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**Risk Factors of Preterm Birth among Palestinian
Women in North West Bank**

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2010

Dedication

To my family

To my supervisor Dr Adnan Sarhan

He was good supporter for me

To all Midwives and Nurses

**Risk Factors of Preterm Birth Among Palestinian
Women In North West Bank**

Who afraid from preterm birth

and their lovely babies

By

Heyam Izzat Saleh Anini

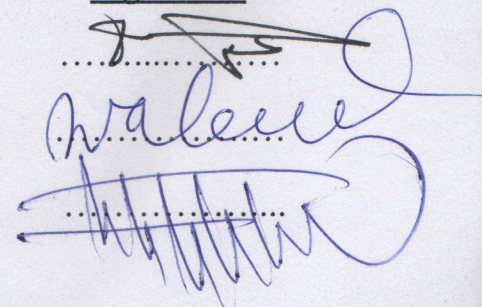
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Signature

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III

Dedication

To my family

To my supervisor Dr Adnan Sarhan

He was good supporter for me

To all Midwives and Nurses

To all pregnant women

Who afraid from preterm birth

and their lovely babies

Acknowledgment

It is of my honor to communicate this study with the help and support from the ministry of health.

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Finally I would like to express my thank and respect to the Palestinian women for their co-operation and participation in this study.

الإقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

Risk Factors of Preterm Birth among Palestinian Women In North West Bank

أقر بأن ما اشتملت عليه هذه الرسالة إنما نتاج جهدي الخاص, باستثناء ما تمت الإشارة إليه حيثما ورد, و أن هذه الرسالة ككل, أو أي جزء منها لم يقدم من قبل لنيل أية درجة علمية أو بحث علمي أو بحثي لدى أية مؤسسة تعليمية أو بحثية أخرى.

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work ,and has not been submitted elsewhere for any other degree or qualification.

Student's name:

اسم الطالب:

Signature:

التوقيع:

Date:

التاريخ:

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List of Abbreviations

PTB: Preterm Birth

PTL: Preterm labor

HIV: Human Immune virus

RDS: Respiratory Distress Syndrome

PPROM: Preterm Premature Rupture of Membrane

PDA: Patent Ducts Arterioses

STD: Sexual Transmitted Disease

IMR: Infant Mortality Rate

LMP: Last Menstrual Period

IPI: Inter Pregnancy Interval

GSB: Group B Streptococcus

Sp PTB: Spontaneous Preterm Birth

ID PTB: Indicated Preterm Birth

CS: Caesarean Section

CRH : Corticotrophin Releasing Hormone

PDA : Patent Ductus Arteriosis

GM-IVH: Germinal Intraventricular Hemorrhage

CL: Cervical Length

**Risk Factors of Preterm Birth among Palestinian Women In North
West Bank**

**By
Heyam Izzat Saleh Anini
Supervisor
Dr .Adnan Sarhan**

Abstract

Preterm birth is defined as the delivery of an infant before 37 weeks of gestation. It is a major public health problem. Prematurity is the leading cause of infant mortality and morbidity worldwide.

Objectives:

The aim of this study is to identify the risk factors of preterm birth and possible determinants among Palestinian women in Northern part of West Bank.

Methodology:

A hospital base case control study of 100 cases of preterm delivery and 201 control of full term delivery was taken from three governmental hospitals in Northern of West Bank. The sample is taken from Rafidia hospital in Nablus, Alshaheed Ali hospital in Jenen, and Alshaheed Thabet Thabet hospital in Tulkarem .The period of the study was six months started from first May 2009 to 30st October2009.

The tool used in the study is a questionnaire. It was filled by face to face interview of the newly delivered women while staying at hospital.

Result:

The data analyzed by using Statistical Package of Social Science (SPSS) program. Frequencies, Chi-square and multiple regression were done to explore the relation between dependent variable (preterm birth) and the other independent variables. The analysis shows that the main risk factors of preterm birth are: First, multiple pregnancy (P : 0.0001). Second, The existence of medical indication for pregnancy termination (Medically indicated preterm birth) (P: 0.0001).

Third, Preterm Premature Rupture Of Membrane (PPROM) (P: 0.006)Forth, previous history of preterm birth (P: 0.007), and Fifth, disorder associated with pregnancy, (P: 0.015). Other risk factors are identified by the study as living in nuclear family presence of congenital gynecological problems, family history of preterm birth ,previous delivery by CS , presence of placental problems , vaginal bleeding during pregnancy, psychological problems, maternal smoking more than 10 cigarettes, and short stature.

Conclusion:

The main risk factors for preterm birth are: multiple pregnancies medically indicated preterm birth mainly due to preeclampsia, placenta previa and abruption placenta, disorder associated with pregnancy, Preterm premature rupture of membrane, and previous history of preterm birth.

Chapter 1
Introduction

Introduction:

Preterm birth is defined as the delivery of infant between 24 and 37 completed weeks of gestation. Prematurity is a major clinical problem that causes neonatal mortality, morbidity, and childhood disability (Baxley et al., 2002).

The dangers of preterm birth are: The baby born with immature lungs that causes respiratory problems like Respiratory Distress Syndrome (RDS). Bleeding in the brain that leads to long term disability like cerebral palsy. Infections, jaundice, and bowels problems because the baby did not breast fed well (Lumley, 2003).

The incidence of preterm birth in developed countries is increased due to several factors, these factors include: increasing rate of multiple gestation, greater use of assisted reproduction technique, and more obstetric interventions (Tucker&McGuire, 2004). The main causes of preterm delivery were: Idiopathic spontaneous premature labor which is responsible for 50%, premature ruptures of membrane (PPROM) 30%, and therapeutic induction of labor 20% (Moutquin, 2003).

The etiology of preterm birth is unknown, but there were many risk factors associated with preterm birth. Risk factors of preterm birth are complicated combination of psychosocial, demographic, structural ,and endocrine factors.

The greatest etiological factor worldwide is infection mainly due to malaria and Human Immune deficiency virus (HIV). In developed countries Iatrogenic delivery is responsible for almost half of the birth between 28 and 35 weeks.

Hypertension and preeclampsia are considered the major pathologies and predisposing factors for indicated preterm birth (Steer, 2005).

The identification of modifiable risk factors is an essential first step in any primary prevention program. Health education about signs and symptoms of preterm labor, awareness that fetal viability is related to gestational age is important in the diagnosis and management of preterm labor. (Goldenberg ,etal ,1998).Healthy life style can go along way toward preventing preterm labor and preterm birth, So favorable life style factors are associated with more favorable pregnancy outcome (Mayo clinic staff ,2009).

1-2 Statement of the problem

Preterm birth is the delivery before 37 completed weeks of gestation. The etiology of preterm birth is multi-factorial .A number of social, behavioral, and biological determinants have been identified, however prediction of preterm birth remain a challenge (Campbell, 2004).There was evidence of a change in risk factors for preterm birth, suggesting that the classification of high risk groups should be brought up to date regularly. The search for epidemiological risk factors for preterm labor needs to be dynamic process as

the profile of populations and the environment in which we live it is subject to change overtime (Deirede&Murphy ,2007) .

1-3 Significance of the Study

Prematurity is a tremendous public health problem with an increasing rate globally due to different causes in developed and developing countries (Camellia,et al.2008). Most of the affected babies have long life impairment and impose significant economic burden on the society (Berkowitz, 1993). Prematurity whether examined by gestational age or birth weight is associated with significant neonatal cost , which is decreased with advancing gestational age .The total cost for each gestational age group from 25 – 36 weeks was 38 million \$. The financial burden of the acute care of preterm infant has been estimated to be at least 26.2 billion per year (Gilbert, 2003). Most of risk factors of preterm birth are modifiable as: socioeconomic, smoking, maternal stress, lack of prenatal care, and iatrogenic preterm birth. The basic mission is improving the health of the babies by preventing premature birth and decreasing infant mortality rate through research in the community service, education ,and advocacy to save lives. Palestinian community have poor socio economic status ,Palestinian population live below the poverty line and under occupation, these conditions make Palestinian women suffer from lack of health services . The number of neonatal units and number of incubators are not enough in comparison with number of premature babies. Many preterm deliveries occur in hospitals without neonatal unit and the transferring process is difficult and needs

long time due to barriers, which affects the babies condition and increase infant morbidity and mortality. Preventive measures are more effective and less expensive, these measures in order to be effective must be supported by high quality researches in the Palestinian community, and these researches must be supported financially by the government and Ministry of Health.

1.4 Objectives of the study

General objectives

To identify the risk factors of preterm birth and possible determinant among Palestinian women in the Northern part of the West Bank.

Specific objectives:

1. To examine the association between maternal socioeconomic status and preterm birth.
2. To explore the association between gyna-obstetric conditions and preterm birth.
3. To determine the relationship between the maternal health status and preterm birth.
4. To determine the relationship between previous obstetric history and preterm birth.

5. To clarify the association between medical intervention and preterm birth.

1.5 Hypothesis of the study

- 1-There is no relation between socioeconomic status and preterm birth.
- 2-There is no relation between of previous history preterm birth, family history and preterm delivery.
- 3-There is no relationship between preterm premature rupture of membrane and preterm birth
- 4-There is no relation between medical intervention and preterm delivery.
- 5-There is no relation between medical disorders associated with pregnancy or caused by pregnancy and preterm delivery.
- 6-There is no relation between multiple pregnancy and preterm birth.

1.6 Demography of the Study

The total Palestinian territory population is 3.761 millions, according to the results of the population housing establishment censuses, 2007. Palestinian population divided as: 1.908 million males, and 1.853 million females, with a sex ratio of 103 males per 100 females. Population of the West Bank was estimated to be 2.354 million, 1.90 million Males and 1.155 million females. The population of the Palestinian by age structure is considered

young population, the percentage of individuals in the age group (0-14) constitute 45.7% of the total population in the Palestinian territory 2006, of which 43.9% in the West Bank and 48.8% in Gaza Strip. The elderly population age 65 years and over constitute 3.0% of total Palestinians population. The Palestinian territories have one of the fastest growing populations in the world with the numbers surging 30 % in the past decade (Palestinian Census, 2007). The study carried from three Palestinian cities at Northern part of West Bank, Nablus, Jenin and Tulkarem.

Nablus is a Palestinian city in the northern West Bank approximately 63 Kilometers,39 miles north of Jerusalem it is located between mount Ebal and mount Gerizim. Nablus lies in strategic position at a junction between two ancient commercial roads , one linking the Sharon costal plain to the Jordan valley the other linking Nablus to the Galilee in the north .Nablus had a population of 321,493 inhabitants (Palestinian census ,2007).

Jenin city is a Palestinian city located in the Northern West Bank , the city had a population 258,212, while the adjacent refugee camp also named Jenin had a population of over 20.300. Jenin over look both the Jordan valley to the east and the Jezreel valley known by Palestinian Marj Ibn Amer to the north . Tulkarem is a Palestinian city situated in the northern West Bank. The city had a population158,2 inhabitants (Palestinians Census, 2007).The study carried on three central governmental hospitals Rafidia hospital in Nablus ,Alshaheed Thabet Thabet hospital in Tulkarem ,and Alshaheed Ali hospital in Jenen.

Fertility Rate : is declining in the Palestinian territory during 1997-2007, the crude birth rate has dropped from 42.7 births per one thousand of the population in 1997 to 36.7 births in 2006. The crude mortality rates declined in the Palestinian territory from 4.9 deaths per 1000 of population in 1997 to 3.9 deaths per 1000, 2006.

Socio Economic Status: The Palestinian society live under low socio-economic condition .The average monthly expenditure in the Palestinian territory for a household of 6 persons in 2007 was 608 JD .In West Bank 708 JD, and in Gaza Strip 415 JD, taking into consideration that the average households size was 6.1 in the West Bank and 6.9 in Gaza Strip. Monthly per capita expenditure increase 8.4 in the West Bank in 2007 compared with 2006, where it is increased from 107 JD to 116 JD, while in Gaza Strip it is decreased by 13.6%. It is decreased from 69 GD to 60 GD (Palestinian census, 2007). In the Palestinian territory 18% of the households were suffering from deep poverty, the poverty rate according to the income patterns was 57%, 45.7% in the West Bank and 79.4% Gaza strip (Palestinian Census, 2007).

Education: Educational status shows that Illiteracy rate among individuals aged 15 years or over in the Palestinian territory was 6.2% on 2007, variation in this rate is significantly noticed between males and females at 2.8% and 9.7% respectively in West Bank and Gaza Strip (Palestinian Census, 2007).

Statistics show that Palestinian community live under line of poverty ,under occupation ,and low socioeconomic status these conditions considered as an indicators of preterm birth and its modification will improve the birth outcome ,and decreased the economic burden that result from prematurity and its consequences .

Chapter 2
Literature Review

2.1 Definition

According to WHO preterm delivery is defined as the delivery at less than 37 completed weeks of gestation, or less than 259 days from the first day of last menstrual period. The age of viability is 22 weeks, the lower limit of definition is less clear differs from country to country and varies from 20 to 28 weeks of gestation, depending upon the neonatal care facility available in the country (Manadhav, 2006). Over the past 20-30 years advances in prenatal care have improved the outcomes for infant born after short gestation. In 1992 the boundary that required registration as preterm live birth in the United Kingdom (UK) was lowered from 28 weeks to 24 weeks gestation. This boundary varies internationally from 20 to 24 weeks (Tucker & McGuire, 2004). Estimation of the period of gestation is one of the most difficult problems, the estimation of maturity done by date of Last Menstrual Period (LMP), date when fetal movement were first noted, uterine size, and ultrasonography which is the most accurate test available for assessment of fetal maturity. It should be performed whenever the clinical findings are in doubt as irregular or unreliable menstrual date, uterine size not consistent with dates. Maturity is assisted by the measurement of the size of gestational sac 6-7 weeks gestation, crown – rump length 8-12 weeks gestation or bi-parietal diameter which is most accurate between 15-20 weeks of gestation, ultrasonographic assessment of fetal maturity is less accurate after 26 weeks of gestation (Norman & Eric, 1982).

2.2 Classification of preterm birth

2.2.1 Classification according to birth weight:

1 –Low birth weight < 2500gm (LBW).

2-Very low birth weight <1500 gm. (VLBW).

3-Extremely low birth weight <1000 gm. (ELBW).

Only around two third of low birth weight infant are preterm, infant may be low birth weight because they are small for gestational age or light for date infant (Tucker &McGuire, 2004).

2.2.2 Classification of Preterm birth according to gestational age

1- Mild preterm birth from 32-36 weeks.

2-Very preterm birth from 28- 31 weeks.

3-Extrem preterm birth less than 28 weeks.

Studies show that infection was mostly responsible for extreme preterm birth, while stress and life style are accountant for mild preterm birth, and mixture of both condition contribute to very preterm birth (Baxley et al, 2002).

2.2.3 Classification of Preterm birth according to Heterogeneity:

- 1- Spontaneous idiopathic preterm birth 50%.
- 2- Preterm Premature Rupture Of Membrane (PPROM) 25% .
- 3- Medically indicated iatrogenic preterm birth 25 % (Moutquin, 2003).

2.3 Causes of preterm birth

The specific causes of preterm labor is not clear, labor is a complex process involving many factors. Four different path ways have been identified that can result in preterm birth as Precocious fetal endocrine activation, uterine over distension as in multiple pregnancy and polyhydromnios, decidual bleeding as in placenta previa and abruption placenta, and intra-uterine inflammation or infection . Activation of one or more of these pathways may have been occurred gradually over weeks even months (Simhan, 2007).

