-Squire (Urban), CVU = Cramer's V (Urban)
PChiR = Peason Chi-Squire (Rural), CVR = Cramer's V (Rural)
* Source: 2001 = 2001 Population census data

Annex 6.9: Age group wise bar chart of educational status of the patient (Weighted 530 cases by gender)



Annex 6.10: Age group wise educational status of the patients (Weighted 530 cases by gender)

Age groups	Educational status					Significance
	Illiterate	Only can sign	Class I-V	Class VI-X	Class XI-XIV	
15-19	3.7 (1)	18.5 (5)	22.2 (6)	44.4 (12)	11.1 (3)	Cases evaluated – 540 (weighted) P.Chi-squire - 0.000 Cramer's V - 0.219
20-24	14.5 (8)	16.4 (9)	25.5 (14)	34.9 (19)	9.1 (5)	
25-29	7.1 (5)	20.0 (14)	24.3 (17)	37.1 (26)	11.4 (8)	
30-34	14.9 (10)	23.9 (16)	35.8 (24)	20.9 (14)	4.5 (3)	
35-39	28.6 (18)	28.6 (18)	22.2 (14)	19.0 (12)	1.6 (1)	
40-44	37.1 (26)	31.4 (22)	18.6 (13)	12.9 (9)	0.0	
45-49	34.0 (17)	24.0 (12)	28.0 (14)	10.0 (5)	4.0 (2)	
50-54	34.0 (17)	26.0 (13)	24.0 (12)	16.0 (8)	0.0	
55-59	28.9 (11)	23.7 (9)	26.3 (10)	21.1 (8)	0.0	
60+	48.0 (24)	32.0 (16)	10.0 (5)	8.0 (4)	2.0 (1)	

Annex 6.11 Overall and gender wise personal occupational status of the sample and comparison with national statistics (Weighted 530 cases except gender comparison)

Personal occupation before illness	All		Male		Female		Significance
	Sample	2001*	Sample	2001*	Sample	2001*	
Agri/farming	7.5 (40)	-	11.0 (39)	-	0.3 (1)	-	P.Chi-squire - 0.000 Cramer's V - 0.704
Agri. Labour	12.2 (65)	-	17.0 (60)	-	2.5 (9)	-	
Smsll Business	21.7 (115)	-	13.9 (49)	-	37.3 (132)	-	
Business	14.3 (76)	-	21.5 (76)	-	0.0	-	
Employment	15.0 (80)	-	17.8 (63)	-	9.3 (33)	-	
H.Hold work	14.8 (79)	-	2.8 (10)	-	38.7 (137)	-	
Student	3.7 (20)	-	2.8 (10)	-	5.4 (19)	-	
Begging	0.8 (5)	-	0.8 (3)	-	0.8 (3)	-	
Rickshaw Puller	4.0 (21)	-	5.9 (21)	-	0.0	-	
Maid servant	1.5 (8)	-	0.3 (1)	-	4.0 (14)	-	
Day labour	4.5 (24)	-	5.9 (21)	-	1.7 (6)	-	
Cases	530 (weighted)		353 (not weighted)		354 (not weighted)		

PChi = Peason Chi-Squire, CV = Cramer's V

* Source: 2001 = 2001 Household income and expenditure survey (1US$=Tk.52)

Annex 6.13: Education wise occupational status of the patient (Weighted cases by gender)

Personal occupation	**Educational status**					**Significance**
	Illiterate	Only can sign	Class I-V	Class VI-X	Class XI-XIV	
Farming	7.4 (10)	9.7 (13)	3.9 (5)	9.5 (11)	4.3 (1)	Cases evaluated – 537 (weighted) P.Chi-squire- 0.000 Cramer's V - 0.293
A.labour	21.3 (29)	13.4 (18)	12.5 (16)	1.7 (2)	0.0	
S.business	18.4 (25)	26.1 (35)	31.3 (40)	12.9 (15)	4.3 (1)	
Business	9.6 (13)	13.4 (18)	15.6 (20)	20.7 (24)	4.3 (1)	
Emplyment	7.4 (10)	8.2 (11)	12.5 (16)	27.6 (32)	52.2 (12)	
H.H.work	17.6 (24)	16.4 (22)	15.6 (20)	10.3 (12)	30.4 (7)	
Student	0.0	0.0	1.6 (2)	10.3 (12)	30.4 (7)	
Begging	2.2 (3)	1.5 (2)	0.0	0.0	0.0	
R.puller	5.1 (7)	6.0 (8)	2.3 (3)	2.6 (3)	0.0	
M.servant	4.4 (6)	0.7 (1)	1.6 (2)	0.0	0.0	
D.labour	6.6 (9)	4.5 (6)	3.1 (4)	4.3 (5)	0.0	

Annex 6.12 Personal occupational status wise urban-rural sample and 2001 census comparison and urban-rural gender wise personal occupational status (Weighted by gender)

Personal occupa-tion before illness	Urban				Rural				Significance
	Sample	2001	Male	Female	Sample	2001	Male	Female	
Ag/farming	1.3 (1)	-	2.0 (1)	0.0	8.5 (39)	-	12.5 (38)	0. (1)	PChi- .001 CV- .236 PChiU- .000 CVU- .677 PchiR- .000 CVR- .724
Ag. Labour	2.6 (2)	-	4.1 (2)	0.0	13.7 (63)	-	19.1 (58)	3.0 (9)	
Sl. Business	15.8 (12)	-	18.4 (9)	11.5 (6)	22.4 (103)	-	13.2 (40)	41.7 (126)	
Business	17.1 (13)	-	26.5 (13)	0.0	13.7 (63)	-	20.7 (63)	0.0	
Employmnt	30.3 (23)	-	32.7 (16)	26.9 (14)	12.4 (57)	-	15.5 (47)	6.3 (19)	
H.Hol.work	14.5 (11)	-	2.0 (1)	38.5 (20)	14.8 (68)	-	3.0 (9)	38.7 (117)	
Student	6.6 (5)	-	2.0 (1)	15.4 (8)	3.3 (15)	-	3.0 (9)	3.6 (11)	
Begging	1.3 (1)	-	2.0 (1)	0.0	0.9 (3)	-	0.7 (2)	1.0 (3)	
Ric. Puller	2.6 (2)	-	4.1 (2)	0.0	4.1 (19)	-	6.3 (19)	0.0	
Ma. Servant	2.6 (2)	-	0.0	5.8 (3)	1.5 (7)	-	0.3 (1)	3.6 (11)	
Day labour	5.3 (4)	-	6.1 (3)	1.9 (1)	4.6 (21)	-	5.9 (18)	1.7 (5)	
Cases	76 (weighted)		101 (not weighted)		459 (weighted)		606 (not weighted)		

PChiU = Peason Chi-Squire (Urban), CVU = Cramer's V (Urban)
PChiR = Peason Chi-Squire (Rural), CVR = Cramer's V (Rural)
* Source: 2001= 2001 Household income and expenditure survey (1US$=Tk.52)

Annex 6.14: Overall and gender wise personal income quintiles of the sample and comparison with national statistics (as per 2001 national data - Weighted 530 cases except gender comparison)

Personal income quintiles before illness	All		Male	Female	Significance
	Sample	2001*	Sample	Sample	
Quintile 1	6.5 (35)	20.0	1.7 (6)	16.1 (57)	P.Chi-squire - 0.000 Cramer's V - 0.733
Quintile 2	24.1 (128)	-	6.2 (22)	59.6 (211)	
Quintile 3	22.5 (120)	-	24.6 (87)	18.4 (65)	
Quintile 4	20.9 (111)	-	29.7 (105)	3.4 (12)	
Quintile 5	25.9 (138)	-	37.7 (133)	2.5 (9)	
Cases	530 (weighted)		353 (not weighted)	354 (not weighted)	

PChi = Peason Chi-Squire, CV = Cramer's V

* Source: 2001 = 2001 Household income and expenditure survey (1US$=Tk.52)

Annex 6.15: Personal income quintals wise urban-rural sample and 2001 census comparison and urban-rural gender wise personal income quintiles (as per 2001 national data - Weighted 530 cases by gender)

Personal income quintiles before illness	**Urban**				**Rural**				**Significance**
	Sample	2001	Male	Female	Sample	2001	Male	Female	
Quintile 1	2.6 (2)	20.0	2.0 (1)	1.9 (1)	7.2 (33)	20.0	1.6 (5)	18.5 (56)	PChi- .083 CV- .124
Quintile 2	22.1 (17)	-	2.0 (1)	59.6 (31)	24.3 (111)	-	6.9 (21)	59.6 (190)	PChiU- .000 CVU- .754
Quintile 3	24.7 (19)	-	22.4 (11)	28.5 (15)	22.1 (101)	-	25.0 (76)	16.6 (50)	
Quintile 4	14.3 (11)	-	16.3 (8)	9.6 (5)	22.1 (101)	-	31.9 (97)	2.3 (7)	PchiR- .000 CVR- .741
Quintile 5	36.4 (28)	-	57.1 (28)	0.0	24.1 (110)	-	34.5 (105)	3.0 (9)	
Cases	77 (weighted)		101 (not weighted)		456 (weighted)		606 (not weighted)		

PChiU = Peason Chi-Squire (Urban), CVU = Cramer's V (Urban)
PChiR = Peason Chi-Squire (Rural), CVR = Cramer's V (Rural)
* Source: 2001 = 2001 Household income and expenditure survey (1US$=Tk.52)

Annex 6.16: Overall and gender wise family income deciles of the sample and comparison with national statistics (as per 2001 national data - Weighted 530 cases except gender comparison)

Family income deciles before illness	**All**		**Male**		**Female**		**Significance**
	Sample	2001*	Sample	2001	Sample	2001	
Deciles1	8.8 (47)	10.00	6.5 (23)	-	13.3 (47)	-	P.Chi-squire - 0.000 Cramer's V - 0.205
Deciles2	9.2 (49)	10.00	7.6 (27)	-	12.4 (44)	-	
Deciles3	10.4 (55)	9.98	11.0 (39)	-	9.0 (32)	-	
Deciles4	10.1 (54)	9.99	8.8 (31)	-	12.7 (45)	-	
Deciles5	8.5 (45)	10.00	9.6 (34)	-	6.2 (22)	-	
Deciles6	11.3 (60)	9.98	11.6 (41)	-	10.7 (38)	-	
Deciles7	9.8 (52)	10.00	9.1 (32)	-	11.3 (40)	-	
Deciles8	10.9 (58)	10.00	13.0 (46)	-	6.8 (24)	-	
Deciles9	10.9 (58)	9.99	12.5 (44)	-	7.9 (28)	-	
Deciles10	10.0 (53)	10.06	10.2 (36)	-	9.6 (34)	-	
Cases	530 (weighted)		353 (not weighted)		354 (not weighted)		

PChi = Peason Chi-Squire, CV = Cramer's V
* Source: 2001 = 2001 Household income and expenditure survey (1US$=Tk.52)

Annex 6.17: Family income deciles wise urban-rural sample and 2001 census comparison and urban-rural gender wise personal income quintiles (as per 2001 national data - Weighted 530 cases by gender)

Family income deciles before illness	Urban				Rural				Significance
	Sample	2001	Male	Female	Sample	2001	Male	Female	
Deciles1	2.6 (2)	9.98	0.0	7.7 (4)	9.8 (45)	9.98	7.6 (23)	14.2 (43)	PChi- .018 CV- .193
Deciles2	5.2 (4)	9.99	4.1 (2)	7.7 (4)	9.8 (45)	9.99	8.2 (25)	13.2 (40)	PChiU- .037 CVU- .420
Deciles3	7.8 (6)	9.97	10.2 (5)	3.8 (2)	10.7 (49)	10.00	11.2 (34)	9.9 (30)	
Deciles4	9.1 (7)	9.96	8.2 (4)	11.5 (6)	10.3 (47)	9.98	8.9 (27)	12.9 (39)	PchiR- .000 CVR- .199
Deciles5	7.8 (6)	9.97	8.2 (4)	5.8 (3)	8.7 (40)	9.99	9.9 (30)	6.3 (19)	
Deciles6	11.7 (9)	10.00	8.2 (4)	17.3 (9)	11.4 (52)	10.00	12.2 (37)	9.6 (29)	
Deciles7	13.0 (10)	9.97	12.2 (6)	13.5 (7)	9.4 (43)	9.98	8.6 (26)	10.9 (33)	
Deciles8	11.7 (9)	9.99	14.3 (7)	7.7 (4)	10.7 (49)	9.99	12.8 (39)	6.6 (20)	
Deciles9	23.4 (18)	9.98	30.6 (15)	9.6 (5)	9.0 (41)	9.99	9.5 (29)	7.6 (23)	
Deciles10	7.8 (6)	10.19	4.1 (2)	15.4 (8)	10.3 (47)	10.10	11.2 (34)	8.6 (26)	
Cases	77 (weighted)		101 (not weighted)		458 (weighted)		606 (not weighted)		

PChiU = Peason Chi-Squire (Urban), CVU = Cramer's V (Urban)
PChiR = Peason Chi-Squire (Rural), CVR = Cramer's V (Rural)
* Source: 20001= 2001 Household income and expenditure survey (1US$=Tk.52)

Annex 6.18: Family size group wise patient's family income deciles before illness distribution (Weighted 530 cases by gender)

Patient's family income deciles	Household size						Significance
	1-2	3-4	5-6	7-8	9-10	11-27	
Decile1	32.4 (11)	12.1 (21)	5.9 (12)	3.3 (3)	0.0	0.0	Cases evaluated – 540 (weighted)
Decile2	11.8 (4)	12.7 (22)	8.9 (18)	3.3 (3)	7.4 (2)	7.1 (1)	
Decile3	11.8 (4)	11.0 (19)	12.4 (25)	7.8 (7)	0.0	0.0	
Decile4	5.9 (2)	19.1 (33)	6.9 (14)	5.6 (5)	3.7 (1)	0.0	
Decile5	5.9 (2)	9.2 (16)	10.9 (22)	5.6 (5)	3.7 (1)	0.0	
Decile6	11.8 (4)	9.8 (17)	12.9 (26)	12.2 (11)	3.7 (1)	14.3 (2)	P.Chi-squire - 0.000 Cramer's V -
Decile7	8.8 (3)	7.5 (13)	12.9 (26)	8.0 (8)	11.1 (3)	0.0	
Decile8	5.9 (2)	6.9 (12)	9.4 (19)	21.1 (19)	18.5 (5)	7.1 (1)	

Decile9	2.9 (1)	6.9 (12)	11.9 (24)	14.4 (13)	29.6 (8)	14.3 (2)	0.237
Decile10	2.9 (1)	4.6 (8)	7.9 (16)	17.8 (16)	22.2 (6)	57.1 (8)	

Annex 6.19: McClements score calculation details

A score was allocated to each household member, and these were added together to produce an overall household McClements score. Household members were given scores as follows.

First adult (head) 0.61

Spouse/partner of head 0.39

Other second adult 0.46

Third adult 0.42

Subsequent adults 0.36

Dependent aged 0-1 0.09

Dependent aged 2-4 0.18

Dependent aged 5-7 0.21

Dependent aged 8-10 0.23

Dependent aged 11-12 0.25

Dependent aged 13-15 0.27

Dependent aged 16+ 0.36

Annex 6.20: Overall and gender wise family per earner income deciles of the sample and comparison with national statistics (Weighted 530 cases except gender comparison)

Family per capita income deciles before illness	All		Male		Female		Significance
	Sample	2001 *	Sample	2001*	Sample	2001*	
Deciles 1	9.1 (48)	-	7.1 (25)	-	13.0 (46)	-	P.Chi-squire - 0.153 Cramer's V - 0.137
Deciles 2	9.7 (52)	-	9.6 (34)	-	9.9 (35)	-	
Deciles 3	9.8 (52)	-	9.1 (32)	-	11.3 (40)	-	
Deciles 4	9.9 (53)	-	9.6 (34)	-	10.5 (37)	-	
Deciles 5	9.8 (52)	-	9.6 (34)	-	10.2 (36)	-	
Deciles 6	10.9 (58)	-	12.2 (43)	-	8.5 (30)	-	
Deciles 7	10.0 (53)	-	10.5 (37)	-	9.0 (32)	-	
Deciles 8	10.3 (55)	-	11.0 (39)	-	8.8 (31)	-	
Deciles 9	10.3 (55)	-	9.9 (35)	-	11.0 (39)	-	
Deciles 10	10.2 (54)	-	11.3 (40)	-	7.9 (28)	-	
Cases	530 (weighted)		353 (not weighted)		354 (not weighted)		

PChi = Peason Chi-Squire, CV = Cramer's V

* Source: 2001 = 2001 Household income and expenditure survey (1US$=Tk.52

Annex 6.21: Family per earner income deciles wise urban-rural sample and 2001 census comparison and urban-rural gender wise personal income quintiles (Weighted 530 cases except gender comparison)

Family per capita income deciles before illness	Urban				Rural				Significance
	Sample	2001	Male	Female	Sample	2001	Male	Female	
Deciles 1	2.6 (2)	-	0.0	5.8 (3)	10.3 (47)	-	8.2 (25)	14.2 (43)	PChi- 0.000 CV- 0.208 PChiU-0.292 CVU- 0.327 PChiR-0.151 CVR- 0.148
Deciles 2	2.6 (2)	-	4.1 (2)	0.0	10.9 (50)	-	10.5 (32)	11.6 (35)	
Deciles 3	9.2 (7)	-	10.2 (5)	7.7 (4)	9.8 (45)	-	8.9 (27)	11.9 (36)	
Deciles 4	5.3 (4)	-	4.1 (2)	7.7 (4)	10.7 (49)	-	10.5 (32)	11.9 (33)	
Deciles 5	11.8 (9)	-	8.2 (4)	19.2 (10)	9.4 (43)	-	9.9 (30)	8.6 (26)	
Deciles 6	9.2 (7)	-	10.2 (5)	7.7 (4)	11.1 (51)	-	12.5 (38)	8.6 (26)	
Deciles 7	10.8 (8)	-	10.2 (5)	11.5 (6)	9.8 (45)	-	10.5 (32)	8.6 (26)	
Deciles 8	17.1 (13)	-	16.3 (8)	19.2 (10)	9.2 (42)	-	10.2 (31)	7.0 (21)	
Deciles 9	19.7 (18)	-	22.4 (11)	15.4 (8)	8.7 (40)	-	7.9 (24)	10.3 (31)	
Deciles 10	11.8 (9)	-	14.3 (7)	5.8 (3)	10.0 (46)	-	10.9 (33)	8.3 (28)	
Cases	76 (weighted)		101 (not weighted)		458 (weighted)		606 (not weighted)		

PChiU = Peason Chi-Squire (Urban), CVU = Cramer's V (Urban)
PChiR = Peason Chi-Squire (Rural), CVR = Cramer's V (Rural)
* Source: 2001 = 2001 Household income and expenditure survey (1US$=Tk.52)

Annex 6.22: Overall and gender wise family per capita income deciles of the sample and comparison with national statistics (Weighted 530 cases except gender comparison)

Family per capita income deciles before illness	All		Male		Female		Significance
	Sample	2001*	Sample	2001*	Sample	2001*	
Deciles 1	8.8 (47)	9.98	6.2 (22)	-	13.8 (49)	-	P.Chi-squire - 0.128 Cramer's V - 0.140
Deciles 2	10.5 (56)	10.00	10.5 (37)	-	10.5 (37)	-	
Deciles 3	9.6 (51)	10.00	9.6 (34)	-	9.6 (34)	-	
Deciles 4	9.8 (52)	9.99	9.9 (35)	-	9.6 (34)	-	
Deciles 5	12.1 (64)	9.99	11.9 (42)	-	12.4 (44)	-	
Deciles 6	8.3 (44)	10.00	9.1 (32)	-	6.8 (24)	-	
Deciles 7	9.9 (53)	10.00	10.2 (36)	-	9.3 (33)	-	
Deciles 8	10.6 (56)	9.99	11.6 (41)	-	8.5 (30)	-	
Deciles 9	10.3 (55)	10.00	10.2 (36)	-	10.5 (37)	-	
Deciles 10	10.2 (54)	10.05	10.8 (38)	-	9.0 (32)	-	
Cases	530 (weighted)		353 (not weighted)		354 (not weighted)		

PChi = Peason Chi-Squire, CV = Cramer's V
* Source: 2001 = 2001 Household income and expenditure survey (1US$=Tk.52)

Annex 6.23: Family per capita income deciles wise urban-rural sample and 2001 census comparison and urban-rural gender wise personal income quintiles (Weighted 530 cases except gender comparison)

Family per capita income deciles before illness	Urban				Rural				Significance
	Sample	2001	Male	Female	Sample	2001	Male	Female	
Decile1	2.6 (2)	9.96	2.0 (1)	3.8 (2)	9.8 (45)	9.98	6.9 (21)	15.6 (47)	PChi-.070 CV-.172
Decile2	5.2 (4)	9.97	4.1 (2)	7.7 (4)	11.4 (52)	9.99	11.5 (35)	10.9 (33)	
Decile3	5.2 (4)	9.97	4.1 (2)	7.7 (4)	10.3 (47)	10.00	10.5 (32)	9.9 (30)	PChiU-.797 CVU-.232
Decile4	14.3 (11)	9.97	14.3 (7)	15.4 (8)	9.0 (41)	9.99	9.2 (28)	8.6 (26)	
Decile5	11.7 (9)	9.98	14.3 (7)	5.8 (3)	12.2 (56)	9.99	11.5 (35)	13.6 (41)	
Decile6	7.8 (6)	9.98	8.2 (4)	5.8 (3)	8.5 (39)	9.98	9.2 (28)	7.0 (21)	PChiR-.097 CVR-.156
Decile7	9.1 (7)	10.00	6.1 (3)	13.5 (7)	10.0 (46)	9.98	10.9 (33)	8. (26)	
Decile8	14.3 (11)	9.99	16.3 (8)	11.5 (6)	9.8 (45)	9.99	10.9 (33)	7.9 (24)	
Decile9	16.9 (13)	9.95	18.4 (9)	15.4 (8)	9.2 (42)	9.99	8.9 (27)	9.6 (29)	
Decile10	13.0 (10)	10.21	12.2 (6)	13.5 (7)	9.8 (45)	10.10	10.5 (32)	8.3 (25)	
Cases	77 (weighted)		101 (not weighted)		458 (weighted)		606 (not weighted)		

PChiU = Peason Chi-Squire (Urban), CVU = Cramer's V (Urban)
PChiR = Peason Chi-Squire (Rural), CVR = Cramer's V (Rural)
* Source: 2001 = 2001 Household income and expenditure survey (1US$=Tk.52)

Chapter: 07 – Diversion and Delay

Annex 7.1: Percentage and (number) of contacted health providers according to contacts (Weighted 530 cases by gender)

Contacted health providers	First contact	Second contact	Third contact	Fourth contact	Fifth contact
Spritual healer	0.8 (5)	4.2 (17)	0.7 (2)	-	-
Harbal practitioner	0.4 (2)	5.7 (22)	8.0 (16)	0.7 (1)	-
Pharmasist	40.1 (215)	4.8 (19)	1.5 (3)	-	-
Village doctor (allo)	31.0 (165)	23.1 (90)	12.7 (26)	6.8 (5)	2.8 (1)
Village doctor (homio)	4.2 (23)	3.9 (15)	4.5 (9)	6.8 (5)	-
Qualified practitioner (MBBS)	17.5 (93)	48.5 (189)	57.4 (115)	64.4 (47)	77.8 (14)
UHC/NGO clinic	4.2 (23)	4.6 (18)	3.2 (7)	3.4 (3)	2.8 (1)
Private hospital/clinic	0.7 (4)	0.8 (6)	4.0 (8)	8.9 (7)	16.7 (3)
Medical assistant/FWV	0.6 (3)	0.5 (2)	1.7 (4)	-	-
District hospital	0.1 (1)	0.5 (2)	-	-	-
Medical college	-	1.5 (6)	4.0 (8)	4.1 (3)	-
Chest disease clinic	-	1.9 (8)	2.2 (5)	4.8 (4)	-
Total	**100.0 (530)**	**100.0 (389)**	**100.0 (210)**	**100.0 (73)**	**100.0 (18)**

Annex 7.2: Gender wise percentage and (number) of first, second and third contacted health providers (Coloum percentage –Not weighted)

Contacted providers	**First contact**			**Second contact**			**Third contact**		
	Gender		**Signi-ficance**	Gender		**Signi-ficance**	Gender		**Signi-ficance**
	Male	Female		Male	Female		Male	Female	
Spri. Healer	0.3 (1)	2.0 (7)	Cra.V- 0.122	2.0 (5)	8.5 (23)	Cra.V- 0.199	0.0 (0)	2.0 (3)	Cra.V- 0.240
Har. Practioner	0.3 (1)	0.6 (2)	Chi.sq- 0.314	5.1 (13)	6.6 (18)	Chi.sq- 0.035	6.3 (8)	10.7 (16)	Chi.sq- 0.105
Pharmasist	41.9 (148)	37.6 (133)		5.5 (14)	3.3 (9)		0.8 (1)	2.7 (4)	
V.doctor (allo)	30.0 (106)	33.1 (117)		22.5 (57)	24.3 (66)		9.5 (12)	18.1 (27)	
V.doctor (homio)	4.2 (15)	4.2 (15)		4.3 (11)	2.9 (8)		4.0 (5)	5.4 (8)	
P.practitioner	17.7 (62)	17.2 (61)		51.0 (129)	43.8 (119)		61.1 (77)	51.0 (76)	
UHC/NGO	4.8 (17)	3.1 (11)		4.0 (10)	5.9 (16)		3.2 (4)	3.4 (5)	
Private hospital	0.6 (2)	0.8 (3)		0.4 (1)	1.5 (4)		4.8 (6)	2.7 (4)	
MA/FWV	0.3 (1)	1.1 (4)		0.4 (1)	0.7 (2)		2.4 (3)	0.7 (1)	
District hospital	0.0 (0)	0.3 (1)		0.8 (2)	0.0 (0)		-	-	
CDC	-	-		2.4 (6)	1.1 (3)		3.2 (4)	0.7 (1)	
Medical college	-	-		1.6 (4)	1.5 (4)		4.8 (6)	2.7 (4)	

Annex 7.3: Gender wise percentage and (number) of fourth and fifth contacted health providers (Coloum percentage – Not weighted)

Contacted providers	Fourth contact			Fifth contact		
	Gender		**Signi-** ficance	Gender		**Signi-** ficance
	Male	Female		Male	Female	
Spritual healer	-	-	Cramer's V - 0.328 Chi squire - 0.126	-	-	Cramer's V - 0.248 Chi squire - 0.633
Harbal practitioner	0.0 (0)	1.6 (1)		-	-	
Village doctor (allo)	4.9 (2)	9.4 (6)		0.0 (0)	5.0 (1)	
Village doctor (homio)	4.9 (2)	9.4 (6)		-	-	
Qualified practitioner (MBBS)	61.0 (25)	68.8 (44)		75.0 (6)	80.0 (16)	
UHC/NGO clinic	2.4 (1)	4.7 (3)		0.0 (0)	5.0 (1)	
Private hospital/clinic	14.6 (6)	1.6 (1)		25.0 (2)	10.0 (2)	
Medical college	4.9 (2)	3.1 (2)		-	-	
Chest disease clinic	7.3 (3)	1.6 (1)		-	-	

Annex 7.4: Urban-rural area wise percentage and (number) of first contacted health providers (Weighted 530 cases by gender)

Contacted providers	First contact (Column percentage)								
	Area		Signi-ficance	Urban		Signi-ficance	Rural		Signi-ficance
	Urban	Rural		Male	Female		Male	Female	
Spri. Healer	2.6 (2)	0.7 (3)	Cra.V-0.203 Chi.sq-0.009	2.0 (1)	1.9 (1)	Cra.V-0.227 Chi.sq-0.515	0.0	2.0 (6)	Cra.V-0.152 Chi.sq-0.124
Har. Practioner	0.0 (0)	0.4 (2)		-	-		0.3 (1)	0.7 (2)	
Pharmasist	51.9 (40)	38.3 (175)		53.1 (26)	53.1 (26)		40.1 (122)	35.1 (106)	
V.doctor (allo)	15.6 (12)	33.5 (153)		20.4 (10)	7.7 (4)		31.6 (96)	37.4 (113)	
V.doctor (homio)	2.6 (2)	4.6 (21)		2.0 (1)	1.9 (1)		4.6 (14)	4.6 (14)	
P.practitioner	23.4 (18)	16.4 (75)		20.4 (10)	30.8 (16)		17.1 (52)	14.9 (45)	
UHC/NGO	1.3 (1)	4.8 (22)		0.0 (0)	1.9 (1)		5.3 (17)	3.3 (10)	
Private hospital	2.6 (2)	0.4 (2)		2.0 (1)	3.8 (2)		0.3 (1)	0.3 (1)	
MA/FWV	0.0	0.7 (3)		-	-		0.3 (1)	1.3 (4)	
District hospital	0.0	0.2 (1)		-	-		0.0	0.3 (1)	
Cases evaluated	534 (weighted)			101 (Not weighted)			606 (Not weighted)		

Annex 7.5: Urban-rural area wise percentage and (number) of second contacted health providers (Weighted 530 cases except gender)

Contacted providers	Second contact (Column percentage)								
	Area		Signi-ficance	Urban		Signi-ficance	Rural		Signi-ficance
	Urban	Rural		Male	Female		Male	Female	
Spri. Healer	6.7 (4)	3.9 (13)	Cra.V-0.250 Chi.sq-0.010	8.6 (3)	2.3 (1)	Cra.V-0.438 Chi.sq-0.133	0.9 (2)	9.6 (22)	Cra.V-0.232 Chi.sq-0.012
Har. Practioner	3.3 (2)	6.3 (21)		0.0 (0)	7.0 (3)		6.0 (13)	6.6 (15)	
Pharmasist	3.3 (2)	5.1 (17)		5.7 (2)	0.0		5.5 (12)	3.9 (9)	
V.doctor (allo)	8.3 (5)	25.3 (85)		11.4 (4)	4.7 (2)		24.3 (53)	27.9 (64)	
V.doctor (homio)	5.0 (3)	3.9 (13)		5.7 (2)	2.3 (1)		4.1 (9)	3.1 (7)	
P.practitioner	55.0 (33)	46.4 (156)		60.0 (21)	53.5 (23)		49.5 (108)	41.9 (96)	
UHC/NGO	3.3 (2)	4.8 (16)		0.0 (0)	9.3 (4)		4.6 (10)	5.2 (12)	
Private hospital	3.3 (2)	0.6 (2)		0.0 (0)	7.0 (3)		0.5 (1)	0.4 (1)	
MA/FWV	1.7 (1)	0.6 (2)		0.0 (0)	2.3 (1)		0.5 (1)	0.4 (1)	
District hospital	0.0	0.6 (2)		-	-		0.9 (2)	0.0	
CDC	3.3 (2)	1.8 (6)		2.9 (1)	4.7 (2)		2.3 (5)	0.4 (1)	
Medical college	6.7 (4)	0.9 (3)		5.7 (2)	7.0 (3)		0.9 (2)	0.4 (1)	
Cases evaluated	396 (weighted)			78 (Not weighted)			447 (Not weighted)		

Annex 7.6: Urban-rural area wise percentage and (number) of third contacted health providers (Weighted 530 cases except gender)

Contacted providers	Third contact (Column percentage)								
	Area		Signi-ficance	Urban		Signi-ficance	Rural		Signi-ficance
	Urban	Rural		Male	Female		Male	Female	
Spri. Healer	0.0	1.1 (2)	Cra. V-0.410 Chi.sq-0.000	-	-	Cra.V-0.535 Chi.sq-0.241	0.0 (0)	2.2 (3)	Cra.V-0.264 Chi.sq-0.076
Har. Practioner	17.9 (5)	6.8 (12)		15.0 (3)	25.0 (3)		4.7 (5)	9.5 (13)	
Pharmasist	0.0	1.7 (3)		-	-		1.9 (1)	2.9 (4)	
V.doctor (allo)	3.6 (1)	14.1 (25)		0.0	8.3 (1)		11.3 (12)	19.0 (26)	
V.doctor (homio)	7.1 (2)	4.0 (7)		10.0 (2)	0.0		2.8 (3)	5.8 (8)	
P.practitioner	35.7 (10)	59.3 (105)		45.0 (9)	16.7 (2)		64.2 (68)	54.0 (74)	
UHC/NGO	3.6 (1)	3.4 (6)		0.0	16.7 (2)		3.8 (4)	2.2 (3)	

Continuation of Annex 7.6: Urban-rural area wise percentage and (number) of third contacted health providers (Weighted 530 cases except gender)

Contacted providers	Third contact (Column percentage)								
	Area		Signi-ficance	Urban		Signi-ficance	Rural		Signi-ficance
	Urban	Rural		Male	Female		Male	Female	
Private hospital	3.6 (1)	4.0 (7)		5.0 (1)	0.0		4.7 (5)	2.9 (4)	
MA/FWV	0.0	2.3 (4)		-	-		2.8 (3)	0.7 (1)	
CDC	7.1 (2)	1.7 (3)		5.0 (1)	8.3 (1)		2.8 (3)	0.0	
Medical college	21.4 (6)	1.7 (3)		20.0 (4)	25.0 (3)		1.9 (2)	0.7 (1)	
Cases evaluated	205 (weighted)			32 (Not weighted)			243 (Not weighted)		

Annex 7.7: Urban-rural area wise percentage and (number) of fourth contacted health providers (Weighted 530 cases except gender)

Contacted providers	Fourth contact (Column percentage)								
	Area		Signi-ficance	Urban		Signi-ficance	Rural		Signi-ficance
	Urban	Rural		Male	Female		Male	Female	
Har. Practioner	0.0	1.4 (1)	Cra.V-0.443 Chi.sq-0.035	-	-	Cra.V-0.683 Chi.sq-0.443	0.0	1.6 (1)	Cra.V-0.350 Chi.sq-0.105
V.doctor (allo)	0.0	7.2 (5)		-	-		5.6 (2)	9.8 (6)	
V.doctor (homio)	0.0	7.2 (5)		-	-		5.6 (2)	9.8 (6)	
P.practitioner	25.0 (2)	66.7 (46)		20.0 (1)	33.3 (1)		66.7 (24)	70.5 (43)	
UHC/NGO	12.5 (1)	2.9 (2)		20.0 (1)	0.0		0.0	4.9 (3)	
Private hospital	25.0 (2)	7.2 (5)		40.0 (2)	0.0		11.1 (4)	1.6 (1)	
CDC	25.0 (2)	2.9 (2)		20.0 (1)	33.3 (1)		5.6 (2)	0.0	
Medical college	12.5 (1)	4.3 (3)		0.0	33.3 (1)		5.6 (2)	1.6 (1)	
Cases evaluated	77 (weighted)			8 (Not weighted)			97 (Not weighted)		

Annex 7.8. Gender wise percentage and (number) of individual factors of not contacting UHC/NGO TB treatment facilities first (Total weighted 530 cases but gender not weighted)

Factors	Total	Male	Female	Cramer's V	Chi-squire
No idea about TB disease	84.4 (429)	83.9 (282)	85.4 (293)	0.021	0.589
No idea about treatment facilities	62.3 (316)	61.9 (208)	63.0 (216)	0.011	0.774
Neighbours and previously known	89.9 (456)	90.8 (305)	88.0 (302)	0.044	0.249
Trustiness and confidentiality	52.8 (268)	50.3 (169)	57.7 (198)	0.075	0.052
Less and easy payment system	59.2 (301)	58.6 (197)	60.3 (207)	0.018	0.648
Distance of UHC/NGO clinic	12.9 (66)	12.5 (42)	13.7 (47)	0.018	0.642
Official/unofficial fee demand	1.2 (6)	1.8 (6)	0.0	0.095	0.013
Influenced by neighbours/relatives	26.6 (135)	25.6 (86)	28.6 (98)	0.033	0.383
Miss diagnosis	0.3 (2)	0.0 (0)	0.9 (3)	0.066	0.086
Unavailability of accompany	0.3 (2)	0.0 (0)	0.9 (3)	0.066	0.086
Less trust on public health treatment	7.2 (37)	7.7 (26)	6.1 (21)	0.032	0.407
Cases evaluated	530 (Weighted)	707 (Not weighted)			

Annex 7.9. Total and gender wise percentage and (number) of first and second causes of contacting other health providers (Coloum percentage – not weighted)

Causes	First cause				Second cause			
	Total	Male	Female	S.ficance	Total	Male	Female	S.ficance
No idea about TB disease	84.1 (571)	83.3 (280)	84.8 (291)	Cra.V- 0.045 Chi.sq- 0.707	-	-	-	Cra.V- 0.046 Chi.sq- 0.840
Lack of information of proper treatment	10.9 (74)	10.7 (36)	11.1 (38)		52.0 (348)	50.9 (167)	53.1 (181)	
Neighbours and previosly known	4.4 (30)	5.4 (18)	3.5 (12)		41.3 (276)	42.4 (139)	40.2 (137)	
Trustiness and confedentiality	0.6 (4)	0.6 (2)	0.6 (2)		4.0 (27)	4.0 (13)	4.1 (14)	
Less and easy payment	-	-	-		2.5 (17)	2.7 (9)	2.3 (8)	
Influenced by neighbor	-	-	-		0.1 (1)	0.0	0.3 (1)	

Annex 7.10. Total and gender wise percentage and (number) of third and fourth causes of contacting other health providers (Coloum percentage – not weighted)

Causes	Third cause				Fourth cause			
	Total	Male	Female	S.ficance	Total	Male	Female	S.ficance
Neighbours and previosly known	54.0 (298)	55.2 (149)	52.8 (149)	Cra.V- 0.093 Chi.sq- 0.685	-	-	-	Cra.V- 0.170 Chi.sq- 0.048
Trustiness and confedentiality	23.9 (132)	22.6 (61)	25.2 (71)		46.3 (179)	42.5 (79)	49.0 (50)	
Less and easy payment	18.3 (101)	18.5 (50)	18.1 (51)		39.5 (153)	44.1 (82)	35.3 (36)	
Influenced by neighbor	2.5 (14)	3.0 (8)	2.1 (6)		9.6 (37)	6.5 (12)	12.7 (13)	
Distance of UHC	0.7 (4)	0.4 (1)	1.1 (3)		3.4 (13)	4.8 (9)	2.0 (2)	
Lack of accompany	0.2 (1)	0.0	0.4 (1)		-	-	-	
Less trust to public health facilities	0.2 (1)	0.4 (1)	0.0		1.0 (4)	1.6 (3)	1.0 (1)	
Miss diagnosis	0.2 (1)	0.0	0.4 (1)		-	-	-	
Official/unofficial fee	-	-	-		0.3 (1)	0.5 (1)	0.0 (0)	

Annex 7.11. Total and gender wise percentage and (number) of fifth and sixth causes of contacting other health providers (Coloum percentage – not weighted)

Causes	Fifth cause				Sixth cause			
	Total	Male	Female	S.ficance	Total	Male	Female	S.ficance
Trustiness and confedentiality	0.4 (1)	0.8 (1)	0.0	Cra.V- 0.150 Chi.sq- 0.307	-	-	-	Cra.V- 0.210 Chi.sq- 0.276
Less and easy payment	48.5 (130)	42.3 (55)	54.3 (75)		-	-	-	
Influenced by neighbor	24.6 (66)	28.5 (37)	21.0 (29)		61.2 (71)	60.4 (29)	61.8 (42)	
Distance of UHC	17.9 (48)	18.5 (24)	17.4 (24)		20.7 (24)	18.8 (9)	22.1 (15)	
Lack of accompany	-	-	-		0.9 (1)	0.0	1.5 (1)	
Less trust to public health facilities	8.2 (22)	9.2 (12)	7.2 (10)		14.7 (17)	14.6 (7)	14.7 (10)	
Miss diagnosis	-	-	-		-	-	-	
Official/unofficial fee	0.4 (1)	0.8 (1)	0.0		2.6 (3)	6.3 (3)	0.0	

Annex 7.12. Urban-rural area wise percentage and (number) of individual factors of not contacting UHC/NGO TB treatment facilities first (Weighted 530 cases by gender)

Factors	Total	Urban	Rural	Cramer's V	Chi-squire
No idea about TB disease	84.4 (429)	58.7 (44)	88.9 (385)	0.296	0.000
No idea about treatment facilities	62.3 (316)	53.3 (40)	63.8 (277)	0.077	0.083
Neighbours and previously known	89.9 (456)	85.3 (64)	90.6 (393)	0.061	0.168
Trustiness and confidentiality	52.8 (268)	41.3 (31)	54.7 (237)	0.095	0.032
Less and easy payment system	59.2 (301)	54.7 (41)	60.0 (260)	0.039	0.381
Distance of UHC/NGO clinic	12.9 (66)	0.0	15.2 (66)	0.160	0.000
Official/unofficial fee demand	1.2 (6)	1.3 (1)	1.2 (5)	0.006	0.895
Influenced by neighbours/relatives	26.6 (135)	12.0 (9)	29.1 (126)	0.137	0.002
Miss diagnosis	0.3 (2)	1.3 (1)	0.2 (1)	0.062	0.159
Unavailability of accompany	0.3 (2)	1.3 (1)	0.2 (1)	0.062	0.159
Less trust on public health treatment	7.2 (37)	2.7 (2)	8.1 (35)	0.074	0.096
Cases evaluated	530 (Weighted)				

Annex 7.13. Urban-rural area gender wise percentage and (number) of individual factors of not contacting UHC/NGO TB treatment facilities first (Not weighted)

Factors	Urban				Rural			
	Male	Female	Cra. V	Chi-sqr	Male	Female	Cra. V	Chi-sqr
No idea about TB disease	57.1 (28)	60.8 (31)	0.031	0.711	88.5 (253)	89.7 (262)	0.020	0.639
No idea about treatment facilities	44.9 (22)	68.6 (35)	0.240	0.017	64.7 (185)	62.0 (181)	0.029	0.481
Neighbours and previously known	89.8 (44)	76.5 (39)	0.177	0.076	91.3 (261)	90.1 (263)	0.015	0.720
Trustiness and confidentiality	34.7 (17)	54.9 (28)	0.203	0.042	53.1 (152)	58.2 (170)	0.053	0.230
Less and easy payment system	63.3 (31)	37.3 (19)	0.260	0.009	58.0 (166)	64.4 (188)	0.067	0.106
Distance of UHC/NGO clinic	-	-	-		14.7 (42)	16.1 (47)	0.020	0.626
Official/unofficial fee demand	2.0 (1)	0.0	0.103	0.305	1.7 (5)	0.0	0.094	0.023
Influenced by neighbours/relatives	12.2 (6)	11.8 (6)	0.007	0.941	28.0 (80)	31.5 (92)	0.040	0.339
Miss diagnosis	0.0	2.0 (1)	0.099	0.325	0.0	0.7 (2)	0.058	0.160
Unavailability of accompany	0.0	3.9 (2)	0.140	0.161	0.0	0.3 (1)	0.041	0.321
Less trust on public health treatment	2.0 (1)	2.0 (1)	0.003	0.977	8.7 (25)	6.8 (20)	0.035	0.403

Annex 7.14. Urban-rural area and gender wise percentage and (number) of first cause of contacting other health providers (Weighted 530 cases except gender)

Cause	Area			Urban			Rural		
	Urban	Rural	S.ficanc	Male	Female	S.ficanc	Male	Female	S.ficanc
No idea about TB disease	57.9 (44)	88.0 (382)	Cra.V- 0. 295 Chi.sq- 0.000	57.1 (28)	60.8 (31)	Cra.V- 0.201 Chi.sq- 0.257	87.8 (252)	89.0 (260)	Cra.V- 0.022 Chi.sq- 0.965
Lack of information of proper treatment	25.0 (19)	8.3 (36)		22.4 (11)	31.4 (16)		8.7 (25)	7.5 (22)	
Neighbours and previosly known	14.5 (11)	3.2 (14)		18.4 (9)	5.9 (3)		3.1 (9)	3.1 (9)	
Trustiness and confedentiality	2.6 (2)	0.5 (2)		2.0 (1)	2.0 (1)		0.3 (1)	0.3 (1)	
Cases evaluated	510 (weighted)			100 (not weighted)			579 (not weighted)		

Annex 7.15. Urban-rural area and gender wise percentage and (number) of second cause of contacting other health providers (Weighted 530 cases except gender)

Cause	Area			Urban			Rural		
	Urban	Rural	S.ficanc	Male	Female	S.ficanc	Male	Female	S.ficanc
Lack of information of proper treatment	28.4 (21)	55.4 (237)	Cra.V- 0. 326 Chi.sq- 0.000	21.7 (10)	41.2 (21)	Cra.V- 0. 269 Chi.sq- 0.135	55.7 (157)	55.2 (160)	Cra.V- 0. 068 Chi.sq- 0.452
Neighbours and previosly known	50.0 (37)	40.0 (171)		54.3 (25)	45.1 (23)		40.4 (114)	39.3 (114)	
Trustiness and confedentiality	6.8 (5)	3.7 (16)		6.5 (3)	5.9 (3)		3.5 (10)	3.8 (11)	
Less and easy payment	13.5 (10)	0.9 (4)		17.4 (8)	5.9 (3)		0.4 (1)	1.7 (5)	
Influenced by neighbor	1.4 (1)	0.0		0.0	2.0 (1)		-	-	
Cases evaluated	502 (weighted)			97 (not weighted)			572 (not weighted)		

Annex 7.16. Urban-rural area and gender wise percentage and (number) of third cause of contacting other health providers (Weighted 530 cases except gender)