Epidemiologist have grouped the multiple disorder that lead to preterm delivery before 28 weeks of gestation in a variety of ways .They enrolled 1006 women who delivered a live born singleton infant at less than 28 weeks gestation in the United State between 2002 and 2004 .Each delivery was classified by presentation, preterm labor(40%), pre labor premature rupture of membrane (23%) , Preeclampsia(18 %) ,placenta abruption(11%) ,cervical incompetence(5%) and fetal indication due to IUGR(3%). Using factor analysis to compare characteristic identified by standardized

interview, chart reviews ,placental histology and placental microbiology among the presentation group .The author found two broads pattern , one pattern characterized by histology chorioamnionitis and placental microbe recovery were associated with preterm labor ,pre labor premature rupture of membrane (PPROM) ,placenta abruption, and cervical insufficiency (McErath et al ,2007).

Many factors have been identified that are associated with preterm birth however association dose not establish causality (Simhan &Bodner, 2007).

2.4 Diagnosis of Preterm Labor

The diagnosis of preterm labor is difficult and most intervention to halt labor is unsuccessful. The diagnosis of preterm labor in symptomatic women is associated with very high false positive rate. This results in unnecessary admissions to hospital and over use of tocolytic drugs and glucocorticoids,which is of due to maternal and fetal risk attached to these therapies (Campbell ,2004). The aim of diagnosis is to identify women at risk, using up date risk scoring system.

Risk Scoring :used to assess a women's potential for preterm birth bases on her socioeconomic status, clinical history, life style and past obstetric and current prenatal complications. Risk scoring has been poorly predictive of preterm labor and delivery (Main et al, 1989). Unfortunately, there is insufficient evidence from randomized trials of preterm preventive program to suggest that the use of prospective risk scoring can reduce the incidence

of preterm delivery (Cannon, 1992). Weekly cervical assessment was used as predictor of preterm labor in women with uncomplicated pregnancies. A multinational randomized trial conducted in 1994 compared women in whom a cervical examination attempt at each prenatal visit with women's whom doesn't have vaginal examination concluded that there were no significant differences between the two groups observed (Buekens et al ,1994).

Trans vaginal Ultrasound Examination used for assessment of cervical length at 24 weeks of gestation, a cervix length less than 25 mm defines as a risk group for preterm birth (Goldenberg, 1997) .Ultrasonography in women with preterm contraction and those whose cervix length exceed 30 mm are unlikely to deliver at the next week (Leitich et al, 1999). Home monitoring of uterine activity have been proposed as a diagnostic aid in reducing the incidence of preterm birth, through early recognition of preterm contraction. Studies show that home monitoring of uterine activity was resulted in improved pregnancy outcome including prolong gestation ,decrease risk for preterm delivery , infant with heavier birth weight ,and decrease need for neonatal care unit (Growin et al ,1996).

Furthermore Saliva Test is used as an exploratory test for diagnosis of pre-term labor. A study done by King's College London offers the possibility of developing a simple non invasive test to identify women at increased risk of delivering early .This research had shown that women going into early preterm labor have low levels of progesterone in their saliva as ear-

ly as 24 weeks of gestation and these levels fail to rise during pregnancy in normal way. This progesterone is a hormone which helps regulate the menstrual cycle and it is the primary hormone of pregnancy it is produced in large amounts from placenta and acts to stop the wombs from contraction (Meadows, 2009).

Mammary Stimulation Test is used to predict preterm birth in nulliparus women, the mammary stimulation test were performed between 26 and 28 weeks of gestation, these patient with positive test were more likely to require observation for preterm uterine contraction. This test is useful in identifying patient at risk for uterine activity and preterm birth equally important for identification women who were at low risk for preterm birth (Iams, 2002). Fibronectin Test also used for prediction of preterm labor. Fibronectin is a glycoprotein of fetal origin that normally resides at the decidual chorionic interface within the uterus, it is present in cervicovaginal secretions in 3% to 4% of pregnant women between 21 and 37 weeks of gestation. Evaluation of fibronectin levels in a symptomatic women at 24 weeks of gestation has sensitivity of 20 to 30% for the prediction of spontaneous preterm birth before 35 weeks of gestation (Iams, et al, 2002). The pathophysiological heterogeneity of the causes of spontaneous preterm birth affect the clinical utility of any individual biomarker for predicting preterm birth. Combination of markers can increase the sensitivity of the prediction by combining risk predictors that address diverse

causes of spontaneous and indicated preterm birth (Goldenberg et al ,2001).

2.5 Management of Preterm Labor

Specific strategies were used for the management of preterm labor. First use of tocolytic therapy which offers some short-term benefit. A delay in delivery can be used to administer corticosteroid therapy to enhance pulmonary maturity and allow to transfer the patient to tertiary care center. These drugs are Magnesium sulfate, Beta adrenergic agent, Indomethacin, Nifedepin, and oral Terbutalin. These tocolytic agent should be used only when the perceived benefits outweigh the risk. There were contraindication to tocolysis as non reassuring fetal heart rate tracing, eclampsia or severe preeclampsia, fetal demise, chorioamnionitis, fetal maturity, and maternal hemodynamic instability. There were criteria for initiation of tocolytic therapy like regular uterine contraction, and cervical changes like effacement or dilatation of at least 3 cm (Lewis et al, 1996). The Canadian preterm labor investigator Group found on their control trial that the use of ritrodrene in the treatment of preterm labor had no significant beneficial effect on prenatal mortality, the frequency of prolongation of pregnancy to term, and birth weight.

Although the use of prophylactic treatment with indomethacin has a number of immediate benefits in particular a reduction in symptomatic patent ductus arteriosus, it is used for duct ligation and prevention of severe intra-

ventricular hemorrhage, there is no evidence to suggest either benefit or harm in long term outcomes including neurodevelopmental (Fowlie & Davis, 2000). Also magnesium sulphate is used to inhibit uterine activity in women with preterm labor and to prevent preterm birth.

Corticosteroid Therapy: Corticosteroid therapy is used for fetal maturation. A Cochrane meta-analysis of 18 randomized trials indicates that antenatal corticosteroid therapy decreases the incidence of Respiratory Distress Syndrome (RDS), neonatal death, and intraventricular hemorrhage in infants between 24 and 34 weeks. The efficacy of neonatal surfactant therapy is enhanced by antenatal exposure to corticosteroid therapy. Neonatal benefit started at 24 hours and lasts for seven days; no long-term maternal or neonatal adverse effects have been reported with use of corticosteroid therapy. In women with PPROM, corticosteroid therapy reduces the risk of RDS at less than 30 to 32 weeks of gestation in the absence of clinical chorioamnionitis. Benefit or risk from repeated doses after 7 days are unknown, although the use of prenatal steroids during preterm labor has reduced neonatal mortality and morbidity. Controversy exists regarding the benefit of additional doses for mothers not delivered within two weeks of the initial treatment. Multiple doses of prenatal steroids might adversely affect growth and postnatal development (Murphy et al, 2008).

An international comparative study comparing the two groups compared the effect of single dose and multiple dose of prenatal steroid treatment on infant outcomes; no differences were found between infants in the treatment group and

placebo groups were found (Murphy et al, 2008).The health care organizations and services should have policies and protocols in place of antenatal for steroid treatment because the cost and duration of neonatal intensive care is reduced following corticosteroid therapy .

Antibiotic therapy: The effectiveness of antibiotic treatment of women in preterm labor whose membrane intact has not been demonstrated, although pregnant women with PROM sustain their pregnancy longer if antibiotic given. Antibiotic also beneficial to the neonate preventing group B streptococcus infection. If membranes ruptured at less than 37 weeks of gestation and mother has not began labor ,collection of samples for group B streptococcal culture must done and administration of antibiotic until culture are completed ,then continue antibiotic only if culture positive. (Lamont, 2005).

2.6 Complications of prematurity

Infant born prematurely are at risk for multiple medical complication due to the immaturity of their body structures and organs, possible exposure to infections and teratogens, and the effects of the medical strategies and the technology required for minimizing illness and sustaining it. Most common complications are:

Respiratory Distress Syndrome (RDS): It occurs as a result of pulmonary immaturity, and in adequate pulmonary surfactant. Premature infants are predisposed to developing RDS due to structural and physiological imma-

turities including poor alveolar capillary development, lack of type II alveolar cells, and insufficient production of surfactant. Surfactant is a substance produced by type II alveolar cells and lines the alveoli and small bronchioles. Decreased surfactant leads to respiratory failure due to increased surface tension, alveolar collapse, diffuse atelectasis and decreased lung compliance. The preterm infant is further compromised by increased compliance of the chest wall due to cartilaginous composition of the ribs, decreased type I fatigue, resistant muscle fibers in the diaphragm, intercostal muscles, and instability of neural control of breathing (Tecklin, nd). The diagnosis of RDS is based on history, clinical presentation, blood gas studies and chest radiography. Clinical signs of RDS include increased respiratory rate, expiratory grunting, sternal retractions, nasal flaring and cyanosis. Interventions for the premature infant with RDS depend on the severity of the disorder. It includes oxygen supplementation, assisted ventilation, and surfactant administration (Tecklin, nd).

Patent Ductus Arteriosus (PDA): The ductus arteriosus is a structure in the developing fetal heart that allows blood to bypass circulation to the lungs since the fetus does not require the lungs to oxygenate blood. The flow from the right ventricle is shunted from the left pulmonary artery to the aorta. The ductus arteriosus typically closes within 10 to 15 hours after birth by constriction of medial smooth muscle. Anatomic closure is complete by 2 to 3 weeks of age and factors that precipitate closure include oxygen, prostaglandin E₂ levels, and maturity, oxygen appears to be the strongest

stimulus for closure of the ducts .The responsiveness of the smooth muscle to oxygen is relate to gestational age , the premature infant has loss of a response to oxygen in the environment due to decrease sensitivity to oxygen include muscle contractions and high levels of prostaglandin E2 ,when the ducts fail to close it is termed patent ductus arteriosus (Tecklin ,nd). In premature infant the pulmonary vascular smooth muscle is not well developed and there is a more rapid fall in pulmonary vascular resistance than in full term infant the clinical signs of PDA include murmur, increased heart rate, and respiratory distress. Diagnosis is made by chest radiography and echo cardiograph. Treatment is determinate by size of the PDA and clinical presentation.

Hyperbilirubinemia: is a physiological jaundice, hyperbilirubinemia is the accumulation of excessive amount of bilirubin in the blood. Bilirubin is one of the breaks down products of hemoglobin from red blood cells. Hyperbilirubinmia commonly occurs in premature infants due to immature hepatic function, increase hemolytic of red blood cell from birth injuries, and possible polycythemia.

The primary concern in the treatment of hyperbilirubinemia is to prevent kernicterus or the deposition of unconjugated bilirubin in the brain, the most commonly affected area the basal ganglia, cranial nerve nuclei, cerebella nuclei , hypo campus ,and anterior horn cell of the spinal cord. Pre-mature infant are more susceptible to anoxia, hypercarbia and sepsis which open the blood brain barrier leading to deposition of bilirubin in neural tis-

sue. Bilirubin toxicity in low birth weight infant may be more reflection of their overall clinical status than actual bilirubin levels. Hyperbilirubinemia is diagnosed by serum blood levels of bilirubin and treated with phototherapy or exchange blood transfusion (Tecklin, nd).

Necrotizing Enterocolitis (NEC) : It is an acute inflammatory disease of the immature intestine that often results in acute intestinal necrosis preterm infants are at the highest risk for developing NEC , only 10% of all cases are found in full term infant. The exact etiology is not known and the disease process appears to result from initial mucosal injury to the immature gastrointestinal tract due to variety of factors, these factors are: intestinal ischemia, infectious agents, toxins, and internal alimentation. The clinical presentation includes: respiratory distress, apnea, bradycardia, temperature instability, decreased peripheral perfusion and lethargy. Abdominal signs includes distension ,tenderness ,gastric aspirate with residuals of previous feedings , vomiting of bile or blood ,bloody stools , radiographic evidence of illius , and intestinal pneumatosis .As NEC progress the infant may developed intestinal hemorrhage ,gangrene, sub mucosal gas and in some cases perforation of the intestines , sepsis and shock .The most important factors in determining out come appears to be early diagnosis and treatment (Tecklin ,nd).

Germinal Intraventricular Hemorrhage (GM-IVH): It is the most common type of brain lesion found in premature infants occurring most frequently in infant less than 1500 g and less than 32 weeks gestation .

The incidence GM-IVH is inversely related to gestational age with the extremely premature being at greatest risk the hemorrhage typically originates in the subependymal layer of the germinal matrix and extends into the intraventricular space between the lateral ventricles. During fetal development this is the site of neural proliferation as neuroblasts divide migrate to the cerebral parenchyma. The neuronal proliferation is complete by 22 weeks, while glial cell proliferation complete until approximately 32 weeks of gestation. The matrix decreases in size from 23 to 24 weeks and nearly complete involution occurs by 36 weeks of gestation. These developmental changes in the brain influence the area and extent of the hemorrhage in the neonate. A fragile and primitive capillary network supplies blood to this metabolically active area, it is within this capillary network that the periventricular hemorrhage-intraventricular hemorrhage (PVH-IVH) occurs. IVH is thought to be due to hypoxia or capillary bleeding resulting from the loss of cerebral auto regulation and an abrupt alteration in blood flow factors associated with the loss of auto regulation in younger gestational age and extremely low birth weight, asynchrony of spontaneous and mechanical breathes pneumothorax, rapid volume expansion, seizures, changes PH, $Paco_2$, Pao_2 , metabolic imbalances, tracheal suctioning and noxious procedures of care giving. Intraventricular hemorrhages are diagnosed by cranial ultrasound and classified according to severity (Tecklin, nd).

Researcher at Yale university have conducted brain scans that show key areas of preemies brain appear less developed than non-preemies the earlier the preemie the less developed these key brain areas, and it appear to be smaller than full term child . These babies appear developmentally okay until the age of three , so all parent of preemies need to be informed about the developmental risk , and these children need to go under frequent developmental screening tests from age three and up, and should seek early intervention as appropriate. These children experience behavioral, emotional, low I.Q and learning difficulties. 40 -50 % of preemies baby have learning disability. Almost half of children who survive extremely preterm birth have neurological and developmental disabilities. Another study shows that 25% of preemies children had major impairment Such as cerebral palsy and mental retardation , and 48% need special education resources (Patti ,2000).

Abnormal cerebral development was recently recognized to be related to prematurity, premature birth between 24 and 32 gestational weeks associated with poor post natal conditions and complicated supratentorial hemorrhage. Brain lesions represent a high –risk situation for disruption of cerebral development (Schmidt et al, 2004) .

Complication of prematurity are serious and costly so preventive programs can lower the incidence of premature birth and decreased the economical burden on the society.

2.7 Risk Factors of Preterm Birth

Many risk factors for preterm delivery were identified by Mayo Clinic staff,2009 these risk factors are :Having previous preterm labor or premature birth ,multiple pregnancy, problem with cervix ,uterus or placenta, smoking cigarette ,drinking alcohol, or using illicit drugs , Infections , chronic condition like Diabetes and Hypertension ,being under weight or over weight before pregnancy , Stressful life event , and Multiple miscarriages or abortion (Mayo clinic staff ,2009).

2.7.1 Infection

The association between Infection and spontaneous preterm Labor is now well established and responsible for up to 40% of cases (Lamont, 2005).

The mechanism of Bacterial colonization or inflammation of the choriodecidual interface induces production of pro-Inflammatory cytokines that in turn leads to neutrophil activation and the synthesis and release of uterotonin such as prostaglandins which cause uterine contractions and metalloproteinases that weaken fetal membranes and remoded cervical collagen . This is reviews the role of cytokines in the patho physiology of preterm labor and delivery.

Epidemiological studies in USA have suggested that two Factors Maternal stress and maternal urogenital tract Infection are significantly and independently associated with an increased risk of spontaneous preterm birth. Studies of the physiology of parturition suggest that neuroendocrine and im-

immune processes play important role in the physiology and path physiology of normal and preterm labor . The effect of maternal stress may acts via one or both physiological pathway:

a-Neuroendocrine path way, it acts by activation of Maternal placental – Fetal endocrine system.

b-An immune inflammatory path way (Jeanne, 2002).

Many studies have confirmed associations between genital tract infection and preterm labor .A large number of clinical trials have evaluated antibiotic regimes as a potential therapeutic strategies. Bacterial vaginosis and trichomonas vaginalis are two of the most studies organisms. However in prospective longitudinal study of 3614 women found that increased psychological stress was associated with greater bacterial vaginosis prevalence and incidence in dependent of other risk factors .There is no evidence to suggest that there is a change in vaginal flora following antibiotic therapy . An increase in Escherchia coli or Klebsella pneumonia results in an increased risk of preterm birth (Lamont,2005).

2.7.2 Preterm Premature Rupture of Membrane (PPROM)

Preterm Premature Rupture of Membranes (PPROM) is the rupture of the fetal membranes during pregnancy before 37 weeks of gestation. ,it occurs in 3% of pregnancies, and is the cause of approximately one third of preterm delivery . it can leads to significant per natal morbidity including respiratory distress syndrome ,neonatal sepsis, umbilical cord prolapsed,

placenta abruption , and fetal death(MedinaT.&HillA. 2006). Significant complications may follow PPROM. Fetal complications which are related to infection and prematurity, and maternal complications related to infection either from chorioamnionitis endomyometritis, or from operative intervention. (Baxely, 2002).

The precise etiology of PROM and PPROM is unknown but there were risk factors as history of PROM in a previous pregnancy, prior surgery on the cervix ,placental pathology, prenatal procedures as amniocentesis , cervical or vaginal infection , and cigarette smoking . Infectious agent associated with PPROM may include group B streptococcus, bacterial vaginosis , mycoplasma ureao plasma, gonorrhea, and clamedia (Baxley ,2002) . Microbial invasion of the amniotic cavity was detected in 16% of women in preterm labor and 25% of women with PPROM. A case control study of Swedish women with infants that developed cerebral palsy, clinical chorioamnionitis and pyelonephritis found that longer interval between rupture of membrane and delivery, or rapid vaginal delivery just significantly increased the risk of cerebral palsy (CP). Apgar score of less than 7 at 5,at,10 minute were strongly associated with an increased risk of CP (Jacobsson, 2004). Abruptio placenta and pathological non stress test reason for delivery were significant risk factors for CP (Jacobsson, 2004).

A cohort study about white blood cell count and endocrine markers found that PPROM was the best predictor of preterm birth within 48 hours ,other predictors were white blood cell count, maternal adreno corticotr-

phin and corticotrophin releasing hormone(CRH) concentration at 28-36 weeks of gestation (Campbell, 2005).

2.7.3 Socio demographic Risk Factors

The most significant demographic risk factor is maternal age, extremes of maternal age below 18 years, and over 35 years were considered risk factor of preterm birth. Many studies show that spontaneous preterm birth were associated with young maternal age , while indicated preterm birth were associated with older maternal age (Paul et al ,1999). A study done in Sao Luis Brazil to identify Risk factors of preterm birth, the study done at ten public and private hospitals from March 1997 to February 1998. Total of 2443 live births were randomly selected excluding multiple deliveries and still birth.

The study find that preterm birth rate in Sao Luis was 12.7% .Risk factors of preterm delivery were : Maternal age below 18 years, family income equal to or less than one minimum wage / month, prim parity , vaginal delivery at a public hospital , single mothers or living without partners and absence of prenatal care (Maria de ,2004).

The following factors remained associated with preterm birth after multivariate analysis to control for confounding: Maternal age below 18 years, primiparity, and failure to appear for scheduled prenatal visits.

Another cohort study done about large social disparities in spontaneous preterm birth rates in Transitional Russia .The result of the study shows

that 5.6% of spontaneous births were preterm , Increased risks of preterm delivery were found in women with lower level of education and in students. Placental complications, Stress, and history of fetal death in previous pregnancies were also associated with elevated risk for preterm delivery . Smoking, hypertension and multi gravidity were associated with reduced length of pregnancy in metric form (Grijibovski, 2005).

2.7.4 Psychosocial Risk factors of preterm birth

Preterm labor is strongly associated with social disadvantages; it increased the burden of health care and disability on vulnerable families.

A Scottish cohort study between 1980 and 2000 concluded that the distribution of social class changed over time with greater inequalities by the 1990's over the start of 1980's ,social inequality and its determinant effects on preterm increased from 1.52 to 1.75 in the (Fairley&Lyland,2006).

Social factors are also reported to be important determinant of preterm birth in transitional Russia with increased risk among women with lower level of education and in student (Grijibovski et al, 2005).

Physical violence during pregnancy was significantly associated with spontaneous preterm labor. In a study of 550 participants in North Carolina (USA) the result of the study found that the body site injured, timing of violence ,and number of violence incidence were significant risk factors for preterm labor (Covington et al ,2001). Another study conducted in Manitoba on 1999-2000 concluded that physical abuse during pregnancy is as-

sociated with number of risk factors for preterm birth. Abuse is considered as a signification cause of preterm birth through the mechanisms of stress and through the association of abuse with other behavioral risk factors such as substance abuse (Heaman, 2005).

Furthermore a Study done in Ain Shams University Maternity Hospital 1991 in Egypt found that the risk for preterm labor was low socioeconomic standard ,smoking whether active or passive, threatened or induced abortion , psychological trauma , surgical intervention , history of preterm labor anemia, hypertention, and body weight Less than 70Kgm (Fahmi et al,1991).

Another study done in Iraq about Risk factors for preterm birth, a case - control study of a total 200 cases of preterm birth (PTB) and 200 controls of full term birth were screened and enrolled in the study. Several significant risk associations between PTB and the following risk factors were Identified as: poor diet, heavy manual work, caring for domestic animals , multiple pregnancies, and abortion .The main determinant of PTB in Iraq were low socio economic status , in addition to urinary tract Infections and poor obstetric history (Al Dabbagh &AL Tae, 2006).

Furthermore a study done about risk factors associated with preterm birth in Gaza Strip 2002: A hospital-based-case-control study was carried out at EL-shiefa and Khan-Younis hospitals .The study Found that the significant risk factors associated with preterm birth were: Maternal age ≥ 35 years ,

being refugees ,Inadequate antenatal care , failure to gain adequate weight during pregnancy and previous history of preterm birth , other significant risk factors included short status, short interval between the last two pregnancies , presence of congenital gynecological abnormalities , previous history of caesarean delivery and previous history of still birth (Abu Hamad , 2003).

2.7.6 Genetic susceptibility

The genetic regulation of common biological functions has redolent control mechanisms, and it is unlikely that single marker will ever be identified that will be both highly sensitive and specific. It is more likely that combination of genes or protein markers perhaps also combined with obstetric family history will be required to achieve the goal of a truly sensitive and specific profile for spontaneous preterm birth. Spontaneous preterm birth remains a syndrome with a final common path way for multiple etiologies, no single explanation, marker or treatment is likely to be 100% sensitive, specific or successful. It is also clear how ever that there is genetic predisposition in many cases of spontaneous preterm labor (Esplin& Varner, 2005). A study done about Mitochoncial DNA variant A4917G , smoking and spontaneous preterm birth found that mitochondrial genome, polymorphisms may play a significant role in PTB through an interaction with smoking (Digna et al ,2008). Farther more a study was done to examine the relation between preterm birth and 22 single Nucleotide polymorphism in genes that encode cytokines and mediators a popnosis and host defense.

Two hundred white woman with spontaneous preterm birth of < 35 weeks of gestation were compared with 185 white woman with term birth . Genotyping was performed with polymerase chain reaction and specific primers multi variable analysis, include demographic and genetic variable (Angle et al, 2005).

Family history of preterm birth also found to be risk factor for preterm birth. Women who were born prematurely or had siblings who were may be at increased risk of having a preterm baby themselves. A large (UK) study of nearly 14,000 women who gave birth between the 1970s and 2008. Researcher found that women who were either born prematurely or had siblings who were had a 35 percent to 49 percent greater chance of preterm delivery. Among women born preterm nine percent had a premature by themselves, that compared with just over 6 percent of women who had born full term (Writes et al, 2010).

Preterm birth results from a complex of genetic susceptibility environmental factors and behaviors. Recent studies have solidified the belief that those genes play a role in preterm birth. Analysis of 1 million births in Sweden women, researcher found that sister of women who had delivered preterm birth had an 80 percent higher risk of early delivery. There was no evidence that the increase risk shared by sister was explained by no genetic factors that could influence the chance of preterm delivery. (Writes et al, 2010).

2.7.7 Smoking and preterm birth

Maternal smoking during pregnancy is a risk factor for very preterm birth. The impact of maternal smoking on very preterm birth appears to be complex. It lowers the risk of preterm birth due to gestational hypertension, but increase the risk of very preterm birth due to other mechanism (Montgnin, 2003).

The risk of preterm birth consistently increased with amount of smoked. Smoking most heavily associated with increased risk of very preterm birth and spontaneous preterm birth. The highest impact was seen on risk of spontaneous very preterm birth among women who smoked at least 10 cigarettes / day (Tucker & Mc Guire, 2005).

A another Swedish study found that moderate and heavy smokers were at increased risk of preterm birth from all causes (Deired,2007).

The smoking related risk of preterm birth remained essentially unchanged, after excluding pregnancies with smoking associated pregnancy complications (Kyrklund, 1998). Interaction of the many factors that contribute to the association of the preterm with socioeconomic status is complex. Mothers who smoke cigarette are twice as likely as non- smoking mothers to deliver before 32 weeks of gestation, although this effect does not explain all the risk associated with social disadvantages. Evidence from meta – analysis of randomized control trials shows that the antenatal smoking cessation program can lower the incidence of preterm birth. Women from

poorer socioeconomic back grounds however are least likely to stop smoking in pregnancy, although they are most at risk of preterm delivery (Tucker & McGuir, 2004).

2.7.8 Medical Conditions and preterm birth

Number of Maternal Medical conditions were associated with an increased risk of indicated or spontaneous preterm birth, including chronic hypertension, diabetes mellitus, and systemic Lupus erythromatous . Maternal illness can alter or limit the placental delivery of oxygen and nutrient to the developing fetus possibly resulting in Fetal growth restriction. The increase risk of preeclampsia increased the risk of indicated preterm birth (Anomenus, 2008). A study done to Identify and quantity the risk factors associated with preterm birth stratified by gestational age and birth obstetrical conditions concluded that placenta previa , placenta abruption and maternal hypertension were significantly associated with preterm delivery in all cases and controls .The leading risk factors for preterm delivery in singleton pregnancies were placenta abruption and placenta previa (Benjamin et al ,2008).

Another study done about preeclampsia and preterm birth subtypes in Nova Scotia in 1986 to 1992. The result of the study shows that mild and sever preeclampsia occurred in 8.7% and 1.7% of pregnancy respectively.

Also Severe preeclampsia was strongly associated with the risk of very preterm birth, and moderately preterm birth due to medical intervention (Ananth et al, 1997).

Furthermore a retrospective cohort study done in Missouri from 1989 to 1997 about Maternal – Fetal condition that necessitate iatrogenic preterm delivery included preeclampsia, small for gestational age birth, fetal distress, placenta abruption, placenta previa, unexplained vaginal bleeding, pregestational and gestational diabetes, renal disease, Rh sensitization and congenital malformation (Ananth & Vintzileos, 1997).

Another study found that mothers who give birth to preterm in fact are at increased risk of mortality from coronary heart disease and stroke. The biological pathways underlying this association have not been explored. High (above the median) plasma homocysteine and HDL cholesterol were significantly and independently associated with the risk of the spontaneous preterm birth. A higher proportion of women with high homocysteine concentration had decidual vasculopathy 13.0 vs 6.8%; . Although the positive association between decidual vasculopathy did not achieve statistical significance. No significant associations were observed with the DNA Polymorphisms or Plasma TAT or folate levels (Michael et al, 2009).

2.7.9 Neuro-endocrine and preterm birth

The way in which the timing of birth is controlled in humans either at term or preterm is not known. As the influence of progesterone, the myometrium undergoes a final switch as labor . Labor is initiated as a result of molecular and biochemical events, and the role of endocrine and mechanical signal (Pertaglia, 2007).

Progesterone is required in virtually all species for the establishment and maintenance of pregnancy. Progesterone plays a polytrophic role during pregnancy ,contributing to the preparation of the implementation site , immunological protection of the fetus and suppression of the uterotonic agonist synthesis .The action of progesterone suppresses the initiation of labor and removal of the source of progesterone during early pregnancy e.g by overectomy or administration of progesterone antagonist causes termination of pregnancy (Pertaglia,2007).

Another hormone important in pregnancy is Corticotrophin-Releasing Hormone (CRH) , increased secretion of (CRH) from the placenta of pregnant women has been associated with preterm birth. Certain indices of risk both medical and psychological in nature have been linked to preterm birth . Maturation of the fetus is prompted by progressive activation of fetal hypothalamic –pituitary adrenal axis in normal pregnancy. CRH is synthesized and secreted by placenta and plasma, CRH is easily detected in maternal blood. (CRH) levels progressively increase in both maternal and fetal

circulation during third trimester. The increasing levels of (CRH) have been a key role in determining the time of term labor. Total plasma (CRH) concentrations are elevated during the second trimester in pregnant women who experience preterm birth ,s similarly bacterial infection disease ,preeclampsia, growth restricted fetal development ,and psycho social stress . Increased level of (CRH) in woman who delivered preterm may be an indicator of potential maternal- Fetal distress or increased metabolic and physiologically demands (Erikson et al, 2007).

A study done about the Role of stress, clinical risk factors and corticotrophin releasing hormone (CRH), the researcher concluded that measurement of stress combined with the measurement of (CRH) from maternal plasma may improved the prediction of which pregnant women are at risk for preterm birth . The measurement of CRH has potential as an early biological marker of preterm birth (Jeanne, 2002).

2.7.10 Previous history of preterm birth

Preterm birth is divided into two types: First, Indicated preterm birth which used to describe circumstances where preterm birth is the prefer management approach, it may be planned by caesarean section or induction of labor. Second, spontaneous preterm birth which refers to un planned preterm birth that result from spontaneous preterm labor .There is a degree of overlapping between spontaneous preterm birth and indicated preterm

birth, these two clinical subtype may share common etiologies (Deirdre & Murphy,2007).

There is an increased tendency for preterm birth to recur in subsequent pregnancy. In USA study of over 150,000 consecutive singleton birth find that if the first pregnancy resulted in spontaneous preterm birth ,then the affected women were more likely to deliver preterm in the subsequent pregnancy (Ananth et al ,2006) . Another study conducted in Alabama shows that women who had spontaneous preterm birth were more likely(85.5 vs 14.4, $p<.0001$) to have spontaneous preterm birth in the previous pregnancy ,while women with an indicated preterm birth were significantly more likely to have had a previous indicated preterm birth 89.7 vs 10.3, $p =.0001$. Nulliparas and women with previous term birth each had about 64% risk for spontaneous preterm birth, and 36 % for indicated preterm birth. Spontaneous preterm birth and indicated preterm were strongly repetitive (Robert et al ,2006).

Women with spontaneous preterm birth are significantly more likely to have acute inflammation in the free membranes chronic plate thrombosis ,while women with indicated preterm birth are significantly more likely to have chronic inflammation (Robert et al , 2006) .

A retrospective cohort study done among Taiwanese women found that the risk factors of preterm delivery included a prior preterm delivery (Chung Chin et al, 2007). Furthermore a study done in Gaza Strep found that the

previous history of preterm birth is significant risk factor for preterm birth (Abu Hamad ,2003).