Cause	Area			Urban			Rural		
	Urban	Rural	S.ficanc	Male	Female	S.ficanc	Male	Female	S.ficanc
Neighbours and previosly known	29.1 (16)	57.8 (208)	Cra.V- 0. 295 Chi.sq- 0.000	29.4 (10)	30.8 (12)	Cra.V- 0. 330 Chi.sq- 0.159	58.9 (139)	56.4 (137)	Cra.V- 0. 091 Chi.sq- 0.549
Trustiness and confedentiality	23.6 (13)	23.3 (84)		17.6 (6)	35.9 (14)		23.3 (55)	23.5 (57)	
Less and easy payment	36.4 (20)	15.6 (56)		47.1 (16)	20.5 (8)		14.4 (34)	17.7 (43)	
Influenced by neighbor	7.3 (4)	2.2 (8)		5.9 (2)	7.7 (3)		2.5 (6)	1.2 (3)	
Distance of UHC	0.0	0.8 (3)		-	-		0.4 (1)	1.2 (3)	

Continuation of Annex 7.16: Urban-rural area and gender wise percentage and (number) of third cause of contacting other health providers (Weighted 530 cases except gender)

Cause	Area			Urban			Rural		
	Urban	Rural	S.ficanc	Male	Female	S.ficanc	Male	Female	S.ficanc
Lack of accompany	1.8 (1)	0.0		0.0	2.6 (1)		-	-	
Less trust to public health facilities	0.0	0.3 (1)		-	-		0.4 (1)	0.0	
Miss diagnosis	1.8 (1)	0.0		0.0	2.6 (1)		-	-	
Cases evaluated	415 (weighted)			73 (not weighted)			479 (not weighted)		

Annex 7.17. Urban-rural area and gender wise percentage and (number) of fourth cause of contacting other health providers (Weighted 530 cases except gender)

Cause	Area			Urban			Rural		
	Urban	Rural	S.ficanc	Male	Female	S.ficanc	Male	Female	S.ficanc
Trustiness and confedentiality	50.0 (11)	44.4 (118)	Cra.V- 0. 240 Chi.sq- 0.005	46.2 (6)	62.5 (10)	Cra.V- 0. 314 Chi.sq- 0.581	42.2 (73)	48.6 (90)	Cra.V- 0. 184 Chi.sq- 0.017
Less and easy payment	27.3 (6)	42.1 (112)		30.8 (4)	18.8 (3)		45.1 (78)	36.8 (68)	
Influenced by neighbor	13.6 (3)	8.3 (22)		15.4 (2)	12.5 (2)		5.8 (10)	12.4 (23)	
Distance of UHC	0.0	4.1 (11)		-	-		5.2 (9)	2.2 (4)	
Less trust to public health facilities	4.5 (1)	1.1 (3)		0.0	6.3 (1)		1.7 (3)	0.0	
Official/unofficial fee	4.5 (1)	0.0		7.7 (1)	0.0		-	-	
Cases evaluated	288 (weighted)			29 (not weighted)			358 (not weighted)		

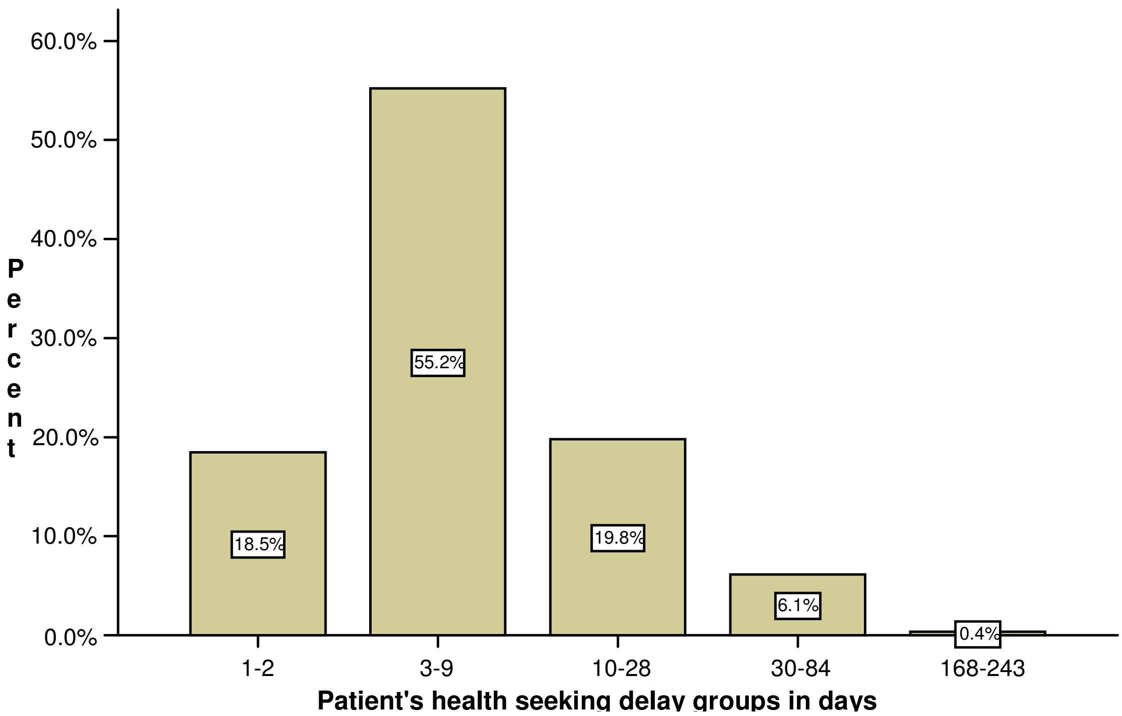
Annex 7.18. Urban-rural area and gender wise percentage and (number) of fifth cause of contacting other health providers (Weighted 530 cases except gender)

Cause	Area			Urban			Rural		
	Urban	Rural	S.ficanc	Male	Female	S.ficanc	Male	Female	S.ficanc
Trustiness and confedentiality	0.0 (0)	0.5 (1)	Cra.V- 0. 152 Chi.sq- 0.463	-	-	Cra.V- 0. 043 Chi.sq- 0.887	0.8 (1)	0.0	Cra.V- 0. 153 Chi.sq- 0.308
Less and easy payment	77.8 (7)	45.0 (86)		80.0 (4)	83.3 (5)		40.8 (51)	53.0 (70)	
Influenced by neighbor	22.2 (2)	26.2 (50)		20.0 (1)	16.7 (1)		28.8 (36)	21.2 (28)	
Distance of UHC	0.0	18.8 (36)		-	-		19.2 (24)	18.2 (24)	
Less trust to public health facilities	0.0	8.9 (17)		-	-		9.6 (12)	7.6 (10)	
Official/unofficial fee	0.0	0.5 (1)		-	-		0.8 (1)	0.0	
Cases evaluated	200 (weighted)			11 (not weighted)			257 (not weighted)		

Annex 7.19: Total, gender and urban-rural area wise percentage and number of cause of contacting late to initial health providers (Weighted 530 cases except gender)

Causes	Total percent	Gender			Urban-Rural		
		Male	Female	Signi	Urban	Rural	Signi
Negligence	20.3 (108)	28.7 (80)	18.0 (55)	0.002	24.6 (15)	25.0 (93)	0.945
Wait and see	77.0 (408)	94.3 (263)	94.8 (290)	0.788	86.7 (52)	95.7 (356)	0.005
Self medication	37.8 (201)	45.2 (126)	48.7 (149)	0.393	13.3 (8)	51.7 (193)	0.000
Financial problem	38.7 (205)	41.2 (115)	58.8 (180)	0.000	29.5 (18)	50.4 (188)	0.002
Husband was absent at home	0.7 (4)	0.0	2.3 (7)	0.011	0.0	1.1 (4)	0.420
Accompany person absent at home	0.8 (4)	0.0	2.6 (8)	0.007	0.0	1.1 (4)	0.420
Belief of not taking medicine before 3 days of disease	3.9 (21)	3.6 (10)	6.9 (21)	0.077	6.7 (4)	6.7 (17)	0.480
Belief of fever due to pregnancy	0.4 (2)	0.0	1.3 (4)	0.055	1.6 (1)	0.5 (2)	0.335
Husband/mother-in-law opposed to meet doctor	0.5 (3)	0.0	1.6 (5)	0.032	0.0	0.8 (3)	0.486
Cases evaluated	432 (weighted)	585 (not weighted)			433 (weighted)		

Annex 7.20: Patient's health care seeking delay group in days bar chart (Weighted 530 cases by gender)



Annex 7.21: Percentage and (number) of cause wise health care seeking delay factors (Weighted 530 cases by gender)

Factors	**First** cause	**Second** cause	**Third** cause	**Fourth** cause
Negligence	23.8 (103)	-	-	-
Wait and see	74.0 (320)	25.9 (91)	-	-
Self medication	1.0 (5)	47.2 (166)	21.7 (32)	-
Financial problem	0.9 (4)	24.0 (85)	68.8 (102)	71.4 (18)
Husband was absent at home	-	0.1 (1)	1.4 (2)	2.0 (1)
Accompany person absent at home	0.1 (1)	0.3 (1)	0.7 (1)	6.1 (2)
Belief of not taking medicine before 3 days of disease	0.1 (1)	1.8 (7)	6.1 (9)	14.3 (4)
Belief of fever due to pregnancy	-	0.4 (3)	0.3 (1)	2.0 (1)
Husband/mother-in-law opposed to meet doctor	-	0.1 (1)	1.0 (2)	4.1 (1)

Annex 7.22: Cross-table of health care seeking delay groups and first cause of contacting late (Weighted 530 cases by gender)

Care seking delay group	**First cause facors (Row percentage)**						**Significance**	
	Negli-gence	Wait and see	Self medi-cation	Finan-cial problem	Accompany-able person absent at home	Belief of not taking medicine before 3 days of disease	Cramer's V	P. Chi-squire
3-9	20.0 (59)	76.9 (227)	1.4 (4)	1.0 (3)	0.3 (1)	0.3 (1)	0.108	0.438
10-28	30.2 (32)	67.9 (72)	0.9 (1)	0.9 (1)	0.0	0.0		
30-84	33.3 (11)	63.6 (21)	0.0	3.0 (1)	0.0	0.0		
168-243	100.0 (2)	0.0	0.0	0.0	0.0	0.0		
Total	23.9 (104)	73.4 (320)	1.1 (5)	1.1 (5)	0.2 (1)	0.2 (2)		

Annex 7.23: Cross tabulation of health care seeking delay groups and number of causes (Coloum percentage - Weighted 530 cases by gender)

Care seking delay group (days)	**Total number of causes mentioned by the patients**				**Significance**	
	One cause	Two causes	Three causes	Four causes	Cramer's V	P.Chi-squire
3-9	90.1 (73)	68.0 (140)	56.9 (70)	40.0 (10)	0.187	0.000
10-28	8.6 (7)	25.2 (52)	31.7 (39)	32.0 (8)		
30-84	1.2 (1)	6.3 (13)	11.4 (14)	24.0 (6)		
168-243	0.0	0.5 (1)	0.0	4.0 (1)		
Total	100.0 (150)	100.0 (206)	100.0 (282)	100.0 (25)		

Annex 7.24: Total, gender and urban-rural area wise percentage of perception of the patients regarding tuberculosis disease (Weighted 530 cases except gender)

Perceptions	Total percent	Gender			Urban-Rural		
		Male	Female	Signi	Urban	Rural	Signi
Not curable	2.4 (13)	3.1 (11)	0.8 (3)	0.030	9.3 (7)	1.3 (6)	0.000
A awful disease	96.5 (512)	96.0 (339)	95.5 (345)	0.286	80.3 (61)	99.1 (451)	0.000
Infectious disease	52.3 (277)	53.8 (190)	49.2 (174)	0.214	68.0 (51)	49.7 (226)	0.003
Heredity	37.0 (196)	32.9 (116)	45.2 (160)	0.001	26.7 (20)	38.7 (176)	0.046
Should not got married to a diseased person	16.3 (87)	16.1 (57)	16.7 (59)	0.852	4.0 (3)	18.4 (84)	0.002
Disease of the King	31.4 (167)	32.6 (115)	29.1 (103)	0.316	13.2 (10)	34.5 (157)	0.000
Contagious disease	30.2 (160)	28.9 (102)	32.8 (116)	0.265	9.2 (7)	33.8 (154)	0.000
Normal/cough related disease	0.4 (2)	0.3 (1)	0.3 (1)	0.998	2.6 (2)	0.0	0.001
Cases evaluated	530 (weighted)	707 (not weighted)			530 (weighted)		

Annex 7.25: Cross tabulation of health care seeking delay groups and patient's first perception about tuberculosis disease (Weighted 530 cases by gender)

Delay groups	Patient's first perception about TB disease (Coloum percentage)						Significance	
	Not curable	A awful disease	Infectious disease	Heredity	Disease of king	Normal/cough related disease	Cramer's V	Chi-squire
1-2	12.5 (2)	18.5 (19)	22.2 (2)	33.3 (1)	0.0	0.0	0.065	0.981
3-9	62.5 (10)	54.8 (376)	66.7 (6)	66.7 (2)	0.0	100.0 (1)		
10-28	18.8 (3)	21.7 (102)	0.0	0.0	100.0 (1)	0.0		
30-84	6.3 (1)	6.2 (31)	11.1 (1)	0.0	0.0	0.0		
168-243	0.0	0.4 (2)	0.0	0.0	0.0	0.0		
Total	100.0 (16)	100.0 (504)	100.0 (9)	100.0 (3)	100.0 (1)	100.0 (1)		

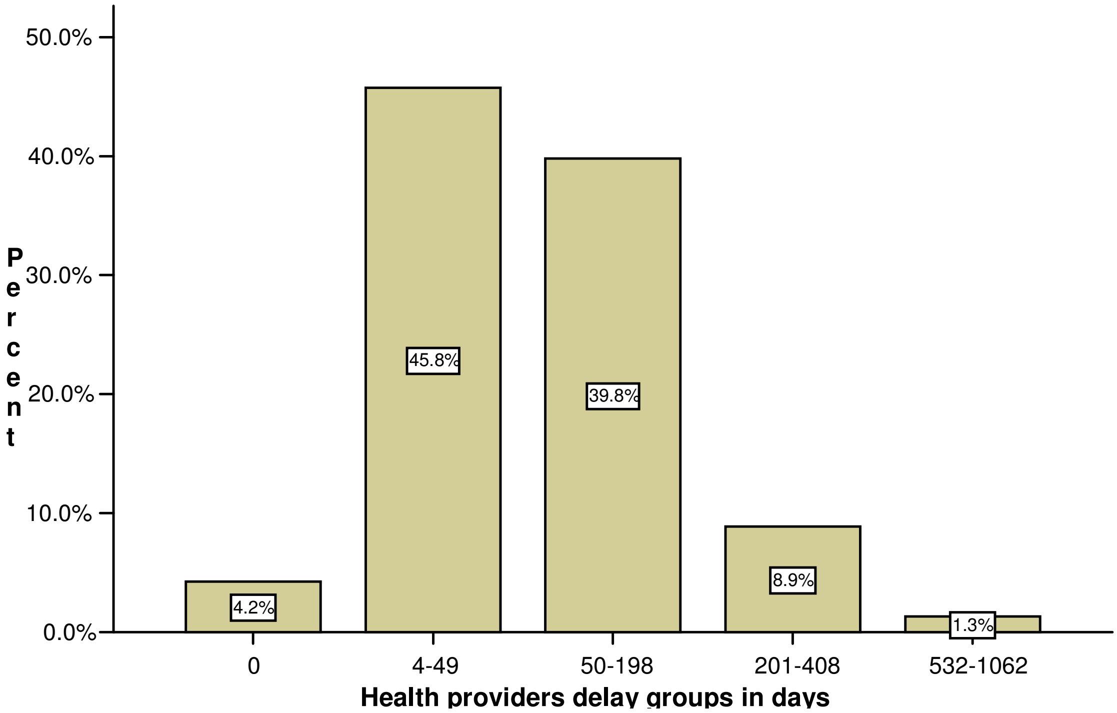
Annex 7.26: Patients socio-demographic and economic characteristics wise health seeking delay groups cross-table (Evaluated 530 weighted cases for all variables except gender)

Socioeconomic factors	Health seeking delays in days (row percentage)						Cramer's V	Chi-square
	1-2	3-9	10-28	30-84	168-243	Total		
Education								
Illiterate	15.4 (21)	52.9 (72)	23.5 (32)	7.4 (10)	0.7 (1)	100.0 (136)	0.077	0.686
Only sign	15.0 (20)	60.9 (81)	19.5 (26)	4.5 (6)	0.0	100.0 (133)		
Class I-V	18.1 (23)	54.3 (69)	18.9 (24)	7.9 (10)	0.8 (1)	100.0 (127)		
Class VI-X	25.2 (29)	51.3 (59)	17.4 (20)	6.1 (7)	0.0	100.0 (115)		
Class XI-XIV	30.4 (7)	52.2 (12)	13.0 (3)	4.3 (1)	0.0	100.0 (23)		
Personal income quintile								
1st Quintile	11.4 (4)	60.0 (21)	22.9 (8)	5.7 (2)	0.0	100.0 (35)	0.126	0.006
2nd Quintile	12.5 (16)	56.3 (72)	23.4 (30)	7.8 (10)	0.0	100.0 (128)		
3rd Quintile	14.2 (17)	55.0 (66)	21.7 (26)	8.3 (10)	0.8 (1)	100.0 (120)		
4th Quintile	14.4 (16)	56.8 (63)	22.5 (25)	6.3 (7)	0.0	100.0 (111)		
5th Quintile	33.1 (46)	51.1 (71)	12.2 (17)	2.9 (4)	0.7 (1)	100.0 (139)		

Annex 7.27: Total, mean and median number of providers and percentage of patients contacted the number of providers (Weighted 530 cases by gender)

Number of providers contacted	Percent	Valid Percent	Mean contacted person	Median contacted person	Standard deviation	Minimum contacted person	Maximum contacted person
1	26.6 (141)	26.6	2.28	2.00	1.072	1	5
2	35.6 (189)	35.6					
3	24.1 (128)	24.1					
4	10.4 (55)	10.4					
5	3.4 (18)	3.4					
Total	100.0 (530)	100.0					

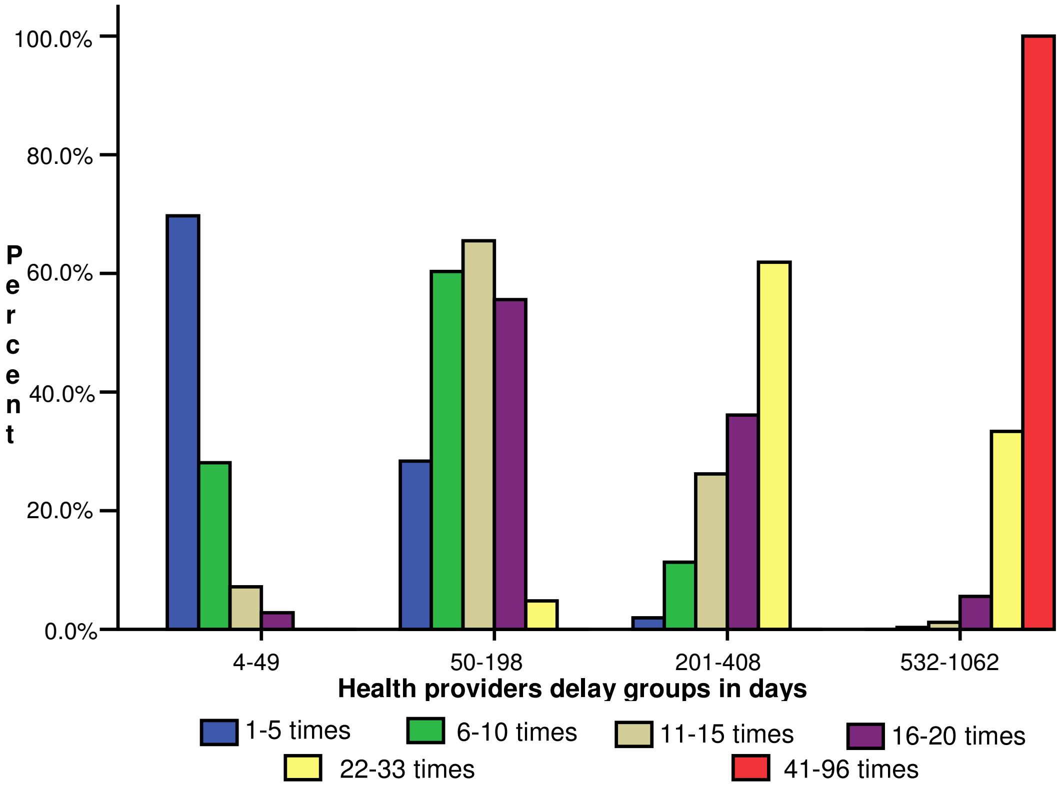
Annex 7.28: Health provider's delay groups in days (Weighted 530 cases by gender)



Annex 7.29: Total, mean and median times of providers and percentage of patients contacted the time groups of the providers (Weighted by gender)

Times contacted health providers	Percent	Valid Percent	Mean	Median	Standard deviation	Minimum	Maximum
1-5	52.9 (281)	55.3	6.55	5.00	6.38	1	96
6-10	29.2 (155)	30.5					
11-15	7.9 (42)	8.3					
16-20	3.4 (18)	3.58					
22-33	2.0 (11)	2.1					
41-96	0.3 (2)	0.3					
Missing System	4.2 (23)	-					
Grand total	100.0 (530)	-					

Annex 7.31: Patients' number of times contacted health provider wise health provider delay group's bar chart (Weighted 530 cases by gender)



Annex 7.30: Age group and family per capita income deciles wise mean and medians of health provider's delay among the study sample in days (Weighted 530 cases by gender)

Factors	Component	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Mini.	Max.
Age groups	15-19 years	88.70	144.43	Kruskal-Wallis Test-NS (0.400)	51.8	NPMT - NS (0.286)	0	1030
	20-24 years	85.79	97.24		44.0		0	362
	25-29 years	85.44	146.56		43.0		0	1062
	30-34 years	92.10	93.71		55.8		0	532
	35-39 years	82.68	106.68		42.0		0	716
	40-44 years	88.90	104.18		54.0		0	688
	45-49 years	81.10	79.06		51.0		0	357
	50-54 years	80.99	103.12		50.0		0	711
	55-59 years	117.20	170.18		51.3		0	723
	60-75 years	71.38	87.52		30.0		0	362
Marital status	Unmarried	66.80	105.28	ANOVA -NS (.226)	38.0	NPMT -NS (.226)	0	1030
	Married	88.37	111.57		51.0		0	1062
	Divorced	131.07	168.29		48.0		14	716
	Widowed	88.40	120.93		46.0		0	711

Continuation of Annex 7.30: Age group and family per capita income deciles wise mean and medians of health provider's delay among the study sample in days (Weighted 530 cases by gender)

Factors	Component	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Mini.	Max.
Educational status	Illiterate	92.93	119.10	ANOVA -NS (.710)	51.0	NPMT -NS (.099)	0	723
	Only sign	92.72	95.63		55.0		0	716
	Class I-V	80.70	91.08		50.0		0	533
	Class VI-X	83.69	147.19		40.0		0	1062
	Class XI-XIV	63.69	84.49		29.0		0	356
Family income deciles before illness	1st Deciles	121.42	155.67	Kruskal-Wallis Test -NS (0.550)	52.5	NPMT -NS (0.922)	12	723
	2nd Deciles	85.77	105.97		45.0		0	540
	3rd Deciles	92.43	108.78		53.5		0	688
	4th Deciles	89.51	102.11		56.0		0	716
	5th Deciles	77.80	124.18		44.0		0	1030
	6th Deciles	76.09	83.79		44.5		0	359
	7th Deciles	86.01	89.43		51.0		0	408
	8th Deciles	84.97	113.85		51.0		0	717
	9th Deciles	73.48	84.36		51.0		0	360
	10th Deciles	85.27	153.39		44.0		0	1062

Annex 7.32: Patients age group and family per capita income deciles wise health provider's delay groups cross-table (Weighted 530 cases by gender)

Factors	Health providers' delays in days (row percentage)						Cramer's V	Chi-squire
	0	4-49	50-198	201-408	532-1062	Total		
Age groups								
15-19 years	3.6 (1)	39.3 (11)	50.0 (14)	3.6 (1)	3.6 (1)	100.0 (28)	0.104	0.946
20-24 years	5.5 (3)	49.1 (27)	32.7 (18)	12.7 (7)	0.0	100.0 (55)		
25-29 years	5.6 (4)	46.5 (33)	39.4 (28)	5.6 (4)	2.8 (2)	100.0 (71)		
30-34 years	2.9 (2)	39.7 (27)	42.6 (29)	13.2 (9)	1.5 (1)	100.0 (68)		
35-39 years	3.2 (2)	53.2 (33)	30.6 (19)	11.3 (7)	1.6 (1)	100.0 (62)		
40-44 years	5.7 (4)	35.7 (25)	47.1 (33)	8.6 (6)	2.9 (2)	100.0 (70)		
45-49 years	2.0 (1)	45.1 (23)	43.1 (22)	9.8 (5)	0.0	100.0 (51)		
50-54 years	4.0 (2)	44.0 (22)	42.0 (21)	8.0 (4)	2.0 (1)	100.0 (50)		
55-59 years	5.3 (2)	44.7 (17)	36.8 (14)	7.9 (3)	5.3 (2)	100.0 (38)		
60-75 years	6.0 (3)	56.0 (28)	28.0 (14)	10.0 (5)	0.0	100.0 (50)		

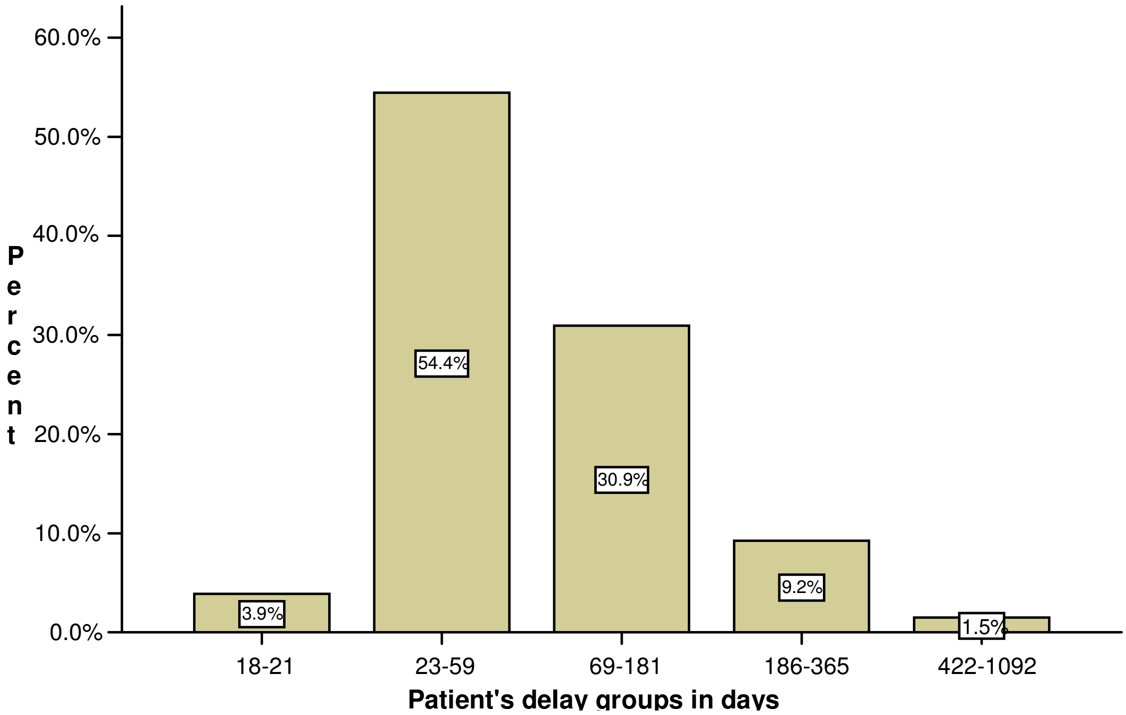
Continuation of Annex 7.32: Patients age group and family per capita income deciles wise health provider's delay groups cross-table (Weighted 530 cases by gender)

Factors	Health providers' delays in days (row percentage)						Cramer's V	Chi-squire
	0	4-49	50-198	201-408	532-1062	Total		
Marital status								
Unmarried	5.7 (4)	55.7 (39)	34.3 (24)	2.9 (2)	1.4 (1)	100.0 (70)	0.096	0.262
Married	4.3 (18)	43.5 (183)	41.6 (175)	9.5 (40)	1.2 (5)	100.0 (421)		
Divorced	0.0	53.3 (8)	20.0 (3)	20.0 (3)	6.7 (1)	100.0 (15)		
Widowed	3.4 (1)	48.3 (14)	34.5 (10)	10.3 (13)	3.4 (1)	100.0 (29)		
Educational status								
Illiterate	5.9 (8)	44.1 (60)	39.0 (53)	8.8 (12)	2.2 (3)	100.0 (136)	0.086	0.473
Only sign	3.0 (4)	38.8 (52)	44.8 (60)	12.7 (17)	0.7 (1)	100.0 (134)		
Class I-V	4.7 (6)	44.1 (56)	43.3 (55)	7.1 (9)	0.8 (1)	100.0 (127)		
Class VI-X	4.3 (5)	52.1 (61)	34.2 (40)	6.8 (8)	2.6 (3)	100.0 (117)		
Class XI-XIV	4.3 (1)	65.2 (15)	21.7 (5)	8.7 (2)	0.0	100.0 (23)		
Family income deciles before illness								
1st Deciles	0.0	46.8 (22)	34.0 (16)	14.9 (7)	4.3 (2)	100.0 (47)	0.105	0.940
2nd Deciles	8.0 (4)	44.0 (22)	38.0 (19)	8.0 (4)	2.0 (1)	100.0 (50)		
3rd Deciles	3.6 (2)	42.9 (24)	41.1 (23)	10.7 (6)	1.8 (1)	100.0 (56)		
4th Deciles	3.6 (2)	40.0 (22)	40.0 (22)	14.5 (8)	1.8 (1)	100.0 (55)		
5th Deciles	4.3 (2)	50.0 (23)	41.3 (19)	2.2 (1)	2.2 (1)	100.0 (46)		
6th Deciles	4.3 (2)	52.5 (32)	36.1 (22)	8.5 (5)	0.0	100.0 (61)		
7th Deciles	5.7 (3)	41.5 (22)	41.5 (22)	11.3 (6)	0.0	100.0 (53)		
8th Deciles	3.4 (2)	47.5 (28)	39.0 (23)	8.5 (5)	1.7 (1)	100.0 (59)		
9th Deciles	8.5 (5)	40.7 (24)	44.1 (26)	6.8 (4)	0.0	100.0 (59)		
10th Deciles	1.9 (1)	51.9 (28)	38.9 (21)	5.6 (3)	1.9 (1)	100.0 (54)		

Continuation of Annex 7.32: Patients age group and family per capita income deciles wise health provider's delay groups cross-table (Weighted 530 cases by gender)

Factors	Health providers' delays in days (row percentage)						Cramer's V	Chi-squire
	0	4-49	50-198	201-408	532-1062	Total		
Number of contacted health providers								
1 provider	16.1 (23)	62.9 (90)	18.9 (27)	2.1 (3)	0.0	100.0 (264)	0.295	0.000
2 providers	0.0	56.3 (107)	37.4 (71)	5.3 (10)	1.1 (2)	100.0 (190)		
3 providers	0.0	30.2 (39)	52.7 (68)	14.7 (19)	2.3 (3)	100.0 (129)		
4 providers	0.0	10.9 (6)	70.9 (39)	16.4 (9)	1.8 (1)	100.0 (55)		
5 providers	0.0	10.5 (2)	42.1 (8)	36.8 (7)	10.5 (2)	100.0 (19)		
Times contacted health providers								
1-5 times	-	69.5 (196)	28.4 (80)	2.1 (6)	0.0	100.0 (282)	0.486	0.000
6-10 times	-	28.0 (44)	59.9 (94)	11.5 (18)	0.6 (1)	100.0 (157)		
11-15 times	-	7.0 (3)	65.1 (28)	25.6 (11)	2.3 (1)	100.0 (43)		
16-20 times	-	5.3 (1)	52.6 (10)	36.8 (7)	5.3 (1)	100.0 (19)		
22-33 times	-	0.0	8.3 (1)	58.3 (7)	33.3 (4)	100.0 (12)		
41-96 times	-	0.0	0.0	0.0	100.0 (2)	100.0 (2)		

Annex7.33: Total patients delay group bar chart (Weighted 530 cases by gender)



Annex 7.34. First, second and third contacted health provider wise health provider's mean delay with One-Way ANOVA test (Weighted 530 cases by gender)

Contacted providers	First contacted		Second contacted		Third contacted	
	Mean	ANOVA	Mean	ANOVA	Mean	ANOVA
Spritual Healer	89.89	0.000	174.61	0.000	261.33	0.022
Harbal Practioner (Kabiraj)	285.00		169.45		231.84	
Pharmasist/drug store	94.49		161.03		163.33	
Village doctor (allopath)	98.30		134.02		148.22	
Village doctor (homiopath)	196.47		247.20		283.11	
Private practitioner (MBBS)	87.43		83.05		130.89	
UHC/NGO clinic	26.36		34.83		144.92	
Private hospital	55.00		122.67		71.44	
Medical assictant/FWV	61.00		153.25		55.26	
District hospital	90.00		34.00		-	
Chest Disease Clinic (CDC)	-		71.00		72.78	
Medical college hospital	-		183.67		119.69	
Total	96.10		113.15		145.44	

Annex 7.35: First contacted health provider wise total patient's delay groups' cross-tabulation (Weighted 530 cases by gender)

First contacted health providers	Total patient's delay groups (Column percentage)					Significance	
	18-21	23-59	69-181	186-365	422-1092	Cram. V	Chi-squire
Spritual Healer	0.0	0.3 (1)	2.4 (4)	0.0	0.0	0.340	0.000
Harbal Practioner	0.0	0.3 (1)	0.0	3.9 (2)	0.0		
Pharmasist	4.5 (1)	40.7 (118)	44.3 (74)	43.1 (22)	11.1 (1)		
Village doctor (allo)	9.1 (2)	31.7 (92)	31.1 (52)	29.4 (15)	444.4 (4)		
Village doctor (hom)	0.0	19.3 (56)	4.2 (7)	9.8 (5)	33.3 (3)		
Private practitioner	13.6 (3)	3.1 (9)	15.6 (26)	13.7 (7)	11.1 (1)		
UHC/NGO clinic	63.6 (14)	0.7 (2)	0.6 (1)	0.0	0.0		
Private hospital	4.5 (1)	0.7 (2)	0.6 (1)	0.0	0.0		
Medical assit./FWV	4.5 (1)	0.0	0.6 (1)	0.0	0.0		
District hospital	0.0	0.0	0.6 (1)	0.0	0.0		
Total	100.0 (22)	100.0 (290)	100.0 (167)	100.0 (51)	100.0 (9)		

Annex 7.36: Urban-rural gender age group, family income and family per capita income deciles wise mean and medians of total patients delay among the study sample in days (Evaluated weighted 530 cases for all variables except gender)

Factors	Component	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Mini.	Max.
Urban	Male	102.57	93.92	ANOVA -NS (.865)	73	NPMT -NS (.625)	27	363
	Female	106.98	155.83		58		19	1031
Rural	Male	88.26	113.47	ANOVA -S (.033)	54	NPMT -S (.009)	18	1092
	Female	107.92	113.61		59		19	723
Age groups	15-19 years	96.70	143.88	Kruskal-Wallis Tes-NS (0.318)	58.0	NPMT -NS (0.790)	21	1031
	20-24 years	95.44	98.88		57.0		21	365
	25-29 years	93.21	148.58		53.5		21	1092
	30-34 years	100.65	94.29		58.8		18	546
	35-39 years	92.34	105.72		56.0		21	723
	40-44 years	96.71	104.23		58.0		21	718
	45-49 years	93.14	80.47		58.0		19	363
	50-54 years	89.43	103.47		54.8		19	715
	55-59 years	126.83	170.61		56.3		21	728
	60-75 years	84.37	97.85		38.0		19	363
Family monthly income deciles before illness	1st Deciles	129.52	156.05	Kruskal-Wallis Test -NS (0.463)	57.3	NPMT -NS (0.905)	23	728
	2nd Deciles	100.37	111.54		54.0		19	542
	3rd Deciles	101.59	110.07		58.0		21	718
	4th Deciles	97.94	101.57		57.8		21	723
	5th Deciles	87.43	122.53		57.5		21	1031
	6th Deciles	84.48	84.36		54.5		18	363
	7th Deciles	96.79	93.38		58.0		21	422
	8th Deciles	94.41	114.74		58.0		21	727
	9th Deciles	82.00	83.87		55.0		19	363
	10th Deciles	92.43	156.61		53.0		19	1092
Family monthly per capita income deciles before illness	1st Deciles	101.49	112.19	Kruskal-Wallis Test -NS (0.131)	58.0	NPMT -NS (0.097)	19	718
	2nd Deciles	111.20	142.21		57.0		21	728
	3rd Deciles	95.26	93.75		55.0		21	363
	4th Deciles	107.82	128.65		59.0		21	1031
	5th Deciles	89.20	96.00		58.0		19	715
	6th Deciles	115.03	144.19		57.0		21	727
	7th Deciles	105.92	94.03		86.5		20	362
	8th Deciles	74.54	97.39		43.0		18	723
	9th Deciles	98.72	152.79		57.0		19	1092
	10th Deciles	67.37	54.00		57.0		21	358

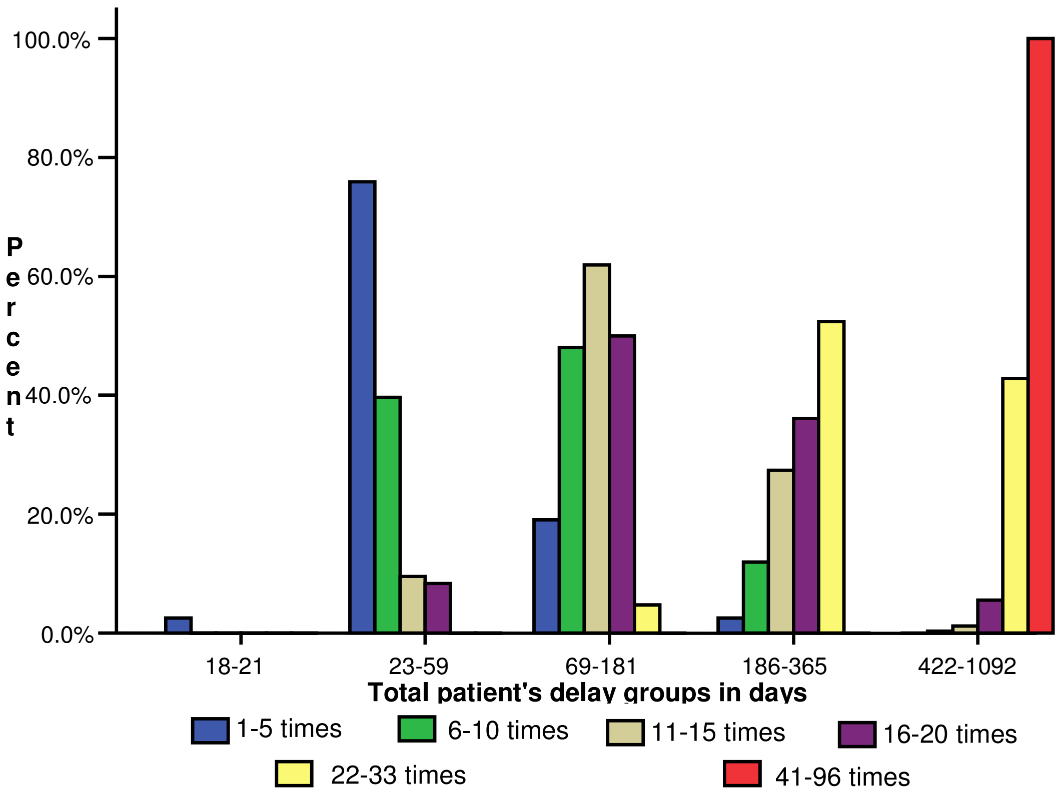
Annex 7.37: Patients urban-rural gender, age group, family income deciles wise total patients delay groups cross-table (Weighted 530 cases for all variables except gender)

Factors		Total patients' delay group in days (row percentage)						Cramer's V	Chi-squire
		18-21	23-59	69-181	186-365	422-1092	Total		
Urban-rural and gender									
Urban	Male	0.0	49.0 (24)	36.7 (18)	14.3 (7)	0.0	100.0 (49)	0.201	0.397
	Female	3.8 (2)	53.8 (28)	32.7 (17)	7.7 (4)	1.9 (1)	100.0 (52)		
Rural	Male	5.6 (17)	58.2 (177)	27.0 (82)	7.6 (23)	1.6 (5)	100.0 (304)	0.161	0.003
	Female	1.7 (5)	48.7 (147)	36.8 (111)	11.3 (34)	1.7 (5)	100.0 (302)		
Age groups									
15-19 years		3.6 (1)	53.6 (15)	35.7 (10)	3.6 (1)	3.6 (1)	100.0 (28)	0.112	0.850
20-24 years		3.6 (2)	55.4 (31)	28.6 (16)	12.5 (7)	0.0	100.0 (56)		
25-29 years		4.2 (3)	62.0 (44)	25.4 (18)	5.6 (4)	2.8 (2)	100.0 (71)		
30-34 years		5.8 (4)	44.9 (31)	34.8 (24)	13.0 (9)	1.4 (1)	100.0 (69)		
35-39 years		3.2 (2)	53.2 (33)	30.6 (19)	11.3 (7)	1.6 (1)	100.0 (62)		
40-44 years		2.9 (2)	51.4 (36)	34.3 (24)	8.6 (6)	2.9 (2)	100.0 (70)		
45-49 years		2.0 (1)	52.9 (27)	33.3 (17)	11.8 (6)	0.0	100.0 (51)		
50-54 years		4.0 (2)	52.0 (26)	34.0 (17)	8.0 (4)	2.0 (1)	100.0 (50)		
55-59 years		5.3 (2)	52.6 (20)	28.9 (11)	5.3 (2)	7.9 (3)	100.0 (38)		
60-75 years		10.0 (5)	58.0 (29)	20.0 (10)	12.0 (6)	0.0	100.0 (50)		
Family monthly incomee deciles before illness									
1st Deciles		0.0	54.2 (26)	27.1 (13)	14.6 (7)	4.2 (2)	100.0 (48)	0.106	0.928
2nd Deciles		6.0 (3)	54.0 (27)	26.0 (13)	12.0 (6)	2.0 (1)	100.0 (50)		
3rd Deciles		3.5 (2)	49.1 (28)	33.3 (19)	12.3 (7)	1.8 (1)	100.0 (57)		
4th Deciles		1.8 (1)	49.1 (27)	32.7 (18)	14.5 (8)	1.8 (1)	100.0 (55)		
5th Deciles		2.2 (1)	58.7 (27)	34.8 (16)	2.2 (1)	2.2 (1)	100.0 (46)		
6th Deciles		4.9 (3)	55.7 (34)	31.1 (19)	8.2 (5)	0.0	100.0 (61)		
7th Deciles		1.9 (1)	56.6 (30)	30.2 (16)	9.4 (5)	1.9 (1)	100.0 (53)		
8th Deciles		3.4 (2)	55.9 (33)	30.5 (18)	8.5 (5)	1.7 (1)	100.0 (59)		
9th Deciles		10.2 (6)	50.8 (30)	32.2 (19)	6.8 (4)	0.0	100.0 (59)		
10th Deciles		7.4 (4)	55.6 (30)	29.6 (16)	5.6 (3)	1.9 (1)	100.0 (54)		

Continuation of Annex 7.37: Patients family per capita income deciles, number and times contacted health providers wise total patients delay groups cross-table (Evaluated weighted 530 cases for all variables except gender)

Factors	Total patients' delay group in days (row percentage)						Cramer's V	Chi-squire
	18-21	23-59	69-181	186-365	422-1092	Total		
Family monthly per capita incomee deciles before illness								
1st Deciles	2.1 (1)	51.1 (24)	38.3 (18)	6.4 (3)	2.1 (1)	100.0 (47)	0.118	0.752
2nd Deciles	3.6 (2)	57.1 (32)	23.2 (13)	12.5 (7)	3.6 (2)	100.0 (56)		
3rd Deciles	3.8 (2)	57.7 (30)	26.9 (14)	11.5 (6)	0.0	100.0 (52)		
4th Deciles	1.9 (1)	50.0 (27)	33.3 (18)	11.1 (6)	3.7 (2)	100.0 (54)		
5th Deciles	6.2 (4)	52.3 (34)	32.3 (21)	7.7 (5)	1.5 (1)	100.0 (65)		
6th Deciles	4.4 (2)	51.1 (23)	28.9 (13)	11.1 (5)	4.4 (2)	100.0 (45)		
7th Deciles	3.8 (2)	43.4 (23)	32.1 (17)	20.8 (11)	0.0	100.0 (53)		
8th Deciles	6.4 (4)	62.1 (36)	24.1 (14)	5.2 (3)	1.7 (1)	100.0 (58)		
9th Deciles	3.6 (2)	50.9 (28)	38.2 (21)	5.5 (3)	1.8 (1)	100.0 (55)		
10th Deciles	3.7 (2)	63.0 (34)	29.6 (16)	3.7 (2)	0.0	100.0 (54)		
Number of contacted health providers								
1 provider	11.3 (16)	70.2 (99)	15.6 (22)	2.8 (4)	0.0	100.0 (141)	0.263	0.000
2 providers	2.6 (5)	65.8 (125)	25.3 (48)	5.3 (10)	1.1 (2)	100.0 (190)		
3 providers	0.0	39.5 (51)	42.6 (55)	14.7 (19)	3.1 (4)	100.0 (129)		
4 providers	0.0	19.6 (11)	60.7 (34)	17.9 (10)	1.8 (1)	100.0 (56)		
5 providers	0.0	15.0 (3)	35.0 (7)	40.0 (8)	10.0 (2)	100.0 (20)		
Times contacted health providers								
1-5 times	2.5 (7)	75.8 (213)	19.2 (54)	2.5 (7)	0.0	100.0 (281)	0.427	0.000
6-10 times	0.0	39.5 (62)	47.8 (75)	12.1 (19)	0.6 (1)	100.0 (157)		
11-15 times	0.0	9.3 (4)	60.5 (26)	27.9 (12)	2.3 (1)	100.0 (43)		
16-20 times	0.0	10.5 (2)	47.4 (9)	36.8 (7)	5.3 (1)	100.0 (19)		
22-33 times	0.0	0.0	8.3 (1)	50.0 (6)	41.7 (5)	100.0 (12)		
41-96 times	0.0	0.0	0.0	0.0	100.0 (2)	100.0 (2)		

Annex 7.38: Patients' number of times contacted health provider wise patient's delay group's bar chart (Weighted 530 cases by gender)



Annex 7.39: Pearson correlation coefficient test of patient's delay against health providers and health care seeking delay (Weighted 530 cases by gender)

Patient's, provider and health care seeking delay correlations

		Total patient's delay in days	Health provider's delay in days	Patient's health seeking delay in days
Total patient's delay in days	Pearson Correlation	1	.991(**)	.150(**)
	Sig. (2-tailed)		.000	.001
	N	530	530	530
Health provider's delay in days	Pearson Correlation	.991(**)	1	.016
	Sig. (2-tailed)	.000		.722
	N	530	530	530
Patient's health care seeking delay in days	Pearson Correlation	.150(**)	.016	1
	Sig. (2-tailed)	.001	.722	
	N	530	530	530

** Correlation is significant at the 0.01 level (2-tailed).

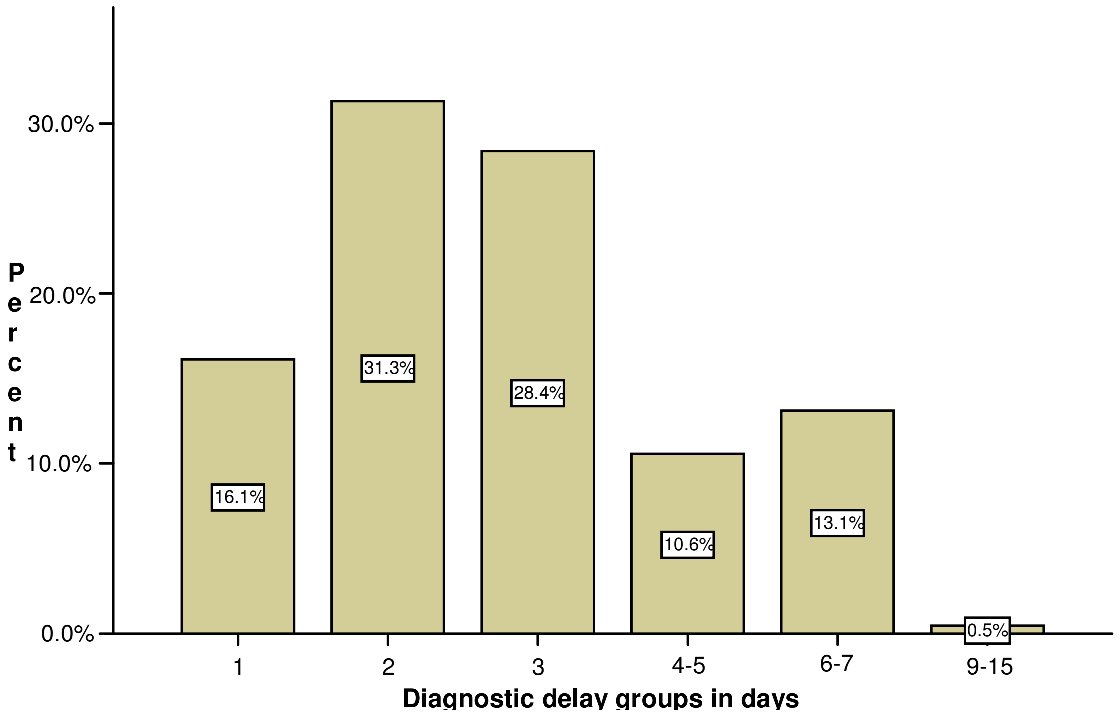
Continuation of Annex 7.39: Pearson correlation coefficient test of patient's delay against number and times contacted health providers by the patients (Weighted 530 cases by gender)

Number and times health provider contacted correlations

		Total patient's delay in days	Total number of providers contacted by the patients	Total times contacted health providers by patients
Total patient's delay in days	Pearson Correlation	1	.386(**)	.696(**)
	Sig. (2-tailed)		.000	.000
	N	530	530	508
Total number of providers contacted by the patients	Pearson Correlation	.386(**)	1	.452(**)
	Sig. (2-tailed)	.000		.000
	N	530	530	508
Total times contacted health providers by patients	Pearson Correlation	.696(**)	.452(**)	1
	Sig. (2-tailed)	.000	.000	
	N	508	508	508

** Correlation is significant at the 0.01 level (2-tailed).

Annex 7.40: Diagnostic delay groups' bar chart (Weighted 530 cases by gender)



Annex 7.41: Age group and family per capita income deciles wise mean and medians of diagnostic delay among the study sample in days (Weighted 530 cases by gender)

Factors	Component	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Minni	Maxi
Over All		3.05	1.86	-	3.0	-	1	15
Gender	Male	2.99	1.84	ANOVA -NS (.159)	2.0	NPMT -NS (.555)	1	10
	Female	3.18	1.89		3.0		1	15
Urban-Rural	Urban	2.27	0.89	ANOVA -S (.000)	2.0	NPMT -S (.000)	1	7
	Rural	3.18	1.94		3.0		1	15
Education	Illiterate	3.23	2.00	ANOVA -S (.029)	3.0	NPMT -S (.050)	1	12
	Only sign	3.22	1.82		3.0		1	7
	Class I-V	3.06	1.97		3.0		1	15
	Class VI-X	2.84	1.66		2.0		1	9
	Class XI-XIV	2.02	0.93		2.0		1	5
Marital status	Unmarried	2.63	1.62	ANOVA -S (.015)	2.0	NPMT -S (.005)	1	9
	Married	3.06	1.86		3.0		1	15
	Divorced	4.32	2.57		3.5		1	10
	Widowed	3.29	1.65		3.0		1	7
Age groups	15-19 years	2.85	1.65	Kruskal-Wallis Tes-NS (0.155)	2.7	NPMT -NS (0.441)	1	7
	20-24 years	3.06	1.69		3.0		1	9
	25-29 years	3.07	1.97		3.0		1	7
	30-34 years	2.59	1.84		2.0		1	15
	35-39 years	3.30	1.97		3.0		1	7
	40-44 years	3.07	1.99		2.5		1	12
	45-49 years	3.21	1.80		3.0		1	10
	50-54 years	3.51	1.85		3.0		1	7
	55-59 years	2.69	1.39		2.7		1	7
	60-75 years	3.07	2.00		3.0		1	7
Family income deciles before illness	1st Deciles	3.82	2.05	Kruskal-Wallis Tes-S (0.022)	3.0	NPMT -NS (0.096)	1	7
	2nd Deciles	2.63	1.37		2.0		1	7
	3rd Deciles	3.08	1.85		3.0		1	12
	4th Deciles	3.22	1.94		3.0		1	7
	5th Deciles	3.21	1.86		3.0		1	7
	6th Deciles	3.05	1.89		3.0		1	10
	7th Deciles	3.15	2.16		3.0		1	15
	8th Deciles	2.94	1.79		2.0		1	7
	9th Deciles	2.97	1.76		3.0		1	9
	10th Deciles	2.55	1.68		2.0		1	7

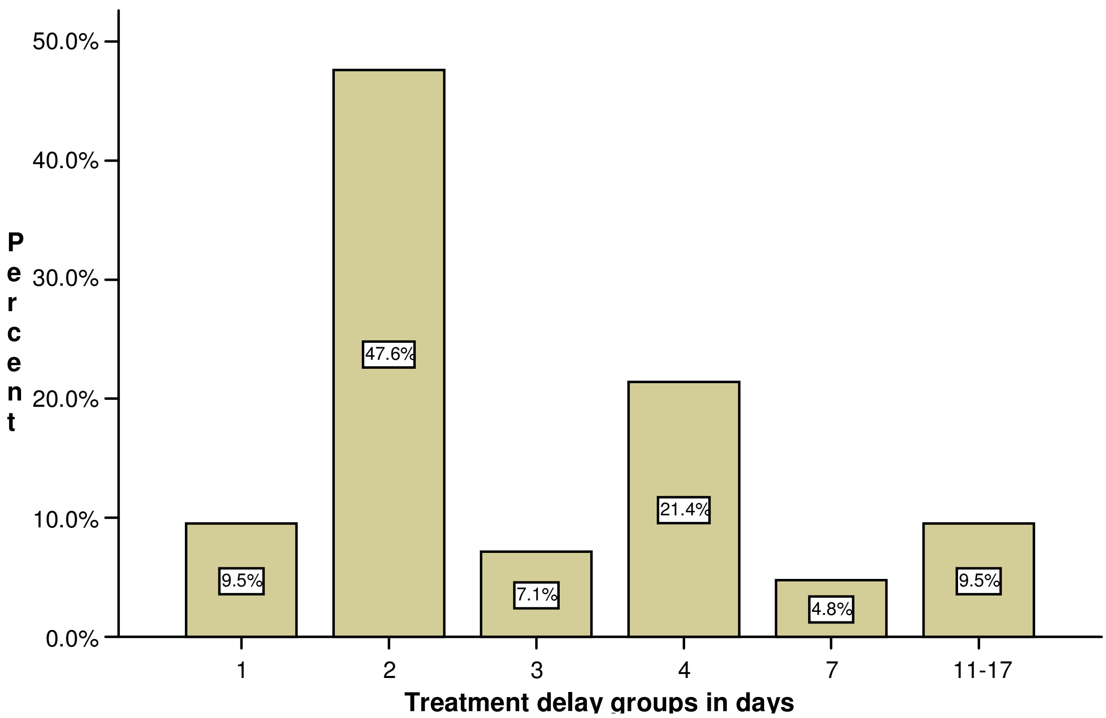
Annex 7.42: Patients gender, urban-rural, education, marital status and age group wise diagnostic delay groups' cross-table (Weighted 530 cases by gender)

Socioeconomic factors	Diagnostic delays in days (row percentage)							Cramer's V	Chi-squar
	1	2	3	4-5	6-7	9-15	Total		
Gender									
Male	18.1 (64)	32.3 (114)	26.1 (92)	9.6 (34)	13.6 (48)	0.3 (1)	100.0 (353)	0.120	0.072
Female	12.1 (43)	29.4 (104)	33.1 (117)	12.4 (44)	12.1 (43)	0.6 (3)	100.0 (354)		
Urban-rural									
Urban	21.1 (16)	34.2 (26)	42.1 (32)	1.3 (1)	1.3 (1)	0.0	100.0 (76)	0.215	0.000
Rural	15.3 (70)	30.9 (141)	26.0 (119)	12.0 (55)	15.1 (69)	0.7 (3)	100.0 (455)		
Education									
Illiterate	15.3 (21)	31.4 (43)	25.5 (35)	8.8 (12)	18.2 (25)	0.7 (1)	100.0 (137)	0.104	0.282
Only sign	14.2 (19)	25.4 (34)	32.1 (43)	13.4 (18)	14.9 (20)	0.0	100.0 (134)		
Class I-V	17.3 (22)	30.7 (39)	26.0 (33)	13.4 (17)	11.0 (14)	1.6 (2)	100.0 (127)		
Class VI-X	16.2 (19)	34.2 (40)	31.6 (37)	6.8 (8)	10.3 (12)	0.9 (1)	100.0 (117)		
Class XI-XIV	29.2 (7)	45.8 (11)	16.7 (4)	8.3 (2)	0.0	0.0	100.0 (24)		
Marital status									
Unmarried	21.4 (15)	37.1 (26)	24.3 (17)	8.6 (6)	7.1 (5)	1.4 (1)	100.0 (70)	0.120	0.084
Married	16.1 (68)	30.8 (130)	24.8 (120)	10.4 (44)	14.0 (59)	0.2 (1)	100.0 (422)		
Divorced	13.3 (2)	13.2 (2)	26.7 (4)	20.0 (3)	20.0 (3)	6.7 (1)	100.0 (15)		
Widowed	6.8 (2)	27.6 (8)	37.9 (11)	13.8 (4)	13.8 (4)	0.0	100.0 (29)		
Age groups									
15-19 years	14.8 (4)	33.3 (9)	33.3 (9)	7.4 (2)	11.1 (3)	0.0	100.0 (26)	0.123	0.640
20-24 years	10.7 (6)	37.5 (21)	25.0 (14)	14.3 (8)	10.7 (6)	1.8 (1)	100.0 (56)		
25-29 years	22.5 (16)	25.4 (18)	26.8 (19)	9.9 (7)	15.5 (11)	0.0	100.0 (71)		
30-34 years	23.5 (16)	35.3 (24)	27.9 (19)	5.9 (4)	5.9 (4)	1.5 (1)	100.0 (68)		
35-39 years	16.1 (10)	24.2 (15)	30.6 (19)	9.7 (6)	19.4 (12)	0.0	100.0 (62)		
40-44 years	17.4 (12)	31.9 (22)	26.1 (18)	10.1 (7)	13.0 (9)	1.4 (1)	100.0 (69)		
45-49 years	5.9 (3)	37.3 (19)	27.5 (14)	17.6 (9)	9.8 (5)	2.0 (1)	100.0 (51)		
50-54 years	8.2 (4)	24.5 (12)	36.7 (18)	8.2 (4)	22.4 (11)	0.0	100.0 (49)		
55-59 years	18.4 (7)	31.6 (12)	28.9 (11)	15.8 (6)	5.3 (2)	0.0	100.0 (38)		
60-75 years	18.0 (9)	34.0 (17)	24.0 (12)	6.0 (3)	18.0 (9)	0.0	100.0 (50)		

Continuation of Annex 7.42: Patients family income deciles wise diagnostic delay groups' cross-table (Weighted 530 cases by gender)

Socioeconomic factors	Diagnostic delays in days (row percentage)							Cramer's V	Chi-squar
	1	2	3	4-5	6-7	9-15	Total		
Family income deciles before illness									
1st Deciles	10.4 (5)	18.8 (9)	33.3 (16)	10.4 (5)	27.1 (13)	0.0		0.112	0.890
2nd Deciles	17.6 (9)	35.3 (18)	41.4 (16)	9.8 (5)	5.9 (3)	0.0			
3rd Deciles	12.5 (7)	33.9 (19)	26.8 (15)	14.3 (8)	10.7 (6)	1.8 (1)			
4th Deciles	14.8 (8)	29.6 (16)	27.8 (15)	9.3 (5)	18.5 (10)	0.0			
5th Deciles	17.4 (8)	21.7 (10)	32.6 (15)	13.0 (6)	15.2 (7)	0.0			
6th Deciles	13.1 (8)	36.1 (22)	27.9 (17)	11.5 (7)	9.8 (6)	1.6 (1)			
7th Deciles	16.7 (9)	31.5 (17)	24.1 (13)	11.1 (6)	14.8 (8)	1.9 (1)			
8th Deciles	18.6 (11)	32.2 (19)	25.4 (15)	11.9 (7)	11.9 (7)	0.0			
9th Deciles	15.3 (9)	33.9 (20)	28.8 (17)	10.2 (6)	10.2 (6)	1.7 (1)			
10th Deciles	27.8 (15)	33.3 (18)	24.1 (13)	5.6 (3)	9.3 (5)	0.0			

Annex 7.43: Treatment delay groups' bar chart (Weighted 530 cases by gender)



Annex 7.44: Gender, urban-rural, education, marital status, age groups and family income deciles wise mean and medians of treatment delay among the study sample in days (Weighted 530 cases by gender)

Factors	Components	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Minni	Maxi
Over All		3.64	3.35	-	2.0	-	1	17
Gender	Male	3.00	2.76	ANOVA -NS (.311)	2.0	NPMT -NS (.081)	1	11
	Female	4.35	3.82		4.0		1	17
Urban-Rural	Urban	2.67	1.63	ANOVA -NS (.721)	3.0	NPMT -NS (.962)	2	4
	Rural	3.72	3.46		2.0		1	17
Education	Illiterate	4.00	4.90	ANOVA -NS (0.557)	2.0	NPMT -NS (0.253)	1	17
	Only sign	2.50	1.14		2.0		1	4
	Class I-V	5.00	3.44		4.0		2	11
	Class VI-X	2.00	0.0		2.0		2	2
	Class XI-XIV	-	-		-		-	-
Marital status	Unmarried	6.50	6.36	ANOVA -S (0.048)	6.5	NPMT -NS (0.396)	2	11
	Married	2.73	1.47		2.0		1	7
	Divorced	10.50	-		-		4	17
	Widowed	5.33	7.26		7.5		1	11
Age groups	15-19 years	5.60	5.69	Kruskal-Wallis Tes-NS (0.770)	4.25	NPMT -NS (0.775)	2.0	11
	20-24 years	3.00	-		-		2.0	4
	25-29 years	3.80	3.37		3.5		2.0	7
	30-34 years	3.00	-		-		2.0	4
	35-39 years	7.50	8.16		7.0		2.0	17
	40-44 years	2.29	0.83		2.0		2.0	4
	45-49 years	2.33	0.82		2.5		2.0	3
	50-54 years	3.14	3.97		1.8		1.0	11
	55-59 years	3.00	1.41		3.3		1.0	4
	60-75 years	2.00	-		-		2.0	2
Family income deciles before illness	1st Deciles	5.37	3.84	Kruskal-Wallis Test -NS (0.845)	2.5	NPMT -NS (0.913)	1.0	11
	2nd Deciles	2.00	1.00		2.0		1.0	3
	3rd Deciles	2.40	1.03		2.0		2.0	4
	4th Deciles	5.40	7.55		3.0		2.0	17
	5th Deciles	5.00	5.20		2.0		2.0	11
	6th Deciles	2.67	1.63		3.0		2.0	4
	7th Deciles	3.50	2.21		3.0		7.0	7
	8th Deciles	7.00	0.00		7.0		7.0	7
	9th Deciles	4.00	0.00		4.0		4.0	4
	10th Deciles	2.75	1.54		3.0		1.0	4

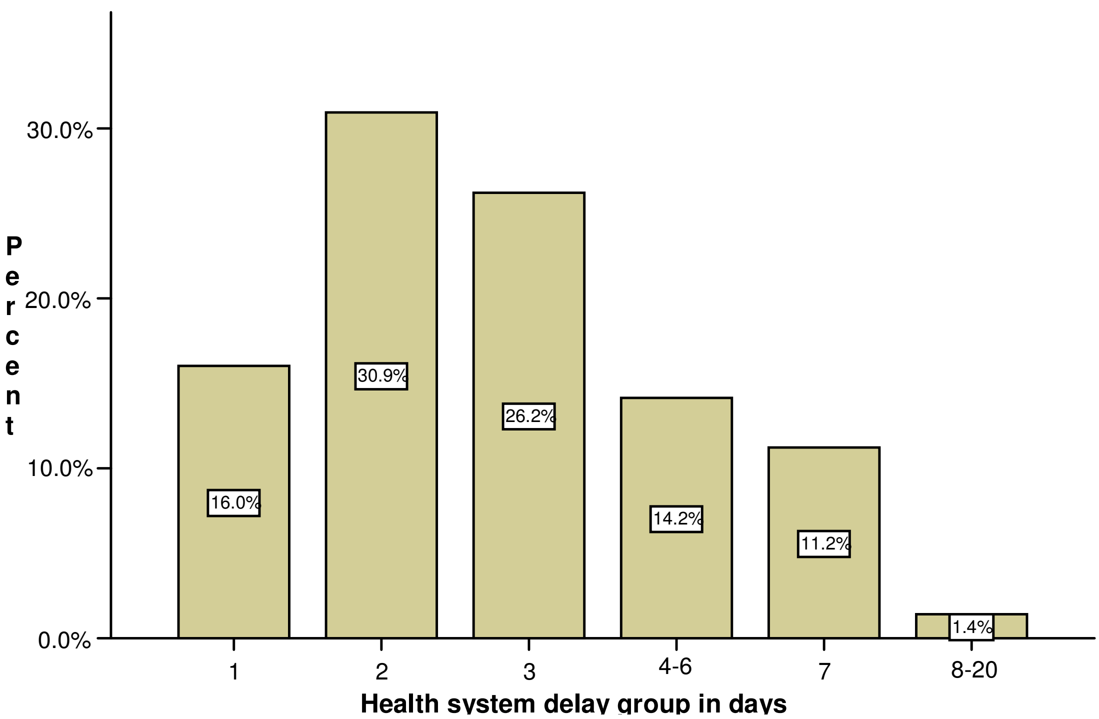
Annex 7.45: Patients gender, urban-rural, education, marital status, age groups wise treatment delay groups' cross-table (Weighted 530 cases by gender)

Socioeconomic factors	Treatment delays in days (row percentage)							Cramer's V	Chi-square
	1	2	3	4	7	11-17	Total		
Gender									
Male	9.1 (1)	63.6 (7)	9.1 (1)	9.1 (1)	0.0	9.1 (1)	100.0 (11)	0.404	0.409
Female	10.0 (2)	30.0 (6)	5.0 (1)	35.0 (7)	10.0 (2)	10.0 (2)	100.0 (20)		
Urban-rural									
Urban	0.0	50.0 (1)	0.0	50.0 (1)	0.0	0.0	100.0 (2)	0.255	0.921
Rural	10.0 (2)	45.0 (9)	10.0 (2)	20.0 (4)	5.0 (1)	10.0 (2)	100.0 (20)		
Education									
Illiterate	14.3 (1)	57.1 (4)	0.0	14.3 (1)	0.0	14.3 (1)	100.0 (7)	0.350	0.886
Only sign	12.5 (1)	50.0 (4)	12.5 (1)	25.0 (2)	0.0	0.0	100.0 (8)		
Class I-V	0.0	28.6 (2)	14.3 (1)	28.6 (2)	14.3 (1))	14.3 (1)	100.0 (7)		
Class VI-X	0.0	100.0 (2)	0.0	0.0	0.0	0.0	100.0 (2)		
Marital status									
Unmarried	0.0	50.0 (1)	0.0	0.0	0.0	50.0 (1)	100.0 (2)	0.441	0.482
Married	11.1 (2)	50.0 (9)	11.1 (2)	22.2 (4)	5.6 (1)	0.0	100.0 (18)		
Divorced	0.0	0.0	0.0	50.0 (1)	0.0	50.0 (1)	100.0 (2)		
Widowed	33.3 (1)	0.0	0.0	33.3 (1)	0.0	33.3 (1)	100.0 (3)		
Age groups									
15-19 years	0.0	66.7 (2)	0.0	0.0	0.0	33.3 (1)	100.0 (3)	0.502	0.814
20-24 years	0.0	50.0 (1)	0.0	50.0 (1)	0.0	0.0	100.0 (2)		
25-29 years	0.0	33.3 (1)	0.0	33.3 (1)	33.3 (1)	0.0	100.0 (3)		
30-34 years	0.0	50.0 (1)	0.0	50.0 (1)	0.0	0.0	100.0 (2)		
35-39 years	0.0	25.0 (1)	0.0	25.0 (1)	25.0 (1)	25.0 (1)	100.0 (4)		
40-44 years	0.0	75.0 (3)	0.0	25.0 (1)	0.0	0.0	100.0 (4)		
45-49 years	0.0	50.0 (1)	50.0 (1)	0.0	0.0	0.0	100.0 (2)		
50-54 years	40.0 (2)	20.0 (1)	0.0	20.0 (1)	0.0	20.0 (1)	100.0 (5)		
55-59 years	33.3 (1)	0.0	33.3 (1)	33.3 (1)	0.0	0.0	100.0 (3)		
60-75 years	0.0	100.0 (1)	0.0	0.0	0.0	0.0	100.0 (1)		

Continuation of Annex 7.45: Patients family income deciles wise treatment delay groups' cross-table (Weighted 530 cases by gender)

Socioeconomic factors	Treatment delays in days (row percentage)							Cramer's V	Chi-square
	1	2	3	4	7	11-17	Total		
Family income decilesbefore illness									
1st Deciles	25.0 (1)	25.0 (1)	0.0	25.0 (1)	0.0	25.0 (1)	100.0 (4)	0.544	0.622
2nd Deciles	33.3 (1)	33.3 (1)	33.3 (1)	0.0	0.0	0.0	100.0 (3)		
3rd Deciles	0.0	66.7 (2)	0.0	33.3 (1)	0.0	0.0	100.0 (3)		
4th Deciles	0.0	50.0 (2)	0.0	25.0 (1)	0.0	25.0 (1)	100.0 (4)		
5th Deciles	0.0	66.7 (2)	0.0	0.0	0.0	33.3 (1)	100.0 (3)		
6th Deciles	0.0	50.0 (1)	0.0	50.0 (1)	0.0	0.0	100.0 (2)		
7th Deciles	0.0	50.0 (2)	0.0	25.0 (1)	25.1 (1)	0.0	100.0 (4)		
8th Deciles	0.0	0.0	0.0	0.0	100.0 (1)	0.0	100.0 (1)		
9th Deciles	0.0	0.0	0.0	100.0 (1)	0.0	0.0	100.0 (1)		
10th Deciles	33.3 (1)	0.0	33.3 (1)	33.3 (1)	0.0	0.0	100.0 (3)		

Annex 7.46: Health system delay groups' bar chart (Weighted 530 cases by gender)



Annex 7.47: Patients socio-demographic and income deciles wise mean and medians of health system delay among the study sample in days (Evaluated 530 weighted cases except gender)

Factors	Components	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Minni	Maxi
Over All		3.20	2.11	-	3.00	-	1	20
Gender	Male	3.08	1.988	ANOVA -S (.033)	2.00	NPMT -NS (.247)	1	14
	Female	3.43	2.325		3.00		1	20
Urban-Rural	Urban	2.33	1.01	ANOVA -S (.000)	2.00	NPMT -S (.000)	1	7
	Rural	3.34	2.21		3.00		1	20
Urban	Male	2.14	0.87	ANOVA -S (.009)	2.00	NPMT -S (.004)	1	5
	Female	2.69	1.16		3.00		1	7
Rural	Male	3.23	2.08	ANOVA -NS (.081)	3.00	NPMT -NS (.308)	1	14
	Female	3.55	2.45		3.00		1	20
Age groups	15-19 years	3.38	2.78	Kruskal-Wallis Tes-NS (0.133)	2.75	NPMT -NS (0.263)	1	14
	20-24 years	3.11	1.81		3.00		1	10
	25-29 years	3.21	2.17		3.00		1	10
	30-34 years	2.62	1.87		2.00		1	15
	35-39 years	3.55	2.58		3.00		1	20
	40-44 years	3.20	2.07		3.00		1	12
	45-49 years	3.28	1.86		3.00		1	10
	50-54 years	3.73	2.23		3.00		1	15
	55-59 years	2.89	1.69		2.75		1	7
	60-75 years	3.11	2.00		2.50		1	7
Education	Illiterate	3.42	2.44	ANOVA -S (0.015)	3.00	NPMT -S (0.007)	1	20
	Only sign	3.36	1.92		3.00		1	7
	Class I-V	3.29	2.34		3.00		1	15
	Class VI-X	2.87	1.68		2.00		1	9
	Class XI-XIV	2.02	0.93		2.00		1	5
Marital status	Unmarried	2.82	2.14	ANOVA -S (0.003)	2.00	NPMT -S (0.004)	1	14
	Married	3.17	1.98		3.00		1	15
	Divorced	5.07	3.99		4.50		1	20
	Widowed	3.58	2.34		3.00		1	15
Family income deciles before illness	1st Deciles	4.06	2.41	Kruskal-Wallis Test -S (0.015)	3.00	NPMT -S (0.043)	1	15
	2nd Deciles	2.71	1.42		2.00		1	7
	3rd Deciles	3.19	1.98		3.00		1	12
	4th Deciles	3.49	2.62		3.00		1	20
	5th Deciles	3.54	2.51		3.00		1	14
	6th Deciles	3.12	1.95		3.00		1	10
	7th Deciles	3.36	2.33		3.00		1	15
	8th Deciles	3.00	1.91		2.00		1	10
	9th Deciles	3.00	1.80		3.00		1	9
	10th Deciles	2.65	1.85		2.00		1	7
Family per capita income deciles before illness	1st Deciles	3.72	2.36	Kruskal-Wallis Test -NS (0.062)	3.00	NPMT -NS (0.066)	1	12
	2nd Deciles	3.53	2.03		3.00		1	7
	3rd Deciles	3.10	1.86		3.00		1	10
	4th Deciles	2.87	1.69		3.00		1	7
	5th Deciles	3.42	2.64		3.00		1	20
	6th Deciles	3.52	2.44		3.00		1	15
	7th Deciles	3.38	2.16		2.75		1	10
	8th Deciles	3.09	2.24		2.00		1	14
	9th Deciles	2.76	1.70		3.00		1	9
	10th Deciles	2.64	1.61		2.00		1	7

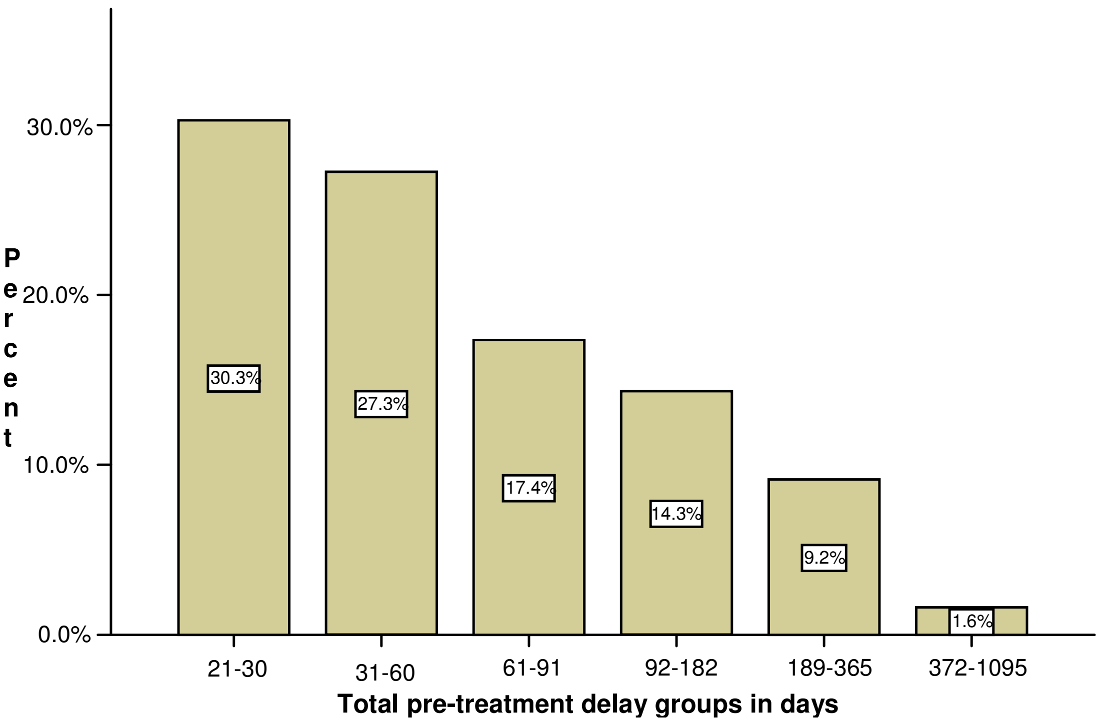
Annex 7.48: Patients gender, urban-rural, age group and marital status wise health system delay groups' cross-table (Evaluated 530 weighted cases except gender)

Socioeconomic factors		Health system delays in days (row percentage)							Cramer's V	Chi-squar
		1	2	3	4-6	7	8-20	Total		
Gender										
Male		18.1 (64)	32.0 (113)	24.4 (86)	13.6 (48)	11.0 (39)	0.8 (3)	100.0 (353)	0.123	0.060
Female		11.9 (42)	28.8 (102)	29.9 (106)	15.3 (54)	11.6 (41)	2.5 (9)	100.0 (354)		
Urban-rural										
Urban		21.1 (16)	34.2 (26)	40.8 (31)	2.6 (2)	1.3 (1)	0.0	100.0 (76)	0.221	0.000
Rural		15.3 (70)	30.2 (138)	23.9 (109)	16.0 (73)	12.9 (59)	1.8 (8)	100.0 (457)		
Urban-rural and gender										
Urban	Male	24.5 (12)	40.8 (20)	32.7 (16)	2.0 (1)	0.0	-	100.0 (49)	0.305	0.053
	Female	13.5 (7)	23.1 (12)	55.8 (29)	3.8 (2)	3.8 (2)	-	100.0 (52)		
Rural	Male	17.1 (52)	30.6 (93)	23.0 (70)	15.5 (47)	12.8 (39)	1.0 (3)	100.0 (304)	0.107	0.224
	Female	11.6 (35)	29.8 (90)	25.5 (77)	17.2 (52)	12.9 (39)	3.0 (9)	100.0 (302)		
Age groups										
15-19 years		14.8 (4)	33.3 (9)	25.9 (7)	11.1 (3)	11.1 (3)	3.7 (1)	100.0 (25)	0.115	0.826
20-24 years		10.9 (6)	38.2 (21)	25.5 (14)	18.2 (10)	5.5 (3)	1.8 (1)	100.0 (55)		
25-29 years		22.5 (16)	25.4 (18)	23.9 (17)	11.3 (8)	14.1 (10)	2.8 (2)	100.0 (71)		
30-34 years		23.9 (16)	34.3 (23)	28.4 (19)	7.5 (5)	4.5 (3)	1.5 (1)	100.0 (67)		
35-39 years		16.1 (10)	24.2 (15)	27.4 (17)	14.5 (9)	16.1 (10)	1.6 (1)	100.0 (62)		
40-44 years		17.1 (12)	31.4 (22)	22.9 (16)	14.3 (10)	12.9 (9)	1.4 (1)	100.0 (70)		
45-49 years		5.9 (3)	37.3 (19)	25.5 (13)	21.6 (11)	7.8 (4)	2.0 (1)	100.0 (51)		
50-54 years		7.8 (4)	23.5 (12)	31.4 (16)	19.6 (10)	15.7 (8)	2.0 (1)	100.0 (51)		
55-59 years		17.9 (7)	30.8 (12)	25.6 (10)	17.9 (7)	7.7 (3)	0.0	100.0 (39)		
60-75 years		18.0 (9)	32.0 (16)	24.0 (12)	10.0 (5)	16.0 (8)	0.0	100.0 (50)		
Marital status										
Unmarried		21.4 (15)	37.1 (26)	21.4 (15)	11.4 (8)	5.7 (4)	2.9 (2)	100.0 (70)	0.126	0.042
Married		16.1 (68)	30.3 (128)	26.5 (112)	14.2 (60)	12.1 (51)	0.9 (4)	100.0 (423)		
Divorced		13.3 (2)	13.3 (2)	20.0 (3)	20.0 (3)	20.0 (3)	13.3 (2)	100.0 (15)		
Widowed		6.9 (2)	27.6 (8)	34.5 (10)	17.2 (5)	10.3 (3)	3.4 (1)	100.0 (29)		

Continuation of Annex 7.48: Patients education and income deciles wise health system delay groups' cross-table (Evaluated 530 weighted cases except gender)

Socioeconomic factors	Health system delays in days (row percentage)							Cramer's V	Chi-squar
	1	2	3	4-6	7	8-20	Total		
Educational status									
Illiterate	15.3 (21)	29.9 (41)	24.8 (34)	13.9 (19)	13.9 (19)	2.2 (3)	100.0 (137)	0.10	0.237
Only sign	14.2 (19)	25.4 (34)	27.6 (37)	17.9 (24)	14.9 (20)	0.0	100.0 (134)		
Class I-V	16.5 (21)	30.7 (39)	23. (30)	15.7 (20)	10.2 (13)	3.1 (4)	100.0 (127)		
Class VI-X	16.2 (19)	34.2 (40)	30.8 (36)	10.3 (12)	7.7 (9)	0.9 (1)	100.0 (117)		
Class XI-XIV	29.2 (7)	45.8 (11)	16.7 (4)	8.3 (2)	0.0	0.0	100.0 (24)		
Family income deciles before illness									
1st Deciles	10.2 (5)	18.4 (9)	28.6 (14)	18.4 (9)	22.4 (11)	2.0 (1)	100.0 (49)	0.113	0.862
2nd Deciles	17.6 (9)	33.3 (17)	29.4 (15)	17.6 (9)	2.0 (1)	0.0	100.0 (51)		
3rd Deciles	12.5 (7)	33.9 (19)	25.0 (14)	19.6 (11)	7.1 (4)	1.8 (1)	100.0 (56)		
4th Deciles	14.5 (8)	29.1 (16)	25.5 (14)	14.5 (8)	12.7 (7)	3.6 (2)	100.0 (55)		
5th Deciles	17.4 (8)	21.7 (10)	28.3 (13)	15.2 (7)	15.2 (7)	2.2 (1)	100.0 (46)		
6th Deciles	13.1 (8)	36.1 (22)	26.2 (16)	11.5 (7)	11.5 (7)	1.6 (1)	100.0 (61)		
7th Deciles	16.7 (9)	29.6 (16)	20.4 (11)	18.5 (10)	13.0 (7)	1.9 (1)	100.0 (54)		
8th Deciles	18.3 (11)	31.7 (19)	25.0 (15)	13.3 (8)	10.0 (6)	1.7 (1)	100.0 (60)		
9th Deciles	15.0 (9)	33.3 (20)	28.3 (17)	11.7 (7)	10.0 (6)	1.7 (1)	100.0 (60)		
10th Deciles	27.3 (15)	32.7 (18)	23.6 (13)	3.6 (2)	12.7 (7)	0.0	100.0 (55)		
Family per capita income deciles before illness									
1st Deciles	12.5 (6)	25.0 (12)	22.9 (11)	18.8 (9)	16.7 (8)	4.2 (2)	100.0 (48)	0.130	0.446
2nd Deciles	12.3 (7)	26.3 (15)	26.3 (15)	17.5 (10)	17.5 (10)	0.0	100.0 (57)		
3rd Deciles	13.2 (7)	34.0 (18)	26.4 (14)	17.0 (9)	7.5 (4)	1.9 (1)	100.0 (53)		
4th Deciles	20.8 (11)	26.4 (14)	30.2 (16)	17.0 (9)	5.7 (3)	0.0	100.0 (53)		
5th Deciles	13.6 (9)	31.8 (21)	27.3 (18)	10.6 (7)	13.6 (9)	3.0 (2)	100.0 (66)		
6th Deciles	17.4 (8)	17.4 (8)	34.8 (16)	15.2 (7)	10.9 (5)	4.3 (2)	100.0 (46)		
7th Deciles	14.8 (8)	33.3 (18)	16.7 (9)	16.7 (9)	16.7 (9)	1.9 (1)	100.0 (54)		
8th Deciles	10.5 (6)	45.6 (26)	21.1 (12)	10.5 (6)	10.5 (6)	1.8 (1)	100.0 (57)		
9th Deciles	21.4 (12)	25.0 (14)	37.5 (21)	5.4 (3)	8.9 (5)	1.8 (1)	100.0 (56)		
10th Deciles	22.2 (12)	38.9 (21)	18.5 (10)	14.8 (8)	5.6 (3)	0.0	100.0 (54)		

Annex 7.49: Total pre-treatment delay groups' bar chart (Weighted 530 cases by gender)



Annex 7.50: Socio-demographic, economic and health factors wise total, mean and medians of total delay among the study sample in days (Evaluated 530 weighted cases except gender)

Factors	Compo-nents	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Minni	Maxi
Over All		99.32	114.79	-	60.00	-	21	1095
Gender	Male	93.33	111.151	ANOVA	60.00	NPMT	21	1095
	Female	111.21	121.004	-S (.041)	60.00	-S (.004)	21	1034
Urban-Rural	Urban	106.43	118.781	ANOVA	61.00	NPMT	22	1034
	Rural	98.12	114.213	-NS(.562)	60.00	-NS (.073)	21	1095
Education	Illiterate	107.54	121.371	ANOVA	60.00	NPMT	21	730
	Only sign	104.03	96.082	-NS (.641)	60.00	-S (.020)	21	730
	Class I-V	94.82	93.322		60.00		22	547
	Class VI-X	94.25	148.912		45.00		21	1095
	Class XI-XIV	72.84	83.174		45.00		22	365
Marital status	Unmarried	76.92	104.429	ANOVA	45.00	NPMT	24	1034
	Married	100.40	112.814	-NS (.132)	60.00	-NS (.218)	21	1095
	Divorced	149.00	167.641		91.00		30	730
	Widowed	112.51	132.016		60.00		22	730
Number of contacted health providers	1 provider	52.12	49.928	ANOVA	30.00	NPMT	21	365
	2 providers	82.08	96.137	-S (.000)	60.00	-S (.000)	21	1034
	3 providers	130.92	139.940		91.00		30	1095
	4 providers	156.95	121.381		122.00		30	730
	5 providers	249.03	176.962		213.00		30	730

Annex 7.51: Gender, age group and family income deciles wise mean and medians of total pre-treatment delay among the study sample in days (Evaluated 530 weighted cases except gender)

Factors	Component	Mean			Median		Delay range	
		Days	S.Devi	Signific.	Days	Signific.	Mini.	Max.
Urban	Male	104.71	93.983	ANOVA -NS (.848)	76.00	NPMT -NS (.380)	30	365
	Female	109.67	155.887		60.50		22	1034
Rural	Male	91.49	113.705	ANOVA -S (.031)	60.00	NPMT -S (.001)	21	1095
	Female	111.47	114.253		60.00		21	730
Age groups	15-19 years	100.08	143.749	Kruskal-Wallis Tes-NS (0.373)	60.00	NPMT -NS (0.512)	24	1034
	20-24 years	98.56	98.865		60.00		23	372
	25-29 years	96.42	148.941		60.00		24	1095
	30-34 years	103.27	94.717		60.50		21	547
	35-39 years	95.89	106.011		60.00		23	730
	40-44 years	99.91	104.935		60.00		24	730
	45-49 years	96.42	80.556		60.00		21	365
	50-54 years	93.16	104.710		60.00		21	730
	55-59 years	129.72	170.570		60.00		23	730
	60-75 years	87.48	98.205		45.00		22	365
Family income deciles before illness	1st Deciles	133.58	156.624	Kruskal-Wallis Test -NS (0.264)	60.00	NPMT -NS (0.848)	30	730
	2nd Deciles	103.08	111.727		60.00		21	547
	3rd Deciles	104.78	110.800		60.00		22	730
	4th Deciles	101.43	101.687		60.00		30	730
	5th Deciles	90.98	122.528		60.00		24	1034
	6th Deciles	87.59	84.651		60.00		21	365
	7th Deciles	100.14	94.098		60.00		24	425
	8th Deciles	97.41	114.921		60.00		24	730
	9th Deciles	85.00	83.870		60.00		22	365
	10th Deciles	95.08	156.853		60.00		22	1095
Family per capita income deciles before illness	1st Deciles	105.22	112.893	Kruskal-Wallis Test -NS (0.080)	60.00	NPMT -NS (0.155)	21	730
	2nd Deciles	115.73	142.193		60.00		22	730
	3rd Deciles	98.36	93.885		60.00		24	365
	4th Deciles	110.68	128.925		60.00		24	1034
	5th Deciles	92.62	96.867		60.00		22	730
	6th Deciles	118.56	144.387		60.00		24	730
	7th Deciles	109.30	94.563		91.00		21	365
	8th Deciles	77.63	97.741		45.00		21	730
	9th Deciles	101.48	152.771		60.00		22	1095
	10th Deciles	70.01	54.544		60.00		22	365
Times contacted health providers	1-5 times	59.89	53.955	Kruskal-Wallis Test -S (.000)	45.00	NPMT -S (.000)	21	372
	6-10 times	114.33	95.446		91.00		30	1034
	11-15 times	165.94	107.302		122.00		30	547
	16-20 times	230.33	123.602		182.00		60	547
	22-33 times	472.10	203.334		365.00		91	730
	41-96 times	912.33	447.440		958.00		547	1095

Annex 7.52: Patients gender, urban-rural. Education and marital status wise total delay groups' cross-table (Evaluated 530 weighted cases except gender)

Factors		Total delay groups in days (row percentage)							Significance	
		21-30	31-60	61-91	92-182	189-365	372-1095	Total	Cramer's V	Chi-squire
Gender										
Male		32.3 (114)	28.9 (102)	15.9 (56)	13.0 (46)	8.5 (30)	1.4 (5)	100.0 (353)	0.110	0.127
Female		26.3 (93)	24.0 (85)	20.3 (72)	16.9 (60)	10.5 (37)	2.0 (7)	100.0 (354)		
Urban-rural										
Urban		23.7 (18)	22.4 (17)	26.3 (20)	14.5 (11)	11.8 (9)	1.3 (1)	100.0 (76)	0.114	0.223
Rural		31.3 (143)	28.0 (128)	15.8 (72)	14.4 (66)	8.8 (40)	1.8 (8)	100.0 (457)		
Urban-rural and gender										
Urban	Male	20.4 (10)	24.5 (12)	28.6 (14)	12.2 (6)	14.3 (7)	0.0	100.0 (49)	0.200	0.542
	Female	30.8 (16)	19.2 (10)	23.1 (12)	17.3 (9)	7.7 (4)	1.9 (1)	100.0 (52)		
Rural	Male	34.2 (104)	29.6 (90)	13.8 (42)	13.2 (40)	7.6 (23)	1.6 (5)	100.0 (304)	0.139	0.038
	Female	25.5 (77)	24.8 (75)	19.9 (60)	16.9 (51)	10.9 (33)	2.0 (6)	100.0 (302)		
Education										
Illiterate		28.7 (39)	26.5 (36)	18.4 (25)	14.0 (19)	10.3 (14)	2.2 (3)	100.0 (136)	0.098	0.411
Only sign		25.4 (34)	25.4 (34)	17.2 (23)	18.7 (25)	12.7 (17)	0.7 (1)	100.0 (134)		
Class I-V		27.3 (35)	28.1 (36)	19.5 (25)	16.4 (21)	7.8 (10)	0.8 (1)	100.0 (128)		
Class VI-X		36.8 (43)	27.4 (32)	17.1 (20)	9.4 (11)	6.0 (7)	3.4 (4)	100.0 (117)		
Class XI-XIV		45.8 (11)	33.3 (8)	4.2 (1)	8.3 (2)	8.3 (2)	0.0	100.0 (24)		
Marital status										
Unmarried		34.8 (24)	34.8 (24)	13.0 (9)	13.0 (9)	2.9 (2)	1.4 (1)	100.0 (69)	0.099	0.397
Married		30.3 (128)	25.3 (107)	18.7 (79)	14.7 (62)	9.5 (40)	1.7 (7)	100.0 (423)		
Divorced		13.3 (2)	33.3 (5)	6.7 (1)	20.0 (3)	20.0 (3)	6.7 (1)	100.0 (15)		
Widowed		23.3 (7)	33.3 (10)	13.3 (4)	13.3 (4)	13.3 (4)	3.3 (1)	100.0 (30)		