2.7.11 Inter pregnancy interval

Inter pregnancy interval is defined as the period between last delivery and subsequent conception. A study done about the impact of inter- pregnancy interval and previous preterm birth on the subsequent risk of preterm birth ,retrospective analysis was conducted on group of 4072 woman who had at least two consecutive births . The result of the study shows that woman with inter pregnancy interval of less than 12 months were at increased risk of preterm birth with the outcome pregnancy. (Hsieh, 2005). Furthermore there was an increased risk for subsequent preterm birth in women who had a preterm birth in the index pregnancy, the risk decreased as inter pregnancy interval increased with a relatively low risk at 18-48 months , more subsequently , it was increased sharply in contrast . Women who had delivered their previous infant at term carried an increased risk of preterm birth with the outcome pregnancy if the interval less than 6 months (Anomnus , 2005). Another study done in Missouri Department of Health Birth Certificate data base, a population – based cohort study of 156,330 women who had two births from 1989 -1997. The result of the study shows that the shortest IpI less than 6 months increase the risk of extreme preterm birth . Adjusted odds ratio (1.41;95% CI 1.13- 1.76) . IPIS of < 6 month and 6- 12 months increased the overall risk of PTB . The risk of PTB and its recurrence increased with short IPI even after adjustment for coexisting risk fac-

tors. It is important for counseling women to wait at least 12 months between delivery and subsequent conception (Emily et al, 2007). Another study done in United Arab Emirates ,a case- control study based on medical record between 1977 and 2000 find that Short inter pregnancy intervals(IPI)were significantly associated with case status ($P < 0.05$) . The multivariate adjusted odds ratio for the 1st , 2nd , and 4th quartiles of IPI compared with the lowest risk 3rd quartile were 8.2, 5.4 and 2.0, 95% CI. The researcher concluded that short inter pregnancy interval is risk factor for spontaneous preterm birth in Emirate women. The magnitude of the risk and the risk gradient between expositor quartiles suggest that the risk factors are casual and that its modification would reduce the risk of preterm birth (AL- Jasmi, et al, 2000).

2.7.12 Multiple Miscarriages and Vaginal Bleeding During Pregnancy

Recurrent abortion is considered a risk factor for preterm birth. Prospective cohort study of 1709 women with singleton live birth in Hanoi Vietnam June – October 2002 shows that the risk of preterm birth was 11.8%. The risk factors of preterm birth were : physically demanding work during pregnancy , two or more prior spontaneous abortions , history of preterm birth ,vaginal bleeding , inadequate prenatal care in the first 20 weeks of gestation , and history of intra uterine device use with removed of less than 12 months before the current pregnancy. These risk factors were associated with increased risk of preterm birth, adjusted odds ratio between 1.8 and 2.6 (Nguyen et al, 2004).

Another study done to investigate the relationship between histories of induced abortion and preterm delivery in various parts of Europe. A case – control survey done, about 2938 preterm birth and 4781 controls at term were included between 1994 - 1997. The result of this study shows that previous induced abortions were significantly associated with preterm delivery and risk of preterm birth increased with the number of abortions, Odds ratios did not differ significantly between the three groups of countries. The extent of association with previous induced abortion varied according to the cause of preterm delivery. Previous induced abortions significantly increased the risk of preterm delivery after idiopathic preterm labor, preterm premature rupture of membrane (PPROM), and ante partum hemorrhage, but not preterm delivery after maternal hypertension. The strength of the association increased with decreasing gestational age at birth (Ancel et al, 2004).

Another study done about risk factors for spontaneous preterm birth in Saudi population found that the significant risk factors for preterm birth were: first and second trimester vaginal bleeding during current pregnancy, previous preterm birth , inadequate prenatal care, consanguinity , maternal body mass index of < 23 and short inter pregnancy interval (Aleissa & Aqeel ,1994).

2.7.13 Cervical Problems and Cervical Cerclage

The cervix has to open to allow birth. Ultra sound now shown that this lower part of the uterus begin to show changes weeks before eventual birth, only Trans vaginal ultrasound should be used to evaluate the cervix for prediction of preterm birth. The shortest cervical length (CL) is the most effective measurement for clinical use ,proper technique is paramount for accurate result. The risk of preterm birth increased with ever shortest CL <25 mm, other factors that must be carefully considered when using CL for prediction of preterm birth are number of fetuses and gestational age at screening (Berghella et al, 2005).

Cervical cerclage : is a surgical intervention that places a suture around the cervix to prevent its shortening and widening .Studies show that cervical cerclage appears helpful primarily for women with short cervix ,and history of preterm birth . Women with short cervix, women with no history of preterm birth and women with twins gestation do not benefit from cerclage (Berbhella et al, 2005).

2.7.14 Multiple Pregnancy

Multi -fetal pregnancy such as twins, triplet and quadruplet increased the risk of preterm delivery .About one quarter of preterm birth occur in multiple pregnancies, half of all twins and most triplets are born preterm. Multiple pregnancies is more likely than singleton pregnancy to be associated with spontaneous preterm labor and with obstetric intervention, such as in-

duction of labor or caesarean section. The incidence of multiple pregnancies in developed countries increased over the past 20 -30 years, this rise is mainly because of the increased use of reproduction techniques, such as drugs that increased ovulation, and In vitro Fertilization (IVF) (Tucker & McGuire, 2004).

The rate of twins in the United States has increased by 55% since 1980, although this rate has decreased slightly over the past five years. In some countries two embryos only are allowed to be placed in the uterus after In vitro Fertilization to limit the higher disorder of pregnancy. Singleton pregnancies that follow assisted reproduction are at a considerable increased risk of preterm delivery. Probably because of factors such as cervical trauma, the higher incidence of uterine problems, and possibly because of the increased risk of infection (Verstraelen et al, 2005). The impact of increasing number of twins and triplets on rates of preterm birth has been investigated in an international study in each country (Canada, England, and Wales, United State). The increase in preterm delivery among multiple births contribute to rise or stabilization of overall rates of preterm delivery (Bolndel et al, 2002).The increased in multi-fetal pregnancy as a result of sub fertility treatment has an impact role to play, as twins resulting from sub fertility treatment has an increased risk of preterm birth compared with naturally conceived twins ,albeit confined to mildly preterm birth(34-36 weeks) (Verstraelen et al, 2005).

A double –blind placebo controlled trial of 500 pregnant with twins from nine (UK) , these women randomized to receive vaginal progesterone gel 90mg the primary outcome measured was delivery or intrauterine death prior to 34 weeks of gestation .The combined primary outcome of either death or delivery prior to 34 weeks gestation occurred in 24.7% of the progesterone treated group and 19.4%in the placebo group .The overall shows no benefit in using progesterone to prevent preterm birth in twins pregnancy (Norman et al,2009).

Another study done about the contribution of male sex to preterm birth in twin's pregnancies, 33926 same sex twins' pairs borne in2002 in the USA, Preterm birth at 20-36 weeks gestation occurred in 59.1% of the male pairs compared with 57.5% of the females pairs P-value 0.0007.

The management of twin pregnancy in term of preventing preterm birth is challenging and many interventions including cerclage are not as beneficial as in singleton pregnancy (Norman et al, 2009).

Multiple birth increased from 1.9 -2.1 of all live birth, the rate of preterm birth among births resulting from multiple gestation increased by 25%. The recent increase in preterm birth in Canada is largely attributed to changes in frequency of multiple birth, obstetric intervention, and the use of ultra sound based estimate of gestational age (Joseph et al, 1998).

Retrospective case record analysis of 375 cases of multiple pregnancies that were reported at Armed Force Hospital and King Khalid University

Hospital, Riyadh, kingdom of Saudi Arabia ,between January 2000 and December 2001 ,the data was analyzed to determine the incidence of multiple pregnancies and its effect on preterm delivery. The over whole incidence of twins was 14 per 1000 birth. Premature labor in multiple pregnancy 7 times greater than singletons ,(42% verses 36.4%), pregnancy was induced in 34% of cases, cervical cerclage was applied only on 8% of cases and betamethason administered to only 11% of cases .Fetal distress in labor ,abnormal presentation ,and previous uterine scar were the main indications for caesarian section. Fifty percent had no antenatal complications . Gestational diabetes complicated 16%, and anemia was reported in 2% of cases (Kurdi et al, 2004).

2.8 Epidemiology of Preterm Birth

Preterm birth is a major clinical problem accounting for 47% of all neonatal death .The preterm birth rate in UK is approximately 7%, the rate of preterm birth is steadily increasing (Bibbye& Stewart, 20004) .

In Europe and many developed countries the preterm birth rate is generally 5-9%, and in the USA it has even risen to 12-13%. Preterm birth classified according to causes as: spontaneous preterm birth 40-45% , 25-30% preterm birth after premature rupture membrane , and 30-35% are preterm that are induced for obstetrical reason (Baxely,2002). Classification by gestational age: 5% of preterm births occur at less than 28 weeks extreme

prematurity , 15% at 28-31 weeks moderate prematurely and 60- 70% at 34-36 weeks (near term) .

Classification according to birth weight: World Health Organization (WHO) tracks rates of low birth weight as less than (2500gm) which occurred in 16.5% percent, one third of these low birth weight deliveries are due to preterm delivery, Very Low Birth Weight (VLBW) less than 1500gm, and Extremely Low Birth (ELBW) which is less than 1000gm, all most all neonates in these later two groups are born preterm,Preterm birth occurred in approximately 12% of all (Tucker ,2004)

An estimation of preterm birth in 2005found those 12.9 million births or 9.6%of all births worldwide were preterm. Approximately 11 million , 85% of these preterm concentrated in Africa and Asia while about 0.5 million occurred in each Europe and north America (excluding Mexico), and 0.9 million in Latin America and the Caribbean .The highest rates of preterm birth were in Africa and north America 11.9 % ,and 10.6% of all birth respectively, and the lowest were in Europe 6.2% (Beck, et al. ,2010).

A study done about the prevalence of preterm birth and season of conception, the spontaneous preterm birth at less than 37 week was associated with conception season. (PL0.05). The peak prevalence occurred among conception in winter and spring peaking February 23, It reaches 9% with an average through among /late summer /early autumn conception ,and in August 25 it reach 6.2 (Lisa, 2005).

2.9 Mortality and Morbidity of Preterm Birth

Worldwide prematurity accounts for 10% of neonatal mortality, or around 500,000 deaths per year. Prematurity is the leading cause of neonatal mortality.

The present study is the result of a large collaboration MOSAIC (Models of Organizing Access to Intensive Care for very preterm birth), project in 10 European regions. It is the first study to prospectively examine the influence of very preterm delivery on neonatal mortality rates. Data for all births that occurred between 22 and 36 (and 6 day) weeks of gestation during 2003 in regions within Belgium, Denmark, France, Germany, Italy, the Northern Poland and Portugal. Infant mortality rates were similar across the regions (4.0- 5.5) deaths per 1000 cases except for in Poland 7 deaths per 1000 cases. The mean number of very preterm deliveries per 1000 births was 13.2. The Trent and Northern regions of UK have the highest rate 16.8 per 1000 births, and Portugal, the Netherlands, Denmark and Italy had the lowest.

There are many factors that determine premature baby chances for survival, like gestational age at birth, birth weight, breathing problems, Infection and the presence of congenital abnormalities. Another factors like rupture of fetal membrane before 24 weeks, also male infants are slightly less mature and have slightly higher risk for dying than female. Diabetes in mothers if not well controlled it causes slow organs maturation. (NCUS) data for

2001-2004). Preterm birth is the single most important cause of prenatal mortality in North America and Europe. British study had estimated that preterm birth accounts for 85% of early neonatal death that are not caused by lethal congenital malformation.

In Infant death file In USA 2002, the 20 leading causes of death accounted for 22273 deaths, 34.3% of all deaths as attributable to preterm birth, 95% of those deaths occurred among infant who born at less than 32 weeks of gestation and weight less than 1500 g, and two third of those deaths occurred during the first 24 hours of life. Preterm birth is the most frequent cause of infant death in the USA, and accounting for at least one third of infant deaths (William et al, 2006).

2.10 Infant Mortality rate In Palestine (IMR)

Infant Mortality Rate is defined as the number of infant death between (0-1year) in relation to number of live birth. IMR\1000 in Palestine according UNRWA annual report 2008 was in West Bank 23.0% and Gaza Strip 29.0%. The leading causes of reported infant mortality in 2008 were: low birth weight and prematurity 28.6%, congenital malformation 27.8, acute respiratory infections 18.2%, and the cause of death in 7% are unknown. Further analysis of the data shows that 39.6% died during early neonatal period (less than one week) of age , 20.2% died during the late neonatal period (8-28 days), and 40.2% between 29 days and one year of age .

Death due to low birth weight ,prematurity and congenital malformation were more likely to occur during the neonatal period (0-28 days).While death due respiratory infections were equally distributed between the neonatal and post –neonatal periods .Infant mortality rate found to be higher among males than females at 55.9% and 44.1%respectively (UNR-WA,2008).

2.11 Prevention

The causes of preterm birth remain unknown and unpreventable. Strategies for reducing the incidence of preterm labor and delivery have focused on educating both physicians and patient about the risks for preterm labor, and methods used to predict preterm labor (David, 1991). Oral health and periodontal treatment is important in the prevention of preterm labor. Periodontitis is a gum disease which associated with increased risk for adverse pregnancy out comes including preterm birth (Todd Smith, 2007).

Use of progesterone: it is used as preventive measure for recurrent preterm birth in women with history of one or more prior spontaneous preterm birth (Meadows, 2009).

Smoking cessation, evidence shows that smoking cessation programs can lower the incidence of preterm birth (Tucker&McGuire, 2004).

In addition to preconception counseling about family planning, nutrition, safe sex techniques, treatment of Sexual Transmitted Diseases (STD),

avoidance of smoking, alcohol, abusive drugs and harmful work condition well decrease the incidence of preterm birth (Goldenberg, 1998).

Chapter 3
Methodology

3.1 Study Design

The type of this study is a hospital – based case - control study which matching one case to two controls with percentage 1/2. It is a comparison study which compare between two groups. Cases that have the condition (preterm delivery) and control which did not have the condition (full term delivery). Case control study is used because it is relatively in expensive and frequently used type of epidemiological studies that can be carried out by small team or individual researcher (Gordis, 1996). Case control study used for studying infrequent events, also it provides cheaper and quicker study of risk factors. The disadvantage of case control study that we cannot calculate: disease incidence, prevalence and relative risk (Gordis, 1996).

3.2 Study Population

Study population constituted from newly delivered women and their infants. For every premature delivery (a case) two full term delivery was taken as a control, and for each premature baby (case) two full term babies (control) were chosen. About 6400 deliveries were enrolled in the study during six months period. The distribution of deliveries were 2885 from Rafidia Hospital ,1040 delivery from Alshaheed Thabet Thabet Hospital and 2482delivery from Alshaheed Ali Hospital .

3.3 Sampling process and Sample size: The sample was chosen conveniently by the meaning of available respondents. A convenient sample size

was chosen of 301 subjects, 100 cases and 201 controls. Each case has been matched to 2 controls. The percentage of cases to control was 1/2.

Weekly visit for the three governmental hospitals was made in the period May 2009 to 31 October 2009. All cases of premature delivery presented at hospital that day were taken as cases, and control were chosen by taking the next two bed full term delivery available at hospital, if they did not meet the inclusion criteria the next bed was taken

3.4 Study period

The period of the study was six months, started from first May 2009 to thirty first October 2009.

3.5 Study setting

The study was carried on three hospitals at Northern part of West Bank, these hospitals are the central governmental hospitals in Nablus, Talkarem and Jenen cities. First, Rafidia Hospital in Nablus, this hospital has large maternity unit and neonatal unit; it has about 6000 deliveries per year. Second, Alshaheed Thabet Thabet Hospital, it is the central hospital in Talkarem city, about 2000 deliveries per year occur in this hospital, also have the central neonatal unit in Tulkarem city. Third, Alshaheed Ali Hospital, this hospital has the central large maternity unit and neonatal unit in Jenen city, about 5000 deliveries per year occur in this hospital .