Annex 7.53: Patients age group and family income deciles wise total pre-treatment delay groups' cross-table (Evaluated 530 weighted cases except gender)

Factors	Total delay groups in days (row percentage)							Significance	
	21-30	31-60	61-91	92-182	189-365	372-1095	Total	Cramer's V	Chi-squire
Age groups									
15-19 years	25.0 (7)	25.0 (7)	21.4 (6)	21.4 (6)	3.6 (1)	3.6 (1)	100.0 (28)	0.126	0.538
20-24 years	29.1 (16)	27.3 (15)	18.2 (10)	12.7 (7)	10.9 (6)	1.8 (1)	100.0 (55)		
25-29 years	33.8 (24)	32.4 (23)	14.1 (10)	11.3 (8)	5.6 (4)	2.8 (2)	100.0 (71)		
30-34 years	30.4 (21)	18.8 (13)	17.4 (12)	18.8 (13)	13.0 (9)	1.4 (1)	100.0 (69)		
35-39 years	33.3 (21)	22.2 (14)	19.0 (12)	12.7 (8)	11.1 (7)	1.6 (1)	100.0 (63)		
40-44 years	24.6 (17)	29.0 (20)	20.3 (14)	14.5 (10)	8.7 (6)	2.9 (2)	100.0 (69)		
45-49 years	14.0 (7)	40.0 (20)	20.0 (10)	14.0 (7)	12.0 (6)	0.0	100.0 (50)		
50-54 years	31.4 (16)	21.6 (11)	23.5 (12)	13.7 (7)	7.8 (4)	2.0 (1)	100.0 (51)		
55-59 years	23.7 (9)	34.2 (13)	7.9 (3)	21.1 (8)	5.3 (2)	7.9 (3)	100.0 (38)		
60-75 years	47.1 (24)	19.6 (10)	11.8 (6)	9.8 (5)	11.8 (6)	0.0	100.0 (51)		
Family income deciles before illness									
1st Deciles	22.9 (11)	31.3 (15)	14.6 (7)	12.5 (6)	12.5 (6)	6.3 (3)	100.0 (48)	0.110	0.908
2nd Deciles	35.3 (18)	25.5 (13)	9.8 (5)	15.7 (8)	11.8 (6)	2.0 (1)	100.0 (51)		
3rd Deciles	21.4 (12)	30.4 (17)	23.2 (13)	10.7 (6)	12.5 (7)	1.8 (1)	100.0 (56)		
4th Deciles	30.9 (17)	20.0 (11)	20.0 (11)	12.7 (7)	14.5 (8)	1.8 (1)	100.0 (55)		
5th Deciles	19.1 (9)	40.4 (19)	21.3 (10)	14.9 (7)	2.1 (1)	2.1 (1)	100.0 (47)		
6th Deciles	36.1 (22)	23.0 (14)	16.4 (10)	16.4 (10)	8.2 (5)	0.0	100.0 (61)		
7th Deciles	26.4 (14)	28.3 (15)	15.1 (8)	18.9 (10)	9.4 (5)	1.9 (1)	100.0 (53)		
8th Deciles	30.5 (18)	27.1 (16)	18.6 (11)	13.6 (8)	8.5 (5)	1.7 (1)	100.0 (59)		
9th Deciles	35.0 (21)	25.0 (15)	18.3 (11)	15.0 (9)	6.7 (4)	0.0	100.0 (60)		
10th Deciles	38.2 (21)	23.6 (13)	18.2 (10)	12.7 (7)	5.5 (3)	1.8 (1)	100.0 (55)		

Continuation of Annex 7.53: Patients family income per capita income deciles, number of provider and times contacted providers wise total pre-treatment delay groups' cross-table (Evaluated 530 weighted cases except gender)

Factors	Total delay groups in days (row percentage)							Significance	
	21-30	31-60	61-91	92-182	189-365	372-1095	Total	Cramer's V	Chi-squire
Family per capita income deciles before illness									
1st Deciles	27.1 (13)	25.0 (12)	20.8 (10)	18.8 (9)	6.3 (3)	2.1 (1)	100.0 (48)	0.121	0.673
2nd Deciles	28.1 (16)	31.6 (18)	14.0 (8)	8.8 (5)	12.3 (7)	5.3 (3)	100.0 (57)		
3rd Deciles	28.8 (15)	32.7 (17)	9.6 (5)	17.3 (9)	11.5 (6)	0.0	100.0 (52)		
4th Deciles	22.2 (12)	27.8 (15)	18.5 (10)	16.7 (9)	11.1 (6)	3.7 (2)	100.0 (54)		
5th Deciles	27.3 (18)	28.8 (19)	21.2 (14)	13.6 (9)	7.6 (5)	1.5 (1)	100.0 (66)		
6th Deciles	28.3 (13)	28.3 (13)	13.0 (6)	15.2 (7)	10.9 (5)	4.3 (2)	100.0 (46)		
7th Deciles	34.5 (19)	12.7 (7)	16.4 (9)	16.4 (9)	20.0 (11)	0.0	100.0 (55)		
8th Deciles	39.7 (13)	27.6 (16)	17.2 (10)	8.6 (5)	5.2 (3)	1.7 (1)	100.0 (58)		
9th Deciles	30.9 (17)	21.8 (12)	23.6 (13)	16.4 (9)	5.5 (3)	1.8 (1)	100.0 (55)		
10th Deciles	32.7 (18)	32.7 (18)	16.4 (9)	14.5 (8)	3.6 (2)	0.0	100.0 (55)		
Number of contacted health providers									
1 provider	60.6 (86)	19.7 (28)	13.4 (19)	3.5 (5)	2.8 (4)	0.0	100.0 (142)	0.294	0.000
2 providers	32.6 (62)	34.7 (66)	15.3 (29)	11.1 (21)	4.7 (9)	1.6 (3)	100.0 (190)		
3 providers	8.5 (11)	31.5 (41)	23.1 (30)	19.2 (25)	14.6 (19)	3.1 (4)	100.0 (130)		
4 providers	3.5 (2)	17.5 (10)	22.8 (13)	36.8 (21)	17.5 (10)	1.8 (1)	100.0 (57)		
5 providers	5.0 (1)	10.0 (2)	10.0 (2)	25.0 (5)	40.0 (8)	10.0 (2)	100.0 (20)		
Times contacted health providers									
1-5 times	45.0 (127)	32.3 (91)	13.1 (37)	6.7 (19)	2.5 (7)	0.4 (1)	100.0 (282)	0.385	0.000
6-10 times	8.9 (14)	29.3 (46)	25.5 (40)	23.6 (37)	12.1 (19)	0.6 (1)	100.0 (157)		
11-15 times	2.3 (1)	9.1 (4)	29.5 (13)	29.5 (13)	27.3 (12)	2.3 (1)	100.0 (44)		
16-20 times	0.0	10.0 (2)	10.0 (2)	40.0 (8)	35.0 (7)	5.0 (1)	100.0 (20)		
22-33 times	0.0	0.0	8.3 (1)	0.0	50.0 (6)	41.7 (5)	100.0 (12)		
41-96 times	0.0	0.0	0.0	0.0	0.0	100.0 (2)	100.0 (2)		

Annex 7.54: Bivariate analysis table of total delay, patient's delay and health system delay (Weighted 530 cases by gender)

		Total pre-treatment delay in days	Total patient's delay in days	Health system delay in days
Total pre-treatment delay in days	Pearson Correlation	1	1.000(**)	.163(**)
	Sig. (2-tailed)		.000	.000
	N	530	530	530
Total patient's delay in days	Pearson Correlation	1.000(**)	1	.145(**)
	Sig. (2-tailed)	.000		.001
	N	530	530	530
Health system delay in days	Pearson Correlation	.163(**)	.145(**)	1
	Sig. (2-tailed)	.000	.001	
	N	530	530	530

** Correlation is significant at the 0.01 level (2-tailed).

Annex 7.55: Bivariate analysis table of total delay, number and times of contacted health providers (Weighted 530 cases by gender)

		Patient's length of sufferings before treatment in days	Total number of providers contacted by the patients	Total times contacted health providers by patients
Patient's length of sufferings before treatment in days	Pearson Correlation	1	.386(**)	.695(**)
	Sig. (2-tailed)		.000	.000
	N	530	530	508
Total number of providers contacted by the patients	Pearson Correlation	.386(**)	1	.452(**)
	Sig. (2-tailed)	.000		.000
	N	530	530	508
Total times contacted health providers by patients	Pearson Correlation	.695(**)	.452(**)	1
	Sig. (2-tailed)	.000	.000	
	N	508	508	508

** Correlation is significant at the 0.01 level (2-tailed).

Annex 7.56: Three patients' clusters as per socio-economic characteristics of the patients (weighting has not worked)

Variables	Cluster 1 (Mean/%)	Cluster 2 (Mean/%)	Cluster 3 (Mean/%)	Outlier cluster (Mean/%)	Total (Mean/%)
Family income before illness	15.62	15.06	24.25	51.10	19.25
Age of the patients	37.62	43.64	30.66	3.97	37.93
Geographical area					
Urban	18.8 (19)	5.0 (5)	57.4 (58)	18.8 (19)	100.0 (101)
Rural	43.2 (262)	35.8 (217)	18.8 (114)	2.1 (13)	100.0 (606)
Gender					
Male	-	60.3 (213)	34.3 (121)	5.4 (19)	100.0 (354)
Female	79.4 (281)	2.5 (9)	14.4 (15)	3.7 (13)	100.0 (353)
Educational status					
Illiterate	48.4 (88)	45.6 (83)	1.6 (3)	4.4 (8)	100.0 (182)
Only can sign	42.4 (75)	44.1 (78)	9.0 (16)	4.5 (9)	100.0 (172)
Class I-V	52.2 (94)	31.7 (57)	10.6 (19)	5.6 (10)	100.0 (180)
Class VI-X	16.1 (23)	1.4 (2)	80.4 (115)	2.1 (3)	100.0 (143)
Class XI-XIV	4.0 (1)	8.0 (2)	76.0 (19)	12.0 (3)	100.0 (25)
Personal occupation					
Agriculture/farming	2.5 (1)	67.5 (27)	27.5 (11)	2.5 (1)	100.0 (40)
Agriculture labor	0.0	100.0 (69)	0.0	0.0	100.0 (69)
Small business	69.6 (126)	18.8 (34)	6.1 (11)	5.5 (10)	100.0 (181)
Business	0.0	46.1 (35)	51.3 (39)	2.6 (2)	100.0 (76)
Employment	6.3 (6)	17.7 (17)	70.8 (68)	5.2 (5)	100.0 (96)
Household work	87.8 (129)	5.4 (8)	4.1 (6)	2.7 (4)	100.0 (147)
Student	0.0	0.0	100.0 (29)	0.0	100.0 (29)
Begging	50.0 (3)	33.2 (3)	0.0	16.7 (1)	100.0 (6)
Rickshaw pulling	0.0	81.0 (17)	14.3 (3)	4.8 (1)	100.0 (21)
Maid servant	73.3 (11)	6.7 (1)	0.0	20.0 (3)	100.0 (15)
Day labor	18.5 (5)	44.4 (12)	18.5 (5)	18.5 (5)	100.0 (27)
Number of cases	281	222	172	32	707

Annex 7.57: Cross-table of patient's clusters and total delay groups (Weighted 530 cases by gender)

Total delay groups	Patients' clusters as per socio-economic factors					Significance	
	Cluster 1	Cluster 2	Cluster 3	Outlier	Total	Cramer's V	Chi-squire
21-30	50.7 (152)	22.7 (68)	22.0 (66)	4.7 (14)	100.0 (300)	0.068	0.460
31-60	47.1 (128)	24.6 (67)	22.4 (61)	5.9 (16)	100.0 (272)		
61-91	55.0 (110)	19.5 (39)	21.5 (43)	4.0 (8)	100.0 (200)		
92-182	60.2 (100)	18.7 (31)	18.1 (30)	3.0 (5)	100.0 (166)		
189-365	57.7 (60)	23.1 (24)	17.3 (18)	1.9 (2)	100.0 (104)		
372-1096	63.2 (12)	10.5 (2)	26.3 (5)	0.0	100.0 (19)		

Annex 7.58: Binary logistic regression of total delay (Family income deciles before illness) -Variables not in equation (Weighted 530 cases by gender)

Step	Variables	Score	df	Signifi-cance	Overall		
					Wald	df	Signi.
Step 0	Age group-Overall	15.693	9	.074	92.914	1	0.000
	Age group (45-49)	5.697	1	.017			
	Age group (60-75)-Reference						
	Education-Overall	7.562	4	.109			
	Education - Class VI-X	3.645	1	.056			
	Education-Class XI-XIV-Refer.						
	Number provider contacted	83.375	1	.000			
	Times provider contacted	52.879	1	.000			
	Overall statistics	123.214	29	.000			

Annex 7.59: Binary logistic regression of total delay (Family per capita income deciles before illness) -Variables not in equation (Weighted 530 cases by gender)

Step	Variables	Score	df	Signifi-cance	Overall		
					Wald	df	Signi.
Step 0	Age group-Overall	15.693	9	.074	92.914	1	0.000
	Age group (45-49)	5.697	1	.017			
	Age group (60-75)-Reference						
	Education-Overall	7.562	4	.109			
	Education - Class VI-X	3.645	1	.056			
	Education-Class XI-XIV-Refer.						
	No. of provider contacted	83.375	1	.000			
	Times provider contacted	52.879	1	.000			
	Overall statistics	121.278	29	.000			

Annex 7.60: Binary logistic regression of total delay (Family per capita income deciles before illness in US$) - Classification table (a) of Step 1 (Weighted 530 cases by gender)

Observed			Predicted		
			Binarized total delay in days		Percentage correct
			Acceptable	Unacceptable	
Step 1	Binarized total delay in days	Acceptable (21-30 days)	83	58	58.9
		Unacceptable (Other than this)	34	333	90.7
	Overall percentage				81.9

aThe cut value is .500.

Annex 7.61: Binary logistic regression of total delay (Family income deciles before illness in US$) - Omnibus tests of model coefficients (Weighted 530 cases by gender)

Step		Chi-squire	df	Significance
Step 1	Step	189.748	29	.000
	Block	189.748	29	.000
	Model	189.748	29	.000

Annex 7.62: Binary logistic regression of total delay (Family per capita income deciles before illness in US$) - Omnibus tests of model coefficients (Weighted 530 cases by gender)

Step		Chi-squire	df	Significance
Step 1	Step	188.051	29	.000
	Block	188.051	29	.000
	Model	188.051	29	.000

Annex 7.63: Binary logistic regression of total delay (Family per capita income deciles before illness in US$) - Model summary and Hosmer and Lemeshow test (Weighted by gender)

Step	Model summary			Hosmer and Lemeshow test		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squire	df	Significance
Step 1	411.707(a)	0.310	0.447	13.302	8	0.102

a Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Annex 7.64: Binary logistic regression of total delay (Family income deciles before illness) -Variables in equation table (Weighted 530 cases by gender)

Step	Variables	B	SE	Wald	df	Sig.	Exp (B)
Step 1 (a)	Age group-Overall			12.251	9	.200	
	Age group (15-19)	1.012	.802	1.590	1	.207	2.751
	Age group (20-24)	.865	.618	1.958	1	.162	2.374
	Age group (25-29)	.755	.542	1.936	1	.164	2.127
	Age group (30-34)	.711	.546	1.693	1	.193	2.036
	Age group (35-39)	.235	.514	.209	1	.647	1.265
	Age group (40-44)	.618	.534	1.339	1	.247	1.854
	Age group (45-49)	1.754	.608	8.327	1	.004	5.779
	Age group (50-54)	.712	.564	1.594	1	.207	2.038
	Age group (55-59)	1.398	.631	4.910	1	.027	4.047
	Age group (60-75)-Reference						
	Sex-Male	-.105	.295	.127	1	.722	.900
	Sex-female-Reference						
	UrbanRural-Urban	.177	.368	.230	1	.631	1.193
	UrbanRural-Rural-Reference						
	Marital status-Overall			2.624	3	.453	
	Marital status-Unmarried	-.465	.808	.331	1	.565	.628
	Marital status-Married	-.831	.623	1.777	1	.183	.436
	Marital status-Divorced	-.271	1.108	.060	1	.807	.763
	Marital status-Widowed-Refer.						
	Education-Overall			2.980	4	.561	
	Education-Illiterate	.919	.660	1.935	1	.164	2.506
	Education-Only can sign	.745	.652	1.305	1	.253	2.107
	Education-Class I-V	.722	.636	1.288	1	.256	2.059
	Education-Class VI-X	.351	.610	.332	1	.564	1.421
	Education-Class XI-XIV-Refer.						
	Family income deciles-Overall			9.220	9	.417	
	Family income deciles1	.741	.563	1.734	1	.188	2.099
	Family income deciles2	.611	.553	1.221	1	.269	1.842
	Family income deciles3	1.142	.560	4.168	1	.041	3.134
	Family income deciles4	.114	.530	.046	1	.830	1.121
	Family income deciles5	1.226	.602	4.139	1	.042	3.406
	Family income deciles6	.099	.524	.036	1	.850	1.104
	Family income deciles7	.616	.546	1.275	1	.259	1.852
	Family income deciles8	.327	.499	.430	1	.512	1.387
	Family income deciles9	.299	.536	.311	1	.577	1.348
	Family income deciles10-Refer						
	No. of provider contacted	.699	.187	13.930	1	.000	2.013
	Times provider contacted	.403	.069	33.733	1	.000	1.496
	Constant	-3.436	.986	12.139	1	.000	.032

a Variable(s) entered on step 1: Sex, UrbanRural, Aggroup, Marital status, Educational status, PatFamIncBefIllDec, No. of contacted provider and TotTimContacted

Annex 7.65: Binary logistic regression of total delay (Family per capita income deciles before illness) -Variables in equation table (Weighted 530 cases by gender)

Step	Variables	B	SE	Wald	df	Sig.	Exp (B)
Step 1 (a)	Age group-Overall			12.596	9	.182	
	Age group (15-19)	1.244	.795	2.449	1	.118	3.469
	Age group (20-24)	1.100	.617	3.178	1	.075	3.005
	Age group (25-29)	.868	.550	2.486	1	.115	2.382
	Age group (30-34)	.711	.543	1.716	1	.190	2.036
	Age group (35-39)	.305	.516	.348	1	.555	1.356
	Age group (40-44)	.608	.536	1.288	1	.256	1.837
	Age group (45-49)	1.741	.605	8.276	1	.004	5.705
	Age group (50-54)	.735	.568	1.673	1	.196	2.086
	Age group (55-59)	1.401	.650	4.648	1	.031	4.061
	Age group (60-75)-Reference						
	Sex-Male	-.034	.291	.014	1	.906	.966
	Sex-female-Reference						
	UrbanRural-Urban	.138	.363	.146	1	.703	1.148
	UrbanRural-Rural-Reference						
	Marital status-Overall			2.740	3	.434	
	Marital status-Unmarried	-.761	.804	.896	1	.344	.467
	Marital status-Married	-.949	.627	2.293	1	.130	.387
	Marital status-Divorced	-.405	1.098	.136	1	.712	.667
	Marital status-Widowed-Refer.						
	Education-Overall			4.102	4	.392	
	Education-Illiterate	1.159	.655	3.127	1	.077	3.186
	Education-Only can sign	.937	.644	2.120	1	.145	2.553
	Education-Class I-V	.836	.625	1.792	1	.181	2.308
	Education-Class VI-X	.525	.600	.764	1	.382	1.690
	Education-Class XI-XIV-Refer.						
	Family income deciles-Overall			7.833	9	.551	
	Family income deciles1	.204	.574	.127	1	.722	1.227
	Family income deciles2	.296	.536	.305	1	.581	1.344
	Family income deciles3	.029	.560	.003	1	.958	1.030
	Family income deciles4	.173	.547	.100	1	.752	1.188
	Family income deciles5	.445	.509	.763	1	.382	1.560
	Family income deciles6	.611	.591	1.070	1	.301	1.843
	Family income deciles7	-.239	.530	.204	1	.652	.787
	Family income deciles8	-.197	.511	.148	1	.701	.822
	Family income deciles9	-.712	.527	1.823	1	.177	.491
	Family income deciles10-Refer						
	No. of provider contacted	.691	.186	13.782	1	.000	1.995
	Times provider contacted	.413	.071	33.988	1	.000	1.511
	Constant	-3.170	.989	10.273	1	.001	.042

a Variable(s) entered on step 1: Sex, UrbanRural, Aggroup, Marital status, Educational status, PaFaPCapIncDecBefIll, No. of contacted provider and TotTimContacted

Annex 7.66: Binary logistic regression of total delay of male patients' model summary table (Family income deciles before illness) – Not weighted

Classification table

Observed		Predicted (Step 0)			Predicted (Step 1)		
		Binarized total delay in days		Percentage correct	Binarized total delay in days		Percentage correct
		Accep-table	Unaccep-table		Accep-table	Unaccep-table	
Binarized total delay in days	Acceptable (21-30 days)	0	99	0.0	65	34	65.7
	Unacceptable (Other than this)	0	237	100.0	27	210	88.6
Overall percentage				70.5			81.8

a The cut value is 0.500.

Step	Model summary			Hosmer and Lemeshow test		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squire	df	Significance
Step 1	257.199(a)	0.360	0.513	8.444	8	0.391

a Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Step	Variables	B	SE	Wald	df	Sig.	Exp (B)
Step 1	Age group-Overall			11.152	9	.265	
	Age group (45-49)	1.862	.762	5.975	1	.015	6.439
	Age group (55-59)	1.436	.742	3.747	1	.053	4.205
	Age group (60-75)-Reference						
	Marital status-Overall			3.660	3	.301	
	Marital-Married	-2.443	1.313	3.460	1	.063	.087
	Marital-Widowed-Reference						
	No. of provider contacted	.823	.247	11.110	1	.001	2.278
	Times provider contacted	.450	.089	25.262	1	.000	1.568
	Constant	-2.096	1.567	1.788	1	.181	.123

a Variable(s) entered on step 1: UrbanRural, Aggroup, Marital status, Educational status, PatFamIncBefIllDec, No. of contacted provider and TotTimConPro

Annex 7.67: Binary logistic regression of total delay of male patients' model summary table (Family per capita income deciles before illness) – Not weighted

Classification table

Observed		Predicted (Step 0)			Predicted (Step 1)		
		Binarized total delay in days		Percentage correct	Binarized total delay in days		Percentage correct
		Accep-table	Unaccep-table		Accep-table	Unaccep-table	
Binarized total delay in days	Acceptable (21-30 days)	0	99	0.0	67	32	67.7
	Unacceptable (Other than this)	0	237	100.0	24	213	89.9
Overall percentage				70.5			83.3

a The cut value is 0.500.

Step	Model summary			Hosmer and Lemeshow test		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squar	df	Significance
Step 1	256.793(a)	0.361	0.514	3.852	8	0.870

a Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Step	Variables	B	SE	Wald	df	Sig.	Exp (B)
Step 1	Age group-Overall			11.830	9	.223	
	Age group (45-49)	1.786	.751	5.652	1	.017	5.963
	Age group (55-59)	1.343	.776	2.993	1	.084	3.830
	Age group (60-75)-Reference						
	Marital status-Overall			4.297	3	.231	
	Marital-Unmarried	-2.654	1.454	3.330	1	.068	.070
	Marital-Married	-2.766	1.337	4.276	1	.039	.063
	Marital-Widowed-Reference						
	Per capita income deciles-Over			7.668	9	.568	
	Per capita income deciles9	-1.236	.696	3.153	1	.076	.290
	Per capita income deciles10-Ref.						
	No. of provider contacted	.895	.252	12.565	1	.000	2.447
	Times provider contacted	.457	.093	24.303	1	.000	1.579
	Constant	-1.702	1.572	1.173	1	.279	.182

a Variable(s) entered on step 1: UrbanRural, Aggroup, Marital status, Educational status, PaFaPCapIncDecBefIll, No. of contacted provider and TotTimConPro

Annex 7.68: Binary logistic regression of total delay of female patients' model summary table (Family monthly income deciles before illness) – Not weighted

Classification table

Observed		**Predicted (Step 0)**			**Predicted (Step 1)**		
		Binarized total delay in days		Percentage correct	Binarized total delay in days		Percentage correct
		Accep-table	Unaccep-table		Accep-table	Unaccep-table	
Binarized total delay in days	Acceptable (21-30 days)	0	84	0.0	43	41	51.2
	Unacceptable (Other than this)	0	259	100.0	19	240	92.7
Overall percentage				75.5			82.5

a The cut value is 0.500.

Step	**Model summary**			**Hosmer and Lemeshow test**		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squire	df	Significance
Step 1	273.158(a)	0.272	0.404	9.072	8	0.336

a Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Step	**Variables**	**B**	**SE**	**Wald**	**df**	**Sig.**	**Exp (B)**
Step 1 (a)	Age group-Overall			11.121	9	.268	
	Age group (20-24)	2.061	.787	6.860	1	.009	7.850
	Age group (25-29)	2.019	.796	6.437	1	.011	7.533
	Age group (30-34)	2.164	.788	7.535	1	.006	8.702
	Age group (35-39)	1.408	.723	3.789	1	.052	4.089
	Age group (40-44)	1.676	.773	4.703	1	.030	5.346
	Age group (45-49)	1.866	.808	5.336	1	.021	6.460
	Age group (60-75)-Reference						
	Family income deciles-Overall			7.753	9	.559	
	Family income deciles1	1.107	.613	3.264	1	.071	3.026
	Family income deciles3	1.282	.735	3.037	1	.081	3.603
	Family income deciles5	2.219	1.167	3.617	1	.057	9.195
	Family income deciles10-Reff.						
	No. of provider contacted	.559	.226	6.148	1	.013	1.749
	Times provider contacted	.327	.085	14.812	1	.000	1.387
	Constant	-3.331	1.538	4.688	1	.030	.036

a Variable(s) entered on step 1: Sex, UrbanRural, Aggroup, Marital status, Educational status, PatFamIncBefIllDec, No. of contacted provider and TotTimConPro

Annex 7.69: Binary logistic regression of total delay of female patients' model summary table (Family per capita income deciles before illness) – Not weighted

Classification table

Observed		Predicted (Step 0)			Predicted (Step 1)		
		Binarized total delay in days		Percentage correct	Binarized total delay in days		Percentage correct
		Accep-table	Unaccep-table		Accep-table	Unaccep-table	
Binarized total delay in days	Acceptable (21-30 days)	0	84	0.0	42	42	50.0
	Unacceptable (Other than this)	0	259	100.0	20	239	92.3
Overall percentage				75.5			81.9

a The cut value is 0.500.

Step	Model summary			Hosmer and Lemeshow test		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squar	df	Significance
Step 1	270.509(a)	.277	.413	8.345	8	.401

a Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Step	Variables	B	SE	Wald	df	Sig.	Exp (B)
Step 1	Age group-Overall			13.660	9	.135	
	Age group (20-24)	2.447	.810	9.128	1	.003	11.548
	Age group (25-29)	2.298	.833	7.610	1	.006	9.953
	Age group (30-34)	2.236	.823	7.373	1	.007	9.353
	Age group (35-39)	1.563	.742	4.433	1	.035	4.773
	Age group (40-44)	1.688	.810	4.343	1	.037	5.408
	Age group (45-49)	2.037	.821	6.158	1	.013	7.668
	Age group (60-75)-Reference						
	No. of provider contacted	.577	.231	6.259	1	.012	1.781
	Times provider contacted	.318	.088	13.171	1	.000	1.374
	Constant	-3.466	1.549	5.007	1	.025	.031

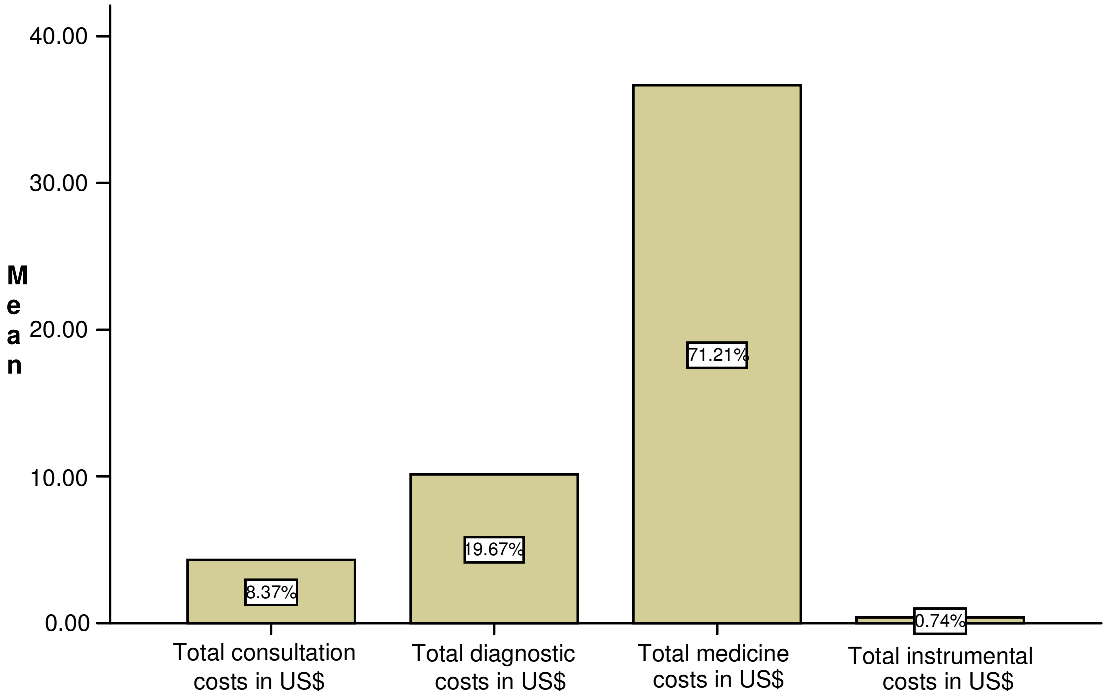
a Variable(s) entered on step 1: Sex, UrbanRural, Aggroup, Marital status, Educational status, PaFaPCapIncDecBefIll, No. of contacted provider and TotTimConPro

Chapter 08: Economic Impact

Annex 8.1: Periodic component wise means and medians of medical and non-medical costs in US$ (Weighted 530 cases by gender)

Costs	Period	Cases	Mean	Std. Dev.	Median	Mini.	Maxi.
Medical	B. treatment	508	49.09	99.81	24.27	0.29	1592.35
	D. treatment	508	2.56	7.99	0.89	0.00	132.35
	Sub-total	508	51.65	101.97	26.60	0.29	1617.06
Non-medical	B. treatment	508	15.63	60.80	4.41	0.00	1192.94
	D. treatment	508	32.15	33.67	22.98	0.00	273.01
	Sub-total	508	47.78	74.45	31.74	0.00	1280.59
Total direct costs		508	99.43	168.35	65.32	1.40	2897.65

Annex 8.2: Component wise total medical cost distribution bar chart (Weighted 530 cases by gender)



Annex 8.3: Accompanied persons and caregivers before the tuberculosis treatment of the patients (Weighted 530 cases by gender)

Accompanied persons	Main person		Second person		Third person	
	Number	Valid percent	Number	Valid percent	Number	Valid percent
Self	15	3.0	262	53.1	2055	88.5
Husband/ spouse	248	48.8	67	13.5	1	0.4
Son/ daughter/ daughter-in-law	67	13.1	36	7.3	6	2.4
Brother/ sister	36	7.1	27	5.4	5	1.9
Father/ mother	90	17.6	60	12.1	8	3.5
Brother/ sister-in-law	21	4.0	24	4.9	2	0.6
Grandfather/ mother	3	0.5	1	0.1	-	-
Nephew/ niece	7	1.4	-	-	-	-
Neighbours/ relatives/ friends	7	1.4	5	0.9	4	1.7
Father/ mother-in-law	8	1.5	10	1.9	2	10.9
Uncle/ auntie	9	1.7	4	0.8	-	-
Total	508	100.0	493	100.0	231	100.0
Missing	23	-	38	-	299	-
Grand total	530	-	530	-	530	-

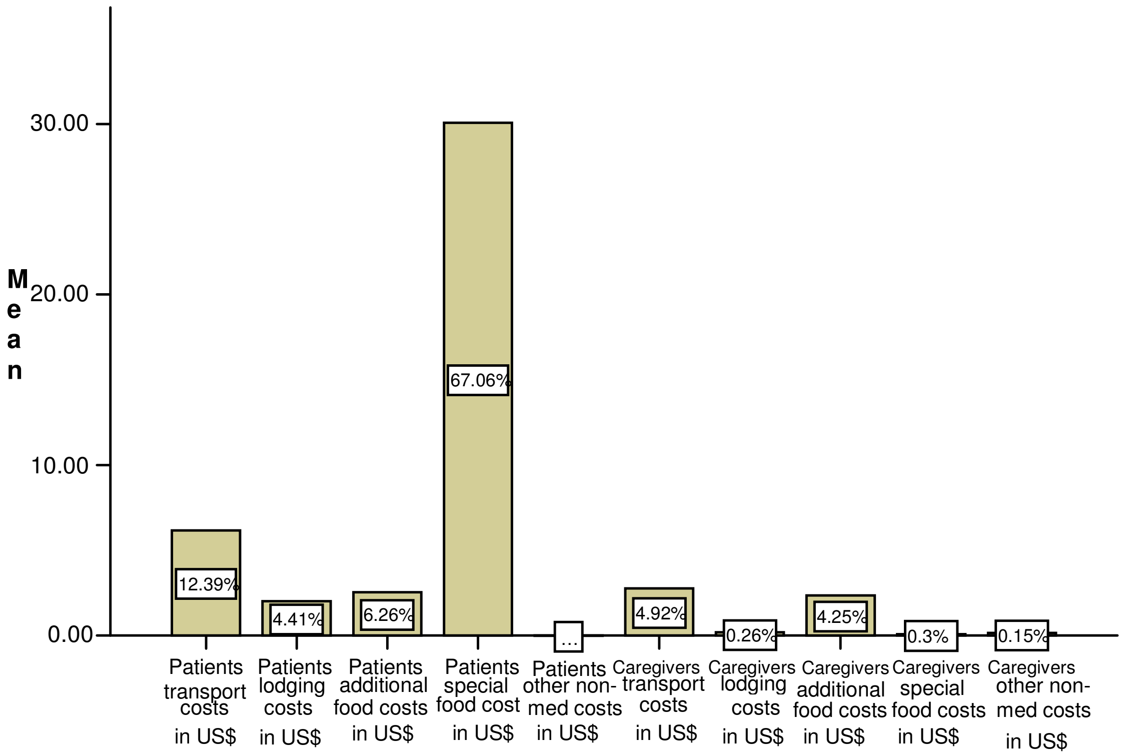
Annex 8.4: Accompanied persons and caregivers during the tuberculosis treatment of the patients (Weighted 530 cases by gender)

Accompanied persons	Main person		Second person		Third person	
	Number	Valid percent	Number	Valid percent	Number	Valid percent
Self	20	3.8	427	87.5	60	98.4
Husband/ spouse	265	52.1	8	1.5	1	0.8
Son/ daughter/ daughter-in-law	63	12.3	15	3.0	-	-
Brother/ sister	17	3.3	7	1.4	-	-
Father/ mother	108	21.3	20	4.0	-	-
Brother/ sister-in-law	17	3.3	4	0.8	-	-
Grandfather/ mother	3	0.6	-	-	-	-
Nephew/ niece	4	0.7	-	-	-	-
Neighbours/ relatives/ friends	3	0.5	3	0.5	-	-
Father/ mother-in-law	10	1.9	5	1.0	1	0.8
Uncle/ auntie	2	0.3	1	0.2	-	-
Total	508	100.0	488	100.0	60	100.0
Missing	23	-	42	-	469	-
Grand total	530	-	530	-	530	-

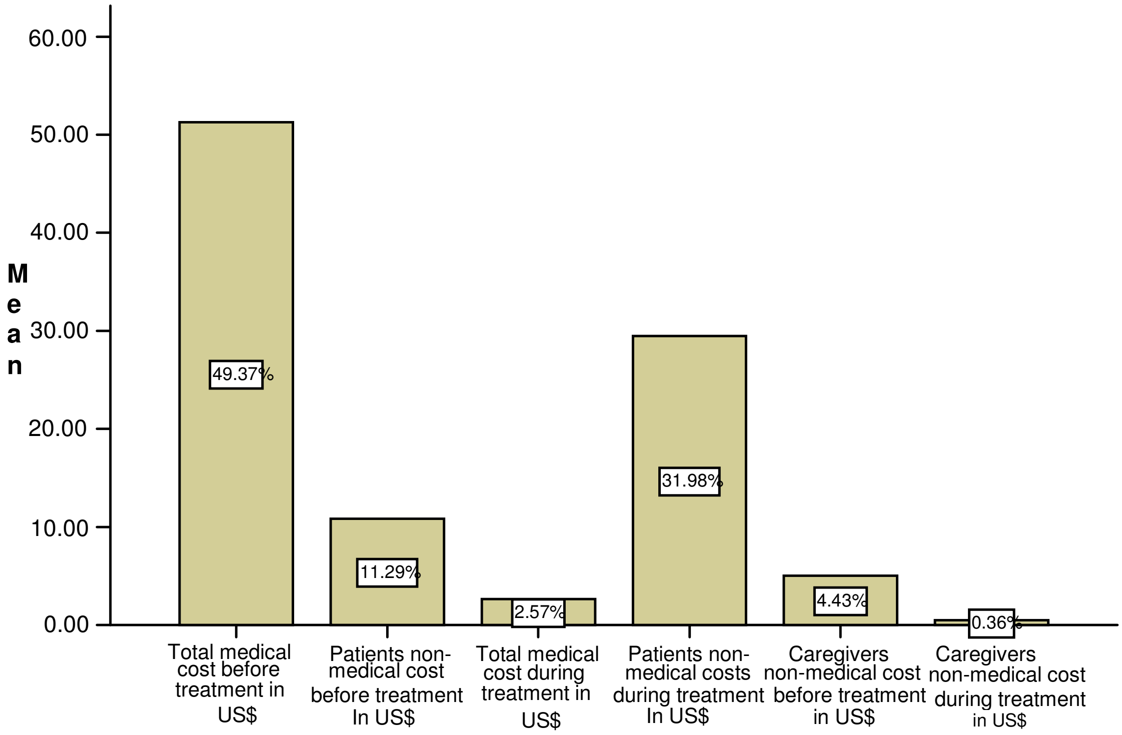
Annex 8.5: Patient's total times accompanied or looked after person before and during tuberculosis treatment (Weighted 530 cases by gender)

Number of accompany		Frequency	Valid Percent	Cumulative Percent	Mean	Std. Deviation	Median	Mini mum	Maxi mum
Before tuberculosis treatment									
Valid	1	262	53.1	53.1	1.52	0.598	1.00	1	3
	2	205	41.5	94.6					
	3	27	5.4	100.0					
	Total	493	100.0	-					
Missing		38	-	-					
Total		530	-						
During tuberculosis treatment									
Valid	1	427	87.5	87.5	1.13	0.339	1.00	1	3
	2	60	12.3	99.8					
	3	1	0.2	100.0					
	Total	488	100.0	-					
Missing		42	-	-					
Total		530	-	-					

Annex 8.6: Component wise total non-medical cost distribution bar chart (Weighted 530 cases by gender)



Annex 8.7: Component wise total direct cost distribution bar chart (Weighted 530 cases by gender)



Annex 8.8: Patient's gender, urban-rural, education and marital status wise mean and medians of total direct costs as a percentage of patient's family income before illness (Weighted 530 cases except gender)

Factors	Compo-nent	Mean			Median		Delay range	
		Percent	S.Devi	Signific.	%	Signific.	Mini.	Max.
Gender	Male	127.71	191.18	ANOVA-S (.048)	80.15	NPMT-NS (.179)	4.29	1831.70
	Female	158.61	214.72		90.09		1.98	2189.33
Urban-Rural	Urban	125.01	170.81	ANOVA-NS (.540)	73.41	NPMT-NS (.199)	4.62	1023.67
	Rural	140.42	204.56		84.46		1.98	2189.33
Urban	Male	112.30	152.66	ANOVA-NS (.301)	75.89	NPMT-NS (.841)	11.56	1023.67
	Female	149.43	200.28		61.54		4.62	1023.11
Rural	Male	130.35	197.11	ANOVA-NS (.084)	80.47	NPMT-NS (.170)	4.29	2189.33
	Female	160.22	217.43		92.88		1.98	1831.70
Education	Illiterate	133.44	185.06	ANOVA-NS (0.991)	80.41	NPMT-NS (0.164)	4.29	1774.21
	Only sign	135.02	127.79		96.95		1.98	785.76
	Class I-V	139.23	246.60		79.77		4.07	2189.33
	Class VI-X	143.53	224.54		81.89		8.51	1831.70
	Class XI-XIV	151.29	226.92		70.65		16.02	1023.67
Marital status	Unmarried	125.61	184.38	ANOVA-NS (0.942)	69.48	NPMT-S (0.028)	12.20	1023.67
	Married	140.95	209.04		83.11		1.98	2189.33
	Divorced	129.46	100.31		114.31		15.92	414.20
	Widowed	130.88	123.08		106.93		7.76	634.71

Continuation of Annex 8.8: Patient's age groups and economic characteristics wise mean and medians of total direct costs as a percentage of patient's family income before illness (Weighted 530 cases by gender)

Factors	Compo-nent	Mean			Median		Delay range	
		Percent	S.Devi	Signific.	%	Signific.	Mini.	Max.
Age groups	15-19 years	118.95	176.13	Kruskal-Wallis Tes-NS (0.228)	72.10	NPMT-NS (0.120)	5.83	1023.11
	20-24 years	156.48	191.12		89.56		12.20	1023.67
	25-29 years	136.59	223.81		74.53		11.06	1831.70
	30-34 years	123.24	133.86		79.83		1.98	1032.48
	35-39 years	151.93	187.32		98.33		11.56	1172.00
	40-44 years	174.70	272.29		96.92		4.29	1774.21
	45-49 years	160.70	311.99		91.82		8.50	2189.33
	50-54 years	104.57	97.19		75.89		5.08	506.33
	55-59 years	135.16	145.22		74.75		5.98	634.71
	60-75 years	95.21	96.15		60.99		5.35	442.68
Family income deciles before illness	1st Deciles	288.74	301.48	Kruskal-Wallis Test-S (.000)	244.63	NPMT-S (.000)	25.81	1831.70
	2nd Deciles	178.88	136.99		136.00		8.50	658.55
	3rd Deciles	208.61	321.32		101.33		4.07	1774.21
	4th Deciles	141.06	123.46		97.39		4.29	564.74
	5th Deciles	126.91	150.46		89.97		5.71	1023.11
	6th Deciles	103.42	93.81		74.80		1.98	476.00
	7th Deciles	98.77	96.24		71.54		5.08	741.67
	8th Deciles	87.59	81.20		65.94		7.76	442.68
	9th Deciles	118.77	297.73		60.36		4.62	2189.33
	10th Deciles	53.43	59.77		38.26		6.90	454.87
Family per capita income deciles before illness	1st Deciles	268.04	336.35	Kruskal-Wallis Test-S (.000)	173.61	NPMT-S (.000)	4.07	1831.70
	2nd Deciles	177.69	196.24		111.26		4.29	1023.67
	3rd Deciles	173.28	253.78		99.68		11.88	1582.73
	4th Deciles	185.52	180.62		129.13		11.17	1023.11
	5th Deciles	109.85	114.41		71.56		1.98	564.74
	6th Deciles	114.89	112.83		74.35		4.62	464.44
	7th Deciles	134.35	307.93		74.32		5.08	2189.33
	8th Deciles	88.80	94.63		65.32		7.29	741.67
	9th Deciles	96.43	98.55		64.52		5.83	525.00
	10th Deciles	57.25	41.35		49.25		9.16	200.48

Annex 8.9: Patient's gender, urban-rural and age groups wise total direct costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases except gender)