3.6 Criteria for Inclusion of participants in the study

A- Inclusion criteria for cases and controls

The inclusion criteria for cases are a live preterm birth at the period of the first May 2009 to 31 October 2009. The gestational age for cases is 27 weeks until 36 weeks, calculated according to the last menstrual period (L.M.P.), gestational age was calculated by Nagles rule (L.M.P plus seven day to minus three months), 27 weeks is used as a lower limit because the birth record registration in the governmental hospital is 27 weeks. The inclusion criteria for control are full term delivery started from 37 weeks of gestation to 41 weeks. Negles rule is used for calculation of gestational age for control.

B- Excluded criteria for cases

1. Still birth.
2. Unknown L.M.P.
3. Below 27 weeks gestational age.
- 4- Congenital abnormal babies.

Excluded criteria for control

1. Still birth.
2. Unknown L.M.P.

3. More than 41 week.
4. Congenital abnormal baby.

3.7 The data collection process

The data collection process started on first May 2009, and two months before that were taken for the preparation for the study as Ministry of Health agreement and pilot study. The data was collected by the researcher. Primary data was collected through highly structured interviews and questionnaire was filled by face to face interviews, these interviews were carried directly after delivery while the women stay at hospital. The researcher was sitting in front of the woman asking her the question and tick her answer. The questionnaire was prepared, organized and numbered with serial numbers. The questionnaire used in the study was taken from previous study done at Gaza Strip. The necessary modifications for the questionnaire were done to be applicable for the current study and population. This questionnaire contains seven parts. First part contains personal information, second part socio economic information's, third part contains past obstetrical and gynecological information's, fourth part contains current pregnancy information's, fifth part contains maternal physical information's, sixth part contains antenatal care information's during pregnancy and the seventh part contains new born information's. Secondary data was taken from mothers, files and birth records. These data are : women weight, height, and hemoglobin level before birth. Also new born information's were tak-

en from new born files at neonatal unit such as birth weight, Apgar score, causes of admission to neonatal unit and period of admission .

3.8 Study Method

A case control study was conducted from three governmental hospitals at the North part of the West Bank in Nablus, Tulkarem and Jenin. From 6400 delivery 100 cases of preterm and 201 of full term were chosen. Cases of preterm who are newly delivered with gestational age from 27 weeks to 36weeks. Control consisted of newly delivered women with gestational age between 37 and 41 weeks. Face to face interviews were done with both cases and control, either delivered by normal delivery or caesarean section. Weekly visit was made by the researcher for each hospital, all premature cases and the two next bed full term delivery (control) that presented at hospital that day which meet study criteria were interviewed. Both Cases and control were interviewed in the postnatal unit or neonatal unit directly after delivery. Questionnaire consisted from seven parts were filled by asking the women all questions.

3.9 Ethical Consideration

Consent form was prepared on the first page of the questionnaire, and the participant is allowed to read the consent before the interview. Explanation about the aim of the study done by the researcher and the agreement of the participant was taking before the interviews ,if the participant cannot read the consent was read and explained by the researcher and verbal

agreement is taking. The percentage of respondent was 99% for cases and control.

3-10 Variables

Variables consisted from:

1. Dependent variable (preterm birth)

2. independent variable as :Socio demographic variables which included age, place of delivery ,years of education ,type of family ,No .of rooms No of persons, and monthly income . Obstetric and gynecological variables : Age at marriage, age at first delivery ,gravid ,para, abortion, birth interval, congenital gynecological problem, cerclage, recurrent vaginal infection , urinary tract infection, previous history of preterm birth , family history of preterm birth history of still birth, history of delivery of a baby with congenital abnormalities, and previous delivery by CS . Current pregnancy variables: how pregnancy happened spontaneously or with medical intervention, maternal smoking during this pregnancy , husband smoking, No. of smoked cigarette, preterm premature rupture of membrane placental problems, indication for pregnancy termination , vaginal bleeding during this pregnancy, disorder caused by pregnancy, disorder associated with pregnancy.

Psychosocial variables: social problems, psychological problems, political problems, and violence.

Maternal physical characteristic variables: maternal weight at time of delivery, height and hemoglobin level.

Antenatal care: gestational age at first antenatal visit, number of antenatal visit during current pregnancy

Newborn characteristic: **gestational** age, birth weight, sex APGAR score mode of delivery, neonatal admission to neonatal unit, causes of admission and period of admission .

3.11 Reliability of the study

The study tool used is a questionnaire, the questionnaire was taken from previous study (Risk factors Associated with Preterm birth in the Gaza Strip)

The study which done in Gaza Strip used this questionnaire and the Cronbach alpha test was found to be 80%. Modification on the questionnaire was done to be suitable for the current study population, then adaptation of the questionnaire in this study was done.

Piloting of the study done for 10 cases and 10 controls, and after that some questions were modified to be suitable for the current study.

3.12 Limitations of the Study

The researcher met many obstacles during data collection. First, difficulty in catching the cases because the time clients staying at hospital was very short, they were discharged from hospital few hours after delivery. Second, the researcher is working alone, and face many barriers during transportation from Nablus to Tulkerm and to Jenen . Third, sometimes the cases and control presented at hospital not meeting the study criteria, some data is not registered in the medical record. Finally it is worth to mention that closure of neonatal unit in Jennen on August was done due to septicemia and premature cases were referred to Rafidia hospital ,also maternity unit in Tulkarem was closed on October because of raining , also the delivery cases were referred to Rafidia hospital , so these conditions result in an increased number of cases and control taken from Rafidia hospital .

Chapter 4
Result of the study

4.1 Introduction

A hospital based case control study conducted at three governmental hospitals in three Palestinian cities at North of West Bank, Nablus ,Jenen and Tulkarem.The study started on first May 2009 to 31st October2009. The aim of this study is to identify risk factors of preterm birth among Palestinian women. A case control study always has some sort of bias , what strengthens this study is face to face interviews were carried out directly after delivery while women at hospital and the interviews were made by individual researcher. The researcher anticipations from the study about risk factors of preterm birth that Preterm birth is mainly related to: previous history of preterm delivery, family history, genitourinary tract infection, disorder caused or associated by pregnancy as pregnancy induced hypertension, preeclampsia and eclampsia, gyna-obstetric conditions as uterine, cervical ,and placental abnormalities as placenta previa and abruption placenta , vaginal bleeding during pregnancy, the existence of medical indication for preterm delivery, multiple pregnancy as twins and triplet, maternal habits like smoking , and psychological problems.

4.2 Data Analysis

Statistical analysis were performed using SPSS version 14, Fishers exact test and Chi-Square test were used to evaluate overall associations as appropriate. Multiple Regressions were performed to assess the unadjusted association (sig) and 95% CI between exposure and the outcome. Predic-

tion with a p-value for the parameter estimate in unvaried analysis of less than 0.05 were included as risk factors.

4.3 Study Findings

Table 4-1: Regression table of 15 risk factors of preterm birth.

variable	B	Std_ error	Beta	t	Sig.
1.nuclear family2.extended family	-9.488E-02	.057	-.075	-1.667	.097
Did you have any congenital gynecological problem:1.yes2.no	-.101	.086	-.057	-1.182	.238
Did you have previous history of preterm delivery:1.yes2.no	.179	.066	.132	2.712	.007
Did you have family history of preterm delivery:1.yes2.no	8.857E-02	.066	.062	1.337	.182
Had you delivered previously by cs?:1.yes2.no	-9.344E-02	.060	-.090	-1.551	.122
If yes an average of smoked cigarette	-1.990E-02	.057	-.016	-.350	.727
Do you have a preterm rupture of membrane	.270	.097	.252	2.776	.006
If yes please specify number of days or hours if yes tick the appropriate	9.508E-02- 6.804E-02	.061 .041	.141 -.093	1.569 -1.669	.118 .096
Do you have an indication of pregnancy termination	.472	.073	.407	6.446	.0001

Do you have a vaginal bleeding during this pregnancy?	2.178E-02	.071	.016	.308	.759
Do you have any disorder associated with this pregnancy	.141	.057	.120	2.452	.015
Do you have any disorder caused by this pregnancy?	-5.250E-02	.065	-.044	-.803	.423
Have you been exposed to any psychological problem during this pregnancy?	6.185E-02	.058	.049	1.069	.286
Height in centimeter	-.346	.190	-.084	-1.823	.069
Types of this pregnancy	.415	.084	.230	4.919	.0001
Mode of delivery	5.511E-02	.062	.057	.896	.371

4.3.1 Result of the Hypothesis

After multiple regression of data analysis of a case control study , 100 cases and 201 control with a percent 1\2 among Palestinian women at North of West Bank. The main risk factors of preterm birth identified by this study are:

1-Previous history of preterm birth, (P: 0.007), 95%CI (.049-.300).

2- Preterm premature rupture of membrane (P: 0.006), 95% CI (.079- .462).

3-The existence of medical indication for pregnancy termination (P: 0.0001) 95%CI (.328- .617).

4- Disorder associated with pregnancy (P: 0.015), 95% CI (.028-.254).

5-Multiple pregnancy such as twins, triplet, and quadruplet(P: 0.0001), 95%CI (.249- .581).

Hypothesis one : There is no relation between socioeconomic status and preterm birth .This null hypothesis is accepted because the result of socio economic data as family income ,house hold characteristics ,level of education found to be not significant ,the only significant social factor is living in a nuclear family(P:0.030).

Hypothesis two :There is no relation between previous history of preterm birth, family history and preterm birth .We reject this hypothesis because the result of the study shows significant relationship between previous history of preterm birth and preterm birth (P : 0.007) , and also family history of preterm birth found to be significant (P: 0.003).

Hypothesis Three: There is no relation between Preterm Premature Rupture of Membrane (PPROM) and Preterm birth. This null hypothesis is rejected because there is a significant relationship between PPRM and preterm birth (P: 0.006).

Hypothesis four: There is no relation between medical intervention and preterm birth. This null hypothesis is rejected because the result of the

study shows significant relationship between medical intervention and pre-term birth (P: 0.0001).

Hypothesis five: There is no relation between medical disorder associated with pregnancy or caused by and preterm birth.

This null hypothesis is rejected because the result of the study shows that there is significant relationship between preterm birth and disorder associated with pregnancy (P: 0.015), and also disorder caused by pregnancy found to be significant (P: 0.0001).

Hypothesis six: There is no relation between multiple pregnancies and pre-term birth .This null hypothesis is rejected because the result of the study shows significant relationship between preterm birth and multiple pregnancies, (P: 0.0001). Conclusion: The study result accepts the first hypothesis and rejects the other five hypotheses.

4.3.2 Result of Demographic Data

Socio demographic data shows that there is no relation between maternal age and preterm birth , 3% of cases age less than 18 years , 77% of cases age between 18 -34 and 20% of cases age \geq 35.

The cases divided according to place of delivery as : 68 % of cases were from Rafidia Hospital, 19 % from Alshaheed Ali Hospital and 13% from Alshaheed Thabet Thabet Hospital .

Years of education: 74% of cases and 66.1% of control are from middle level of education (6-12) years, (P: 0.334).

Type of family : 90% of cases and 80% of control are belonged to nuclear family, while 10% of cases and 19 %of control are from belonged to extended family so nuclear family considered risk factor for preterm birth (P :0.030).

Number of persons in family and number of rooms in house show no relation with preterm birth.

Monthly Income : found to be not significant risk factor, 33% of cases and 22.8 % of control have very low income (less than 1000 (NIS)), 41 %of cases and 51% of control income from 1000 – 2000(NIS) and 24 % of cases, 24.8 % of control income more than 2000 (NIS) . Total income percentage of less than 1000 (NIS) is 26.2%, (P: 0.232).

Table 4-2:The Risk of Preterm Birth in relation to Socio demographic factors , north West Bank 2009:

Variable	Case	case%	control	Control %	Total	Total %	P-value
Age in years							0.437
<18	3	3	2	0.9	5	1.6	
18-25	37	37	90	44.7	127	42.1	
26-34	40	40	78	38.8	118	39.2	
35-40	17	17	28	13.9	45	14.9	

41-45	3	3	3	1.4	6	1.9	
Place of delivery							
Rafedia	68	68	135	67	203	67.4	0.501
Tulkarm	13	13	19	9.4	32	10.6	
Jenine	19	19	47	23	66	21.9	
Years of education							
<6 years	3	3	11	5.4	14	4.6	0.334
6-12	74	74	133	66.1	207	68.7	
>12	23	23	57	28.3	80	26.5	
Type of family							
Nuclear	90	90.0	161	80.0	251	83.0	0.030
Extended	10	10.0	40	19.9	50	16.6	
No. of rooms in the house							
1	8	8.0	14	6.96	22	7.3	0.920
2-3	57	57.0	113	56.2	170	56.47	
>3	35	35.0	74	36.8	109	36.2	
No. of persons living in the house							
2-3	23	23	34	16.9	57	18.9	0.821
4-6	41	41	100	49.75	141	46.8	
>6	36	36	67	33.3	103	34.2	

Monthly income (NIS)							
<1000	33	33	46	22.8	79	26.2	0.232
1000-1500	27	27	59	29.3	86	28.5	
1600-2000	16	16	46	22.88	62	20.5	
>2000	24	24	50	24.8	74	24.58	

Socio demographic data shows that there is no relation between maternal age and preterm birth, 3% of cases age less than 18 years , 77% of cases age between 18 -34 and 20% of cases age ≥ 35 .

Table 4 -3: Risk of Preterm Birth in relation to Reproductive History

Variable	Case	case%	control	control%	Total	Total %	P-value
Age at Marriage							
<18	28	28	58	28.8	86	28.57	0.988
18-25	65	65	129	64.1	194	64.4	
>25	7	7	14	6.9	21	6.97	
Age at the first delivery							
<18	17	17	25	12.4	42	13.9	0.480
18-25	70	70	153	76.1	223	74.0	
>25	13	13	23	11.4	36	11.96	
Gravida							
1-3	48	48	112	55.7	160	53.1	0.246
4-6	31	31	61	30.3	92	30.56	
>6	21	21	28	13.9	49	16.2	
Para							
1-3	51	51	122	60.6	173	57.4	

4-6	35	35	64	31.8	99	32.89	0.119
>6	14	14	15	7.4	29	9.6	
Previous abortion							
No	65	65	140	69.6	205	68.1	0.415
yes	35	35	61	30.3	96	31.8	
The interval between the last Two pregnancies							
No	30	30	44	21.8	74	24.5	0.484
<6 months	3	3	9	4.4	12	3.98	
6-12m	16	16	39	19.4	55	18.2	
12-18m	15	15	40	19.9	55	18.2	
>18	33	33	69	34.3	102	33.8	

Age of marriage and age of first delivery found to be not significant risk factor (P: 0.988, P: 0.480) respectively. Number of pregnancy (gravida), number of delivery(Para), and number. of abortion show no significant relationship with preterm birth (P:0.246 , P:0.119 , P:0.415 respectively) . Birth interval between the last two pregnancy is also not significant risk factor, 3% of cases and 4.4% of control have birth interval of less than 6

months , 33 % of cases and 34.3 % of control have birth interval more than 18 months .(P :0.484).