Factors		Direct costs percentage groups (row percentage)							Significance	
		1.98-40.00	40.60-80.00	80.16-119.50	120.67-199.94	200.48-346.67	352.78-576.80	634.71-2189.38	Cramer's V	Chi-squire
Gender										
Male		24.1 (81)	25.9 (87)	18.2 (61)	17.3 (58)	8.3 (28)	4.8 (16)	1.5 (5)	0.149	0.143
Female		21.3 (73)	23.9 (82)	15.7 (54)	15.5 (53)	13.1 (45)	7.0 (24)	3.5 (12)		
Urban-Rural										
Urban		23.4 (18)	29.9 (23)	16.9 (13)	14.3 (11)	9.1 (7)	3.9 (3)	2.6 (2)	0.058	0.941
Rural		23.0 (100)	24.4 (106)	17.5 (76)	17.0 (74)	10.1 (44)	6.0 (26)	2.1 (9)		
Urban-rural and gender										
Urban	Male	20.4 (10)	32.7 (16)	22.4 (11)	14.3 (7)	6.1 (3)	2.0 (1)	2.0 (1)	0.297	0.128
	Female	29.4 (15)	25.5 (13)	5.9 (3)	15.7 (8)	13.7 (7)	5.9 (3)	3.9 (2)		
Rural	Male	24.7 (71)	24.7 (71)	17.4 (50)	17.8 (51)	8.7 (25)	5.2 (15)	1.4 (4)	0.117	0.243
	Female	19.9 (58)	23.6 (69)	17.5 (51)	15.4 (45)	13.0 (38)	7.2 (21)	3.4 (10)		
Age groups										
15-19 years		30.8 (8)	23.1 (8)	19.2 (5)	11.5 (3)	7.7 (2)	3.8 (1)	3.8 (1)	0.119	0.817
20-24 years		18.9 (10)	24.5 (13)	17.0 (9)	18.9 (10)	7.5 (4)	9.4 (5)	3.8 (2)		
25-29 years		25.0 (17)	27.9 (19)	14.7 (10)	13.2 (9)	11.8 (8)	5.9 (4)	1.5 (1)		
30-34 years		15.2 (10)	36.4 (24)	13.6 (9)	16.7 (11)	10.6 (7)	6.1 (4)	1.5 (1)		
35-39 years		18.3 (11)	23.3 (14)	21.7 (13)	15.0 (9)	13.3 (8)	5.0 (3)	3.3 (2)		
40-44 years		21.5 (14)	16.9 (11)	23.1 (15)	16.9 (11)	12.3 (8)	3.1 (2)	6.2 (4)		
45-49 years		15.7 (8)	23.5 (12)	25.5 (13)	19.6 (10)	5.9 (3)	7.8 (4)	2.0 (1)		
50-54 years		25.0 (12)	27.1 (13)	18.8 (9)	14.6 (7)	10.4 (5)	4.2 (2)	0.0		
55-59 years		36.8 (14)	15.8 (6)	7.9 (3)	15.8 (6)	10.5 (4)	10.5 (4)	2.6 (1)		
60-75 years		34.0 (16)	27.7 (13)	6.4 (3)	21.3 (10)	6.4 (3)	4.3 (2)	0.0		

Continuation of Annex 8.9: Patient's socio-demographic and economic characteristics wise total direct costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases by gender)

Factors	Direct costs percentage groups (row percentage)							Significance	
	1.98-40.00	40.60-80.00	80.16-119.50	120.67-199.94	200.48-346.67	352.78-576.80	634.71-2189.38	Cram-er's V	Chi-squire
Educational status									
Illiterate	29.5 (38)	19.4 (25)	14.0 (18)	19.4 (25)	10.1 (13)	6.2 (8)	1.6 (2)	0.105	0.538
Only sign	18.6 (24)	23.3 (30)	17.8 (23)	20.9 (27)	11.6 (15)	6.2 (8)	1.6 (2)		
Class I-V	23.0 (28)	28.7 (35)	20.5 (25)	13.1 (16)	8.2 (10)	4.1 (5)	2.5 (3)		
Class VI-X	19.6 (22)	29.5 (33)	19.6 (22)	11.6 (13)	11.6 (13)	5.4 (6)	2.7 (3)		
Class XI-XIV	30.4 (7)	26.1 (6)	8.7 (2)	17.4 (4)	0.0	13.0 (3)	4.3 (1)		
Marital status									
Unmarried	33.3 (22)	22.7 (15)	13.6 (9)	15.2 (10)	7.6 (6)	3.0 (2)	4.5 (3)	0.103	0.576
Married	21.7 (88)	26.4 (107)	17.5 (71)	16.0 (65)	9.9 (40)	6.4 (26)	2.0 (8)		
Divorced	18.8 (3)	6.3 (1)	31.3 (5)	25.0 (4)	12.5 (2)	6.3 (1)	0.0		
Widowed	21.4 (6)	17.9 (5)	14.3 (4)	21.4 (6)	17.9 (5)	3.6 (1)	3.6 (1)		
Family income deciles before illness									
1st Deciles	10.4 (5)	8.3 (4)	12.5 (6)	12.5 (6)	31.3 (15)	16.7 (8)	8.3 (4)	0.214	0.000
2nd Deciles	8.3 (4)	10.4 (5)	20.8 (10)	33.3 (16)	12.5 (6)	12.5 (6)	2.1 (1)		
3rd Deciles	20.4 (11)	16.7 (9)	18.5 (10)	24.1 (13)	7.4 (4)	5.6 (3)	7.4 (4)		
4th Deciles	22.6 (12)	17.0 (9)	17.0 (9)	20.8 (11)	15.1 (8)	7.5 (4)	0.0		
5th Deciles	22.2 (10)	24.4 (11)	17.8 (8)	13.3 (6)	13.3 (6)	6.7 (3)	2.2 (1)		
6th Deciles	23.3 (14)	30.0 (18)	15.0 (9)	20.0 (12)	6.7 (4)	5.0 (3)	0.0		
7th Deciles	20.0 (10)	36.0 (18)	20.0 (10)	14.0 (7)	8.0 (4)	0.0	2.0 (1)		
8th Deciles	25.9 (15)	32.8 (19)	24.1 (14)	8.6 (5)	5.2 (3)	3.4 (2)	0.0		
9th Deciles	23.6 (13)	38.2 (21)	18.2 (10)	12.7 (7)	3.6 (2)	1.8 (1)	1.8 (1)		
10th Deciles	51.9 (28)	31.5 (17)	5.6 (3)	7.4 (4)	1.9 (1)	1.9 (1)	0.0		

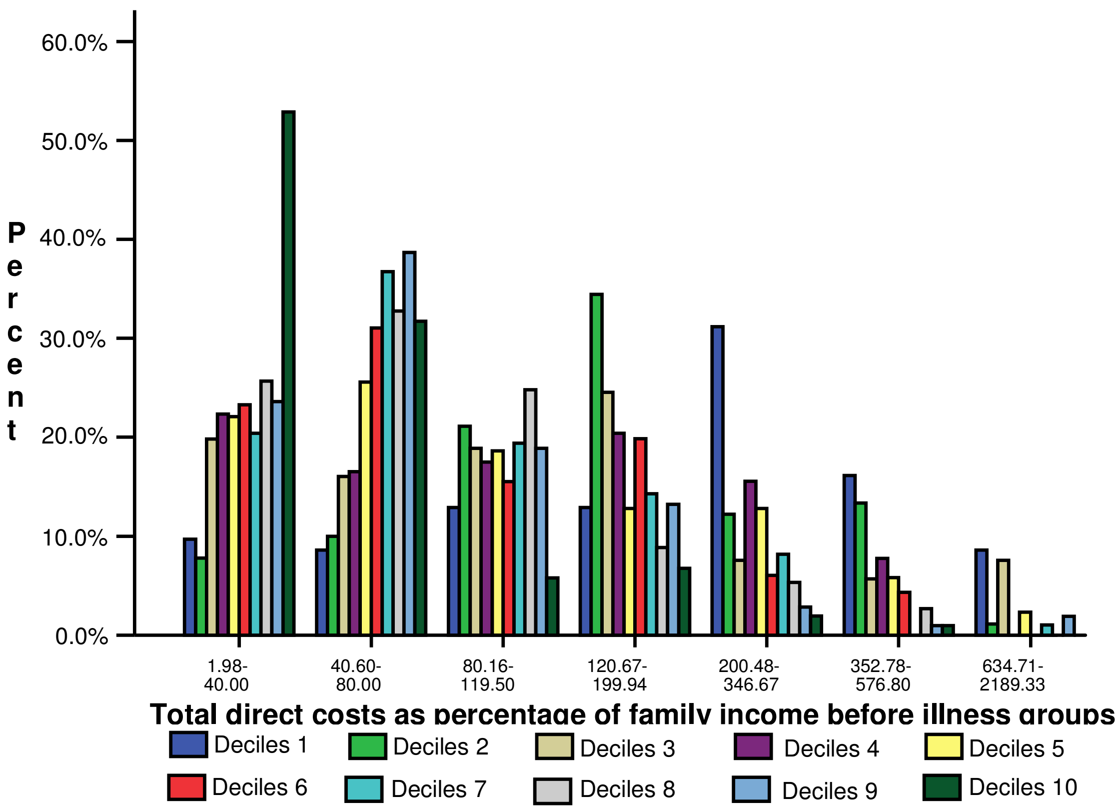
Continuation of Annex 8.9: Patient's per capita income deciles, number and times contacted health provider wise total direct costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases by gender)

Factors	Direct costs percentage groups (row percentage)							Significance	
	1.98-40.00	40.60-80.00	80.16-119.50	120.67-199.94	200.48-346.67	352.78-576.80	634.71-2189.38	Cram-er's V	Chi-squire
Family per capita income deciles before illness									
1st Deciles	10.4 (5)	8.3 (4)	12.5 (6)	22.9 (11)	27.1 (13)	10.4 (5)	8.3 (4)	0.191	0.000
2nd Deciles	16.7 (9)	14.8 (8)	22.2 (12)	22.2 (12)	7.4 (4)	11.1 (6)	5.6 (3)		
3rd Deciles	18.4 (9)	16.3 (8)	20.4 (10)	22.4 (11)	14.3 (7)	4.1 (2)	4.1 (2)		
4th Deciles	9.4 (5)	24.5 (13)	11.3 (6)	20.8 (11)	18.9 (10)	11.3 (6)	3.8 (2)		
5th Deciles	23.8 (15)	33.3 (21)	15.9 (10)	12.7 (8)	7.9 (5)	6.3 (4)	0.0		
6th Deciles	30.2 (13)	20.9 (9)	14.0 (6)	16.3 (7)	11.6 (5)	7.0 (3)	0.0		
7th Deciles	29.4 (15)	23.5 (12)	17.6 (9)	21.6 (11)	3.9 (2)	2.0 (1)	2.0 (1)		
8th Deciles	20.4 (11)	35.2 (19)	27.8 (15)	11.1 (6)	1.9 (1)	1.9 (1)	1.9 (1)		
9th Deciles	30.4 (17)	23.2 (13)	21.4 (12)	12.5 (7)	8.9 (5)	3.6 (2)	0.0		
10th Deciles	37.5 (21)	42.9 (24)	10.7 (6)	7.1 (4)	1.8 (1)	0.0	0.0		
Number of contacted health providers									
1 provider	33.3 (40)	33.3 (40)	11.7 (14)	13.3 (16)	7.5 (9)	0.8 (1)	0.0	0.236	0.000
2 providers	33.5 (64)	25.1 (48)	15.2 (29)	11.5 (22)	7.9 (15)	4.7 (9)	2.1 (4)		
3 providers	9.4 (12)	25.0 (32)	24.2 (31)	25.0 (32)	10.2 (13)	4.7 (6)	1.6 (2)		
4 providers	3.5 (2)	15. (9)	22.8 (13)	21.1 (12)	17.5 (10)	12.3 (7)	7.0 (4)		
5 providers	5.0 (1)	5.0 (1)	10.0 (2)	20.0 (4)	20.0 (4)	30.0 (6)	10.0 (2)		
Times contacted health providers groups									
1-5 times	32.6 (92)	30.1 (85)	16.0 (45)	13.1 (27)	5.7 (16)	2.1 (6)	0.4 (1)	0.233	0.000
6-10 times	12.7 (20)	23.6 (37)	20.4 (32)	19.1 (3)	15.9 (25)	7.0 (11)	1.3 (2)		
11-15 times	9.3 94)	14.0 (6)	11.6 (5)	30.2 (13)	9.3 (4)	11.6 (5)	14.0 (6)		
16-20 times	10.0 (2)	5.0 (1)	30.0 (6)	20.0 (4)	15.0 (3)	15.0 (3)	5.0 (1)		
22-33 times	0.0	0.0	9.1 (1)	18.2 (2)	18.2 (2)	36.4 (4)	18.2 (20		
41-96 times	50.0 (1)	0.0	0.0	0.0	50.0 (1)	0.0	0.0		

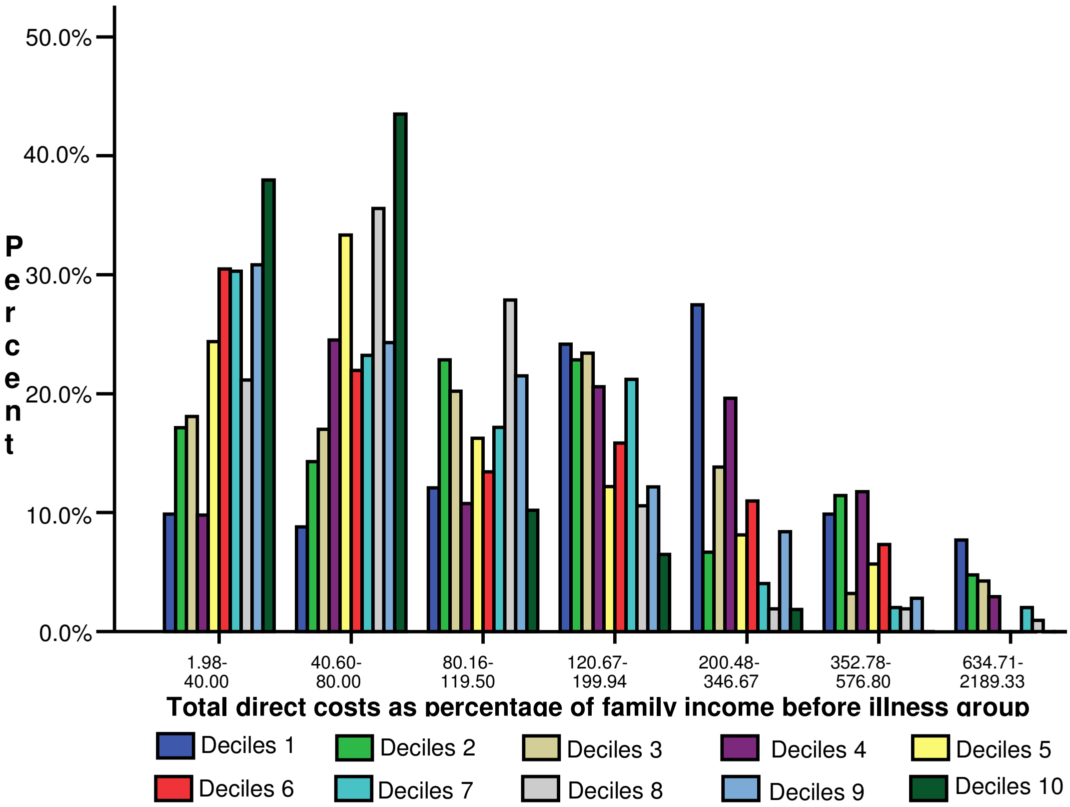
Continuation of Annex 8.9: Patient's total pre-treatment delay wise total direct costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases by gender)

Factors	Direct costs percentage groups (row percentage)							Significance	
	1.98-40.00	40.60-80.00	80.16-119.50	120.67-199.94	200.48-346.67	352.78-576.80	634.71-2189.38	Cram-er's V	Chi-squire
Total pre-treatment delay groups									
21-30 days	43.7 (62)	30.3 (43)	10.6 (15)	9.2 (13)	5.6 (8)	0.7 (1)	0.0	0.228	0.000
31-60 days	21.8 (31)	28.2 (40)	19.7 (28)	15.5 (22)	8.5 (12)	5.6 (8)	0.7 (1)		
61-91 days	15.1 (14)	28.0 (26)	21.5 (20)	17.2 (16)	12.9 (12)	2.2 (2)	3.2 (30		
92-182 days	11.4 (9)	17.7 (14)	21.5 (17)	25.3 (20)	10.1 (8)	10.1 (8)	3.8 (3)		
189-365 days	4.0 (2)	12.0 (6)	14.0 (7)	30.0 (15)	18.0 (9)	14.0 (70	8.0 (4)		
372-1095 days	10.0 (1)	0.0	20.0 (2)	0.0	20.0 (2)	40.0 (4)	10.0 (1)		

Annex 8.10: Patient's family income deciles before illness wise distribution of direct costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



Annex 8.11: Patient's family per capita income deciles before illness wise distribution of direct costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)

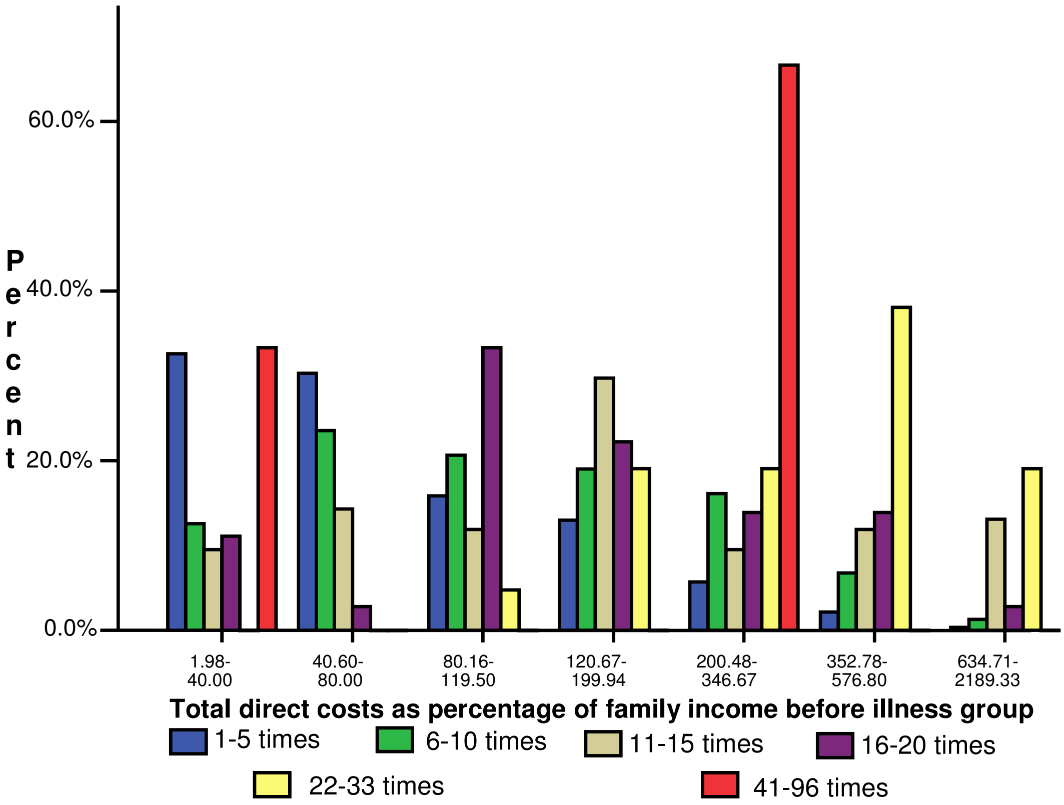


Annex 8.13: Bivariate correlation analysis (Pearson's) table of total direct cost as percentage of family income before illness, patient's family income and per capita income before illness (Weighted 530 cases by gender)

Components		Patients direct costs as a percentage of family income before illness	Patient's family income before illness in US$	Patient's family per capita income before illness in US$
Patients direct costs as a percentage of family income before illness	Pearson Correlation	1	-.188(**)	-.215(**)
	Sig. (2-tailed)		.000	.000
	N	508	508	508
Patient's family income before illness in US$	Pearson Correlation	-.188(**)	1	.707(**)
	Sig. (2-tailed)	.000		.000
	N	508	530	530
Patient's family per capita income before illness in US$	Pearson Correlation	-.215(**)	.707(**)	1
	Sig. (2-tailed)	.000	.000	
	N	508	530	530

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.12: Patient's times of contacted health providers' group wise distribution of direct costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



Annex 8.14: Bivariate correlation analysis (Nonparametric Spearman's) table of total direct cost as percentage of family income before illness, patient's family income deciles and per capita income deciles before illness (Weighted 530 cases by gender)

Components		Patients direct costs as a percentage of family income before illness	Patient's family income deciles before illness in US$	Patient's family per capita income deciles before illness in US$
Patients direct costs as a percentage of family income before illness	Spearman's Correlation	1.000	-.424(**)	-.351(**)
	Sig. (2-tailed)	.	.000	.000
	N	679	679	679
Patient's family income deciles before illness in US$	Spearman's Correlation	-.424(**)	1.000	.798(**)
	Sig. (2-tailed)	.000	.	.000
	N	679	707	707
Patient's family per capita income deciles before illness in US$	Spearman's Correlation	-.351(**)	.798(**)	1.000
	Sig. (2-tailed)	.000	.000	.
	N	679	707	707

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.15: Bivariate correlation analysis (Pearson's) table of total direct cost as percentage of family income before illness, number and times of contacted health providers and total pre-treatment delay (Weighted 530 cases by gender)

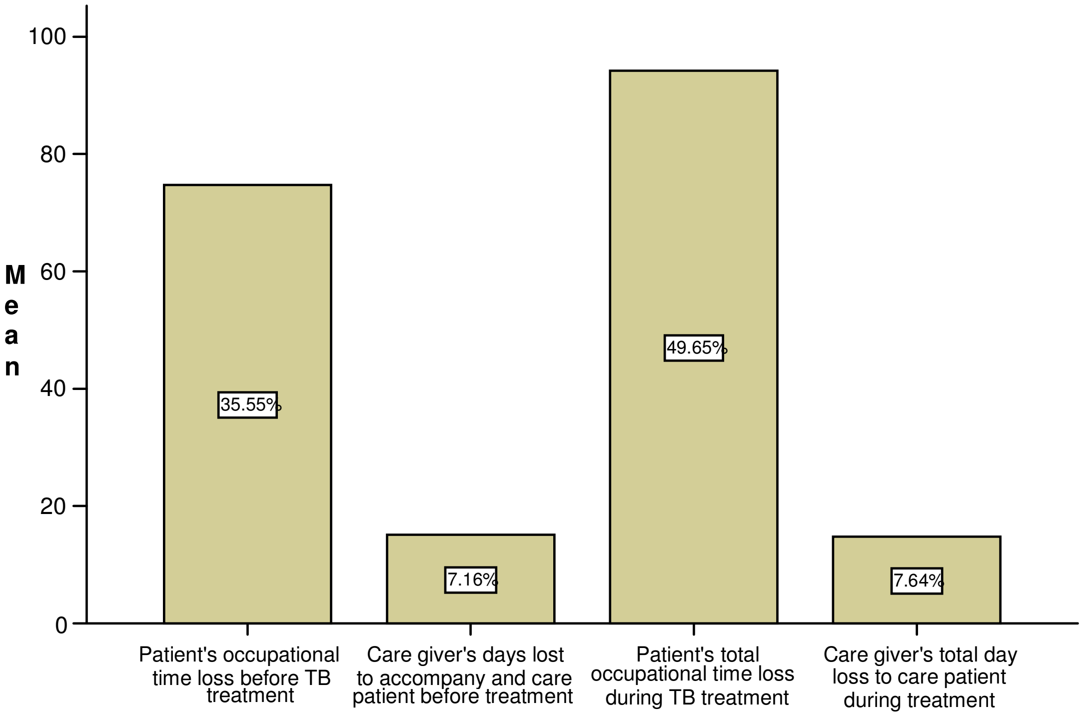
Components		Patients direct costs as a percentage of family income before illness	Total number of providers contacted by the patients	Total times contacted health providers by patients	Total pre-treatment delay in days
Patients direct costs as a percentage of family income before illness	Pearson Correlation	1	.324(**)	.291(**)	.377(**)
	Sig. (2-tailed)		.000	.000	.000
	N	508	508	508	508
Total number of providers contacted by the patients	Pearson Correlation	.324(**)	1	.452(**)	.386(**)
	Sig. (2-tailed)	.000		.000	.000
	N	508	530	508	530
Total times contacted health providers by patients	Pearson Correlation	.291(**)	.452(**)	1	.695(**)
	Sig. (2-tailed)	.000	.000		.000
	N	508	508	508	508
Total pre-treatment delay in days	Pearson Correlation	.377(**)	.386(**)	.695(**)	1
	Sig. (2-tailed)	.000	.000	.000	
	N	508	530	508	530

** Correlation is significant at the 0.01 level (2-tailed).

Table 8.16: Patients, caregivers and total workdays lost before and during tuberculosis treatment in days (Weighted 530 cases by gender)

Sequence of workdays lost	No	Mean	Standard Deviation	Median	Mini-mum	Maxi-mum
Patients total workdays loss	508	159.55	117.08	150.00	5.00	1060.00
Patients total workdays loss before treatment	508	66.57	85.23	45.00	0	940.00
Patients total workdays loss during treatment	508	92.98	62.81	90.00	0	210.00
Caregivers total workdays loss	508	27.71	23.49	22.00	00	218.00
Caregivers total workdays loss before treatment	508	13.40	15.77	9.00	0	150.00
Caregivers total workdays loss during treatment	508	14.31	12.89	11.00	0	180.00
Patients and caregiver's total workdays loss before treatment	508	79.97	97.16	53.25	00	970.00
Patients and caregiver's total workdays loss during treatment	508	107.28	72.19	101.00	1.00	360.00
Total occupational time loss	508	187.26	134.71	169.00	5.00	1120.00

Annex 8.17: Component wise total work-day loss by the patients and caregicers bar chart (Weighted 530 cases by gender)



Annex 8.18: Percentage wise patient's, caregiver's and total workdays loss groups in days (Weighted 530 cases by gender)

Patient's workdays loss groups			Caregivers's workdays loss groups			Total workdays loss groups		
Groups	No.	Percent	Groups	No.	Percent	Groups	No.	Percent
00	-	-	00	12	2.3	00	-	-
5-30	48	9.4	1-30	332	65.4	5-30	37	7.3
35-60	67	13.1	31-60	123	24.2	31-60	38	7.5
67-90	50	9.9	61-83	29	5.6	61-90	48	9.5
97-120	67	13.1	91-119	9	1.8	91-119	49	9.7
127-182	97	19.0	139-318	4	0.7	121-181	112	22.0
186-270	142	27.9	-	-	-	186-272	119	23.3
300-360	25	4.8	-	-	-	273-365	73	14.4
390-1060	15	2.9	-	-	-	368-1120	33	6.4
Sub-total	508	100.0	Sub-total	508	100.0	Sub-total	508	100.0
Missing	23	-	Missing	23	-	Missing	23	-
Total	530	-	**Total**	530	-	**Total**	530	-

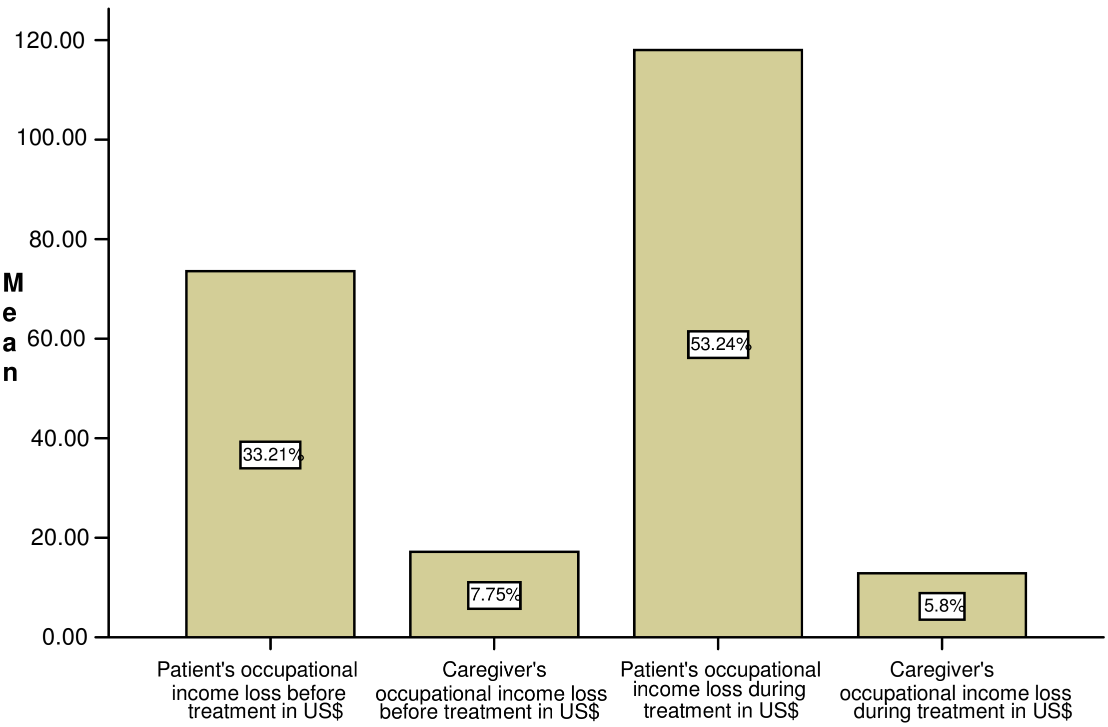
Table 8.19: Patients, caregivers and total indirect costs before and during tuberculosis treatment in US$ (Weighted 530 cases by gender)

Sequence of indirect cost	No	Mean	Standard Deviation	Median	Mini-mum	Maxi-mum
Patients total indirect costs	508	191.63	302.61	88.24	00	2823.53
Patients indirect costs before treatment	508	73.62	133.41	30.88	00	1411.76
Patients indirect costs during treatment	508	118.01	206.24	44.12	00	2205.88
Caregivers total indirect costs	508	30.05	73.13	16.89	00	1516.18
Caregivers indirect costs before treatment	508	17.19	68.48	7.35	00	1479.41
Caregivers indirect costs during treatment	508	12.86	15.94	7.35	00	176.47
Patients and caregivers indirect costs before treatment	508	90.81	164.51	44.85	00	2067.65
Patients and caregivers indirect costs during treatment	508	130.87	211.44	58.57	0.40	2208.39
Total indirect costs	508	221.68	325.19	109.52	2.94	2976.47

Annex 8.20: Percentage wise patient's, caregiver's and total indirect costs groups in US$ (Weighted 530 cases by gender)

Patient's indirect costs groups			**Caregivers's indirect costs groups**			**Total indirect costs groups**		
Groups	No.	Percent	Groups	No.	Percent	Groups	No.	Percent
00	1	.2	00	12	2.3	00	-	-
2.06-24.56	107	21.0	0.25-25.00	309	60.8	2.94-25.00	50	9.9
25.74-48.53	86	16.9	25.07-49.71	109	21.4	25.37-50.00	76	15.0
51.41-73.53	43	8.5	50.15-75.00	46	9.0	50.29-74.63	60	11.8
77.21-99.26	37	7.2	75.74-145.74	28	5.5	75.29-99.85	51	10.0
102.94-147.06	50	9.9	152.94-249.26	4	.7	100.49-195.88	107	21.1
154.41-250.0	66	12.9	257.21-304.93	1	.2	202.94-397.06	88	17.2
255.88-397.06	57	11.2	1516.18	1	.2	403.68-992.65	65	12.8
411.76-2823.53	62	12.2	-	-	-	1051-84-2976.47	11	2.2
Sub-total	508	100.0	Sub-total	508	100.0	Sub-total	508	100.0
Missing	23	-	Missing	23	-	Missing	23	-
Total	530	-	**Total**	530	-	**Total**	530	-

Annex 8.21: Component wise mean percentage of total indirect costs experienced by the patients and caregicers bar chart (Weighted 530 cases by gender)



Annex 8.22: Patient's area of residence and age groups wise mean and medians of total indirect costs as a percentage of patient's family income before illness (Weighted 530 cases except gender)

Factors	Compo-nent	Mean			Median		Delay range	
		Percent	S.Devi	Signific.	%	Signific.	Mini.	Max.
Urban-Rural	Urban	265.89	258.89	ANOVA-NS (.747)	179.25	NPMT-NS (.816)	3.11	1173.37
	Rural	255.71	250.31		179.53		1.28	1761.77
Urban	Male	326.89	279.50	ANOVA-S (.000)	242.00	NPMT-S (.001)	13.67	1173.37
	Female	148.67	159.68		87.50		3.11	672.00
Rural	Male	307.11	263.88	ANOVA-S (.000)	228.10	NPMT-S (.000)	9.14	1761.77
	Female	154.68	183.43		86.67		1.28	1200.00
Age groups	15-19 years	98.65	133.38	Kruskal-Wallis Tes-S (.000)	40.00	NPMT-S (.000)	5.46	577.78
	20-24 years	200.50	183.86		132.04		12.68	771.67
	25-29 years	230.00	232.74		126.66		1.31	1046.67
	30-34 years	328.68	315.10		212.77		5.33	1248.17
	35-39 years	243.91	237.25		173.38		1.28	933.91
	40-44 years	316.66	256.87		213.80		12.87	925.00
	45-49 years	305.67	223.81		259.91		2.78	1200.00
	50-54 years	247.80	230.24		207.15		3.11	1111.30
	55-59 years	299.29	369.99		191.94		10.23	1761.77
	60-75 years	206.40	170.38		179.35		11.67	700.15

Continuationof Annex 8.22: Patient's education, economic and health characteristics wise mean and medians of total indirect costs as a percentage of patient's family income before illness (Weighted 530 cases by gender)

Factors	Compo-nent	Mean			Median		Delay range	
		Percent	S.Devi	Signific.	%	Signific.	Mini.	Max.
Education	Illiterate	279.44	287.49	ANOVA-S (0.032)	185.46	NPMT-NS (.169)	9.61	1761.77
	Only sign	292.74	266.87		197.12		3.11	1173.37
	Class I-V	245.94	229.61		174.65		1.28	1248.17
	Class VI-X	226.33	215.97		173.33		2.78	1234.69
	Class XI-XIV	134.99	148.19		107.23		1.31	636.67
Family income deciles before illness	1st Deciles	391.08	354.10	Kruskal-Wallis Test-S (.000)	296.59	NPMT-S (.000)	19.48	1761.77
	2nd Deciles	261.24	241.85		182.96		12.41	960.42
	3rd Deciles	295.25	242.23		203.84		12.33	840.00
	4th Deciles	223.76	189.22		177.76		19.43	933.91
	5th Deciles	258.26	247.52		178.90		4.44	1046.67
	6th Deciles	239.77	194.91		193.87		6.02	866.00
	7th Deciles	250.24	256.25		130.33		9.47	925.00
	8th Deciles	239.47	237.61		156.58		20.00	1234.69
	9th Deciles	259.33	269.21		170.77		3.11	1173.37
	10th Deciles	170.62	228.97		92.67		1.28	1248.17
Family per capita income deciles before illness	1st Deciles	306.44	289.20	Kruskal-Wallis Test-S (.001)	194.68	NPMT-S (.006)	23.35	1200.00
	2nd Deciles	342.83	333.86		239.29		12.87	1761.77
	3rd Deciles	241.69	183.92		182.00		12.68	672.00
	4th Deciles	289.93	250.54		209.04		12.33	945.00
	5th Deciles	203.02	197.02		138.61		4.44	801.58
	6th Deciles	260.25	222.74		237.50		5.33	1234.69
	7th Deciles	233.71	218.23		189.95		10.60	869.23
	8th Deciles	249.32	261.28		180.29		3.11	1173.37
	9th Deciles	238.71	248.08		123.76		3.11	957.00
	10th Deciles	221.96	261.73		109.69		1.28	1248.17
Number of contacted health providers	1 provider	213.64	191.49	ANOVA-S (0.001)	159.08	NPMT-NS (.056)	2.78	960.42
	2 providers	230.18	222.42		157.01		1.28	1200.00
	3 providers	280.92	284.51		192.16		6.02	1761.77
	4 providers	361.01	318.60		245.01		5.46	1248.17
	5 providers	341.84	300.89		235.00		18.33	1234.69

Annex 8.23: Patient's urban-rural area wise total indirect costs as a percentage of patient's family income before illness groups' cross-table (Not weighted)

Factors		Total indirect costs percentage groups (row percentage)							Significance	
		1.28-39.90	40.26-79.81	80.89-140.00	140.92-220.00	220.29-374.87	376.26-600.00	602.36-1761.77	Cram-er's V	Chi-squire
Urban-rural and gender										
Urban	Male	6.1 (3)	14.3 (7)	10.2 (5)	16.3 (8)	16.3 (8)	22.4 (11)	14.3 (7)	0.437	0.004
	Female	31.4 (16)	11.8 (6)	19.6 (10)	17.6 (9)	9.8 (5)	7.8 (4)	2.0 (1)		
Rural	Male	9.1 (26)	6.6 (19)	16.7 (48)	15.3 (44)	22.6 (65)	16.0 (46)	13.6 (39)	0.393	0.000
	Female	23.3 (68)	24.3 (71)	17.1 (50)	14.7 (43)	11.3 (33)	4.8 (14)	4.5 (13)		

Continuation of Annex 8.23: Patient's socio-demographic and health characteristics wise total indirect costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases by gender)

Factors	Total indirect costs percentage groups (row percentage)							Significance	
	1.28-39.90	40.26-79.81	80.89-140.00	140.92-220.00	220.29-374.87	376.26-600.00	602.36-1761.77	Cram-er's V	Chi-squire
Urban-rural									
Urban	14.5 (11)	13.2 (10)	13.2 (10)	17.1 (13)	14.5 (11)	17.1 (13)	10.5 (8)	0.071	0.856
Rural	13.8 (60)	12.6 (55)	16.8 (73)	15.2 (66)	18.9 (82)	12.2 (53)	10.6 (46)		
Age groups									
15-19 years	48.1 (13)	3.7 (1)	29.6 (8)	3.7 (1)	7.4 (2)	7.4 (2)	0.0	0.166	0.003
20-24 years	11.1 (6)	22.2 (12)	20.4 (11)	14.8 (8)	11.1 (6)	14.8 (8)	5.6 (3)		
25-29 years	19.7 (13)	13.6 (9)	19.7 (13)	7.6 (5)	16.7 (11)	13.6 (9)	9.1 (6)		
30-34 years	10.4 (7)	9.0 (6)	11.9 (8)	19.4 (13)	17.9 (12)	14.9 (10)	16.4 (11)		
35-39 years	15.0 (9)	16.7 (10)	13.3 (8)	20.0 (12)	13.3 (8)	8.3 (5)	13.3 (8)		
40-44 years	4.5 (3)	10.4 (7)	17.9 (12)	19.4 (13)	14.9 (10)	17.9 (12)	14.9 (10)		
45-49 years	5.8 (3)	7.7 (4)	11.5 (6)	15.4 (8)	30.8 (16)	17.3 (9)	11.5 (6)		
50-54 years	12.2 (6)	14.3 (7)	18.4 (9)	10.2 (5)	18.4 (9)	18.4 (9)	8.2 (4)		
55-59 years	15.8 (6)	13.2 (5)	13.2 (5)	15.8 (6)	23.7 (6)	5.3 (2)	13.2 (5)		
60-75 years	14.9 (7)	14.9 (7)	12.8 (6)	21.3 (10)	25.5 (12)	6.4 (3)	4.3 (2)		
Educational status									
Illiterate	10.1 (13)	12.4 (16)	16.3 (21)	21.7 (28)	16.3 (21)	9.3 (12)	14.0 (18)	0.122	0.166
Only sign	12.3 (16)	11.5 (15)	13.8 (18)	16.9 (22)	16.2 (21)	16.2 (21)	13.1 (17)		
Class I-V	11.6 (14)	14.9 (18)	17.4 (21)	13.2 (16)	19.8 (24)	14.0 (17)	9.1 (11)		
Class VI-X	18.8 (21)	11.6 913)	17.9 (20)	8.9 (10)	21.4 (24)	15.2 (17)	6.3 (7)		
Class XI-XIV	31.8 (7)	13.6 (3)	22.7 (5)	13.6 (3)	13.6 (3)	0.0	4.5 (1)		
Number of contacted health providers									
1 provider	14.0 (17)	15.7 (19)	19.8 (24)	12.4 (15)	21.5 (26)	11.6 (14)	5.0 (6)	0.128	0.089
2 providers	18.3 (35)	10.5 (20)	17.3 (33)	18.3 (35)	15.2 (29)	12.6 (24)	7.9 (15)		
3 providers	12.4 (16)	12.4 (16)	17.1 (22)	13.2 (16)	17.1 (22)	14.0 (18)	14.0 (18)		
4 providers	7.0 (4)	14.0 (8)	5.3 (3)	17.5 (10)	21.1 (12)	12.3 (7)	22.8 (13)		
5 providers	5.0 (1)	15.0 (3)	10.0 (2)	15.0 (3)	20.0 (4)	20.0 (4)	15.0 (4)		

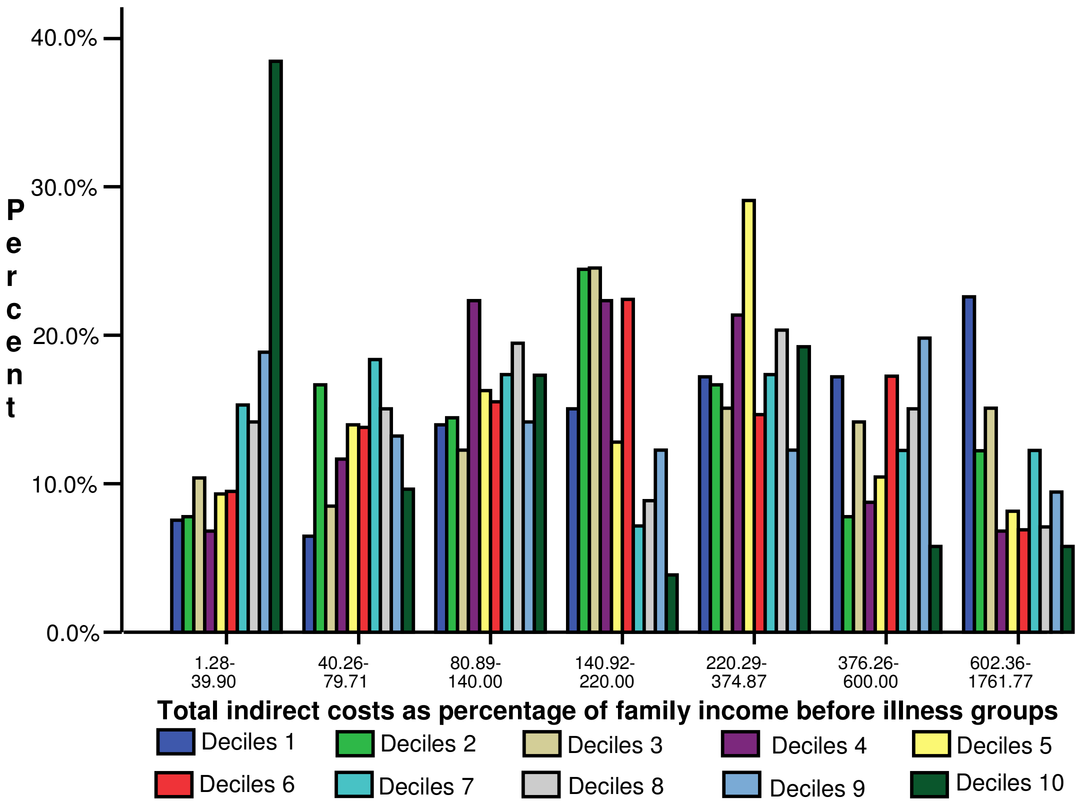
Continuation of Annex 8.23: Patient's economic characteristics wise total indirect costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases by gender)

Factors	Total indirect costs percentage groups (row percentage)							Significance	
	1.28-39.90	40.26-79.81	80.89-140.00	140.92-220.00	220.29-374.87	376.26-600.00	602.36-1761.77	Cram-er's V	Chi-squire
Family income deciles before illness									
1st Deciles	8.3 (4)	6.3 (3)	14.6 (7)	14.6 (7)	16.7 (8)	16.7 (8)	22.9 (11)	0.155	0.029
2nd Deciles	8.3 (4)	16.7 (8)	14.6 (7)	22.9 (11)	16.7 (8)	8.3 (4)	12.5 (6)		
3rd Deciles	10.9 (6)	9.1 (5)	12.7 (7)	23.6 (13	14.5 (8)	14.5 (8)	14.5 (8)		
4th Deciles	7.4 (4)	11.1 (6)	22.2 (12)	22.2 (12)	20.4 (11)	9.3 (5)	7.4 (4)		
5th Deciles	8.9 (4)	13.3 (6)	15.6 (7)	13.3 (6)	28.9 (13)	11.1 (5)	8.9 (4)		
6th Deciles	10.2 (6)	13.6 (8)	15.3 (9)	22.0 (13)	15.3 (9)	16.9 (10)	6.8 (4)		
7th Deciles	15.7 (8)	17.6 (9)	17.6 (9)	7.8 (4)	17.6 (9)	11.8 (6)	11.8 (6)		
8th Deciles	13.8 (8)	15.5 (9)	19.0 (11)	8.6 (5)	20.7 (12)	15.5 (9)	6.9 (4)		
9th Deciles	18.2 (10)	12.7 (7)	14.5 (8)	12.7 (7)	12.7 (7)	20.0 (11)	9.1 (5)		
10th Deciles	38.5 (20)	9.6 (5)	17.3 (9)	3.8 (2)	19.2 (10)	5.8 (3)	5.8 (3)		
Family per capita income deciles before illness									
1st Deciles	12.5 (6)	10.4 (5)	12.5 (6)	22.9 (11)	12.5 (6)	12.5 (6)	16.7 (8)	0.150	0.058
2nd Deciles	9.1 (5)	10.9 (60	18.2 (10)	9.1 (5)	21.8 (12)	9.1 (5)	21.8 (12)		
3rd Deciles	6.1 (3)	12.2 (6)	20.4 (10)	22.4 (11)	16.3 (8)	16.3 (8)	6.1 (3)		
4th Deciles	9.4 (5)	7.5 94)	15.1 (8)	24.5 (13)	15.1 (8)	15.1 (8)	13.2 (7)		
5th Deciles	15.9 (10)	19.0 (12)	15.9 (10)	12.7 (8)	19.0 (12)	9.5 (6)	7.9 (5)		
6th Deciles	9.3 (4)	14.0 (6)	4.7 (2)	16.3 (7)	34.9 (15)	16.3 (7)	4.7 (2)		
7th Deciles	15.7 (8)	11.8 (6)	17.6 (9)	19.6 (10)	13.7 (7)	13.7 (7)	7.8 (4)		
8th Deciles	9.4 (5)	18.9 (10)	17.0 (9)	15.1 (8)	20.8 (11)	9.4 (5)	9.4 (5)		
9th Deciles	16.7 (9)	14.8 (8)	20.4 (11)	7.4 (4)	16.7 (9)	16.7 (9)	7.4 (4)		
10th Deciles	32.7 (18)	7.3 (4)	18.2 (10)	7.3 (4)	10.9 (6)	12.7 (7)	10.9 (6)		

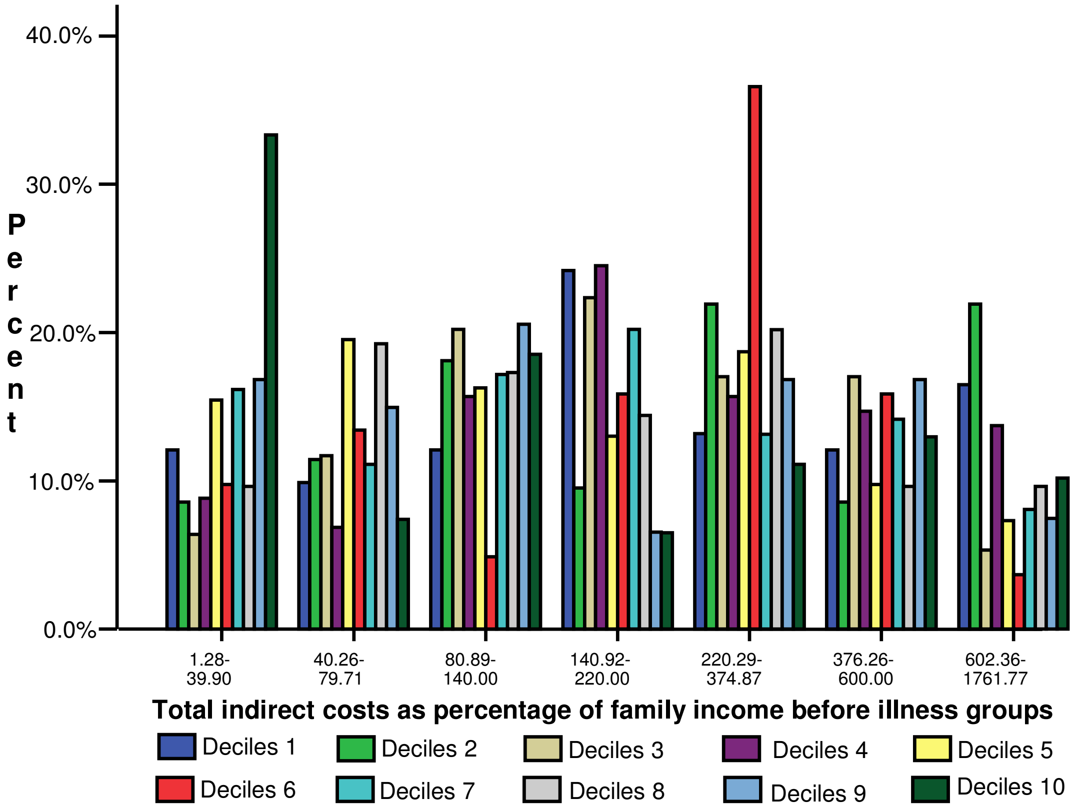
Continuation of Annex 8.23: Patient's times contacted health providers wise total indirect costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases by gender)

Factors	Total indirect costs percentage groups (row percentage)							Significance	
	1.28-39.90	40.26-79.81	80.89-140.00	140.92-220.00	220.29-374.87	376.26-600.00	602.36-1761.77	Cram-er's V	Chi-squire
Times contacted health providers groups									
1-5 times	18.4 (52)	13.1 (37)	19.8 (56)	14.8 (42)	17.7 (50)	10.6 (30)	5.7 (16)	0.168	0.000
6-10 times	10.2 (16)	14.6 (23)	12.7 (20)	14.6 (23)	19.1 (30)	16.6 (26)	12.1 (19)		
11-15 times	4.4 (2)	8.9 (4)	6.7 (3)	22.2 (10)	22.2 (10)	17.8 (8)	17.8 (8)		
16-20 times	5.0 (1)	10.0 (2)	25.0 (5)	15.0 (3)	10.0 (2)	10.0 (2)	25.0 (5)		
22-33 times	8.3 (1)	0.0	0.0	16.7 (2)	8.3 (1)	8.3 (1)	58.3 (7)		
41-96 times	50.0 (1)	50.0 (1)	0.0	0.0	0.0	0.0	0.0		

Annex 8.24: Patient's family income deciles before illness wise distribution of indirect costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



Annex 8.25: Patient's family per capita income deciles before illness wise distribution of indirect costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)

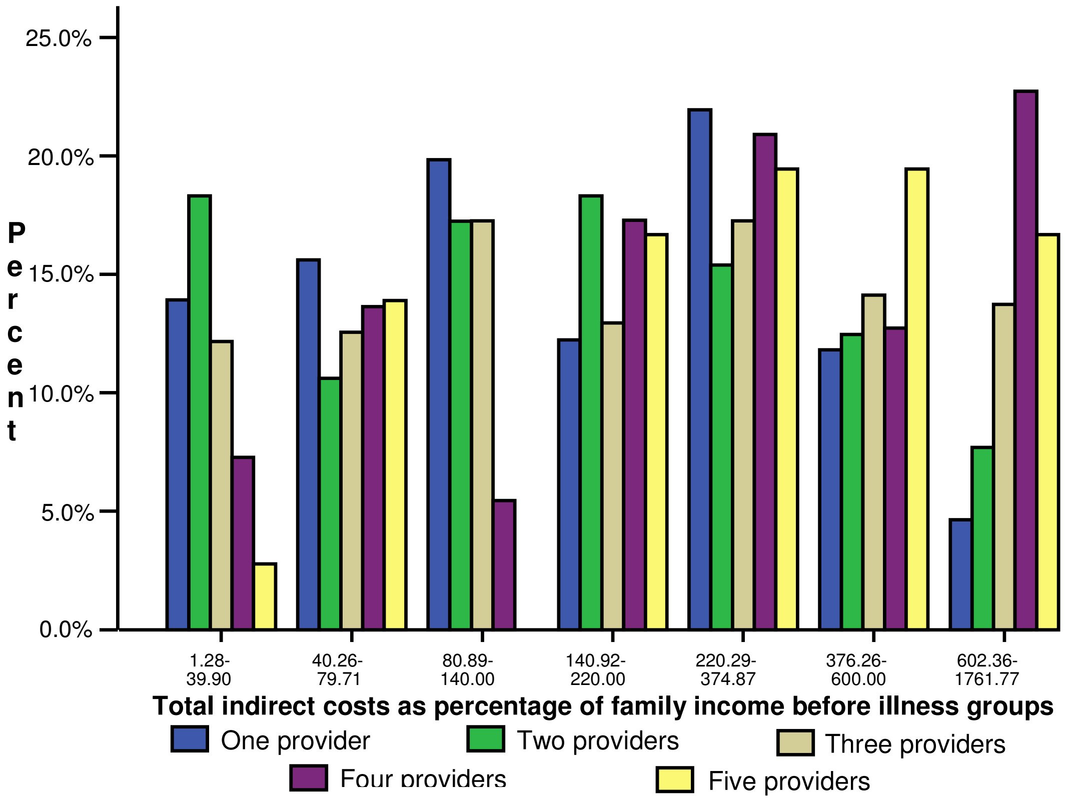


Annex 8.27: Bivariate correlation analysis (Pearson's) table of total indirect cost as percentage of family income before illness, patient's family income and per capita income before illness (Weighted 530 cases by gender) swoon

Components		Patients indirect costs as a percentage of family income before illness	Patient's family income before illness in US$	Patient's family per capita income before illness in US$
Patients indirect costs as a percentage of family income before illness	Pearson Correlation	1	-.137(**)	-.086
	Sig. (2-tailed)		.002	.052
	N	508	508	508
Patient's family income before illness in US$	Pearson Correlation	-.137(**)	1	.707(**)
	Sig. (2-tailed)	.002		.000
	N	508	530	530
Patient's family per capita income before illness in US$	Pearson Correlation	-.086	.707(**)	1
	Sig. (2-tailed)	.052	.000	
	N	508	530	530

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.26: Patient's number of contacted health providers' wise distribution of indirect costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



Annex 8.28: Bivariate correlation analysis (Nonparametric Spearman's) table of total indirect cost as percentage of family income before illness, patient's family income deciles and per capita income deciles before illness (Weighted 530 cases by gender)

Components		Patients indirect costs as a percentage of family income before illness	Patient's family income deciles before illness in US$	Patient's family per capita income deciles before illness in US$
Patients indirect costs as a percentage of family income before illness	Spearman's Correlation	1.000	-.241(**)	-.168(**)
	Sig. (2-tailed)	.	.000	.000
	N	679	679	679
Patient's family income deciles before illness in US$	Spearman's Correlation	-.241(**)	1.000	.798(**)
	Sig. (2-tailed)	.000	.	.000
	N	679	707	707
Patient's family per capita income deciles before illness in US$	Spearman's Correlation	-.168(**)	.798(**)	1.000
	Sig. (2-tailed)	.000	.000	.
	N	679	707	707

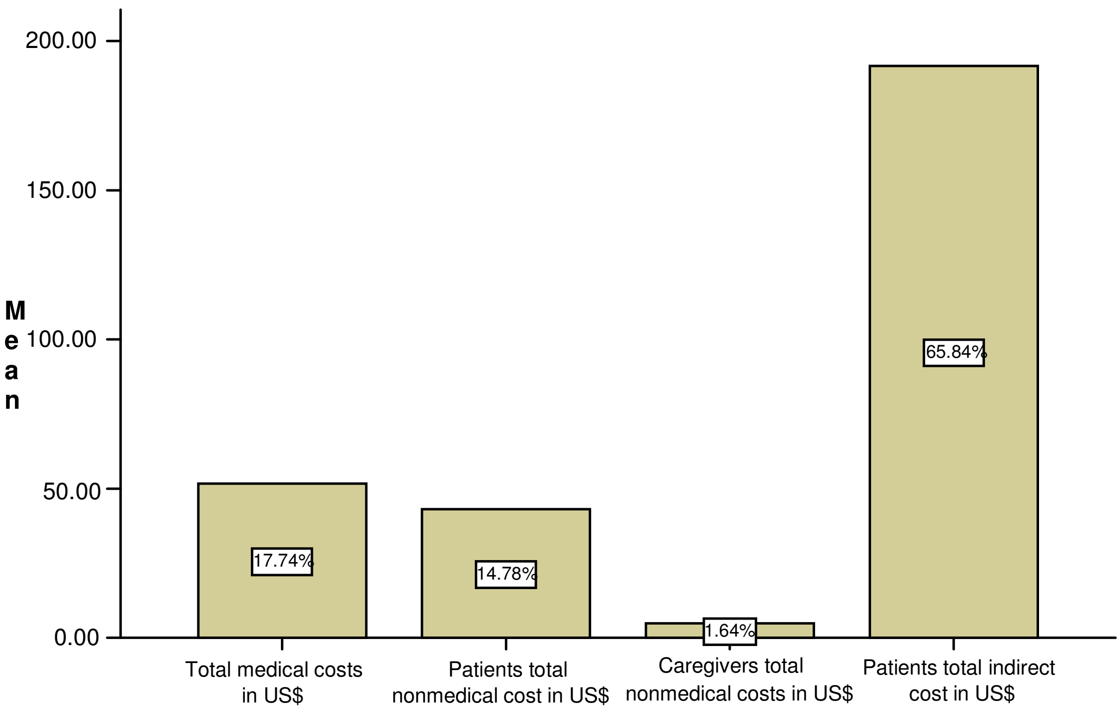
** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.29: Bivariate analysis table of total indirect cost as percentage of family income before illness, number and times of contacted health providers and total pre-treatment delay (Weighted 530 cases by gender)

Components		Total indirect cost as percentage of family income before illness	Total pre-treatment delay in days	Total number of providers contacted by the patients	Total times contacted health providers by patients
Total indirect cost as percentage of family income before illness	Pearson Correlation	1	.299(**)	.179(**)	.203(**)
	Sig. (2-tailed)		.000	.000	.000
	N	508	508	508	508
Total pre-treatment delay in days	Pearson Correlation	.299(**)	1	.386(**)	.695(**)
	Sig. (2-tailed)	.000		.000	.000
	N	508	530	530	508
Total number of providers contacted by the patients	Pearson Correlation	.179(**)	.386(**)	1	.452(**)
	Sig. (2-tailed)	.000	.000		.000
	N	508	530	530	508
Total times contacted health providers by patients	Pearson Correlation	.203(**)	.695(**)	.452(**)	1
	Sig. (2-tailed)	.000	.000	.000	
	N	508	508	508	508

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.30: Component wise patient's cost distribution bar chart (Weighted 530 cases by gender)



Annex 8.31: Gender, urban-rual, age group, education, marital status and family income deciles wise mean and medians of total patient's costs as a percentage of patient's family income before illness (Weighted 530 cases except gender)

Factors	Compo-nent	Mean			Median		Delay range	
		Percent	S.Devi	Signific.	%	Signific.	Mini.	Max.
Over All		354.21	333.92	-	267.79	-	8.37	2544.89
Gender	Male	403.93	343.90	ANOVA-S (.000)	314.98	NPMT-S (.000)	14.57	2544.89
	Female	256.80	290.16		159.44		8.37	2239.72
Urban-Rural	Urban	347.38	308.27	ANOVA-NS (.849)	271.28	NPMT-NS (.677)	8.37	1494.22
	Rural	355.39	338.45		267.74		14.57	2544.89
Urban	Male	400.36	308.13	ANOVA-S (.010)	348.03	NPMT-S (.000)	41.30	1450.33
	Female	245.58	284.65		151.40		8.37	1494.22
Rural	Male	404.54	350.13	ANOVA-S (.000)	306.81	NPMT-S (.000)	14.57	2544.89
	Female	258.76	291.54		160.27		16.53	2239.72
Age groups	15-19 years	182.22	250.35	Kruskal-Wallis Tes-S (.000)	103.33	NPMT-S (.000)	16.53	1494.22
	20-24 years	309.39	284.31		207.24		30.50	1450.33
	25-29 years	326.99	338.37		209.82		16.88	1946.97
	30-34 years	402.56	327.65		315.74		8.37	1444.66
	35-39 years	355.96	333.10		254.57		17.43	1772.00
	40-44 years	450.25	406.04		323.54		23.68	2239.72
	45-49 years	424.46	370.30		350.27		39.51	2544.89
	50-54 years	326.81	259.67		264.65		10.64	1263.25
	55-59 years	390.19	421.27		266.09		14.57	1899.17
	60-75 years	259.57	187.91		252.72		22.25	796.47
Education	Illiterate	366.66	356.640	ANOVA-NS (.493)	265.33	NPMT-NS (.416)	18.69	2239.72
	Only sign	383.63	308.30		306.75		22.57	1467.58
	Class I-V	342.79	337.52		255.46		8.37	2544.89
	Class VI-X	337.01	337.99		248.62		10.64	1861.64
	Class XI-XIV	257.26	301.77		196.53		16.88	1450.33
Marital status	Unmarried	245.06	278.43	ANOVA-S (.029)	153.82	NPMT-S (.003)	16.53	1494.22
	Married	373.21	343.81		287.30		8.37	2544.89
	Divorced	399.61	278.73		464.00		30.50	1196.81
	Widowed	307.39	285.66		210.78		10.64	1160.99
Family income deciles before illness	1st Deciles	591.69	472.40	Kruskal-Wallis Test-S (.000)	485.42	NPMT-S (.000)	70.00	1946.97
	2nd Deciles	381.15	262.11		335.71		23.58	1219.13
	3rd Deciles	454.56	438.54		311.34		16.57	2239.72
	4th Deciles	315.54	248.99		262.02		22.25	1322.63
	5th Deciles	347.39	294.59		283.67		24.18	1494.22
	6th Deciles	309.01	219.33		255.05		44.68	956.20
	7th Deciles	318.09	283.50		233.50		23.54	1088.08
	8th Deciles	299.61	259.89		263.00		22.57	1627.58
	9th Deciles	354.97	410.07		252.72		8.37	2544.89
	10th Deciles	203.22	226.83		142.92		10.64	1272.36

Continuation of Annex 8.31: Family per capita income deciles, contacted health ptoviders and total delay groups wise mean and medians of total patient's costs as a percentage of patient's family income before illness (Weighted 530 cases by gender)

Factors	Compo-nent	Mean			Median		Delay range	
		Percent	S.Devi	Signific.	%	Signific	Mini.	Max.
Family per capita income deciles before illness	1st Deciles	499.53	461.73	Kruskal-Wallis Test-S (.000)	352.28	NPMT-S (.000)	16.57	2239.72
	2nd Deciles	465.78	395.90		360.71		24.18	1899.17
	3rd Deciles	368.54	320.56		306.97		39.26	1961.64
	4th Deciles	426.67	343.44		329.33		23.58	1494.22
	5th Deciles	273.62	242.95		212.18		22.25	1322.63
	6th Deciles	332.17	270.82		293.77		8.37	1627.58
	7th Deciles	339.47	403.60		219.04		23.54	2544.89
	8th Deciles	310.50	274.45		239.82		47.87	1262.71
	9th Deciles	310.78	254.94		247.16		10.64	1031.37
	10th Deciles	249.56	257.64		147.69		14.57	1272.36
Number of contacted health providers	1 provider	260.67	204.07	ANOVA-S (.000)	209.92	NPMT-S (.000)	16.53	982.00
	2 providers	306.97	288.98		233.20		8.37	1850.00
	3 providers	378.86	303.05		281.95		23.13	1899.17
	4 providers	552.69	464.99		401.14		46.37	2239.72
	5 providers	683.82	640.41		439.52		73.44	2544.89
Times contacted health providers	1-5 times	260.54	223.23	Kruskal-Wallis Test-S (.000)	205.44	NPMT-S (.000)	8.37	1850.00
	6-10 times	396.95	315.58		324.63		23.13	1772.00
	11-15 times	581.08	498.89		442.02		33.51	2544.89
	16-20 times	507.96	387.31		435.60		99.39	1946.97
	22-33 times	1078.39	612.56		1178.90		93.86	2239.72
	41-96 times	188.82	141.31		203.25		73.44	246.51
Total delay groups	21-30 days	228.99	183.51	Kruskal-Wallis Test-S (.000)	176.60	NPMT-S (.000)	10.64	803.46
	31-60 days	309.15	261.22		236.97		8.37	1467.58
	61-91 days	372.93	333.48		311.00		25.56	1961.64
	92-182 days	452.40	359.70		365.71		23.13	1772.00
	189-365 days	544.52	457.51		407.96		62.00	2544.89
	372-1095 days	1018.93	697.74		967.12		73.44	2239.72

Annex 8.32: Bivariate correlation analysis (Pearson's) table of total patient's cost as percentage of family income before illness, patient's family income and per capita income before illness (Weighted 530 cases by gender)

Components		Patient's total costs as a percentage of family income before illness	Patient's family income before illness in US$	Patient's family per capita income before illness in US$
Patient's total costs as a percentage of family income before illness	Pearson Correlation	1	-.183(**)	-.172(**)
	Sig. (2-tailed)		.000	.000
	N	508	508	508
Patient's family income before illness in US$	Pearson Correlation	-.183(**)	1	.707(**)
	Sig. (2-tailed)	.000		.000
	N	508	530	530
Patient's family per capita income before illness in US$	Pearson Correlation	-.172(**)	.707(**)	1
	Sig. (2-tailed)	.000	.000	
	N	508	530	530

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.33: Bivariate correlation analysis (Nonparametric Spearman's) table of total patient's cost as percentage of family income before illness, patient's family income deciles and per capita income deciles before illness (Weighted 530 cases by gender)

Components		Patient's total costs as a percentage of family income before illness	Patient's family income deciles before illness in US$	Patient's family per capita income deciles before illness in US$
Patient's total costs as a percentage of family income before illness	Spearman's Correlation	1.000	-.313(**)	-.239(**)
	Sig. (2-tailed)	.	.000	.000
	N	679	679	679
Patient's family income deciles before illness in US$	Spearman's Correlation	-.313(**)	1.000	.798(**)
	Sig. (2-tailed)	.000	.	.000
	N	679	707	707
Patient's family per capita income deciles before illness in US$	Spearman's Correlation	-.239(**)	.798(**)	1.000
	Sig. (2-tailed)	.000	.000	.
	N	679	707	707

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.34: Bivariate correlation analysis table of total patient's cost as percentage of family income before illness, total pre-treatment delay and number and times of contacted health providers (Weighted 530 cases by gender)

Components		Patient's total costs as percentage of family income before illness	Total pre-treatment delay in days	Total number of providers contacted by the patients	Total times contacted health providers by patients
Patient's total costs as percentage of family income before illness	Pearson Correlation	1	.402(**)	.300(**)	.302(**)
	Sig. (2-tailed)		.000	.000	.000
	N	508	508	508	508
Total pre-treatment delay in days	Pearson Correlation	.402(**)	1	.386(**)	.695(**)
	Sig. (2-tailed)	.000		.000	.000
	N	508	530	530	508
Total number of providers contacted by the patients	Pearson Correlation	.300(**)	.386(**)	1	.452(**)
	Sig. (2-tailed)	.000	.000		.000
	N	508	530	530	508
Total times contacted health providers by patients	Pearson Correlation	.302(**)	.695(**)	.452(**)	1
	Sig. (2-tailed)	.000	.000	.000	
	N	508	508	508	508

** Correlation is significant at the 0.01 level (2-tailed).

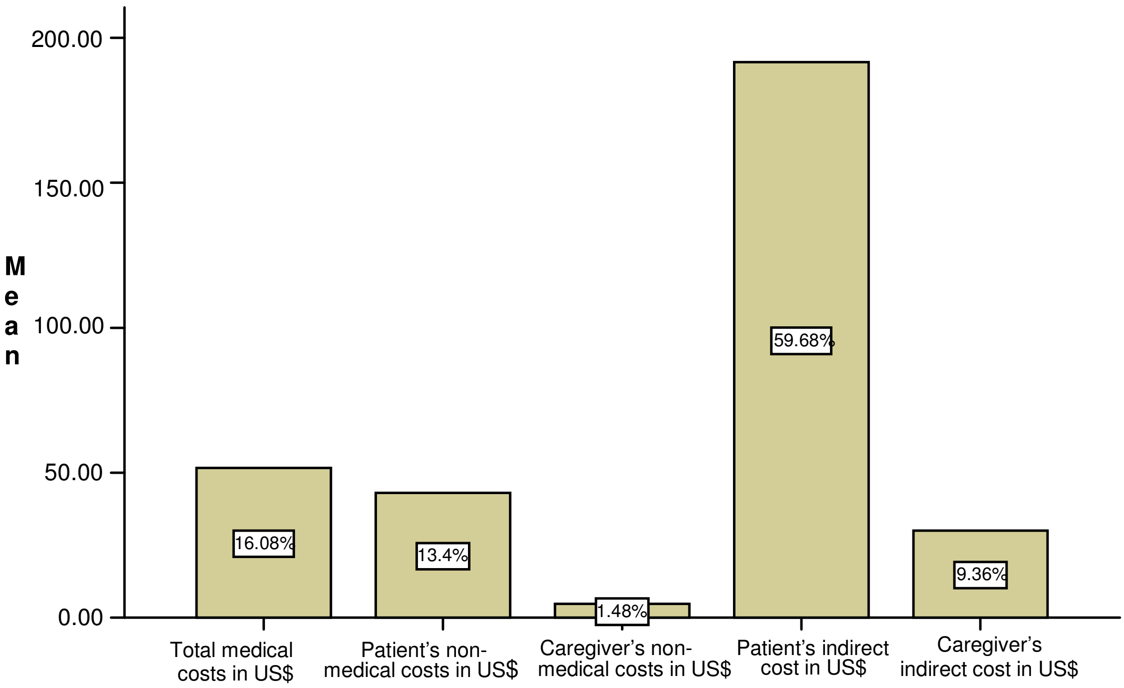
Annex 8.35: Socio-demographic, economic and health care atributes wise mean and medians of caregiver's costs as a percentage of caregiver's personal income before illness (Weighted 530 cases except gender)

Factors		Mean			Median		Delay range	
		Percent	S.Devi	Signific.	%	Signific.	Minni	Maxi
Over All		2.40	3.52	-	1.00	-	0.06	23.95
Gender	Male	3.03	4.03	ANOVA-S (.001)	1.52	NPMT-S (.000)	0.06	23.95
	Female	2.09	3.20		0.83		0.06	22.06
Urban-Rural	Urban	4.34	6.03	ANOVA-S (.000)	1.86	NPMT-NS (.125)	0.07	23.95
	Rural	2.43	3.18		1.20		0.06	22.06
Age groups	15-19 years	2.24	3.51	Kruskal-Wallis Tes-NS (.216)	0.64	NPMT-NS (.290)	0.06	17.65
	20-24 years	2.60	3.60		1.47		0.06	17.65
	25-29 years	2.15	2.86		0.86		0.06	17.65
	30-34 years	2.22	3.83		0.76		0.07	23.95
	35-39 years	2.36	3.49		1.10		0.09	18.38
	40-44 years	2.26	3.41		0.93		0.11	20.59
	45-49 years	2.00	2.15		1.21		0.09	8.82
	50-54 years	1.75	1.78		1.11		0.09	8.82
	55-59 years	4.41	5.44		2.13		0.13	22.06
	60-75 years	3.04	4.54		0.87		0.09	19.61
Education	Illiterate	2.91	4.34	ANOVA-NS (.618)	1.26	NPMT-NS (.094)	0.06	23.95
	Only sign	2.97	3.89		1.67		0.06	20.59
	Class I-V	2.30	3.35		1.03		0.06	22.06
	Class VI-X	2.72	3.60		1.47		0.09	18.38
	Class XI-XIV	2.20	2.87		0.90		0.12	11.76
Marital status	Unmarried	2.05	2.72	ANOVA-NS (.370)	0.78	NPMT-NS (.566)	0.06	17.65
	Married	2.75	3.85		1.27		0.06	23.95
	Divorced	3.56	5.39		1.44		0.15	17.65
	Widowed	3.30	4.33		1.62		0.13	22.06
Number of contacted health providers	1 provider	2.38	2.44	ANOVA-NS (.303)	1.84	NPMT-NS (.088)	0.06	16.18
	2 providers	2.56	3.52		1.15		0.06	20.59
	3 providers	3.23	5.10		0.98		0.09	23.95
	4 providers	2.42	3.03		1.20		0.10	13.24
	5 providers	3.64	4.70		1.65		0.25	22.06
Times contacted health providers	1-5 times	2.23	2.80	Kruskal-Wallis Test-S (.000)	1.17	NPMT-S (.037)	0.06	19.61
	6-10 times	2.61	3.64		1.23		0.08	18.38
	11-15 times	4.54	6.53		1.26		0.15	23.95
	16-20 times	4.14	5.82		1.42		0.30	22.06
	22-33 times	6.88	4.70		8.67		0.76	12.79
	41-96 times	4.14	.00		4.14		4.14	4.14
Total delay groups	21-30 days	2.02	2.34	Kruskal-Wallis Test-S (.000)	1.20	NPMT-NS (.083)	0.06	16.18
	31-60 days	2.01	2.40		1.15		0.06	13.24
	61-91 days	2.66	4.10		1.19		0.09	23.95
	92-182 days	4.50	5.63		1.73		0.06	20.59
	189-365 days	3.09	4.35		1.39		0.10	22.06
	372-1095 days	8.65	5.67		10.51		0.44	17.65

Annex 8.36: Pre and during treatment component wise means and medians of total costs in US$ (Weighted 530 cases by gender)

Head of costs	No. of cases	Mean	Std. Devi.	Median	Mini mum	Maxi-mum
Total pre-treatment cost	508	155.53	250.13	82.69	1.76	3104.41
Pre-treatment direct costs	508	64.72	156.20	30.22	0.37	2785.29
Pre-treatment indirect costs	508	90.80	164.51	44.85	0.00	2067.65
Total during treatment cost	508	165.58	225.99	93.57	2.06	2468.46
During treatment direct costs	508	34.71	35.75	24.91	0.00	280.22
During treatment indirect costs	508	130.87	211.44	58.57	0.40	2208.34
Total cost	508	321.11	319.17	195.15	8.38	3469.71

Annex 8.37: Component wise mean percentage of total costs experienced by the patients and caregicers bar chart (Weighted 530 cases by gender)



Annex 8.38: Patient's socio-demographic and economic characteristics wise mean and medians of total costs as a percentage of patient's family income before illness (Weighted 530 cases except gender)

Factors	Compo-nent	Mean			Median		Delay range	
		Percent	S.Devi	Signific.	%	Signific.	Mini.	Max.
Urban-Rural	Urban	390.90	336.29	ANOVA-NS (.908)	349.80	NPMT-NS (.841)	9.95	1660.33
	Rural	396.13	363.18		299.52		17.33	2621.56
Urban	Male	439.19	336.89	ANOVA-S (.034)	372.23	NPMT-S (.009)	48.02	1660.33
	Female	298.11	316.60		198.38		9.95	1600.89
Rural	Male	437.45	370.81	ANOVA-S (.000)	332.84	NPMT-S (.000)	21.09	2621.56
	Female	314.90	334.82		205.68		17.33	2563.86
Age groups	15-19 years	217.60	282.36	Kruskal-Wallis Tes-S (.000)	112.17	NPMT-S (.001)	20.20	1600.89
	20-24 years	356.98	321.13		237.53		41.12	1660.33
	25-29 years	366.59	363.40		250.70		17.33	2141.67
	30-34 years	451.92	346.22		351.86		9.95	1523.86
	35-39 years	395.83	360.54		275.79		17.43	1907.00
	40-44 years	491.37	428.14		354.54		38.04	2563.86
	45-49 years	466.37	393.99		373.36		40.83	2621.56
	50-54 years	352.37	272.92		285.50		11.62	1374.55
	55-59 years	434.45	457.04		292.17		21.09	2165.10
	60-75 years	301.62	223.19		285.99		29.25	1096.55
Education	Illiterate	412.88	391.76	ANOVA-NS (.410)	307.52	NPMT-NS (.174)	23.62	2563.86
	Only sign	427.76	330.21		350.54		34.87	1504.09
	Class I-V	385.17	359.13		294.98		9.95	2621.56
	Class VI-X	369.86	354.30		283.00		11.62	2052.74
	Class XI-XIV	286.27	343.92		221.46		17.33	1660.33
Family income deciles before illness	1st Deciles	679.82	515.97	Kruskal-Wallis Test-S (.000)	540.75	NPMT-S (.000)	95.03	2165.10
	2nd Deciles	440.11	286.32		385.98		23.58	1306.09
	3rd Deciles	503.87	473.47		358.67		29.07	2563.86
	4th Deciles	364.82	267.34		296.58		37.30	1355.08
	5th Deciles	385.17	311.65		330.27		29.89	1600.89
	6th Deciles	343.18	231.83		274.95		66.26	1022.20
	7th Deciles	349.01	296.50		250.03		30.25	1114.83
	8th Deciles	327.05	272.09		274.93		42.93	1637.78
	9th Deciles	378.09	422.44		270.88		9.95	2621.56
	10th Deciles	224.05	240.90		150.65		11.62	1320.53
Family per capita income deciles before illness	1st Deciles	574.48	513.07	Kruskal-Wallis Test-S (.000)	385.42	NPMT-S (.000)	29.07	2563.86
	2nd Deciles	520.51	435.25		386.31		29.89	2165.10
	3rd Deciles	414.97	334.44		354.92		69.32	2037.42
	4th Deciles	475.44	363.90		358.67		23.58	1600.89
	5th Deciles	312.86	266.45		248.96		30.25	1355.08
	6th Deciles	375.14	285.88		335.65		9.95	1637.78
	7th Deciles	368.05	409.71		252.16		34.42	2621.56
	8th Deciles	338.12	291.82		256.56		49.89	1348.12
	9th Deciles	335.14	267.18		250.70		11.62	1085.40
	10th Deciles	279.20	277.10		173.69		17.33	1320.53
Family Income Change	Decreased	499.22	368.81	Kruskal-Wallis Test-S (.012)	434.04	NPMT-S (.006)	20.55	1637.78
	Static	347.67	281.60		260.45		11.62	1296.10
	Increased	388.79	369.20		294.65		9.95	2621.65

Annex 8.39: Patient's gender, age group and education wise total costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases except gender)

Factors		Total costs percentage groups (row percentage)							Significance	
		9.95-124.94	126.12-249.15	252.10-349.93	350.26-499.68	501.48-694.97	703.81-981.33	1004.40-2621.56	Cram-er's V	Chi-squire
Urban-rural										
Urban		23.4 (18)	18.2 (14)	9.1 (7)	22.1 (17)	13.0 (10)	7.8 (6)	6.5 (6)	0.106	0.445
Rural		18.9 (82)	22.8 (99)	17.0 (74)	15.4 (67)	11.5 (50)	7.8 (34)	6.7 (29)		
Urban-rural and gender										
Urban	Male	14.3 (7)	18.4 (9)	6.1 (3)	30.6 (15)	14.3 (7)	8.2 (4)	8.2 (4)	0.418	0.008
	Female	41.2 (21)	17.6 (9)	13.7 (7)	5.9 (3)	11.8 (6)	5.9 (3)	3.9 (2)		
Rural	Male	11.5 (33)	22.6 (65)	18.5 (53)	18.1 (52)	12.9 (37)	8.4 (24)	8.0 (23)	0.280	0.000
	Female	33.2 (97)	22.9 (67)	14.4 (42)	10.3 (30)	8.9 (26)	6.5 (19)	3.8 (11)		
Age groups										
15-19 years		53.8 (14)	19.2 (5)	11.5 (3)	3.8 (1)	7.7 (2)	0.0	3.8 (1)	0.155	0.029
20-24 years		20.8 (11)	32.1 (17)	7.5 (4)	11.3 (6)	15.1 (8)	7.5 (4)	5.7 (3)		
25-29 years		25.4 (17)	23.9 (16)	14.9 (10)	10.4 (7)	10.4 (7)	9.0 (6)	6.0 (4)		
30-34 years		14.9 (10)	14.9 (10)	19.4 (13)	17.9 (12)	14.9 (10)	6.0 (4)	11.9 (8)		
35-39 years		18.0 (11)	27.9 (17)	11.5 (7)	19.7 (12)	6.6 (4)	9.8 (6)	6.6 (4)		
40-44 years		9.1 (6)	25.8 (17)	13.6 (9)	15.2 (10)	13.6 (9)	12.1 (8)	10.6 (7)		
45-49 years		7.8 (4)	13.7 (7)	17.6 (9)	27.5 (14)	17.6 (9)	11.8 (6)	3.9 (2)		
50-54 years		16.7 (8)	20.8 (10)	25.0 (12)	16.7 (8)	12.5 (6)	4.2 (2)	4.2 (2)		
55-59 years		16.2 (6)	24.3 (9)	18.9 (7)	13.5 (5)	5.4 (2)	10.8 (4)	10.8 (4)		
60-75 years		27.7 (13)	14.9 (7)	19.1 (9)	21.3 (10)	12.8 (6)	2.1 (1)	2.1 (1)		
Educational status										
Illiterate		16.3 (21)	24.8 (32)	18.6 (24)	14.7 (1(0	10.9 (14)	6.2 (8)	8.5 (11)	0.099	0.739
Only sign		15.4 (20)	20.8 (27)	13.8 (18)	19.2 (25)	13.1 (17)	8.5 (11)	9.2 (12)		
Class I-V		20.7 (25)	20.7 (25)	14.9 (18)	17.4 (21)	13.2 (16)	8.3 (10)	5.0 (6)		
Class VI-X		24.3 (27)	18.9 (21)	18.9 (21)	13.5 (15)	10.8 (12)	9.0 (10)	4.5 (5)		
Class XI-XIV		30.4 (7)	34.8 (8)	4.3 (1)	17.4 (4)	8.7 (2)	0.0	4.3 (1)		

Continuation of Annex 8.39: Patient's family and per capita income deciles wise total costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases by gender)

Factors	Total costs percentage groups (row percentage)							Significance	
	9.95-124.94	126.12-249.15	252.10-349.93	350.26-499.68	501.48-694.97	703.81-981.33	1004.40-2621.56	Cramer's V	Chi-squire
Family income deciles before illness									
1st Deciles	2.1 (1)	16.7 (8)	14.6 (7)	10.4 (5)	22.9 (11)	14.6 (7)	18.8 (9)	0.173	0.001
2nd Deciles	8.7 (4)	17.4 (8)	19.6 (9)	21.7 (10)	13.0 (4)	13.0 (6)	6.5 (3)		
3rd Deciles	14.8 (8)	18.5 (10)	13.0 (7)	25.9 (14)	7.4 (4)	5.6 (3)	14.8 (8)		
4th Deciles	10.9 (6)	29.1 (16)	16.4 (9)	21.8 (12)	10.9 (6)	5.5 (3)	5.5 (3)		
5th Deciles	22.2 (10)	15.6 (7)	17.8 (8)	17.8 (8)	11.1 (5)	8.9 (4)	6.7 (3)		
6th Deciles	15.3 (9)	28.8 (17)	16.9 (10)	18.6 (11)	8.5 (5)	10.2 (6)	1.7 (1)		
7th Deciles	24.0 (12)	26.0 (13)	14.0 (7)	12.0 (6)	10.0 (5)	10.0 (5)	4.0 (2)		
8th Deciles	22.4 (13)	25.9 (15)	20.7 (12)	12.1 (7)	10.3 (6)	6.9 (4)	1.7 (1)		
9th Deciles	27.3(15)	20.0 (11)	12.7 (7)	12.7 (7)	18.2 (10)	1.8 (1)	7.3 (4)		
10th Deciles	44.4 (24)	20.4 (11)	13.0 (7)	11.1 (6)	7.4 (4)	1.9 (1)	1.9 (1)		
Family per capita income deciles before illness									
1st Deciles	6.4 (3)	19.1 (9)	19.1 (9)	19.1 (9)	10.6 (5)	8.5 (4)	17.0 (8)	0.152	0.048
2nd Deciles	10.9 (6)	21.8 (12)	12.7 (7)	14.5 (8)	10.9 (6)	16.4 (9)	12.7 (7)		
3rd Deciles	10.4 (5)	18.8 (9)	18.8 (9)	25.0 (12)	12.5 (6)	10.4 (5)	4.2 (2)		
4th Deciles	17.0 (9)	17.0 (9)	9.4 (5)	20.8 (11)	13.2 (7)	11.3 (6)	11.3 (6)		
5th Deciles	25.0 (16)	25.0 (16)	15.6 (10)	17.2 (11)	6.3 (4)	6.3 (4)	4.7 (3)		
6th Deciles	16.3 (7)	16.3 (7)	23.3 (10)	20.9 (9)	16.3 97)	4.7 (2)	2.3 (1)		
7th Deciles	19.6 (10)	29.4 (15)	21.6 (11)	5.9 (3)	13.7 (7)	5.9 (3)	3.9 (2)		
8th Deciles	22.6 (12)	24.5 (13)	18.9 (10)	15.1 (8)	7.5 (4)	5.7 (3)	5.7 (3)		
9th Deciles	21.8 (12)	27.3 (15)	9.1 (5)	16.4 (9)	16.4 (9)	3.6 (2)	5.5 (3)		
10th Deciles	38.6 (22)	19.3 (11)	10.5 (6)	8.8 (5)	14.0 (8)	7.0 (4)	1.8 (1)		

Continuation of Annex 8.39: Patient's number and times contacted health providers, total delay and family income change groups wise total costs as a percentage of patient's family income before illness groups' cross-table (Weighted 530 cases by gender)

Factors	Total costs percentage groups (row percentage)							Significance	
	9.95-124.94	126.12-249.15	252.10-349.93	350.26-499.68	501.48-694.97	703.81-981.33	1004.40-2621.56	Cram-er's V	Chi-squire
Number of contacted health providers									
1 provider	24.6 (30)	27.0 (33)	14.8 (18)	18.9 (23)	8.2 (10)	4.9 (6)	1.6 (2)	0.168	0.000
2 providers	24.2 (46)	23.2 (44)	15.8 (30)	13.7 (26)	12.1 (23)	6.3 (12)	4.7 (9)		
3 providers	13.1 (17)	23.1 (30)	16.2 (21)	17.7 (23)	13.8 (18)	9.2 (12)	6.9 (9)		
4 providers	10.5 (6)	10.5 (6)	17.5 (10)	19.3 (11)	14.0 (8)	8.8 (5)	19.3 (11)		
5 providers	5.3 (1)	5.3 (1)	15.8 (3)	10.5 (2)	15.8 (3)	26.3 (5)	21.1 (4)		
Times contacted health providers groups									
1-5 times	27.7 (78)	26.2 (74)	15.2 (43)	13.8 (39)	9.2 (26)	5.7 (16)	2.1 (6)	0.218	0.000
6-10 times	10.9 (17)	19.2 (30)	18.6 (29)	21.8 (34)	13.5 (21)	7.7 (12)	8.3 (13)		
11-15 times	7.0 (3)	9.3 (4)	11.6 (5)	18.6 (8)	20.9 (9)	16.3 (7)	16.3 (7)		
16-20 times	5.0 (1)	15.0 (3)	25.0 (5)	5.0 (1)	20.0 (4)	20.0 (4)	10.0 (2)		
22-33 times	8.3 (1)	0.0	0.0	16.7 (2)	8.3 (1)	8.3 (1)	58.3 (7)		
41-96 times	50.0 (1)	50.0 (1)	0.0	0.0	0.0	0.0	0.0		
Total pre-treatment delay groups									
21-30 days	31.0 (44)	26.8 (38)	15.5 (22)	14.1 (20)	9.2 (13)	3.5 (5)	0.0	0.189	0.000
31-60 days	21.0 (30)	25.9 (37)	16.8 (24)	14.7 (21)	9.8 (14)	8.4 (12)	3.5 (5)		
61-91 days	15.1 (14)	22.6 (21)	14.0 (13)	23.7 (22)	8.6 (8)	8.6 (8)	7.5 (7)		
92-182 days	11.7 (4)	13.0 (10)	16.9 (13)	14.3 (11)	22.1 (17)	7.8 (8)	14.3 (11)		
189-365 days	6.0 (3)	10.0 (5)	18.0 (9)	20.0 (10)	18.0 (9)	14.0 (7)	14.0 (7)		
372-1095 days	10.0 (1)	10.0 (1)	0.0	10.0 (1)	10.0 (1)	20.0 (2)	40.0 (4)		
Family income change as percentage of family income before illness									
Decreased	16.7 (10)	13.3 (8)	11.7 (7)	15.0 (9)	20.0 (12)	11.7 (7)	11.7 (7)	0.116	0.314
Static	19.5 (15)	27.3 (21)	15.6 (12)	18.2 (14)	9.1 (7)	3.9 (3)	6.5 (5)		
Increased	20.1 (75)	22.5 (84)	16.6 (62)	16.3 (61)	11.0 (41)	7.8 (29)	5.9 (22)		

Annex 8.43: Different socio-demographic and economic characteristics of the divorced and widowed patients (Row and coloum percentage - weighted 530 cases except gender)

Gender	Urban-rural			Significance	
	Urban	Rural	Total	Cramer's V	Chi-squire
Male	2 (22.2)	7 (77.8)	9 (12.2)	0.229	0.049
Female	3 (4.6)	62 (95.4)	65 (87.8)		
Total	5 (6.8)	69 (93.2)	74 (100.0)		

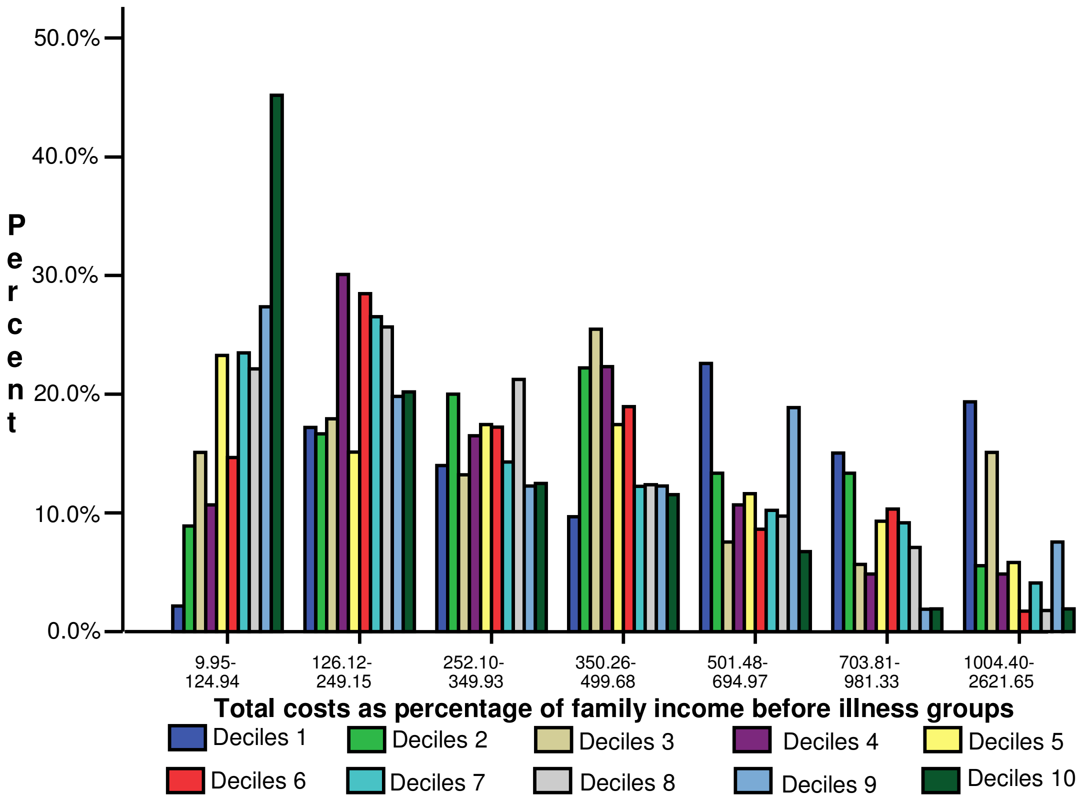
Gender wise educational status of the divorced and widowed patients