Table 4-4: Risk of Preterm Birth in relation with Current Pregnancy Factors

Variable	Case	Case %	control	Control %	Total	Total %	P-value
Do you have any congenital- Gynecological problems							
Yes	13	13	10	4.97	23	7.6	0.014
No	87	87	191	95.0	278	92.3	
History of cervical cerclage							
Yes	13	13	5	2.4	18	5.98	Fisher extract 0.001
No	87	87	196	97.5	283	94.0	
Recurrent infection of cervix or vagina							
Yes	55	55	81	40.2	136	45.1	0.016
no	45	45	120	59.7	165	54.8	
History of UTI							
Yes	55	55	90	44.7	145	48.1	0.095

no	45	45	111	55.2	156	51.8	
Previous History of preterm delivery							
Yes	26	26	16	7.9	42	13.9	0.0001
no	74	74	185	92.3	259	86.0	
Family History of preterm delivery							
Yes	19	19	17	8.45	36	11.96	0.003
no	79	79	184	91.5	263	87.3	
History of still birth							
Yes	10	10	22	10.9	32	10.6	0.802
no	90	90	179	89.0	269	89.3	
Delivered baby with congenital abnormalities							
Yes	8	8	10	4.97	18	5.9	0.297
no	92	92	191	95.2	283	94.0	

Previous history of preterm birth found to be significant risk factor for preterm birth (P : 0.000), and family history of preterm birth (P : 0.003)
 Recurrent vaginal infection (P: 0.016), congenital gynecological problems (P : 0.014), and cervical cerclage (P : 0.001) are significant risk factors .In contrast UTI is not significant risk factor for preterm birth (P : 0.095),

also history of still birth (P: 0.802) , and history of delivery of baby with congenital abnormalities (P:0.297), are not significant risk factor.

Table4-5: Risk of Preterm Birth in relation to Gina obstetric History, North West Bank 2009

variable	Case	Case %	control	Control %	Total	total%	P-value
Past delivery with CS							
Yes	38	38	50	24.8	88	29.2	0.018
no	62	62	151	75.1	213	70.7	
This pregnancy happened							
Spontaneously	90	90	193	96	283	94.0	0.072
With medical intervention	9	9	8	3.98	17	5.6	
Preterm rupture of membrane							
Yes	29	29	38	18.9	67	22.2	0.015
no	69	69	163	81.0	232	77.0	
Did your doctor inform you that you have placental problem during this pregnancy							

Yes	16	16	2	0.9	18	5.9	0.0001
No	84	84	199	99.0	283	94.0	
If there are placental problems							
Placenta pre- via	10	10	1	0.49	11	3.65	0.0001
Abruption placenta	7	7	1	0.49	8	2.65	
No placental abnormalities	83		199	99.0	282	93.6	
Do you have indication for pregnancy termination							
Yes	52	52	11	5.4	63	20.9	0.0001
No	48	48	190	94.5	238	79.0	
The indication for pregnancy termination were							
Eclampsia and preec- lampsia	18	18	7	3.48	25	8.3	0.0001
D.M	3	3	1	0.49	4	1.3	

Anti partum hemorrhage	28	28	3	1.49	31	10.29	
No indication	51	51	190	94.5	241	80.0	
Do you have vaginal bleeding during this pregnancy							
Yes	25	25	17	8.4	42	13.95	0.0001
No	75	75	184	91.5	259	86.0	

Most of Gina obstetric conditions found to be significant risk factor for pre-term birth. These conditions as: Previous delivery by caesarian section (CS) (P: 0.018). How pregnancy happened spontaneously or with medical intervention is not significant risk factor, 90% of cases and 96% of control pregnancy is happened spontaneously (P: 0.072). Placental problems as placenta previa and abruption placenta found to be significant risk factor for preterm birth (P: 0.000).The existence of an indication for pregnancy termination found to be significant risk factor (P: 0.0001). These indications are: Preeclampsia and eclampsia responsible for 18 % , Diabetes 3% , and ant partum hemorrhage 28 % . Vaginal bleeding during pregnancy found to be significant risk factor specially mid trimester vaginal bleeding (P: 0.0001).

Table 4-6: Risk of Preterm birth in relation to Disorder Caused by Pregnancy, North West Bank 2009

Variable	Case	Case %	Control	Control %	Total	Total %	P- value
Do you have any disorder caused by pregnancy							
Yes	31	31	26	12.9	57	18.9	0.0001
No	69	69	175	87.0	244	81.0	
These disorders are							
Pregnancy induced hypertension	22	22	21	10.4	43	14.2	0.0001
Eclampsia	1	1	1	0.4.9	2	0.66	
Gestational diabetes	4	4		0	4	1.3	
Others	5	5	3		8	2.6	

Disorder caused by pregnancy found to be significant risk factor of preterm birth (P: 0.0001). These disorders are: Pregnancy induced hypertension responsible for 22 % of preterm birth, gestational Diabetes 4% and other factor 5% .

Table 4-7: Risk of Preterm birth in relation to Disorder Associated with Pregnancy , North West Bank 2009.

Variable	Case	Case%	Control	Control %	Total	Total %	P-value
disorder associated with pregnancy							
Yes	37	37%	23	11.4%	60	19.9%	0.0001
no	62	62%	178	88%	240	79.7%	
If there is a disorder associated with pregnancy these disorder							
UTI	9	9	4	1.9	13	4.3	0.0001
Vaginal infection	7	7	1	0.49	8	2.6	
anemia	9	9	12	5.9	21	6.9	
DM	7	7	3	1.4	10	3.3	
Cardiac disease	0	0	2	0.99	2	0.66	
Renal disease	4	4	0	0	4	1.3	
other	3	3	3	1.49	6	1.9	
No disorder	61	61	176	87.5	237	78.7	

Disorder associated with preterm birth found to be significant risk factor for preterm birth (P: 0.0001). These disorders divided among cases as: (UTI) 9%, vaginal infection 7%, anemia 9% renal disease 4%, and other 3%.

Table 4-8: Risk of preterm birth in relation to psychosocial problems, North West Bank, 2009

Variable	Case	case%	Control	control %	Total	total%	P-value
Have you been exposed to any social problems							
Yes	12	12	12	5.97	24	7.9	0.06
No	88	88	189	94.0	277	92	
Have you been exposed to any psychological problems during this pregnancy							
Yes	23	23	28	13.9	51	16.9	0.04
No	77	77	173	86.0	250	83.	
Have you been exposed to stress related to political situation							
Yes	10	10	12	5.97	22	7.3	0.206
No	90	90	189	94.0	279	92.6	
Have you been exposed to any physical violence or trauma during this pregnancy							
Yes	6	6	3	1.49	9	2.99	Fisher 0.064
No	94	94	198	98.5	292	97.0	

This table shows that there is association between psychological problem and preterm birth (P : 0.04) .Social problems found to be not significant (P: 0.06).

Stress due to political problems found to be not significant (P: 0.206), 10% of cases and 5.9% of control face political problems.

Physical violence found to be not significant risk factor for preterm birth (Fisher test 0.064), 6% of cases are face physical violence and 1.49 % of control.

Table 4-9: Association between maternal physical characteristic and preterm birth, North West Bank 2009

Variable	Case	Case %	Control	Control %	Total	Total %	P-value
Height in centimeter of the mother							
<150	4	4	-		4	1.38	0.012
>150	96	96	201	100	297	98.6	
Wt of the Mother							
<60kg	16	16	19	9.4	35	11.6	0.329
60-70	24	24	67	33.3	91	30.2	
>70	59	59	115	57.1	174	57.0	
Hemoglobin level at the time of delivery							
<11	40	40	79	39.3	119	39.5	1.000
>11	60	60	122	60.6	182	60.46	

The only significant risk factor in this table is maternal height less than 150 cm (P: 0.012) 4% of cases height are less than 150 cm .Maternal level of hemoglobin shows no significant relation with preterm birth (P: 1.00) .

40% of cases have hemoglobin level less than 11.0 (anemia) and 39.3 % of control . Maternal weight found to be not significant (P : 0.329) , 16% of cases weight less than 60 Kg and 9.4% of control ,59% of cases weight more than 70 Kg and 57% of control .

Table 4-10:Association between antenatal care and preterm birth

Variable	Case	Case %	Control	Control %	Total	Total %	P-value
Total No. of antenatal care visits							
<5	9	9	18	8.9	27	8.9	0.634
5-10	71	71	133	66.1	204	67.7	
>10	20	20	50	23.48	70	23.25	
Gestational age at the first prenatal visit							
1-3	93	93	184	91.5	277	92.0	0.822
>3	7	7	17	8.45	24	7.9	

Antenatal care shows no significant relation with preterm birth , 93% of cases have the first antenatal visit in the first three months, and 91% of control(P :0.634). In relation to No of visits, 71% of cases and 66% of control have 5-10 antenatal visits during pregnancy (P :0.822).

Table 4.11: The risk of preterm birth in relation with Smoking, North of West Bank 2009

variable	Case	Case %	Control	Control%	Total	Total %	p- value
Maternal cigarettes smoking							
yes	7	7	5	2.4	12	3.98	Fisher extract 0.113
no	93	93	196	97	289	96.0	
<10cigarettes	4	4	5	2.48	9	2.99	0.04
>10cigarettes	3	3	0	0	3	0.99	
Does husband smoking							
yes	62	62	117	58.2	179	59.4	0.528
no	38	38	84	41.7	122	40.5	

This table shows that maternal smoking more than 10 cigarettes is a significant risk factor for preterm birth (P: 0.04). Percentage of smoking among cases is 7% and control 2.4 %.

Husband smoking is not significant risk factor; percentage of husband smoking is 62% of cases and 58.2% of control.

Table 4- 12 : Neonatal outcome of preterm birth.

Variable	Case	Case%	control	Control %	Total	Total%	P-value
Type of this pregnancy							
single	84	84	195	97.0	279	92.6	0.0001
Twins or triplet	16	16	6	2.9	22	7.3	
Birth WT. in grams							
<1500	12	12	-		12	3.9	0.0001
1500-2499	58	52	10	4.9	68	22.59	
2500-3999	28	28	173	86.0	201	66.7	
4000 or more	2	2	18	8.9	20	6.6	
Mode of delivery							
Spontaneous	39	39	149	74.1	188	62.4	Fisher 0.0001
Instrumental or CS	61	61	52	25.8	113	37.5	
Apgar score							
<5	33	33	6	2.98	39	12.9	

5-7	53	53	39	19.4	92	30.5	0.0001
8-10	14	14	156	77.6	170	56.4	
Fetal sex							
Male	47	47	98	48.7	145	48.1	0.774
Female	53	53	103	51.2	156	51.8	

Neonatal outcome of preterm birth shows that multiple pregnancy as twins triplet ,and quadruple are significant risk factors for preterm birth (P :0.0001) . Birth weight: 12% of preterm babies are very low birth weight of less than 1500 gm and 58 %are low birth weight less than 2500gm. Mode of delivery: spontaneous preterm birth 39 % and 61%of premature babies delivered by CS or instrument. APGAR Score: 33% of preterm babies have APGAR score less than 5, and 2% only of control .Fetal sex: 47% of premature babies male and 53 % female.

Table 4- 13: Causes and duration of admission to neonatal care unit, North West Bank, 2009

Variable	Case	case%	control	control %	Total	total%	P-value
History of infant admission to the neonatal intensive care							
Yes	94	94	26	12.9	120	39.8	0.0001
No	6	6	175	87.6	181	60.1	
Causes of admission to the neonatal intensive care							
RDS	60	60	16	7.96	76	25.2	0.000
Immature	22	22	-		22	7.3	
LBW	6	6	2	0.99	8	2.6	
Hypoglycemia	2	2	-		2	0.6	
Birth asphyxia	3	3	1	0.49	4	1.3	
No admission	5	5	182	90.5	187	62.1	
The period of admission to neonatal							
1-3 days	16	16	21	10.4	37	12.2	

3-6	25	25	1	0.49	26	8.6	0.0001
7-14	30	30	-		30	9.96	
>14	18	18	-		18	5.9	

94% of premature babies are admitted to neonatal unit, 60% of them due to respiratory problems (RDS) (P : 0.0001) . Prematurity is the major cause of long period admission to neonatal care unit.

4.4 Summary of Study Findings

Socio demographic data shows no relation between maternal age and pre-term birth also age at marriage and age at the first delivery found to be not significant variable in relation with preterm delivery. Place of delivery 68 % of cases are from Rafidia Hospital in Nablus, 13% from Alshaheed Thabet Hospital in Talkarem and 19% from Alshaheed Ali Hospital in Jenen .Years of education: 74% of cases and 66.1% of control are from middle level of education (6-12)years (P :0.334).Type of family : 90% of cases and 80% of control are living in a nuclear family while 10% of cases and 19 %of control are living in extended family so nuclear family considered a risk factor (P : 0.030) Number of persons on family and number of house rooms show no significant relation with preterm birth .Monthly income also found to be not significant ,33% of cases and 22.8 % of control have very low income less than 1000 (NIS) and 24 % of cases ,24.8 % of control income more than 2000 (NIS) (P :0.232) .

Previous obstetric history: number of pregnancy (gravid), number of delivery (Para), and No. of abortion show no significant relationship with preterm birth .

Birth interval between the last two pregnancies, 3% of cases and 4.4% of control have birth interval of less than 6 month , and 33 % of cases, and 34.3 % of control have birth interval of more than 18 month (P : 0.484) Congenital gynecological problems of uterus or cervix have significant relationship with preterm birth (P : 0.014) ,and history of cervical cerclage also have significant relation with preterm birth (P : 0.001) . Recurrent infection of vagina or cervix found to be significant (P : 0.016), presence of urinary tract infection found to be not significant (P : 0.095). Previous history of preterm birth is significant risk factor (P: 0.007). Family history of preterm birth have significant relation with preterm birth (P: 0.003) . History of still birth and history of delivery of baby with congenital abnormalities found to be not significant .Previous delivery by CS found to be significant risk factor(P : 0.018) . How pregnancy happened spontaneously or with medical intervention is not significant risk factor 90% of cases and 96% of control are happened spontaneously (P : 0.072).

Maternal smoking more than 10 cigarette found to be significant risk factor for preterm birth (P : 0.04). Placental problems placenta previa and abruption placenta are significant risk factor for preterm birth (P: 0.0001) The existence of an indication for pregnancy termination found to be significant risk factor for preterm birth, (P: 0.0001) mainly due to eclampsia and

preeclampsia. Vaginal bleeding during pregnancy found to be significant risk factor for preterm birth (P: 0.0001). Also disorder associated with pregnancy (P: 0.0001), and disorder caused by pregnancy are significant risk factors for preterm birth (P : 0.0001) . Psychological problems during pregnancy found to be significant (P : 0.04). Maternal high of less than 150 cm is a significant factor for preterm birth (P : 0.012) . Antenatal care shows no significant relationship with preterm birth, 93% of cases and 91% of control started antenatal visit at 1-3 month 71% of cases and 66.1 % of control have from (5-10) antenatal visit during pregnancy.

Neonatal outcome: Mode of delivery for cases is 39% spontaneous and 61 % by CS or by instrument . Apgar score: 33% of premature babies have Apgar score less than 5 and 2.9% of control.

Multiple pregnancy as twins triplet is significant risk factors for preterm birth (P: 0.0001).

Birth weight of less than 1500 gm found to be significant, 12% of premature babies are Very Low Birth Weight (VLBW) and 58% of preterm babies have birth weight from 1500 – 2500 Low Birth Weight (LBW). Fetal sex shows no significant relationship with preterm birth, 47% of cases male and 53% female.

Admission to Neonatal Unit: 94% of preterm babies are admitted to neonatal unit, 60% of them due to RDS . The period of admission depends on

gestational age ,birth weight and severity of respiratory problems ,30 % of them stay from 7-14 days and 18 % stay for more than two weeks .

Chapter 5

Discussion

5.1 Introduction

Risk factors of preterm birth are combination of multi factorial. The risk of preterm birth is increased when combination of two factors or more present. Many risk factors of preterm birth are identified by this study. These risk factor are: living belong to nuclear family , having previous history of preterm birth , family history of preterm birth, previous delivery by caesarean section , multiple pregnancy ,congenital gynecological problem in cervix ,uterus and placental problems, maternal smoking more than 10 cigarettes ,vaginal and cervical infection , Preterm Premature Rupture Of Membrane (PPROM), vaginal bleeding during pregnancy , medically indicated PTB, disorder caused by pregnancy mainly hypertensive disorder, disorder associated with pregnancy as: Genitourinary tract infection, Diabetes, and renal disease. Psychological problems during current pregnancy, short stature, mode of delivery by caesarean section.

5.2 Discussion of Socio Demographic Factors in relation to preterm birth.

Age : This study shows that there is no significant relationship between age and preterm birth (P: 0.437) , also age of marriage and age of first delivery found to be not significant .Although Abu Hamed (2003) found in her study in Gaza Strip that maternal age ≥ 35 years was significant risk factor, another study in Saoulis in Barazel found that maternal age below 18 years is a risk factor for preterm birth (Maria de 2004). The age of

marriage in West Bank increased so the risk of preterm birth related to teenage pregnancy decreased.

Family Income: Family income and household factors found to be not significant risk factor for preterm birth. Although in Brazil family income equal to or less than minimum wage /month and delivery at public hospital were a risk factors of preterm birth (Maria de ,2004). A study done in Iraq found that the main determinant of preterm birth in Iraq was low socioeconomic status (AL Dabbagh, 2006) . Socioeconomic data in this study as, income, number of person. And number of rooms at house show no significant relationship with preterm birth . The possible cause that the study is carried out at public hospitals, the women are from the same socioeconomic class with no social disparities . The income of 33% of cases and 22.8 of control is less than 1000 (NIS), this category considered below level of poverty, at the same time both cases and control have the same household characteristics.

Level of education : Level of education in this study found to be not significant risk factor , 3% of cases and 5.4% of control have level of education less than 6 years which considered according to WHO as illiterate , 74% of cases and 66.1%control are from middle level of education (6-12years). In contrast with my study a cohort study done about large social disparities and spontaneous preterm birth in Transitional Russia increased risk of preterm delivery found in women with lower level of education and stress (Grijibovski ,et al ,2005).

Nuclear Family : The only significant social risk factor found in this study is nuclear family (P: 0.030) , the interpretation of this result is that Palestinian society is moving towards nuclear family with loss of psychological and social support which existed in the extended family. **psychological Problems :** Stress during current pregnancy found to be a significant risk factor in this study (P : 04) .Maternal stress modulate the women susceptibility to preterm labor ,maternal stress may act via neuroendocrine pathway that activate the maternal –placental – fetal endocrine system. Scandinavian studies suggested an association between maternal stress life event and preterm delivery (Deirdre, et al, 2007). Stress become more significant when it is combined with other risk factors like infection, violence, and substances abused like smoking, alcohol and drug addiction.

5.3 Discussion of Reproductive History of Preterm Birth

Gravidity , parity , and number of abortion are not significant risk factors of preterm birth , in the other hand Maria de(2004) in Brazil found in her study that prim parity is a risk factor of preterm birth and in Transitional Russia, multiparty found to be risk factor for preterm birth .It might be large sample size and more specific cases is recommended to identify these risk factors .also abortion found to be significant in many study. Induced abortion found to be significant in European countries (Ancel et al, 2004). Further more in Vietnam two or more spontaneous abortion found to be significant risk factor for preterm birth (Nguyen, 2004). It is worth to say that using drugs therapy for induced abortion instead of forcible dilata-

tion of cervix is decreased the risk of preterm birth from induced abortion in West Bank.

Birth Interval: The interval between the last two pregnancy found to be not significant risk factor for preterm birth .In the other hand study done in United Arab Emirate found that the inter pregnancy interval risk factor is causal and its modification would reduced the risk of preterm birth .In order to identify this risk factor, specific sample from women who have two birth or more is recommended.

History of Still Birth : History of still birth is not significant risk factor (P: 0.802),but in Gaza Strip found to be significant risk factor this result interpretive is that prenatal mortality on 2009 decreased , at the same time IMR in Gaza Strip is higher than IMR in West Bank .

History of Delivery of a baby with Congenital Abnormalities: Found to be not significant risk factor (P : 0.297) , these babies have high mortality rate, it is responsible for 27.8%from Infant Mortality Rate in Palestine (UNRWA ,2008).

5.4 Discussion of Hypotheses of the study

Hypothesis one: There is no relation between socio economic status and preterm birth. The result of the study shows that there is no significant relationship between low socioeconomic status and preterm birth , the only significant social factor is living in nuclear family, other socio economic factors which discussed in demographic part as income house hold fac-

tors and level of education found to be not significant ,so the null hypothesis is accepted (see the discussion of socio-demographic variables).

Hypothesis Two: There is no relation between previous history of preterm birth family history of preterm birth and preterm birth.

Previous history of preterm birth found to be significant risk factor for preterm birth (P: 0.007). our study is consistent with a study conducted in Alabama which show that women who had a spontaneous preterm birth (sp PTB)were more likely to have a spontaneous preterm birth in the previous pregnancy while women with indicated preterm birth (IPTB)were significantly more likely to have had a previous indicated preterm birth, so sp PTB and IPTB are strongly repetitive (Robert ,et al ., 2006). Prior preterm birth is identified as a risk factor of preterm birth among Taiwanese women(Chung –chin, 2007), and also among Palestinian women in Gaza Strip(Abu Hamad 2003). Previous Preterm birth found to be a significant risk factor in almost studies about risk factors. The result of the study supports the hypothesis that previous history of preterm birth is a significant risk factor for preterm birth.

Family history of preterm birth: found to be significant risk factor (P: 0.003). 19% of cases have had a family history of preterm birth and 8.45 % of control. Studies show that Preterm birth results from a complex mix of genetic susceptibility, environmental factors and behaviors .Analysis of 1.million births in Sweden research found that sister of a

women who had delivered preterm had an 80% percent higher risk of early delivery ,Similarly there was an increased risk among women whose mothers had been born premature delivery than woman without a similar family history (Writes et al, 2010) .

Lessa (1994) found that the risk factors for spontaneous preterm birth were a previous preterm birth and consanguinity.

Genetic studies have recently begun to elucidate the role of genetic variant in preterm birth. A study done among Caucasian women support the hypothesis that mitochondrial genome polymorphisms may play a significant role in preterm birth through interaction with smoking. (Digna et al, 2008). Researchers do not know precisely how genes may influence preterm risk , and genes that regulate the condition of the uterus during pregnancy. More studies are needed to pinpoint which genes play a role in preterm delivery (Writes, &William, 2010). All these risk factors as previous history of preterm birth, family history of preterm birth show that genetics play role in the etiology of preterm birth among Palestinian women .Specific genetic research is recommended on these women with recurrent preterm birth and have family history of preterm birth.

Hypothesis Three: There is no relation between Preterm Premature Rupture of Membrane (PPROM) and preterm birth.

The result of the study support the hypothesis that Preterm premature rupture of membrane (PPROM) is significant risk factor for preterm birth (P:

0.006). Preterm premature rupture of membrane contributes to about 29% of cases and 18.9% of control from preterm birth in this study. Campbell (2005) concluded in her study that the presence of rupture membrane was the best predictor of preterm birth within 48 hours. Another study found that rupture of membrane is significant risk factor among Taiwanese women (Chung –Chin, 2007). The long interval between rupture membrane and delivery increased the risk of microbial invasion of the amniotic cavity so recurrent vaginal and cervical infection found to be significant risk factors in this study (Fisher exact test 0.001). Inflammation is associated with higher incidence of preterm birth, also data supported an association between infection, Inflammation, and cerebral palsy (Jacobsson , 2000).

Preterm premature rupture of membrane (PPROM) and infection are two risk factors that are related to each others. Infection can weaken the fetal membrane and lead to PROM, at the same time PROM increased the risk of sending genital tract infection, and both of them increased the risk of preterm delivery through inflammation process.

Hypothesis four: There is no relation between Medical intervention and preterm birth.

The result of the study support the hypothesis that the existence of medical indication for pregnancy termination is a significant risk factor for preterm birth (P: 0.0001). Indicated preterm delivery is referred to planned preterm birth with caesarian section(C.S) or induction of labor , it is used

to describe circumstances were preterm birth is prefer management (Deirdre & Murphy, 2007). The indications for pregnancy termination in this study classified as: Diabetes 3%, Eclampsia and preeclampsia are responsible for 18 % of cases ,and Ant partum hemorrhage 28% . In a study in Nova Scotia found that sever preeclampsia was strongly associated with risk of preterm birth due to medical intervention.

Anti partum hemorrhage is mainly due to placenta previa and abruption placenta, sometimes these conditions presented with massive anti partum hemorrhage and fetal distress that recommended urgent medical intervention to save life of both mother and baby .In these conditions sometimes emergency delivery is happened ,we cant stop or delay delivery for administration of corticosteroid therapy so premature babies in this category have high mortality and morbidity due to respiratory problems and intracranial hemorrhage.

Placental problem found to be significant risk factor (P: 0.000). A retrospective cohort study in Missouri found that the maternal –fetal condition that necessitated iatrogenic preterm delivery included preeclampsia, placenta abruption, placenta previa , un explain vaginal bleeding ,pre gestation and gestational Diabetes . Previous delivery by C.S found to be significant risk factor for PTB (P: 0.018). Previous C.S also found to be significant in Abu Hamad study at Gaza Strip. The number of preterm C.S performed regardless of gestational age has increased so this increased the incidence of indicated preterm birth.

Hypothesis five: There is no relation between Disorder associated with pregnancy or caused by pregnancy and preterm birth.

Preliminary data support this hypothesis (P: 0.015). Disorders associated with pregnancy in this study are classified as: Diabetes responsible for 7% of cases, Genito urinary tract infection 16% anemia 9% and renal disease 4%. Disorder caused by pregnancy found to be significant (P: 0.000), the main disorder is hypertensive disorder which responsible for 22%. Most of these disorders need medical intervention because these cases affect both fetal and maternal condition and result in medically indicated preterm birth. A study done about preeclampsia and preterm birth subtypes in Nova Scotia found that sever preeclampsia was strongly associated with the risk of very preterm birth and moderately preterm birth (Anth & Savitiz, 1997). Another study concluded that placenta previa, placenta abruption and maternal hypertension were significantly associated with preterm delivery (Benjamin et al, 2008). Maternal illness as Diabetes mellitus and hypertension can alter or limit the placental delivery of oxygen and nutrient to the developing fetus possibly resulting in fetal growth restriction and result in increased the risk indicated preterm birth (Benjamin et al, 2008). The result of the study support the hypothesis that disorder associated with pregnancy or caused by pregnancy is a significant risk factor for preterm birth.

Hypothesis six: There is no relation between multiple pregnancy and preterm birth.

Multiple pregnancy as (twins, triplet, and quadruplets) found to be significant risk factor for preterm birth (P: 0.0001), and it is responsible for 16 % of preterm birth in this study. Twins pregnancy carry a high risk of spontaneous preterm birth compared with singleton pregnancy (Norman JE., 2009). Kurdi Ahmad found in his study in Saudi Arabia, 2000- 2001 that the over whole incidence of twins was 14 per 1000 birth and premature labor in multiple pregnancy 7 times greater than singleton. Multiple pregnancy cause over distention of uterus and decreased level of progesterone which may lead to preterm labor, and male presentation which indicate caesarean section. A study in Canada concluded that the recent increase in preterm birth in Canada is largely attributed to changes in frequency of multiple births, obstetric intervention and use of ultrasound based estimate of gestational age (Joseph et al, 1998). Risk factors for preterm birth are interrelated and overlapping each other. The researcher concluded that hypothesis 4,5 and 6 are related to each other . We found that medical intervention increased due to disorder associated or caused by pregnancy, also multiple pregnancy increased the rate of indicated and spontaneous preterm birth. We concluded that iatrogenic delivery is the leading cause of preterm delivery in North West Bank.

5.5 Discussion of Congenital Gynecological problems in relation to preterm birth

Presence of congenital gynecological problem as bicornuate uterus and cervical incompetence, narrow pelvis found to be significant risk factor for

preterm birth (P: 0.014). Women with bicornuate uterus have high incidence of preterm birth because the uterus is divided into two small chambers not allowing the baby to grow well and result in second trimester preterm delivery. Presence of history of cervical cerclage found to be significant risk factor. (Fisher exact test 0.001). This means that cervical problems as cervical incompetence is a risk factor for preterm birth. Studies found that cervical cerclage is helpful for women with short cervix and history of preterm birth (Berghella, 2005). At the same time cervical surgery is considered a risk factor for preterm birth through the risk of infection. Abu Hamad found in her study in Gaza Strip that presence of congenital gynecological abnormalities is a risk factor for preterm birth.

Genito urinary tract infection: Recurrent vaginal and cervical infection is found to be significant risk factor for preterm birth (P: 0.016). Many studies have confirmed associations between genital tract infection and preterm labor. Epidemiological studies in USA suggested that two factors maternal stress and maternal urogenital tract infection are significantly and independently associated with an increased risk of spontaneous preterm birth (Lumley, 2003). Urinary tract infection found to be not significant risk factor of preterm birth (P: 0.095), but it has high incidence, the percentage of UTI among cases and control 55% ,44% respectively. At the same time Al Debbagh(2006) in Iraq found that urinary tract infection is significant risk factor for preterm birth. Specific studies are recommended in urogenital tract infection.

How pregnancy happened: Pregnancy happened spontaneously in 90% of cases and 96% of control, only 9% of cases and 3.9% of control pregnancy happened with medical intervention as IVF or hormonal therapy. It is found to be not significant risk factor in this study (P: 0.072). The risk of preterm birth increased in Pregnancy happened with medical intervention as IVF through the risk of multiple gestations and risk of infection.

5.6 Discussion of Smoking and Preterm birth

Maternal smoking more than 10 cigarettes found to be significant risk factor among Palestinian women (P: 0.04). Maternal smoking during pregnancy is a risk factor for very preterm birth, the impact of maternal smoking on very preterm birth appears to be complex and it increased with amount of smoked. The highest impact was seen among women who smoked at least 10 cigarette \day (Kyrklund,1999).The percentage of smoking in West Bank increased by 7% , 38.4 % of smoker males and 3.0 % females while the percentage of smoking among females in Gaza Strip 0.5%(Palestinian Census, 2007), so smoking found to be not significant risk factor of preterm birth at Gaza Strip . A study done in Ain Shams University found that smoking whether active or passive is significant risk factor for preterm birth (Fahmi et al, 1991).

Smoking acts through its interaction with other risk factors as genetics, infection , stress ,and low socio economic status .

5. 7 Discussion of maternal physical characteristic in relation to pre-term birth

Maternal High: The relationship of short maternal height and low maternal weight and risk of preterm birth is not clear the study shows small increased risk of short stature. The risk of maternal height of less than 150 cm found to be significant (P: 0.012). This result is consisted with study in Gaza Stripe that short stature is a risk factor for preterm birth Short statures mostly associated with narrow or contracted pelvis which result in medically indicated preterm birth.

Maternal weight: found to be not significant although Aleisa (1994) Found in his study in Saudi Arabia maternal body mass index of <23 is significant risk factors for preterm birth. Abu Hammad found in her study in Gaza Strip that failure to gain weight during pregnancy is risk factor for preterm birth another study conducted in Egypt found that body weight more than 70 kg is significant.

Maternal level of hemoglobin: Maternal level of hemoglobin found to be not significant risk factor for preterm birth (P: 1.0). In spit of anemia found to be significant risk factor of preterm birth among Egyptian population (Fahmi et al, 1991). Anemia in pregnancy is compensated and the fetus takes it s needs from mother in regardless of her hemoglobin.

5.8 Discussion of Antenatal Care in relation to Preterm Birth

Antenatal care factor represented with number of antenatal visits and gestational age at first visit found to be not significant risk factor for preterm birth (P: 0.634). Although in adequate antenatal care is a significant risk factor in Brazil population in Gaza Strip and also in Vietnam population. This result supported that the women have awareness for seeking antenatal care. Antenatal is improved and primary health care is developed and supported by Ministry Of Health and UNRWA in West Bank.