Gender	Educational status (Row and coloum percentage)					Significance	
	Illiterate	Only sign	Class I-V	Class VI-X	Total	Cramer's V	Chi-squire
Male	44.4 (4)	22.2 (2)	22.2 (2)	11.1 (1)	9 (12.2)	0.068	0.952
Female	46.2 (30)	21.5 (14)	26.2 (17)	6.2 (4)	65 (87.8)		
Total	45.9 (34)	21.6 (16)	25.7 (19)	6.8 (5)	74 (100.0)		

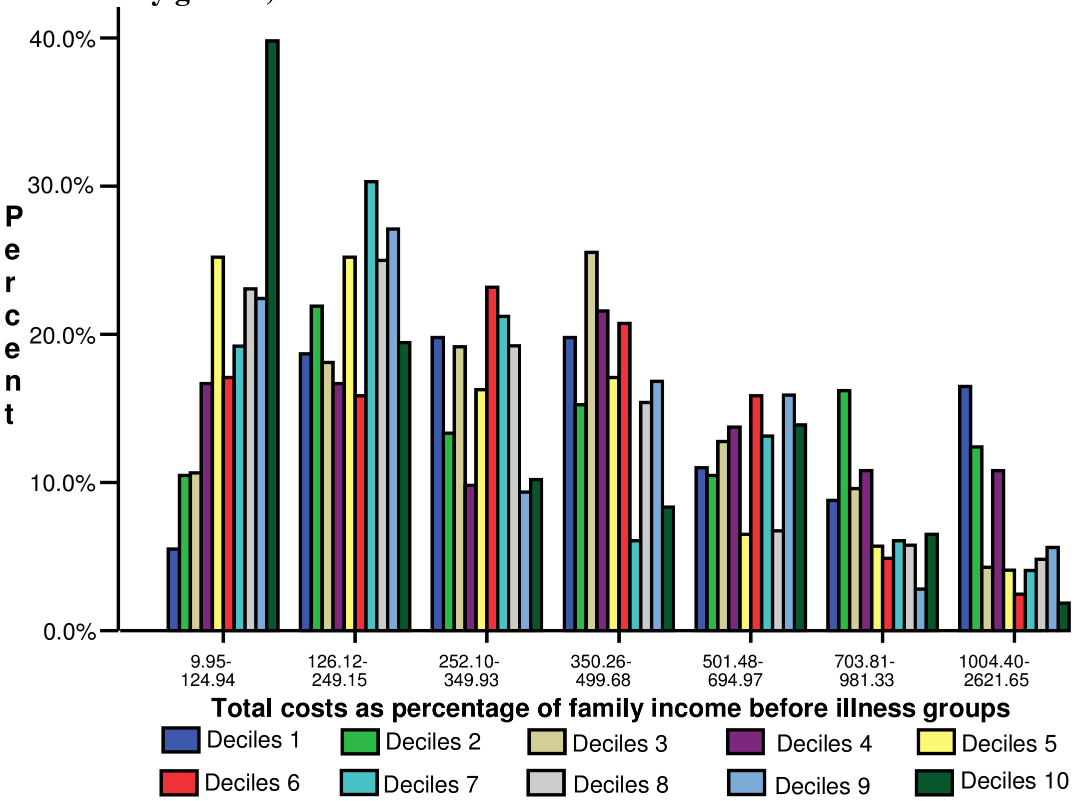
Gender wise personal occupational status of the divorced and widowed patients

Personal occupation	Gender (Row and coloum percentage)			Significance	
	Male	Female	Total	Cramer's V	Chi-squire
Agriculture	0.0	1 (100.0)	1 (1.4)	0.352	0.240
Agri. Labour	1 (20.0)	4 (80.0)	5 (6.8)		
Small business	4 (21.1)	15 (78.9)	19 (25.7)		
Employment	1 (33.3)	2 (66.7)	3 (4.1)		
Household work	1 (3.3)	29 (96.7)	30 (40.5)		
Begging	0.0	2 (100.0)	2 (2.7)		
Maid servant	0.0	8 (100.0)	8 (10.8)		
Day labour	3 (33.3)	4 (66.7)	6 (8.1)		
Total	9 (12.2)	65 (87.8)	74 (100.0)		

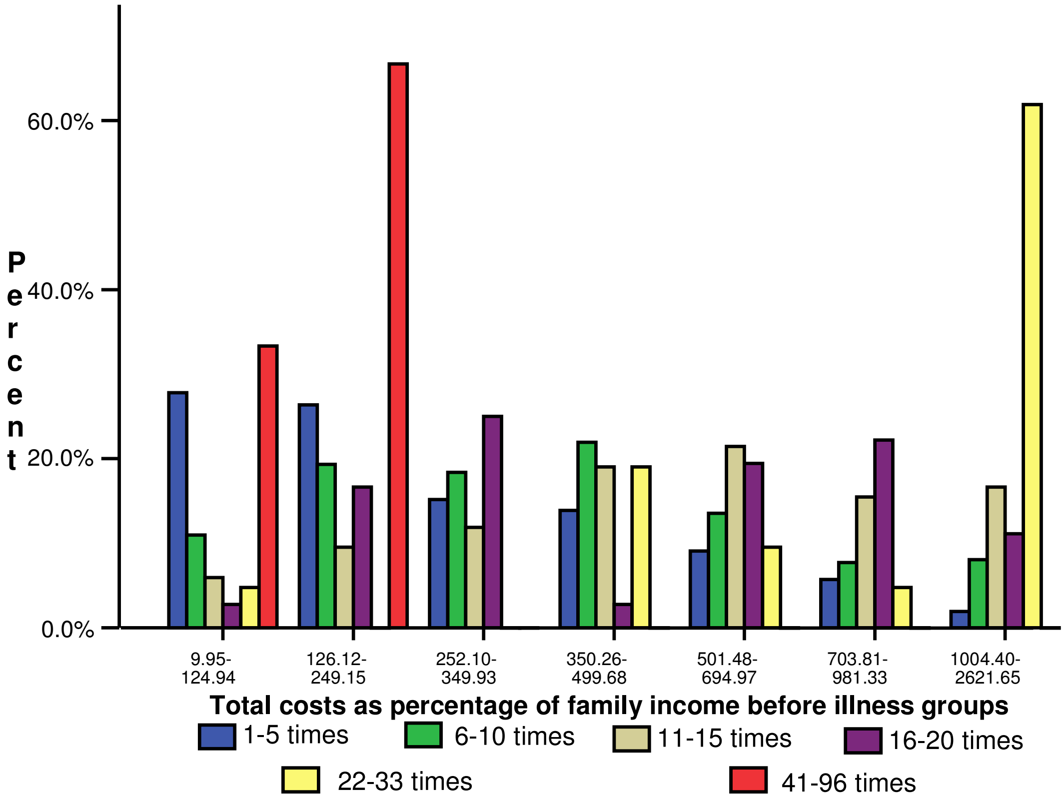
Annex 8.40: Patient's family income deciles before illness wise distribution of total costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



Annex 8.41: Patient's family per capita income deciles before illness wise distribution of total costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



Annex 8.42: Patient's times of contacted health providers' wise distribution of total costs as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



Annex 8.44: Bivariate correlation analysis (Pearson's) table of total cost as percentage of family income before illness, patient's family income and per capita income before illness (Weighted 530 cases by gender)

Components		Total costs as a percentage of family income before illness	Patient's family income before illness in US$	Patient's family per capita income before illness in US$
Total costs as a percentage of family income before illness	Pearson Correlation	1	-.200(**)	-.180(**)
	Sig. (2-tailed)		.000	.000
	N	508	508	508
Patient's family income before illness in US$	Pearson Correlation	-.200(**)	1	.707(**)
	Sig. (2-tailed)	.000		.000
	N	508	530	530
Patient's family per capita income before illness in US$	Pearson Correlation	-.180(**)	.707(**)	1
	Sig. (2-tailed)	.000	.000	
	N	508	530	530

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.45: Bivariate correlation analysis (Nonparametric Spearman's) table of total cost as percentage of family income before illness, patient's family income deciles and per capita income deciles before illness (Weighted 530 cases by gender)

Components		Total costs as a percentage of family income before illness	Patient's family income deciles before illness in US$	Patient's family per capita income deciles before illness in US$
Total costs as a percentage of family income before illness	Spearman's Correlation	1.000	-.345(**)	-.261(**)
	Sig. (2-tailed)	.	.000	.000
	N	679	679	679
Patient's family income deciles before illness in US$	Spearman's Correlation	-.345(**)	1.000	.798(**)
	Sig. (2-tailed)	.000	.	.000
	N	679	707	707
Patient's family per capita income deciles before illness in US$	Spearman's Correlation	-.261(**)	.798(**)	1.000
	Sig. (2-tailed)	.000	.000	.
	N	679	707	707

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.46: Bivariate analysis table of total cost as percentage of family income before illness, number and times of contacted health providers and total pre-treatment delay (Weighted 530 cases by gender)

Components		Total cost as a percentage of family income before illness	Total pre-treatment delay in days	Total number of providers contacted by the patients	Total times contacted health providers by patients
Total cost as a percentage of family income before illness	Pearson Correlation	1	.419(**)	.306(**)	.304(**)
	Sig. (2-tailed)		.000	.000	.000
	N	508	508	508	508
Total pre-treatment delay in days	Pearson Correlation	.419(**)	1	.386(**)	.695(**)
	Sig. (2-tailed)	.000		.000	.000
	N	508	530	530	508
Total number of providers contacted by the patients	Pearson Correlation	.306(**)	.386(**)	1	.452(**)
	Sig. (2-tailed)	.000	.000		.000
	N	508	530	530	508
Total times contacted health providers by patients	Pearson Correlation	.304(**)	.695(**)	.452(**)	1
	Sig. (2-tailed)	.000	.000	.000	
	N	508	508	508	508

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.47: Means and medians of total costs as a percentage of family income before illness according to patient's socio-demographic clusters (Weighted 530 cases by gender)

Patient's socio-demographic clusters	Mean			Median		Delay range	
	Percent	S.Devi	Signific.	%	Signific.	Mini.	Max.
Outlier Cluster	289.95	358.23	Kruskal-Wallis Test-S (.000)	141.16	NPMT-S (.000)	17.33	1660.33
Lowest income, female patients	317.74	343.72		219.62		17.43	2563.86
Middle income, male & female patients	346.96	300.86		257.60		9.95	2052.74
Highest income, male patients	467.56	386.10		354.73		24.60	2621.56

Annex 8.48: Distribution of total costs as a percentage of family income before illness groups according to patient's socio-demographic clusters (Weighted 530 cases by gender)

Socio-demographic clusters	Total costs percentage groups (row percentage)							Significance	
	9.95-124.94	126.12-249.15	252.10-349.93	350.26-499.68	501.48-694.97	703.81-981.33	1004.40-2621.56	Cram-er's V	Chi-squire
Outlier Cluster	46.4 (13)	14.3 (4)	3.6 (1)	17.9 (5)	10.7 (3)	3.6 (1)	3.6 (1)	0.191	0.000
Lowest income, female patients	31.1 (28)	22.2 (20)	16.7 (15)	11.1 (10)	11.1 (10)	3.3 (3)	4.4 (4)		
Middle income, male & female patients	25.2 (39)	23.2 (36)	12.9 (20)	15.5 (24)	9.7 (15)	10.3 (16)	3.2 (5)		
Highest income, male patients	8.4 (20)	21.8 (52)	18.9 (45)	18.9 (45)	13.4 (32)	8.4 (20)	10.1 (24)		

Annex 8.49: Regression model summary and ANOVA table of total costs as percentage of family income before illness using the predictors mentioned below (Weighted 530 cases by gender)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.534(a)	0.285	0.265	307.90764

a Predictors: (Constant), Patient's family per capita income before illness in US$, Total times contacted health providers by patients, Sex, Combined urban and rural, Only can sign, Divorced, Class XI-XIV, Widowed, Unmarried, Class I-V, Total number of providers contacted by the patients, Age of patient, Total pre-treatment delay in days, Class VI-X

Continuation of Annex 8.49: Regression model summary and ANOVA table of total costs as percentage of family income before illness

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18602768.622	14	1328769.187	14.016	0.000(a)
	Residual	46692504.104	493	94807.115		
	Total	65295272.727	507			

a Predictors: (Constant), Patient's family per capita income before illness in US$, Total times contacted health providers by patients, Sex, Combined urban and rural, Only can sign, Divorced, Class XI-XIV, Widowed, Unmarried, Class I-V, Total number of providers contacted by the patients, Age of patient, Total pre-treatment delay in days, Class VI-X
b Dependent Variable: Total cost as a percentage of family income before illness

Annex 8.50: Regression predictors' coefficient table of total costs as percentage of family income before illness using above mentioned predictors (Weighted 530 cases by gender)

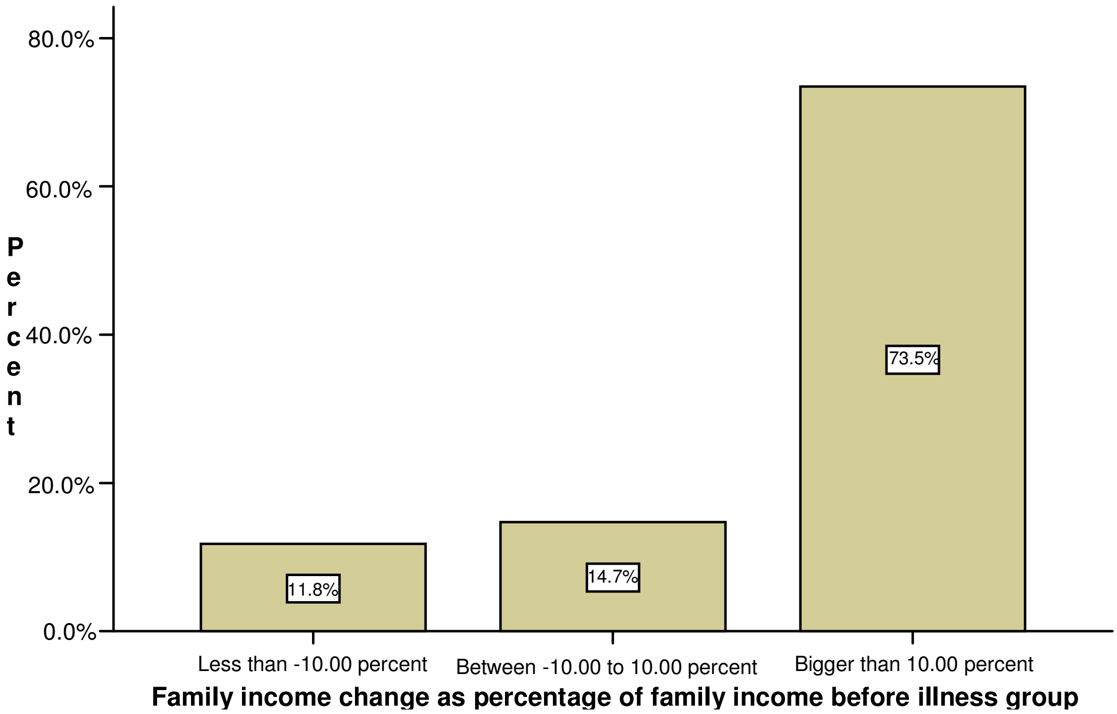
Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	344.156	79.798		4.313	0.000
	Age of patient	-1.814	1.308	-0.067	-1.387	0.166
	Total pre-treatment delay in days	1.146	0.165	0.371	6.937	0.000
	Total number of providers contacted by the patients	71.619	14.639	0.211	4.892	0.000
	Total times contacted health providers by patients	-2.214	3.151	-0.039	-0.703	0.483
	Patient's family income before illness in US$	-0.666	0.139	-0.191	-4.805	0.000
	Sex-Male-Reference					
	Sex-Female	-190.811	32.043	-0.252	-5.955	0.000
	UrbanRural-Urban-Referenc					
	UrbanRural-Rural	-14.431	39.045	-0.014	-0.370	0.712
	Marital-Unmarried	-94.102	49.847	-0.087	-1.888	0.060
	Marital-Married-Reference					
	Marital-Divorced	44.258	83.980	0.020	0.527	0.598
	Marital-Widowed	85.862	67.281	0.053	1.276	0.202
	Education-Illiterate-Reference					
	Education-Only can sign	6.268	38.825	0.008	0.161	0.872
	Education-Class I-V	3.692	40.187	0.004	0.092	0.927
	Education-Class VI-X	1.037	43.502	0.001	0.024	0.981
	Education-Class XI-XIV	-46.548	76.750	-0.026	-0.606	0.544

Annex 8.51: Regression predictors' coefficient table of total costs as percentage of family income before illness using the predictors mentioned below (Weighted 530 cases by gender)

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	382.924	81.783		4.682	.000
	Age of patient	-2.425	1.313	-.089	-1.848	.065
	Total pre-treatment delay in days	1.164	.167	.377	6.973	.000
	Total number of providers contacted by the patients	71.226	14.794	.210	4.814	.000
	Total times contacted health providers by patients	-3.565	3.162	-.063	-1.127	.260
	Patient's family per capita income before illness in US$	-3.299	.928	-.142	-3.556	.000
	Sex-Male-Reference					
	Sex-Female	-196.337	32.349	-.259	-6.069	.000
	UrbanRural-Urban-Referenc					
	UrbanRural-Rural	-18.524	39.500	-.018	-.469	.639
	Marital-Unmarried	-113.842	50.017	-.106	-2.276	.023
	Marital-Married-Reference					
	Marital-Divorced	19.532	84.707	.009	.231	.818
	Marital-Widowed	97.990	67.896	.061	1.443	.150
	Education-Illiterate-Reference					
	Education-Only can sign	8.991	39.232	.011	.229	.819
	Education-Class I-V	3.108	40.734	.004	.076	.939
	Education-Class VI-X	-7.060	43.971	-.008	-.161	.872
	Education-Class XI-XIV	-53.542	77.630	-.030	-.690	.491

a Dependent Variable: Total cost as a percentage of family income before illness

Annex 8.52: Bar chart of patient's family income change as percentage of family income groups (Weighted 530 cases by gender)



Annex 8.53: Means and medians of family income change as a percentage of patient's family income before illness in relation to education, marital status and total delay groups of the study sample (Weighted 530 cases by gender)

Factors	Compo-nent	Mean change			Median		Change range	
		Percent	S.Devi	Signific.	%	Signific.	Mini.	Max.
Education status of the patients	Illiterate	42.44	60.22	ANOVA NS (.917)	26.09	NPMT-NS (.777)	-70.00	403.75
	Only sign	36.01	48.77		33.33		-60.00	370.71
	Class I-V	40.23	85.91		33.00		-73.85	1066.67
	Class VI-X	38.25	50.02		29.91		-34.31	275.00
	Class XI-XIV	44.87	32.31		46.16		-6.15	115.90
Marital status of the patients	Unmarried	43.71	58.34	ANOVA NS (.910)	29.57	NPMT-NS (.734)	-63.64	400.00
	Married	38.66	63.38		31.92		-73.85	1066.67
	Divorced	36.63	60.76		26.92		-40.00	275.00
	Widowed	43.59	50.33		31.63		-53.33	200.00
Total delay groups	21-30 days	37.70	47.66	Kruskal-Wallis Test-NS (.476)	31.64	NPMT-NS (.684)	-68.25	250.00
	31-60 days	38.59	55.75		31.26		-66.67	403.75
	61-91 days	35.11	55.62		29.22		-70.00	370.71
	92-182 days	40.39	49.48		33.33		-73.85	181.25
	189-365 days	49.87	119.29		26.25		-37.50	1066.67
	372-1095 days	70.03	93.27		51.19		-30.95	272.41

Continuation of Annex 8.53: Means and medians of family income change as a percentage of patient's family income before illness in relation to personal occupation and family income deciles of the study sample (Weighted 530 cases by gender)

Factors	Compo-nent	Mean change			Median		Change range	
		Percent	S.Devi	Signific.	%	Signific.	Mini.	Max.
Patient's personal occupation before illness	Agriculture	55.47	48.39	ANOVA S (.017)	51.81	NPMT-S (.016)	-37.38	239.98
	Agr. labour	46.20	47.88		42.20		-68.25	181.25
	Sml. business	40.25	52.18		31.84		-66.67	272.41
	Business	14.12	37.21		16.05		-73.85	100.00
	Employment	37.46	58.70		25.00		-66.00	400.00
	H.H. work	51.73	101.60		33.33		-56.81	1066.67
	Student	39.14	39.22		33.33		-19.05	222.22
	Begging	60.75	89.84		33.79		0.00	250.00
	Rick. Puller	25.28	28.50		25.00		-25.81	101.63
	Maid servant	54.65	91.23		25.86		-25.45	340.00
	Day labour	41.18	58.53		25.00		-21.74	275.00
Family income deciles before illness	1st Deciles	94.78	131.80	Kruskal-Wallis Test-S (.000)	61.77	NPMT-S (.000)	-40.00	1066.67
	2nd Deciles	61.60	60.43		47.73		-9.58	370.71
	3rd Deciles	38.99	50.50		33.33		-68.25	272.41
	4th Deciles	47.46	47.84		45.10		-24.64	340.00
	5th Deciles	46.60	50.97		43.33		-53.33	239.98
	6th Deciles	35.90	37.37		31.91		-25.45	178.00
	7th Deciles	22.15	46.96		21.41		-73.85	268.32
	8th Deciles	26.90	31.64		24.71		-31.86	101.63
	9th Deciles	18.04	43.73		20.00		-63.64	200.00
	10th Deciles	15.53	38.47		17.50		-70.00	191.25
Family per capita income deciles before illness	1st Deciles	100.81	130.10	Kruskal-Wallis Test-S (.000)	67.14	NPMT-S (.000)	-25.00	1066.67
	2nd Deciles	56.20	58.81		40.83		-33.33	370.71
	3rd Deciles	50.78	60.94		43.68		-68.25	400.00
	4th Deciles	45.44	39.32		43.57		-40.00	222.22
	5th Deciles	45.37	41.78		36.10		-24.45	178.00
	6th Deciles	29.39	41.03		26.25		-66.67	185.71
	7th Deciles	27.55	39.20		25.00		-73.85	200.00
	8th Deciles	29.61	48.26		26.71		-43.33	239.98
	9th Deciles	10.77	43.58		9.09		-63.64	268.32
	10th Deciles	12.80	36.99		17.50		-70.00	110.00

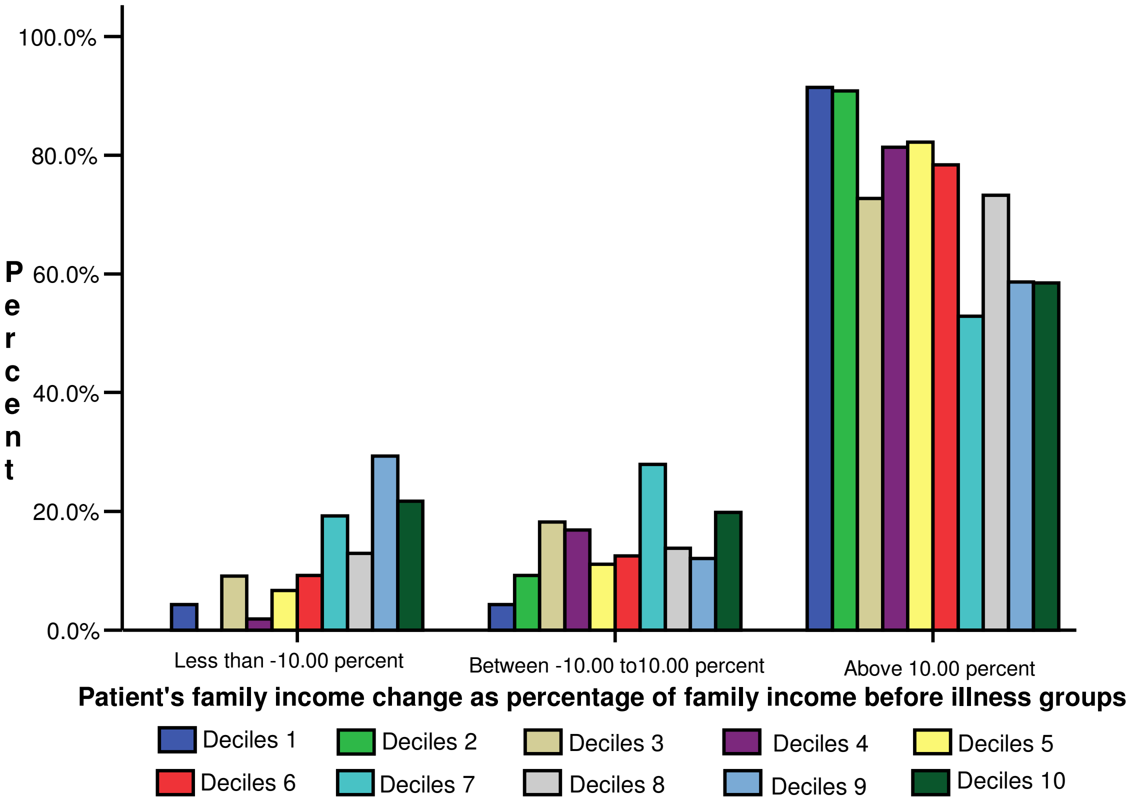
Annex 8.54: Percentage and number of patient's family income change as a percentage of monthly family income before illness groups according to the patient's socio-demographic factors (Weighted 530 cases by gender)

Factors	Family income change (Row percentage)				Significance	
	Income fell	Income same	Income rose	Total	Cramer's V	Chi-squire
Educational status of the patients						
Illiterate	11.0 (15)	14.0 (19)	75.0 (102)	100.00 (136)	0.081	0.539
Only sign	15.0 (20)	14.3 (19)	70.7 (94)	100.00 (133)		
Class I-V	13.4 (17)	18.1 (23)	68.5 (87)	100.00 (127)		
Class VI-X	10.4 (12)	13.0 (15)	76.5 (88)	100.00 (115)		
Class XI-XIV	0.0	13.0 (3)	87.0 (20)	100.00 (23)		
Marital status of the patients						
Unmarried	2.9 (2)	15.9 (11)	81.2 (56)	100.00 (69)	0.089	0.203
Married	13.5 (57)	15.0 (63)	71.5 (301)	100.00 (421)		
Divorced	20.0 (3)	13.3 (2)	66.7 (10)	100.00 (15)		
Widowed	7.1 (2)	10.7 (3)	82.1 (23)	100.00 (28)		
Patient's Personal Occupation						
Agriculture	5.0 (2)	5.0 (2)	90.0 (36)	100.00 (40)	0.191	0.007
Agric. labour	9.2 (6)	10.8 (7)	80.0 (52)	100.00 (65)		
Sml. business	10.3 (12)	14.7 (17)	75.0 (87)	100.00 (116)		
Business	28.9 (22)	17.1 (13)	53.9 (41)	100.00 (76)		
Employment	12.8 (10)	16.7 (13)	70.5 (55)	100.00 (78)		
H.Hold work	6.1 (5)	14.6 (12)	79.3 (65)	100.00 (82)		
Student	5.0 (1)	20.0 (4)	75.0 (15)	100.00 (20)		
Begging	0.0	40.0 (2)	60.0 (3)	100.00 (5)		
Rick. Puller	9.5 (2)	23.8 (5)	66.7 (14)	100.00 (21)		
Maid servant	10.0 (1)	20.0 (2)	70.0 (7)	100.00 (10)		
Day labour	16.7(4)	12.5 (3)	70.8 (17)	100.00 (24)		
Family Income deciles						
Deciles 1	4.3 (2)	4.3 (2)	91.5 (43)	100.00 (47)	0.239	0.000
Deciles 2	0.0	10.0 (5)	90.0 (45)	100.00 (50)		
Deciles 3	9.1 (5)	18.2 (10)	72.7 (40)	100.00 (55)		
Deciles 4	1.9 (1)	16.7 (9)	81.5 (44)	100.00 (54)		
Deciles 5	6.7 (3)	11.1 (5)	82.2 (37)	100.00 (45)		
Deciles 6	9.8 (6)	13.1 (8)	77.0 (47)	100.00 (61)		
Deciles 7	18.9 (10)	28.3 (15)	52.8 (28)	100.00 (53)		
Deciles 8	13.6 (8)	13.6 (8)	72.9 (43)	100.00 (59)		
Deciles 9	29.3 (17)	12.1 (7)	58.6 (34)	100.00 (58)		
Deciles 10	22.2 (12)	20.4 (11)	57.4 (31)	100.00 (54)		
Family per capita income deciles						
Deciles 1	2.3 (1)	6.8 (3)	90.9 (40)	100.00 (44)	0.239	0.000
Deciles 2	3.4 (2)	8.6 (5)	87.9 (51)	100.00 (58)		
Deciles 3	4.4 (2)	6.7 (3)	88.9 (40)	100.00 (45)		
Deciles 4	3.9 (2)	11.8 (6)	84.3 (43)	100.00 (51)		
Deciles 5	3.4 (2)	17.2 (10)	79.3 (46)	100.00 (58)		
Deciles 6	14.0 (7)	20.0 (10)	66.0 (33)	100.00 (50)		
Deciles 7	10.2 (6)	22.0 (13)	67.8 (40)	100.00 (59)		
Deciles 8	19.7 (12)	14.8 (9)	65.6 (40)	100.00 (61)		
Deciles 9	32.7 (16)	20.4 (10)	46.9 (23)	100.00 (49)		
Deciles 10	23.3 (14)	18.3 (11)	58.3 (35)	100.00 (60)		

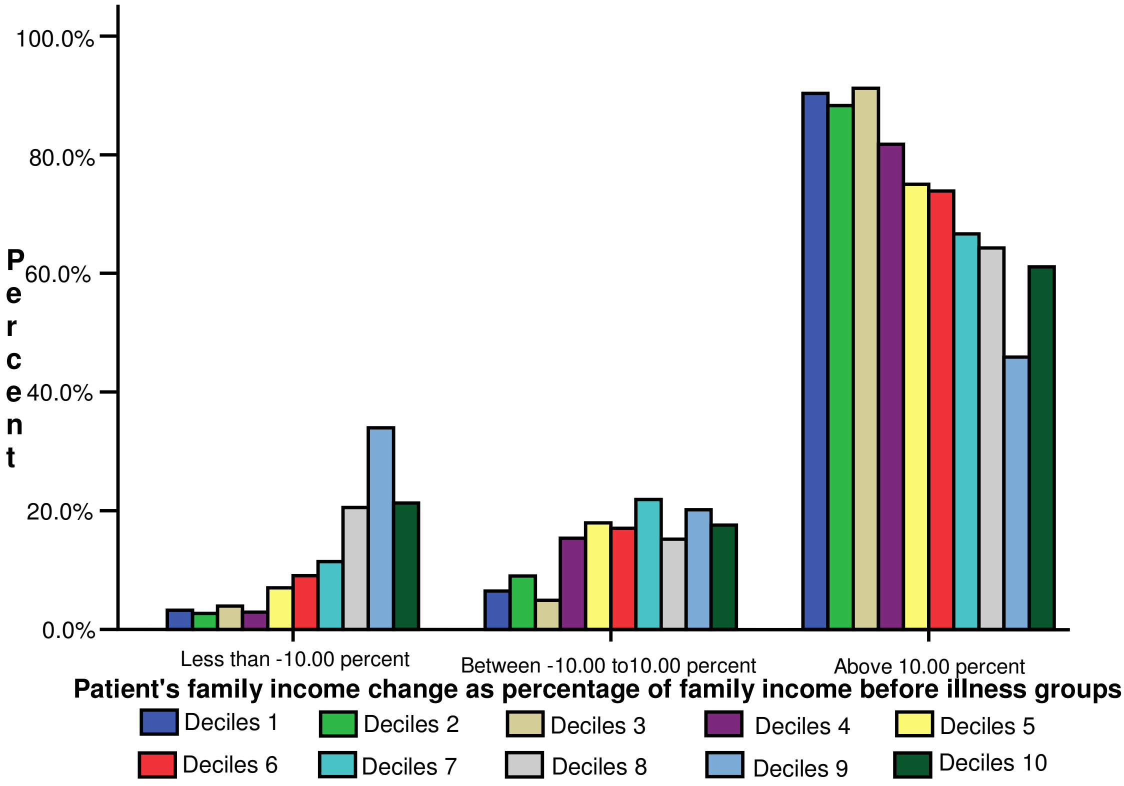
Continuation of Annex 8.54: Percentage and number of patient's family income change as a percentage of monthly family income before illness groups according to the patient's pre-treatment groups (Weighted 530 cases by gender)

Total pre-treatment delay groups						
21-30 days	12.4 (20)	10.6 (17)	77.0 (124)	100 (161)	0.099	0.397
31-60 days	10.3 (15)	19.2 (28)	70.5 (103)	100 (146)		
61-91 days	16.1 (15)	17.2 (16)	66.7 (62)	100 (93)		
92-182 days	10.4 (8)	11.7 (9)	77.9 (60)	100 (77)		
189-365 days	10.2 (5)	18.4 (9)	71.4 (35)	100 (49)		
372-1095 days	22.2 (2)	0.0	77.8 (7)	100 (9)		

Annex 8.55: Patient's family income deciles before illness wise distribution of patient's family income change as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



Annex 8.56: Patient's family per capita income deciles before illness wise distribution of patient's family income change as percentage of family income before illness groups' bar chart (Weighted 530 cases by gender)



Annex 8.57: Gender, education and marital status wise urban patient's family income change as percentage of family income before illness (Weighted 75 urban cases by gender)

Socio-demographic and economic factors	Family income change (Row percentage)			Significance	
	Income decreased	Income increased	Total	Cramer's V	Chi-squtre
Gender					
Male	40.8 (20)	59.2 (29)	100.0 (49)	0.417	0.261
Female	32.7 (17)	67.3 (35)	100.0 (52)		
Marital status					
Unmarried	27.8 (5)	72.2 (13)	100.0 (18)	0.166	0.546
Married	43.6 (24)	56.4 (31)	100.0 (55)		
Divorced	0.0	100.0 (1)	100.0 (1)		
Widowed	33.3 (1)	66.7 (2)	100.0 (3)		
Educational status					
Illiterate	53.8 (7)	46.2 (6)	100.0 (13)	0.175	0.666
Only can sign	40.9 (9)	59.1 (13)	100.0 (22)		
Class I-V	35.3 (6)	64.7 (11)	100.0 (17)		
Class VI-X	33.3 (7)	66.7 (14)	100.0 (21)		
Class XI-XIV	20.0 (1)	80.0 (4)	100.0 (5)		

Continuation of Annex 8.57: Age groups and family income deciles wise urban patient's family income change as percentage of family income before illness (Weighted 75 urban cases by gender)

Household population size					
1-3 persons	25.0 (3)	75.0 (9)	100.0 (12)	0.236	0.145
4-6 persons	34.0 (17)	66.0 (33)	100.0 (50)		
7-9 persons	64.3 (9)	35.7 (5)	100.0 (14)		
10-12 persons	50.0 (1)	50.0 (1)	100.0 (2)		
Age group of the patients					
15-19 years	42.9 (3)	57.1 (4)	100.0 (7)	0.346	0.407
20-24 years	33.3 (6)	66.7 (12)	100.0 (18)		
25-29 years	14.3 (1)	85.7 (6)	100.0 (7)		
30-34 years	45.5 (5)	54.5 (6)	100.0 (11)		
35-39 years	14.3 (1)	85.7 (6)	100.0 (7)		
40-44 years	55.6 (5)	44.4 (4)	100.0 (9)		
45-49 years	62.5 (5)	37.5 (3)	100.0 (8)		
50-54 years	40.0 (2)	60.0 (3)	100.0 (5)		
55-59 years	100.0 (1)	0.0	100.0 (1)		
60-75 years	20.0 (1)	80.0 (4)	100.0 (5)		
Family income deciles before illness					
Deciles 1	0.0	100.0 (2)	100.0 (2)	0.268	0.780
Deciles 2	25.0 (1)	75.0 (3)	100.0 (4)		
Deciles 3	33.3 (2)	66.7 (4)	100.0 (6)		
Deciles 4	25.0 (2)	75.0 (6)	100.0 (8)		
Deciles 5	16.7 (1)	83.3 (5)	100.0 (6)		
Deciles 6	33.3 (3)	66.7 (6)	100.0 (9)		
Deciles 7	50.0 (5)	50.0 (5)	100.0 (10)		
Deciles 8	44.4 (4)	55.6 (5)	100.0 (9)		
Deciles 9	50.0 (9)	50.0 (9)	100.0 (18)		
Deciles 10	50.0 (3)	50.0 (3)	100.0 (6)		
Family percapita income deciles before illness					
Deciles 1	0.0	100.0 (2)	100.0 (2)	0.236	0.145
Deciles 2	25.0 (1)	75.0 (3)	100.0 (4)		
Deciles 3	0.0	100.0 (4)	100.0 (4)		
Deciles 4	42.9 (3)	57.1 (4)	100.0 (7)		
Deciles 5	37.5 (3)	62.5 (5)	100.0 (8)		
Deciles 6	55.6 (5)	44.4 (4)	100.0 (9)		
Deciles 7	44.4 (4)	55.6 (5)	100.0 (9)		
Deciles 8	25.0 (3)	75.0 (9)	100.0 (12)		
Deciles 9	63.6 (7)	36.4 (4)	100.0 (11)		
Deciles 10	33.3 (4)	66.7 (8)	100.0 (12)		

Annex 8.58: Bivariate correlation analysis table of family income change as percentage of family income before illness, pre-treatment delay, family income before illness and family percapita income before illness (Weighted 530 cases by gender)

Components		Patient's family income change as percentage of family income	Total pre-treatment delay in days	Patient's family income before illness in US$	Patient's family percapita income before illness in US$
Patient's family income change as percentage of family income	Pearson Correlation	1	.085(*)	-.205(**)	-.269(**)
	Sig. (2-tailed)		.050	.000	.000
	N	530	530	530	530
Total pre-treatment delay in days	Pearson Correlation	.085(*)	1	-.016	-.088(*)
	Sig. (2-tailed)	.050		.713	.042
	N	530	530	530	530
Patient's family income before illness in US$	Pearson Correlation	-.205(**)	-.016	1	.707(**)
	Sig. (2-tailed)	.000	.713		.000
	N	530	530	530	530
Patient's family percapita income before illness in US$	Pearson Correlation	-.269(**)	-.088(*)	.707(**)	1
	Sig. (2-tailed)	.000	.042	.000	
	N	530	530	530	530

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Annex 8.59: Bivariate correlation analysis table of family income change as percentage of family income before illness, family income deciles before illness and family per capita income deciles before illness (Weighted 530 cases by gender)

Components		Patient's family income change as percentage of family income	Patient's family income deciles before illness in US$	Patient's family percapita income deciles before illness in US$
Patient's family income change as percentage of family income	Spearman Correlation	1.000	-.324(**)	-.396(**)
	Sig. (2-tailed)	.	.000	.000
	N	707	707	707
Patient's family income deciles before illness in US$	Spearman Correlation	-.324(**)	1.000	.797(**)
	Sig. (2-tailed)	.000	.	.000
	N	707	707	707
Patient's family percapita income deciles before illness in US$	Spearman Correlation	-.396(**)	.797(**)	1.000
	Sig. (2-tailed)	.000	.000	.
	N	707	707	707

** Correlation is significant at the 0.01 level (2-tailed).

Annex 8.60: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness in US$) -Variables not in equation (Weighted 530 cases by gender)

Step	Variables	Score	df	Signifi-cance	Overall		
					Wald	df	Signi.
Step 0	Age groups-Overall	6.691	9	.669	102.851	1	0.000
	Age group (55-59)	4.574	1	.032			
	Gender-Male	2.859	1	.091			
	UrbanRural-Urban	6.192	1	.013			
	Marital status-Overall	4.014	3	.260			
	Marital status - Married	3.310	1	.069			
	Family income deciles-Overall	41.186	9	.000			
	Family income deciles 1	8.421	1	.004			
	Family income deciles 2	6.904	1	.009			
	Family income deciles 7	10.497	1	.001			
	Family income deciles 9	8.671	1	.003			
	Overall statistics	81.692	40	.000			

Annex 8.61: Binary logistic regression of family income change as percentage of family income before illness (Family per capita income deciles before illness in US$) - Variables not in equation (Weighted 530 cases by gender)

Step	Variables	Score	df	Signifi-cance	Overall		
					Wald	df	Signi.
Step 0	Age groups-Overall	6.691	9	.669	102.851	1	0.000
	Age group (55-59)	4.574	1	.032			
	Gender-Male	2.859	1	.091			
	UrbanRural-Urban	6.192	1	.013			
	Marital status-Overall	4.014	3	.260			
	Marital status - Married	3.310	1	.069			
	Family income deciles-Overall	52.108	9	.000			
	Family income deciles 1	7.081	1	.008			
	Family income deciles 2	8.666	1	.003			
	Family income deciles 3	7.620	1	.006			
	Family income deciles 9	25.180	1	.000			
	Overall statistics	94.020	40	.000			

Annex 8.62: Binary logistic regression of family income change as percentage of family income before illness (Family per capita income deciles before illness in US$) - Classification table (a) of Step 1 (Weighted 530 cases by gender)

Observed			Predicted		
			Binarized family income change		Percentage correct
			Decreased	Increased	
Step 1	Binarized family income change percentage	Decreased (Lowest to 10%)	44	91	32.7
		Increased (Above 10%)	21	352	94.4
	Overall percentage				78.0

aThe cut value is 0.500.

Annex 8.63: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness in US$) - Omnibus tests of model coefficients (Weighted by gender)

Step		Chi-squire	df	Significance
Step 1	Step	86.261	40	0.000
	Block	86.261	40	0.000
	Model	86.261	40	0.000

Annex 8.64: Binary logistic regression of family income change as percentage of family income before illness (Family per capita income deciles before illness in US$) - Omnibus tests of model coefficients (Weighted 530 cases by gender)

Step		Chi-squire	df	Significance
Step 1	Step	100.593	40	0.000
	Block	100.593	40	0.000
	Model	100.593	40	0.000

Annex 8.65: Binary logistic regression of family income change as percentage of family income before illness (Family per capita income deciles before illness in US$) - Model summary and Hosmer and Lemeshow test (Weighted 530 cases by gender)

Step	Model summary			Hosmer and Lemeshow test		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squire	df	Significance
Step 1	486.328(a)	0.180	0.262	4.989	8	0.759

a Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

Annex 8.66: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness in US$) -Variables in equation table (Weighted 530 cases by gender)

Step	Variables	B	SE	Wald	df	Sig.	Exp (B)
Step 1 (a)	Age group-Overall			11.964	9	.215	
	Age group (15-19)	-.448	.780	.330	1	.566	.639
	Age group (20-24)	.354	.598	.350	1	.554	1.425
	Age group (25-29)	.163	.521	.098	1	.754	1.177
	Age group (30-34)	.320	.517	.382	1	.536	1.377
	Age group (35-39)	.479	.519	.851	1	.356	1.614
	Age group (40-44)	.626	.510	1.508	1	.219	1.870
	Age group (45-49)	.354	.520	.462	1	.497	1.424
	Age group (50-54)	.919	.548	2.806	1	.094	2.506
	Age group (55-59)	-.723	.548	1.740	1	.187	.486
	Age group (60-75)-Reference						
	Sex-Male	.006	.297	.000	1	.984	1.006
	Sex-female-Reference						
	UrbanRural-Urban	-.515	.316	2.649	1	.104	.598
	UrbanRural-Rural-Reference						
	Marital status-Overall			3.715	3	.294	
	Marital status-Unmarried	.213	.812	.069	1	.793	1.237
	Marital status-Married	-.477	.614	.604	1	.437	.621
	Marital status-Divorced	-1.110	.901	1.516	1	.218	.330
	Marital status-Widowed-Refer.						
	Education-Overall			3.830	4	.429	
	Education-Illiterate	-1.033	.726	2.026	1	.155	.356
	Education-Only can sign	-.935	.716	1.706	1	.192	.393
	Education-Class I-V	-.915	.706	1.678	1	.195	.401
	Education-Class VI-X	-.466	.698	.445	1	.505	.628
	Education-Class XI-XIV-Refer.						
	Family income deciles-Overall			43.938	9	.000	
	Family income deciles1	3.154	.691	20.805	1	.000	23.419
	Family income deciles2	2.774	.637	18.943	1	.000	16.016
	Family income deciles3	1.531	.496	9.538	1	.002	4.624
	Family income deciles4	1.830	.514	12.665	1	.000	6.234
	Family income deciles5	1.575	.522	9.089	1	.003	4.830
	Family income deciles6	1.362	.474	8.253	1	.004	3.904
	Family income deciles7	.257	.453	.323	1	.570	1.294
	Family income deciles8	.996	.454	4.805	1	.028	2.708
	Family income deciles9	.361	.446	.654	1	.419	1.435
	Family income deciles10-Refer						
	No. of provider contacted	.118	.135	.762	1	.383	1.125
	Times provider contacted	.276	.173	2.547	1	.110	1.318

Continuation of Annex 8.66: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness in US$) -Variables in equation table (Weighted 530 cases by gender)

	TotPreTrtDelGrp-Overall			7.016	5	.219	
	TotPreTrtDelGrp1 (21-30 days)	-.013	1.199	.000	1	.991	.987
	TotPreTrtDelGrp2 (31-60 days)	-.535	1.173	.208	1	.648	.586
	TotPreTrtDelGrp3 (61-91 days)	-.561	1.162	.234	1	.629	.570
	TotPreTrtDelGrp4 (92-182 days)	.143	1.146	.015	1	.901	1.153
	TotPreTrtDelGrp5 (189-365 days)	-.721	1.139	.400	1	.527	.486
	TotPreTrtDelGrp6-Reference						
	TotCostPerFamIncGrp-Overall			10.510	6	.105	
	TotCostPerFamIncGrp1	1.760	.619	8.074	1	.004	5.810
	TotCostPerFamIncGrp2	1.310	.561	5.453	1	.020	3.707
	TotCostPerFamIncGrp3	1.235	.571	4.686	1	.030	3.440
	TotCostPerFamIncGrp4	1.010	.553	3.339	1	.068	2.747
	TotCostPerFamIncGrp5	.591	.560	1.113	1	.291	1.806
	TotCostPerFamIncGrp6	.750	.618	1.475	1	.225	2.117
	TotCostPerFamIncGrp7-Refer.						
	Constant	-.669	1.672	.160	1	.689	.512

a Variable(s) entered on step 1: Aggroup, Sex, Urban-Rural, Marital status, Education, PatFamIncBefIllDec, Numbers of contacted health providers, TimContHelProvidGrp, TotPreTrtDelGroup, TotCostPerFamIncGroup.

Annex 8.67: Binary logistic regression of family income change as percentage of family income before illness (Family per capita income deciles before illness in US$) - Variables in equation table (Weighted 530 cases by gender)

Step	Variables	B	SE	Wald	df	Sig.	Exp (B)
Step 1 (a)	Age group-Overall			11.138	9	.266	
	Age group (15-19)	-.211	.793	.071	1	.790	.810
	Age group (20-24)	.599	.597	1.007	1	.316	1.820
	Age group (25-29)	.453	.527	.738	1	.390	1.572
	Age group (30-34)	.643	.520	1.527	1	.217	1.902
	Age group (35-39)	.709	.525	1.820	1	.177	2.031
	Age group (40-44)	.667	.510	1.709	1	.191	1.948
	Age group (45-49)	.622	.529	1.382	1	.240	1.862
	Age group (50-54)	.980	.546	3.221	1	.073	2.665
	Age group (55-59)	-.489	.546	.803	1	.370	.613
	Age group (60-75)-Reference						
	Sex-Male	-.095	.300	.101	1	.751	.909
	Sex-female-Reference						
	UrbanRural-Urban	-.537	.316	2.882	1	.090	.584
	UrbanRural-Rural-Reference						
	Marital status-Overall			3.377	3	.337	
	Marital status-Unmarried	-.155	.836	.035	1	.853	.856
	Marital status-Married	-.791	.634	1.556	1	.212	.453
	Marital status-Divorced	-.837	.920	.829	1	.363	.433
	Marital status-Widowed-Refer.						

Continuation of Annex 8.67: Binary logistic regression of family income change as percentage of family income before illness (Family per capita income deciles before illness in US$) -Variables in equation table (Weighted 530 cases by gender)

	Education-Overall			6.436	4	.169	
	Education-Illiterate	-1.283	.739	3.016	1	.082	.277
	Education-Only can sign	-1.292	.730	3.130	1	.077	.275
	Education-Class I-V	-1.297	.720	3.249	1	.071	.273
	Education-Class VI-X	-.661	.711	.866	1	.352	.516
	Education-Class XI-XIV-Refer.						
	Per capita income deciles-Over.			54.214	9	.000	
	Per capita income deciles1	2.502	.642	15.191	1	.000	12.205
	Per capita income deciles2	2.585	.624	17.185	1	.000	13.262
	Per capita income deciles3	2.241	.616	13.227	1	.000	9.400
	Per capita income deciles4	1.567	.509	9.466	1	.002	4.793
	Per capita income deciles5	.912	.446	4.185	1	.041	2.490
	Per capita income deciles6	.980	.505	3.771	1	.052	2.666
	Per capita income deciles7	.517	.469	1.217	1	.270	1.678
	Per capita income deciles8	.364	.452	.649	1	.420	1.439
	Per capita income deciles9	-.682	.440	2.398	1	.122	.506
	Per capita income deciles10-Refer						
	No. of provider contacted	.105	.137	.589	1	.443	1.111
	Times provider contacted	.278	.179	2.423	1	.120	1.321
	TotPreTrtDelGrp-Overall			7.872	5	.163	
	TotPreTrtDelGrp1 (21-30 days)	.400	1.180	.115	1	.735	1.491
	TotPreTrtDelGrp2 (31-60 days)	-.273	1.148	.057	1	.812	.761
	TotPreTrtDelGrp3 (61-91 days)	-.156	1.138	.019	1	.891	.856
	TotPreTrtDelGrp4 (92-182 days)	.438	1.125	.152	1	.697	1.550
	TotPreTrtDelGrp5 (189-365 days)	-.428	1.110	.149	1	.700	.652
	TotPreTrtDelGrp6-Reference						
	TotCostPerFamIncGrp-Overall			8.809	6	.185	
	TotCostPerFamIncGrp1	1.639	.617	7.063	1	.008	5.148
	TotCostPerFamIncGrp2	1.402	.567	6.118	1	.013	4.063
	TotCostPerFamIncGrp3	1.249	.574	4.741	1	.029	3.487
	TotCostPerFamIncGrp4	1.005	.567	3.146	1	.076	2.731
	TotCostPerFamIncGrp5	.859	.577	2.217	1	.137	2.360
	TotCostPerFamIncGrp6	.726	.616	1.386	1	.239	2.066
	TotCostPerFamIncGrp7-Refer.						
	Constant	-.230	1.626	.020	1	.887	.794

a Variable(s) entered on step 1: Aggroup, Sex, Urban-Rural, Marital status, Education, PerCapIncBefIllDec, Numbers of contacted health providers, TimContHelProvidGrp, TotPreTrtDelGroup, TotCostPerFamIncGroup.

Annex 8.68: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness in US$) of rural patients (Weighted 530 cases by gender)

Classification table

Observed		**Predicted (Step 0)**			**Predicted (Step 1)**		
		Binarized family income change		Percentage correct	Binarized family income change		Percentage correct
		Decreased	Increased		Decreased	Increased	
Binarized family income change percentage	Decreased (Lowest to 10%)	0	106	0.0	34	72	32.1
	Increased (Above 10%)	0	327	100.0	15	312	95.4
Overall percentage				75.5			79.9

a The cut value is 0.500.

Model summary and Hosmer and Lemeshow test

Step	**Model summary**			**Hosmer and Lemeshow test**		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squire	df	Significance
Step 1	407.397(a)	0.158	0.236	3.280	8	0.916

a Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

Variables in the Equation

Step1	**Variables**	**B**	**SE**	**Wald**	**df**	**Sig.**	**Exp (B)**
	Age group-Overall			13.870	9	.127	
	Age group (40-44)	1.124	.552	4.145	1	.042	3.078
	Age group (50-54)	1.301	.594	4.795	1	.029	3.674
	Age group (60-75)-Reference						
	FamIncBefIllDeciles-Overall			41.184	9	.000	
	FamIncBefIllDeciles1	3.275	.731	20.069	1	.000	26.435
	FamIncBefIllDeciles2	3.076	.710	18.778	1	.000	21.662
	FamIncBefIllDeciles3	1.409	.535	6.944	1	.008	4.092
	FamIncBefIllDeciles4	1.845	.558	10.932	1	.001	6.325
	FamIncBefIllDeciles5	1.544	.571	7.320	1	.007	4.683
	FamIncBefIllDeciles6	1.389	.521	7.114	1	.008	4.012
	FamIncBefIllDeciles8	1.205	.508	5.634	1	.018	3.337
	FamIncBefIllDeciles10-Refer.						
	TotTimeContGroup	.442	.190	5.390	1	.020	1.555
	TotCostPerFamIncGroup-Over			11.115	6	.085	
	TotCostPerFamIncGroup1	1.887	.688	7.516	1	.006	6.602
	TotCostPerFamIncGroup2	1.146	.615	3.472	1	.062	3.146
	TotCostPerFamIncGroup7-Ref						
	Constant	-.926	1.325	.488	1	.485	.396

a Variable(s) entered on step 1: Agegroup, Sex, Marital status, Education, PatFamIncBefIllDec, Numbers contacted health providers, TimContHelProvidGrp, TotPreTrtDelGroup, TotCostPerFamIncGroup.

Annex 8.69: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness) of urban patients (Weighted 530 cases by gender)

Classification table

Observed		**Predicted (Step 0)**			**Predicted (Step 1)**		
		Binarized family income change		Percentage correct	Binarized family income change		Percentage correct
		Decreased	Increased		Decreased	Increased	
Binarized family income change percentage	Decreased (Lowest to 10%)	0	29	0.0	20	9	68.4
	Increased (Above 10%)	0	46	100.0	9	38	81.5
Overall percentage				61.7			76.5

a The cut value is 0.500.

Model summary and Hosmer and Lemeshow test

Step	**Model summary**			**Hosmer and Lemeshow test**		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squire	df	Significance
Step 1	73.687(a)	0.289	0.393	7.924	8	0.441

a Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

Variables in the Equation

Step1	**Variables**	**B**	**SE**	**Wald**	**df**	**Sig.**	**Exp (B)**
	Age group-Overall			8.496	9	0.485	
	Age group (15-19)	-4.778	2.380	4.029	1	0.045	0.008
	Age group (20-24)	-3.305	1.744	3.592	1	0.058	0.037
	Age group (40-44)	-2.906	1.591	3.337	1	0.068	0.055
	Age group (45-49)	-2.805	1.529	3.365	1	0.067	0.061
	Age group (60-75)-Reference						
	PatFamIncBefIllDec	-0.311	.139	5.005	1	0.025	0.733
	TotCostPerFamIncGrp	-0.013	.227	0.003	1	0.956	0.988
	TotPreTrtGrp	0.465	.357	1.697	1	0.193	1.592
	Constant	5.423	2.983	3.304	1	0.069	226.534

a Variable(s) entered on step 1: Agegroup, Sex, Marital status, Education, PatFamIncBefIllDec, Numbers of contacted health providers, TimContHelProvidGrp, TotPreTrtDelGroup, TotCostPerFamIncGroup.

Annex 8.70: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness in US$) of rural male patients (Not weighted)

Classification table

Observed		**Predicted (Step 0)**			**Predicted (Step 1)**		
		Binarized family income change		Percentage correct	Binarized family income change		Percentage correct
		Decreased	Increased		Decreased	Increased	
Binarized family income change percentage	Decreased (Lowest to 10%)	0	77	0.0	35	42	45.5
	Increased (Above 10%)	0	210	100.0	14	196	93.3
Overall percentage				**73.2**			**80.5**

a The cut value is 0.500.

Model summary and Hosmer and Lemeshow test

Step	**Model summary**			**Hosmer and Lemeshow test**		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squire	df	Significance
Step 1	267.452(a)	0.206	0.300	6.532	8	0.588

a Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

Variables in the Equation

Step	**Variables**	**B**	**SE**	**Wald**	**df**	**Sig.**	**Exp (B)**
1	Age group-Overall			15.144	9	.087	
	Age group (30-34)	1.239	.703	3.111	1	.078	3.454
	Age group (35-39)	1.507	.721	4.372	1	.037	4.512
	Age group (40-44)	1.729	.680	6.466	1	.011	5.636
	Age group (45-49)	1.736	.730	5.651	1	.017	5.673
	Age group (50-54)	1.602	.707	5.137	1	.023	4.962
	Age group (50-75)-Reference						
	PatFamIncBefIllDeciles-Overall			30.354	9	.000	
	PatFamIncBefIllDeciles1	3.453	.973	12.584	1	.000	31.593
	PatFamIncBefIllDeciles2	2.862	.861	11.045	1	.001	17.489
	PatFamIncBefIllDeciles3	1.182	.660	3.209	1	.073	3.260
	PatFamIncBefIllDeciles4	2.372	.759	9.760	1	.002	10.720
	PatFamIncBefIllDeciles5	1.656	.699	5.602	1	.018	5.236
	PatFamIncBefIllDeciles6	1.636	.676	5.861	1	.015	5.133
	PatFamIncBefIllDeciles8	1.157	.587	3.887	1	.049	3.180
	PatFamIncBefIllDeciles10-Reff.						
	TimContHelProGrps	.517	.277	3.484	1	.062	1.677
	TotCostPerFamIncGroup-Over.			5.966	6	.427	
	TotCostPerFamIncGroup2	1.955	.851	5.281	1	.022	7.061
	TotCostPerFamIncGroup4	1.184	.715	2.741	1	.098	3.266
	TotCostPerFamIncGroup-Refer.						
	Constant	-2.285	2.574	.788	1	.375	.102

a Variable(s) entered on step 1: Agegroup, Marital status, Education, PatFamIncBefIllDec, Numbers contacted health providers, TimContHelProvidGrp, TotPreTrtDelGroup, TotCostPerFamIncGroup.

Annex 8.71: Binary logistic regression of family income change as percentage of family income before illness (Family income deciles before illness in US$) of rural female patients (Not weighted)

Classification table

Observed		**Predicted (Step 0)**			**Predicted (Step 1)**		
		Binarized family income change		Percentage correct	Binarized family income change		Percentage correct
		Decreased	Increased		Decreased	Increased	
Binarized family income change percentage	Decreased (Lowest to 10%)	0	58	0.0	16	42	27.6
	Increased (Above 10%)	0	234	100.0	6	228	97.4
Overall percentage				**80.1**			**83.6**

a The cut value is 0.500.

Model summary and Hosmer and Lemeshow test

Step	**Model summary**			**Hosmer and Lemeshow test**		
	- 2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-squire	df	Significance
Step 1	229.784(a)	0.189	0.300	5.729	8	0.678

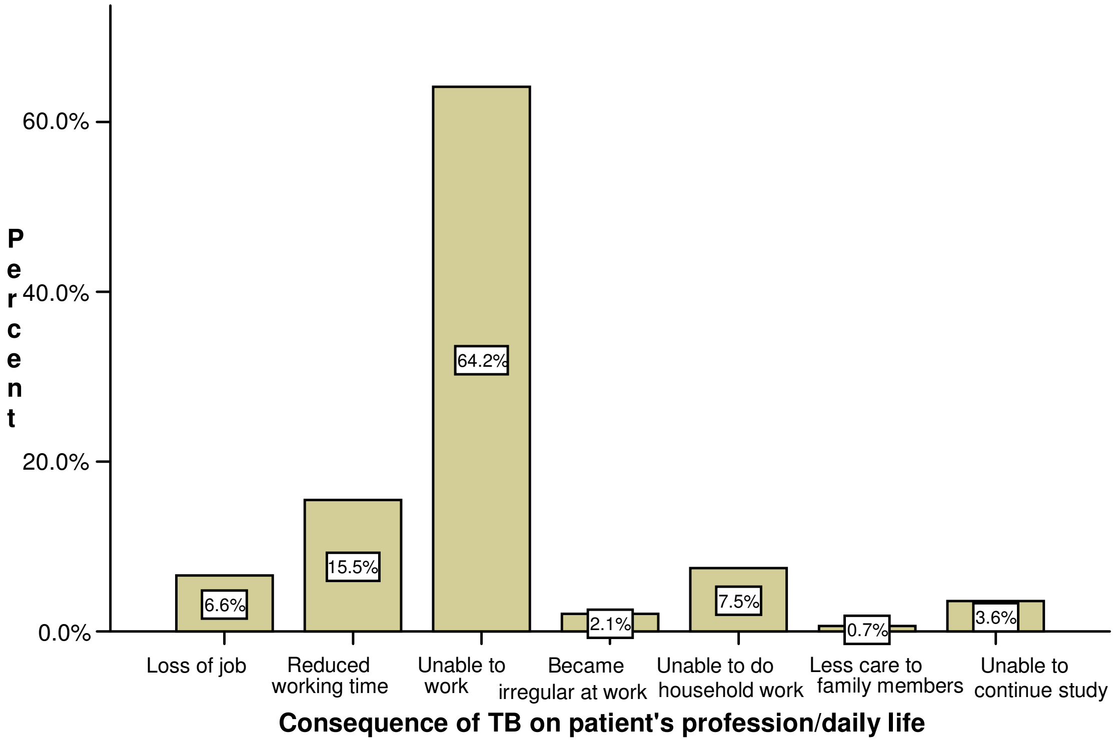
a Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

Variables in the Equation

Step	**Variables**	**B**	**SE**	**Wald**	**df**	**Sig.**	**Exp (B)**
1	Age groups-Overall			9.502	9	0.392	
	Age group (25-29)	-2.204	1.044	4.457	1	0.035	0.110
	Age group (35-39)	-2.028	0.996	4.144	1	0.042	0.132
	Age group (60-75)-Reference						
	PatFamIncBefIllDeciles-Overall			25.073	9	0.003	
	PatFamIncBefIllDeciles1	3.360	0.976	11.840	1	0.001	28.784
	PatFamIncBefIllDeciles2	4.265	1.286	10.997	1	0.001	71.181
	PatFamIncBefIllDeciles3	2.090	.889	5.530	1	0.019	8.089
	PatFamIncBefIllDeciles4	1.577	.825	3.660	1	0.056	4.842
	PatFamIncBefIllDeciles10-Refer.						
	TotCostPerFamIncGroup-Over.			12.859	6	0.045	
	TotCostPerFamIncGroup1	1.329	1.576	0.712	1	0.399	3.779
	TotCostPerFamIncGroup2	0.343	1.550	0.049	1	0.825	1.410
	TotCostPerFamIncGroup7-Reff.						
	Constant	-0.661	2.581	0.066	1	0.798	0.516

a Variable(s) entered on step 1: Agegroup, Marital status, Education, PatFamIncBefIllDec, Numbers contacted health providers, TimContHelProvidGrp, TotPreTrtDelGroup, TotCostPerFamIncGroup.

Annex 8.72: Consequence of tuberculosis on patient's profession/daily life bar chart (Weighted 530 cases by gender)



Annex 8.73: Total delay groups wise immediate consequences of tuberculosis on patient's personal life (Weighted 530 cases by gender)

Factors	Loss of job	Red-uce work time	Una-ble to work	Irregu-lar at work	Unable to do H.hold work	Less care of child	Dis-con-tinue study	Total	Sig.	Cra-mer's V
Total delay groups in days										
21-30	4.3 (7)	17.8 (29)	65.0 (106)	1.2 (2)	5.5 (9)	1.2 (2)	4.9 (8)	100.0 (163)	0.167	0.118
31-60	9.6 (14)	17.8 (26)	61.0 (89)	0.7 (1)	6.8 (10)	0.7 (1)	3.4 (5)	100.0 (146)		
61-91	6.5 (6)	9.7 (9)	66.7 (62)	2.2 (2)	9.7 (9)	1.1 (1)	4.3 (4)	100.0 (93)		
92-182	5.2 (4)	9.1 (7)	68.8 (53)	1.3 (1)	11.7 (9)	1.3 (1)	2.6 (2)	100.0 (77)		
187-365	10.0 (5)	20.0 (10)	50.0 (25)	10.0 (5)	8.0 (4)	0.0	2.0 (1)	100.0 (50)		
372-1095	0.0	20.0 (2)	60.0 (6)	0.0	10.0 (1)	0.0	10.0 (1)	100.0 (10)		

Continuation of Annex 8.73: Age groups and family income deciles wise immediate consequences of tuberculosis on patient's personal life (Weighted 530 cases by gender)

Factors	Loss of job	Red-uce work time	Una-ble to work	Irregu - lar at work	Unable to do H.hold work	Less care of child	Dis-con-tinue study	Total	Sig.	Cra-mer's V
Age groups										
15-19	7.1 (2)	3.6 (1)	14.3 (4)	3.6 (1)	14.3 (4)	3.6 (1)	53.6 (15)	100.0 (28)	0.000	0.294
20-24	17.9 (10)	3.6 (2)	53.6 (30)	3.6 (2)	12.5 (7)	1.8 (1)	7.1 (4)	100.0 (56)		
25-29	12.9 (9)	21.4 (15)	55.7 (39)	0.0	7.1 (5)	1.4 (1)	1.4 (1)	100.0 (70)		
30-34	8.7 (6)	14.5 (10)	65.2 (45)	2.9 (2)	7.2 (5)	1.4 (1)	0.0	100.0 (69)		
35-39	1.6 (1)	19.4 (12)	74.2 (46)	3.2 (2)	1.6 (1)	0.0	0.0	100.0 (62)		
40-44	5.7 (4)	22.9 (16)	65.7 (46)	0.0	4.3 (3)	1.4 (1)	0.0	100.0 (70)		
45-49	2.0 (1)	21.6 (11)	68.6 (35)	2.0 (1)	5.9 (3)	0.0	0.0	100.0 (51)		
50-54	0.0	14.0 (7)	74.0 (37)	4.0 (2)	6.0 (3)	2.0 (1)	0.0	100.0 (50)		
55-50	5.3 (2)	13.2 (5)	71.1 (27)	0.0	10.5 (4)	0.0	0.0	100.0 (38)		
60-75	2.0 (1)	12.0 (6)	70.0 (35)	2.0 (1)	14.0 (7)	0.0	0.0	100.0 (50)		
Patient's family income deciles before illness										
Deciles1	10.4 (5)	10.4 (5)	56.3 (27)	2.1 (1)	14.6 (7)	2.1 (1)	4.2 (2)	100.0 (48)	0.669	0.123
Deciles2	3.9 (2)	13.7 (7)	64.7 (33)	0.0	13.7 (7)	2.0 (1)	2.0 (1)	100.0 (51)		
Deciles3	1.8 (1)	8.9 (5)	78.6 (44)	0.0	7.1 (4)	1.8 (1)	1.8 (1)	100.0 (56)		
Deciles4	5.6 (3)	24.1 (13)	57.4 (31)	1.9 (1)	9.3 (5)	0.0	1.9 (1)	100.0 (54)		
Deciles5	6.7 (3)	22.2 (10)	62.2 (28)	2.2 (1)	4.4 (2)	0.0	2.2 (1)	100.0 (45)		
Deciles6	6.6 (4)	14.8 (9)	65.6 (40)	3.3 (2)	6.6 (4)	0.0	3.3 (2)	100.0 (61)		
Deciles7	7.5 (4)	15.1 (8)	58.5 (31)	3.8 (2)	11.3 (6)	1.9 (1)	1.9 (1)	100.0 (53)		
Deciles8	5.1 (3)	16.9 (10)	62.7 (37)	3.4 (2)	1.7 (1)	1.7 (1)	8.5 (5)	100.0 (59)		
Deciles9	10.0 (6)	8.3 (5)	70.0 (42)	3.3 (2)	5.0 (3)	0.0	3.3 (2)	100.0 (60)		
Deciles10	10.9 (6)	21.8 (12)	52.7 (29)	0.0	5.5 (3)	1.8 (1)	7.3 (4)	100.0 (55)		

Continuation of Annex 8.73: Family per capita income deciles wise immediate consequences of tuberculosis on patient's personal life (Weighted 530 cases by gender)

Patient's familyper capita income deciles before illness										
Deciles1	6.5 (3)	17.4 (8)	58.7 (27)	0.0	13.0 (6)	2.2 (1)	2.2 (1)	100.0 (46)	0.666	0.122
Deciles2	5.1 (3)	11.9 (7)	69.5 (41)	1.7 (!0	8.5 (5)	1.7 (1)	1.7 (1)	100.0 (59)		
Deciles3	4.3 (2)	13.0 (6)	67.4 (31)	0.0	6.5 (3)	2.2 (1)	6.5 (3)	100.0 (46)		
Deciles4	1.9 (1)	15.4 (8)	75.0 (39)	0.0	3.8 (2)	0.0	3.8 (2)	100.0 (52)		
Deciles5	11.9 (7)	16.9 (10)	52.5 (31)	3.4 (2)	8.5 (5)	0.0	6.8 (4)	100.0 (59)		
Deciles6	5.9 (30	7.8 (4)	66.7 (34)	2.0 (1)	11.8 (6)	2.0 (1)	3.9 (2)	100.0 (51)		
Deciles7	5.0 93)	23.3 (14)	53.3 (32)	5.0 (3)	10.0 (6)	0.0	3.3 (2)	100.0 (60)		
Deciles8	3.3 (2)	13.1 (8)	68.9 (42)	3.3 (2)	4.9 (3)	1.6 (1)	4.9 (3)	100.0 (61)		
Deciles9	17.6 (9)	13.7 (7)	52.9 (27)	3.9 (2)	5.9 (3)	2.0 (1)	3.9 (2)	100.0 (51)		
Deciles10	8.2 (5)	21.3 (13)	60.7 (37)	0.0	4.9 (3)	0.0	4.9 (3)	100.0 (61)		

Annex 8.74: Comparison of of patient’s personal occupation after completion of the treatment against the occupation before illness and (Weighted 530 cases by gender)

Patient’s personal occupation now ↓	**Patient’s personal occupation before illness (Column percentage)**													
	Agricul-ture	Agricul-tural labour	Small business	Business	Employ-ment	House hold work	Student	Begging	Rick-shaw pulling	Maid servant	Day labour	**Total**	Cramer’s V	Ch-squire
Unemployed	10.0 (4)	4.6 (3)	4.3 (5)	3.9 (3)	2.5 (2)	1.2 (1)	0.0	0.0	0.0	0.0	12.0 (3)	3.9 (21)	0.729	0.000
Agriculture	75.0 (30)	4.6 (3)	1.7 (3)	5.3 (4)	5.1 (4)	0.0	5.3 (1)	0.0	4.8 (1)	0.0	0.0	8.3 (45)		
Agricultural labour	7.5 (3)	70.8 (46)	2.6 (2)	1.3 (1)	3.8 (3)	0.0	0.0	0.0	9.5 (2)	0.0	8.0 (2)	11.1 (60)		
Small business	2.5 (1)	10.8 (7)	81.2 (95)	5.3 (4)	7.6 (6)	3.7 (3)	0.0	0.0	4.8 (1)	10.0 (1)	4.0 (1)	22.1 (119)		
Business	0.0	1.5 (1)	2.6 (3)	76.3 (58)	8.9 (7)	0.0	0.0	0.0	0.0	0.0	4.0 (1)	13.0 (70)		
Employment	2.5 (1)	3.1 (2)	2.6 (3)	3.9 (3)	59.5 (47)	6.1 (5)	5.3 (1)	0.0	9.5 (2)	0.0	0.0	11.9 (64)		
House hold work	2.5 (1)	3.1 (2)	4.3 (5)	2.6 (2)	7.6 (6)	85.4 (70)	10.5 (2)	0.0	4.8 (1)	20.0 (2)	12.0 (3)	17.4 (94)		
Student	0.0	0.0	0.0	0.0	0.0	1.2 (1)	78.9 (15)	0.0	0.0	10.0 (1)	0.0	3.2 (17)		
Begging	0.0	0.0	0.9 (1)	0.0	0.0	0.0	0.0	100.0 (5)	0.0	10.0 (1)	0.0	1.3 (7)		
Rick-shaw pulling	0.0	1.5 (1)	0.0	1.3 (1)	1.3 (1)	0.0	0.0	0.0	66.7 (14)	0.0	4.0 (1)	3.3 (18)		
Maid servant	0.0	0.0	0.0	0.0	1.3 (1)	2.4 (2)	0.0	0.0	0.0	50.0 (5)	0.0	1.5 (8)		
Day labour	0.0	0.0	0.0	0.0	2.5 (2)	0.0	0.0	0.0	0.0	0.0	56.0 (14)	3.0 (16)		
Total	100.0 (40)	100.0 (65)	100.0 (117)	100.0 (76)	100.0 (79)	100.0 (82)	100.0 (19)	100.0 (5)	100.0 (21)	100.0 (10)	100.0 (25)	100.0 (539)		

Annex 8.75: Gender and urban-rural area wise social and psychological consequences experienced by the patients (Weighted 530 cases except gend

Consequences	**Gender (Column percentage)**				**Geographical Area**			
	Male	Female	Cramer's V	Significance	Urban	Rural	Cramer's V	Significance
Social Consequences								
Neighbors became afraid	46.5 (164)	49.7 (176)	0.033	0.386	54.7 (41)	46.4 (211)	0.058	0.183
Teased by neighbors/society	28.9 (102)	34.5 (122)	0.060	0.112	18.4 (14)	32.9 (150)	0.110	0.011
Humiliated by husband/in-laws	0	9.0 (32)	0.217	0.000	2.7 (2)	3.1 (14)	0.008	0.847
Forced wife to collect money	0	0.6 (2)	0.053	0.157	1.3 (1)	0.2 (1)	0.063	0.148
Divorce/separation	0.6 (2)	2.0 (7)	0.063	0.094	0.0	1.3 (6)	0.043	0.318
Sent to father's house for treatment	0	9.6 (34)	0.224	0.000	1.3 (1)	3.5 (16)	0.043	0.320
Psychological Consequences								
Feared of telling neighbors	61.8 (218)	60.2 (213)	0.016	0.665	70.7 (53)	59.6 (272)	0.079	0.090
Feared of not getting married	0.6 (2)	5.6 (20)	0.146	0.000	2.6 (2)	2.4 (11)	0.005	0.909
Feared of divorce/separation	0	1.1 (4)	0.075	0.045	1.3 (1)	0.4 (2)	0.041	0.344
Wife went father's house due to fear	1.7 (6)	0	0.102	0.012	1.3 (1)	1.1 (5)	0.007	0.868
No Problem	27.5 (97)	24.3 (86)	0.036	0.334	16.0 (12)	28.1 (128)	0.096	0.027

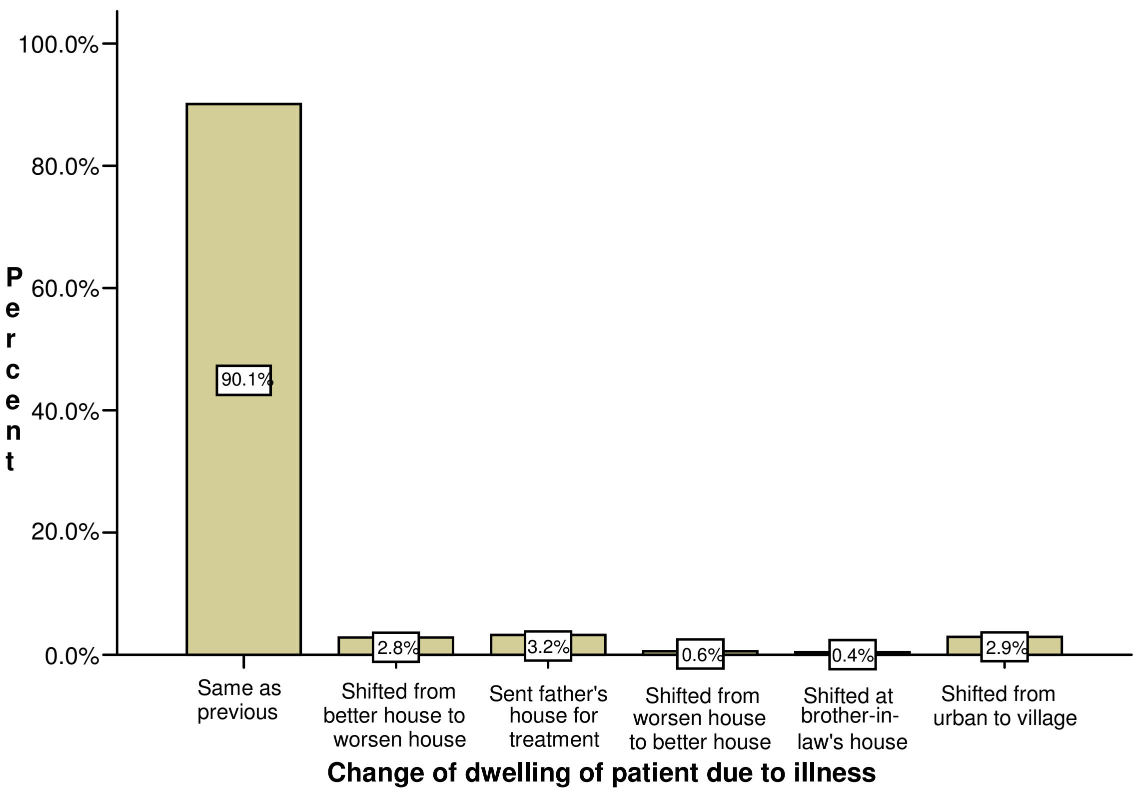
Annex 8.76: Social and psychological consequences according to the family income deciles before illness experienced by the patients (Weighted 530 cases by gender)

Consequences	Family income deciles before illness (Row percentage)											Significance	
↓	Dec.1	Dec.2	Dec.3	Dec.4	Dec.5	Dec.6	Dec.7	Dec.8	Dec.9	Dec.10	Total	Cramer's V	Chi-squire
Social Consequences													
Neighbors became afraid	9.8 (25)	9.8 (25)	10.6 (27)	12.6 (32)	8.7 (22)	11.0 (28)	11.0 (28)	9.4 (24)	9.8 (25)	7.1 (18)	100.0 (254)	0.143	0.285
Teased by neighbors	10.2 (17)	9.0 (15)	13.8 (23)	14.4 (24)	7.8 (13)	12.6 (21)	10.8 (18)	6.0 (10)	8.4 (14)	7.2 (12)	100.0 (167)	0.179	0.046
Humiliated by in-laws	16.7 (3)	16.7 (3)	5.6 (1)	5.6 (1)	11.1 (2)	11.1 (2)	11.1 (2)	0.0	11.1 (1)	11.1 (1)	100.0 (18)	0.100	0.801
Forced wife to collect money	50.0 (1)	0.0	0.0	0.0	0.0	50.0 (1)	0.0	0.0	0.0	0.0	100.0 (2)	0.116	0.116
Divorce/ separation	12.5 (1)	12.5 (1)	.0%	12.5 (1)	12.5 (1)	25.0 (2)	0.0	0.0	12.5 (1)	12.5 (1)	100.0 (8)	0.090	0.887
Father's house for treatment	10.5 (2)	21.1 (4)	10.5 (2)	5.3 (1)	5.3 (1)	15.8 (3)	10.5 (2)	5.3 (1)	10.5 (2)	5.3 (1)	100.0 (19)	0.098	0.820
Psychological Consequences													
Fear of telling neighbors	8.0 (26)	9.2 (30)	11.0 (36)	10.4 (34)	6.4 (21)	12.0 (39)	9.8 (32)	11.7 (38)	11.7 (38)	9.8 (32)	100.0 (326)	0.115	0.634
Feared of not getting married	15.4 (2)	0.0	7.7 (1)	0.0	7.7 (1)	7.7 (1)	7.7 (1)	15.4 (2)	7.7 (1)	30.8 (4)	100.0 (13)	0.133	0.394
Feared of divorce	0.0	33.3 (1)	0.0	33.3 (1)	0.0	0.0	0.0	0.0	33.3 (1)	0.0	100.0 (3)	0.123	0.529
Wife went father's house	0.0	33.3 (2)	0.0	16.7 (1)	0.0	0.0	33.3 (2)	0.0	0.0	16.7 (1)	100.0 (6)	0.146	0.251
No problem	7.1 (10)	9.9 (14)	10.6 (15)	8.5 (12)	12.1 (17)	8.5 (12)	8.5 (12)	10.6 (15)	11.3 (16)	12.8 (18)	100.0 (141)	0.118	0.600

Annex 8.77: Patiemt's binarized (Unmarried and married vs. divorced and widowed) marital status wise social and psychological consequences of Tuberculosis cross table (Weighted 530 cases by gender)

Consequences	Marital status (Column percentage)			Significance	
	Unmarried and married	Divorced and widowed	Total	Cramer's V	Chi-squire
Social Consequences					
Neighbors became afraid	47.0 (236)	54.8 (23)	253	0.042	0.336
Teased by neighbors/society	30.3 (148)	35.7 (15)	163	0.032	0.463
Humiliated by in-laws	2.7 (13)	7.1 (3)	16	0.071	0.130
Forced wife to collect money	0.2 (1)	0.0	1	0.013	0.769
Divorce/separation	0.0	14.3 (6)	6	0.365	0.000
Sent to father's house for treatment	3.1 (15)	7.1 (3)	18	0.061	0.161
Psychological Consequences					
Feared of telling neighbors	62.0 (303)	52.4 (22)	325	0.053	0.221
Daughter feared of not getting married	0.8 (4)	4.8 (2)	6	0.101	0.020
No Problem	26.6 (130)	23.8 (10)	140	0.017	0.695

Annex 8.78: Change of dwelling due to illness bar chart (Weighted 530 cases by gender)



Annex 8.79: Gender, urban-rural area and income deciles wise percentage (Number) of patient's change of dwelling cross-tabulation (Weighted 530 cases except gender)

Factors	Same as pre-vious	Shifted to worsen house	Shifted to father's house	Shifted to better house	Shifted to inlaws house	Shifted from urban to village	Total	Cra-mer's V	Sig.
Gender									
Male	92.9 (328)	2.5 (9)	0	0.6 (2)	0.3 (1)	3.7 (13)	100.0 (353)	0.237	0.000
Female	84.5 (299)	3.4 (12)	9.6 (34)	0.6 (2)	0.6 (2)	1.4 (5)	100.0 (354)		
Geographical area									
Urban	81.3 (61)	14.7 (11)	1.3 (1)	2.7 (2)	0.0	0.0	100.0 (75)	0.321	0.000
Rural	91.4 (417)	0.9 (4)	3.5 (16)	0.2 (1)	0.4 (2)	3.5 (16)	100.0 (456)		
Patient's family income deciles before illness									
Deciles1	89.4 (42)	4.3 (2)	4.3 (2)	0.0	2.1 (1)	0.0	100.0 (47)	0.135	0.307
Deciles2	90.0 (45)	2.0 (1)	8.0 (4)	0.0	0.0	0.0	100.0 (50)		
Deciles3	94.6 (53)	0.0	3.6 (2)	1.8 (1)	0.0	0.0	100.0 (56)		
Deciles4	96.3 (52)	1.9 (1)	1.9 (1)	0.0	0.0	0.0	100.0 (54)		
Deciles5	91.3 (42)	4.3 (2)	2.2 (1)	0.0	0.0	2.2 (1)	100.0 (46)		
Deciles6	90.2 (55)	1.6 (1)	4.9 (3)	0.0	1.6 (1)	1.6 (1)	100.0 (61)		
Deciles7	86.8 (46)	3.8 (2)	3.8 (2)	0.0	0.0	5.7 (3)	100.0 (53)		
Deciles8	88.1 (52)	5.1 (3)	1.7 (1)	1.7 (1)	0.0	3.4 (2)	100.0 (59)		
Deciles9	78.3 (47)	6.7 (4)	3.3 (2)	3.3 (2)	0.0	8.3 (5)	100.0 (60)		
Deciles10	85.5 (47)	1.8 (1)	1.8 (1)	0.0	1.8 (1)	9.1 (5)	100.0 (55)		

Annex 8.80: Coping strategies frequency table (Weighted 530 cases by gender)

Coping strategies	Cases evaluated	Number of cases reported	Percentage
Using own savings	508	407	80.1
Borrowed money from family/friends		136	26.7
Borrowed from others with interest		119	23.3
Microfinance or bank loan		62	12.2
Engaged spouse in work		11	2.2
Sold household assets		54	10.6
Sold pet animals		87	17.0
Withdrawal of children from school		62	12.2
Sold land/other property		41	8.1
Took donation from relatives		86	16.9
Mortgage land/gold/other property		28	5.4

Annex 8.81: Gender and urban -rural area wise percentage (Number) of coping strategies (Weighted 530 cases except gender)

Coping Strategies Cited	Gender (Column percentage)				Geographical Area (Column percentage)			
	Male	Female	Cramer's V	Significance	Urban	Rural	Cramer's V	Significance
From savings	81.3 (273)	77.8 (267)	0.042	0.271	80.0 (60)	80.0 (347)	0.000	0.993
Borrowed from family and friends	28.6 (96)	23.0 (79)	0.114	0.059	45.3 (34)	23.6 (102)	0.174	0.000
Borrowed from others with interest	20.2 (68)	29.4 (101)	0.106	0.006	30.7 (23)	22.2 (96)	0.071	0.109
Microfinance/bank loan	13.4 (45)	9.9 (34)	0.054	0.157	16.0 (12)	11.8 (51)	0.046	0.302
Engaged wife in work	33.3 (11)	0.0	0.130	0.001	8.0 (6)	1.2 (5)	0.167	0.000
Sold household assets	11.3 (38)	9.3 (32)	0.033	0.396	21.3 (16)	9.0 (39)	0.141	0.001
Sold pet animal	15.5 (52)	20.1 (68)	0.061	0.114	4.0 (3)	19.4 (84)	0.145	0.001
Withdrawn children from school and engaged in work	11.9 (40)	12.8 (44)	0.014	0.715	17.3 (13)	11.5 (50)	0.063	0.158
Sold land/other property	8.9 (30)	6.4 (22)	0.047	0.218	4.0 (3)	9.0 (39)	0.064	0.147
Took donation from family/friends	12.5 (42)	25.7 (88)	0.167	0.000	14.7 (11)	15.7 (76)	0.027	0.546
Mortgage land/gold/other property	6.0 (20)	4.4 (15)	0.036	0.352	1.3 (1)	6.2 (27)	0.076	0.086

Annex 8.82: Family income deciles before illness wise percentage (Number) of coping strategy adopted by the patients (Weighted 530 cases by gender)

Strategy Cited ↓	Patient's family income deciles (Coloum percentage)												
	Dec.1	Dec.2	Dec.3	Dec.4	Dec.5	Dec.6	Dec.7	Dec.8	Dec.9	Dec.10	Total	Cramer's V	Significance
Savings	63.8 (30)	62.2 (28)	77.4 (41)	76.9 (40)	72.1 (31)	79.7 (47)	83.7 (41)	87.7 (50)	90.6 (48)	98.1 (52)	408	0.264	0.000
Borrowed from friends	25.5 (12)	32.6 (15)	32.1 (17)	38.5 (20)	23.3 (10)	34.5 (20)	20.4 (10)	21.1 (12)	28.3 (15)	11.3 (6)	137	0.175	0.073
Borrowed with interest	23.4 (11)	28.9 (13)	22.6 (12)	28.8 (15)	20.9 (9)	33.9 (20)	38.0 (19)	14.0 (8)	18.5 (10)	5.8 (3)	120	0.216	0.005
Microfinance/ bank loan	10.6 (5)	6.5 (3)	20.4 (11)	15.4 (8)	15.9 (7)	13.6 (8)	18.0 (9)	14.0 (8)	11.1 (6)	1.9 (1)	66	0.154	0.200
Engage spouse in work	2.1 (1)	0.0	3.8 (2)	3.8 (2)	4.7 92)	1.7 (1)	4.1 (2)	1.8 (1)	0.0	0.0	11	0.116	0.650
Sold H.hold assets	6.4 (3)	17.4 (8)	3.8 (2)	15.4 (8)	18.6 (8)	6.9 (4)	18.0 (9)	10.5 (6)	9.3 (5)	5.8 (3)	56	0.168	0.105
Sold pet animals	21.3 (10)	22.2 (10)	29.6 (16)	25.0 (13)	9.3 (4)	20.7 (12)	12.2 (6)	12.3 (7)	9.3 (5)	9.6 (5)	88	0.188	0.034
Withdrawn child from school	12.8 (6)	8.9 (4)	18.5 (10)	13.5 (7)	16.3 (7)	8.6 (5)	14.0 (7)	15.8 (9)	7.5 (4)	7.7 (4)	63	0.115	0.663
Sold land	8.5 (4)	8.9 (4)	13.2 (7)	5.8 (3)	18.2 (8)	5.1 (3)	8.0 (4)	10.5 (6)	5.6 (3)	3.8 (2)	44	0.143	0.313
Taking donation	38.3 (18)	23.9 (11)	18.9 (10)	17.3 (9)	16.3 (7)	12.1 (7)	14.0 (7)	14.0 (8)	7.4 (4)	13.5 (7)	88	0.209	0.008
Mortgage land /other property	8.5 (4)	10.9 (5)	1.9 (1)	7.7 (4)	6.8 (3)	6.9 (4)	8.0 (4)	5.3 (3)	3.7 (2)	1.9 (1)	31	0.116	0.653

Annex 8.83: Family income change wise percentage (Number) of coping strategy adopted by the patients (Weighted 530 cases by gender)

	Family income change groups (Coloum percent)				Significance	
Strategy Cited	Income fell	Income static	Income rose	Total	Cramer's V	Chi-squire
Savings	81.4 (48)	84.4 (65)	78.9 (295)	408	0.051	0.522
Borrowed from friends	28.8 (17)	35.5 (27)	24.6 (92)	136	0.089	0.135
Borrowed from others	28.8 (17)	26.0 (20)	22.0 (82)	119	0.057	0.434
Microfinance /bank loan	11.9 (7)	11.7 (9)	12.6 (47)	63	0.011	0.970
Spouse engaged work	1.7 (1)	6.6 (5)	1.3 (1)	11	0.127	0.016
Sold H.hold assets	20.3 (20)	9.1 (7)	9.6 (36)	55	0.112	0.042
Sold pet animals	20.3 (20)	9.1 (7)	18.4 (69)	88	0.092	0.113
Withdrawn from school	18.6 (11)	9.2 (7)	12.0 (45)	63	0.075	0.237
Sold land	10.2 (6)	7.8 (6)	8.0 (30)	42	0.026	0.846
Taking donation	16.9 (10)	10.5 (8)	18.4 (69)	87	0.074	0.247
Mortgage land/jewelry	8.5 (5)	3.9 (3)	5.6 (21)	29	0.051	0.517

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