5.9 Discussion of neonatal outcome of preterm birth

Type of Pregnancy: Multiple pregnancy is found to be significant risk factor for preterm birth (P: 0.0001). It is found to be significant risk factor in almost of studies due to excessive use reproductive technique and medical intervention which is recommended as caesarian section due to mal presentation which is common in multiple pregnancies (Tucker & McGuire, 2005).

Birth Weight: This study found that 12% of preterm babies born with very low birth weight and 58% of them have low birth weight. Very low birth weight affects the baby's condition and increased the complication of prematurity also it is increased the period of admission to neonatal care unit.

APGAR Score: It is found to be significant (P: 0.0001).

33% of premature babies born with Apgar score less than 5 and 53% A/S from 5-7. Swedish study shows that the risk of cerebral palsy is significantly increased with Apgar score of less than 7 (Jacobsson, 2004).

Fetal sex: It is found to be not significant in this study, although there is a study found that the risk of prematurity increased with male sex.

5.10 Discussion of causes and period of admission to neonatal unit

94 % of premature babies were admitted to neonatal unit. The most common cause of admission is respiratory problems RDS it is responsible for 60%, and it is mostly due to prematurity because the baby born with immature lungs .Period of admission depends on gestational age and birth weight and respiratory problems 18 % of premature babies stay at incubator for more than two weeks.

Conclusion :The main risk factors of preterm birth in this study are : previous history of preterm birth , preterm premature rupture of membrane (PPRM), the existence of medical indication for preterm birth, disorder associated with pregnancy mainly hypertensive disorder , and multiple pregnancy .

Recommendations

Palestinian society needs more high quality research about different branches of primary health care. Data collected in this study shows that

there is a need to accurately establish the rate of preterm birth, put lower limit and upper limit for the definition of preterm birth, and more accurate way to estimate the gestational age. Also there is need for better understanding of the etiology of preterm birth such understanding brings benefit on term of health and health economics. The researcher has recommendation for deferent concern peoples.

Recommendations for Ministry of Health:

1- Support high quality research to study deferent modifiable risk factors of preterm birth as genitourinary tract infection and effect of prophylactic treatment with antibiotic.

2- Establishment of polices and protocol on health organization for antenatal steroid treatment because the cost and duration of neonatal care is reduced following corticosteroid treatment.

3- Encourage Genetics studies and isolation of deferent genes responsible for PTB and Factor V relation with recurrent abortion and PTB.

4- Elaboration on Iatrogenic preterm delivery causes consequences and prevention.

5- To start advance hormonal testing clinics and laboratories with acceptable costs.

6- To encourage family planning which can decrease the family load and improved the financial status for families.

7-To enhance preconception counseling for families.

8- To develop and updating the risk scoring system in the antenatal care unit.

There are many clues to the etiology of preterm labor ,it is clear that no single approach will be effective for prevention or treatment, as there appear to be complex interaction between maternal anthropometry environmental exposure and genetic susceptibility of mother and fetus (Deirdre, 2007).

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Appendices

Consent form

استبيان حول عوامل الخطر من الولادة المبكرة بين النساء الفلسطينيات في شمال
الضفة الغربية

أنا طالبة ماجستير في قسم الصحة العامة في جامعة النجاح الوطنية أقوم بعمل بحث
عن عوامل الخطر من الولادة المبكرة بين النساء الفلسطينيات في شمال الضفة
الغربية

أود الإشارة هنا باني أخذت الإذن الرسمي من الجامعة ومن وزارة الصحة لإجراء
مقابلات هذا البحث في مستشفى رفيديا طولكرم وجنين .

ان أي معلومات تؤخذ منكم هي بغرض البحث العلمي فقط وسيتم الاحتفاظ بهذه
المعلومات بطريقة سرية للغاية

الباحثة: هيام عيني

المشرف: الدكتور عدنان سرحان

Risk Factors of Preterm Birth Questionnaire

Serial No.....

Date

Subject : 1- Case .

2- Control

Personal information

1.1 -Do you live in : 1. City . 2. Village . 3. Camp .

1.2 - Age in year s : 1. Less than 18 . 2- From 18 - 25 . 3- 26 -34
4 - 35-40 . 5- 41 -45 . 6- More than 45.

1.3- Place of Delivery : 1- Rafidia Governmental Hospital .
2- Tulkarem Governmental Hospital 3- Jenin Governmental Hospital.

1.4 -Years of Education 1- Less than 6 years 2- From 6 -12 .
3- More than 12 yeares .

1.5 - Husband years of education : 1- Less than 6 years 2- From 6 -12
years

3- More than 12 years

1. 6- Do you work 1.No 2. Yes. If your answer yes what is your
current occupation .

1.7 -Do your husband work : 1. Yes 2. No . If yes What is his cur-
rent occupation .

Socioeconomic Information

2.1 - Do you live in: 1- Nuclear family 2- Extended Family

2.2 - What are the number of rooms in your house 1- one room 2- 2-3 rooms.

3. More than 3 rooms.

2.3 - Number of persons living in your house .1- 2 -3 . 2. 4 -6.
3 -More than 6.

2.4 Monthly income of your family : 1. Less than 1000 NS . 2. From 1000 -1500 . 3- 1600 -2000 . 4- More than 2000.

Obstetric – Gynecological Information

3.1-Age at marriage in years : 1- Less than 18 . 2-From 18 - 25 .
3- From 26 -34 - 4- From 35 - 40 . 5- From 41- 45 . 6- over 45

3.2 Gravid a : 1- 1 -3 . 2 - 4 -6 . 3- More than 6 .

Para : 1- 1 -3 . 2- 4 -6 . 3- More than 6

Abortion : 1 - 1 -3. 2 - 4 -6. 3- More than 6.

3.3- The interval between the last two pregnancies in month : 1- Less than 6 month. 2- From 6 – 12 months . 3 - from 12 - 18 month .
3-More than 18 months .

3.4- Did you have any congenital gynecological problem : 1- Yes. 2- No .

3.5- If answer yes what is the problem: 1- Cervical incompetence
2- Bicorniated uterus 3 - Narrow pelvis. 4- Others . 5-no problem.

3.6 -Do you have a history of cervical cerclage : 1- Yes . 2- No .

3.7- Did you have a history of recurrent infection in cervix or vagina :
1- Yes . 2- No .

3.8 - Did you have a history of urinary Tract Infection : 1-Yes . 2-No

3.9 -Did you have previous history of preterm delivery : 1- Yes. 2- No .

3.10- Did you have family history of preterm delivery : 1- Yes. 2- No .

3.11 - If the answer yes : 1- Mother . 2 - Sister . 3- No one.

3.12 - Have you had history of still birth : 1-Yes 2-No

3.13 - If the answer yes . 1. Full term 2 . Premature.

3.14- Have you delivered a baby with congenital abnormalities

1- Yes . 2- No.

3.15- If the answer yes what are these abnormalities

3.16- Had you delivered previously by CS ? : 1- Yes . 2- No .

3.17 If the answer yes what are the indication of C.S .

- 1. Don,t know
- 2. Cephalopelvic disproportion.
- 3. Fetal distress.
- 4. Previous CS
- 5. Anti partum hemorrhage .
- 6 .Preeclampsia .

4. Current Pregnancy Obstetric information

4.1 - Date of last menstrual period

4.2 - How this pregnancy happened ? 1- Spontaneously . 2-With medical intervention .

4.3 - If the answer option(2) These intervention were :

- 1- Hormonal therapy .
- 2- Invetro fertilization .
- 3- Others

.4 -Have you been smoking cigarette during this pregnancy .?

- 1. Yes
- 2. No

4.5- If yes an average of smoked cigarette

- 1- Less than 10 .
- 2- More than 10.

4.6- Dose your husband smoke cigarette ?

- 1- Yes .
- 2-No

4.7- If yes an average of smoke cigarette .

- 1-Less than 10 .
- 2-More than 10.
- 3- No smoking.

4.8 - Do you have a preterm rupture of membrane ?

1. Yes . 2.No .

4.9- If yes number of hours : 1- Less than 17 hour . 2- more than 17 hour.

4.10 -Did your doctor inform you that you have placental problems during this pregnancy ? 1- Yes. 2- No .

4.10 - If yes tick the appropriate .

1-placenta previa . 2- Abruptio placenta . 3- Others

4.11 -Do you have an indication for pregnancy termination ?

1- Yes . 2- No .

4.12. If yes these indication are :

1- Eclampsia or preeclampsia 2- Diabetes 3 - Cardiac disease
4-Others .

4.13-Do you have vaginal bleeding during this pregnancy ? .

1- Yes . 2- No .

4. 14 - If yes please indicate the trimester of pregnancy .

1- First trimester . 2- Second trimester. 3-Third trimester.

4.15- Do you have any disorder associated with this pregnancy?.

- 1- Yes 2- No .

4.16 - If yes these indication were :

1 .Urinary tract infection 2.Vaginal infection

3. Anemia 4. Diabetes.

5 .Cardiac disease . 6. Renal disease . 7. Other diseases .

8- No disorder associated with pregnancy .

4.17 - Do you have any disorder caused by pregnancy ?

- 1- Yes 2- No

4.18 If yes these disorder were :

1-Pregnancy induced hypertension 2- Eclampsia

3- Gestational diabetes. 4-Anti partum hemorrhage

4.19- Have you been exposed to any significant social problem.?

- 1- Yes 2- No

4.19 - Have you been expose to any psychological problem during this pregnancy? 1-Un wanted pregnancy. 2-Gender of the fetus .

3-Un expected pregnancy .

4.20- Have you been exposed to stress related to the current political situation during this pregnancy ?

- 1- Yes 2- No .

4.21- Have you been exposed to any physical violence or(trauma) during this pregnancy . 1- Yes 2- No

5 . Maternal Physical Information

5.1 -Height in centimeter:

- 1- Less than 150 cm . 2 -Between 150 - 160 . 3- More than 160 cm .

5.2 - Weight in Kilogram

- 1-Less than 50 Kg . 2- Between 50-60Kg . 3- 60- 70 Kg . 4-More than 70 Kg .

5.3 -Hemoglobin level at the time of delivery :

- 1-Less than 11 gm/ ml . 2-From 11- 13 gm/ml 3-More than 13gm/ml.

6 .Antenatal care during pregnancy

6.1 -Gestational Age at the first prenatal visit :

- 1- 1-3 months . 2- 3 -6 months . 3- 7 -9 months .

6.2-Total number of antenatal care visit:

- 1- Less than 5 2- From 5 -10 . 3 -More than 10.

7 . New born Information

7.1- Date of birth

7.2 -Gestational age in weeks : 1-Lessthan 28 . 2-From 28 - 30

3- From 30 -33. 4- From 33 -36 .

7.3 -Type of this pregnancy .

1- Single 2- Twines 3-Triplet 4-Quadruplet .

7.4 - Birth weight in Gram .

1 -Less than 1500 gm 2- From 1500 -2490 gm .

3- 2490 - 3990 gm . 4- More than 4000gm.

7.5 -Fetal sex : 1 - Male 2- Female

7.6 - Mode of delivery :

1-Spontaneous 2- Instrumental 3- caesarian section (CS)

7.7 – APGAR score .

1 - Less than 5 . 2- From 5-7 . 3- 8 -10.

7.8 - Has the baby been admitted to the neonatal intensive care unit ?

1- Yes 2- No .

7.9 - If the answer yes causes of admission are :

1. Respiratory distress syndrome 2. Immaturity 3 Low birth weight

4. Hypoglycemia 5 . Birth asphyxia

7.10 - Had the baby have any congenital malformation : 1- Yes. 2- No .

7.11 - If the answer yes what are these malformation

7.12- The period of admission to neonatal unit.

1- 1 -3 days . 2- 3 -6 days .

3 - 7 -14 days . 5- More than 14 days .

Thanks for your cooperation Researcher

Heyam Anini

جامعة النجاح الوطنية

كلية الدراسات العليا

عوامل الخطر من الولادة المبكرة بين النساء الفلسطينيات في شمال الضفة الغربية

إعداد

هيام عزت عيني

إشراف

د. عدنان سرحان

قدمت هذه الأطروحة استكمالاً لمتطلبات درجة الماجستير في الصحة العامة بكلية الدراسات
العليا في جامعة النجاح الوطنية في نابلس - فلسطين.

2010

ب

عوامل الخطر من الولادة المبكرة بين النساء الفلسطينيات في شمال الضفة الغربية

إعداد

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الملخص

الولادة المبكرة هي الولادة قبل الأسبوع السابع و الثلاثون من بداية الحمل. وتعتبر الولادة المبكرة من اخطر المشاكل الصحية التي تواجهها الأم و الطفل حيث يحتاج الطفل دخول لقسم العناية المركزة لفترة طويلة علما بان دخول قسم الحضانه مكلف جدا ويشكل عبئا اقتصاديا على وزارة الصحة وعلى المجتمع بشكل عام.

الولادة المبكرة هي السبب الرئيسي لوفيات الأطفال عالميا كما أنها السبب في حدوث مضاعفات لدى الأطفال الخدج مثل الشلل الدماغي وانخفاض نسبة الذكاء وإعاقات في التعلم.

الهدف من هذه الدراسة: هو معرفة وتحديد عوامل الخطر من الولادة المبكرة عند الأمهات الحوامل.

أن معرفة ودراسة هذه العوامل تساعد في وضع خطة مستقبلية للوقاية من الولادة المبكرة وتجنب كثير من هذه العوامل القابلة للتغيير والتعديل ولتخفيف العبء الاقتصادي على وزارة الصحة. حيث إن برامج الوقاية من هذه العوامل غير مكلفة بالمقارنة مع تكاليف علاج المضاعفات التي تحصل لدى الأطفال الخدج والعبء الاقتصادي والاجتماعي الذي تفرضه هذه الإعاقات.

نوع هذه الدراسة : هي عبارة عن مقارنة عوامل الخطورة بين 100 حالة من الأمهات اللواتي ولدن قبل الأسبوع السابع والثلاثون (ولادة مبكرة) و 201 حالة من الأمهات اللواتي ولدن بين الأسبوع السابع والثلاثون و الواحد والأربعون(ولادة كاملة) . وذلك عن طريق عمل مقابلات مع

الأمهات مباشرة بعد الولادة إثناء تواجدهن في المستشفى وتعبئة استبيان حول عوامل الخطر لدى هؤلاء الأمهات. وقد أجريت هذه الدراسة في ثلاث مستشفيات حكومية مستشفى رفيديا في نابلس و مستشفى الشهيد ثابت ثابت في طولكرم ومستشفى الشهيد علي في جنين . وقد استمرت فترة الدراسة ستة أشهر من 2009/ 5/1 إلى 2009/ 10/ 31.

نتائج الدراسة : بعد التحليل الإحصائي باستخدام البرنامج الإحصائي ظهر أن هناك فروق ذات دلالة إحصائية بين الولادة المبكرة و عدة عوامل هي :

أولا - ولادة التوأم (P: .000).

ثانيا- وجود أسباب طبية للولادة المبكرة (P: .000).

ثالثا- وجود أمراض وحالات صحية مرافقة للحمل (P: .015).

رابعا - نزول السائل الامنيوسي قبل الولادة (P: .006) .

خامسا - وجود ولادات مبكرة سابقة. (P: .007) .

كما وجدت هذه الدراسة أن هناك عوامل خطر أخرى اقل أهمية مثل السكن في عائلة نوبية ووجود تاريخ عائلي للولادة المبكرة مثل وجود ولادة مبكرة لدى الأمهات والأخوات والتدخين أكثر من 10 سجائر في اليوم، وكما أن وجود مشاكل تركيبية في الرحم وعنق الرحم، ووضع قطبه في عنق الرحم ووجود مشاكل في الخلاصة ، والنزيف المتتالي في خلال فترة الحمل ووجود مشاكل صحية لدى الأمهات بسبب الحمل مثل تسمم الحمل، ووجود مشاكل نفسية خلال فترة الحمل هي من عوامل الخطر من الولادة المبكرة عند النساء الحوامل .

نستنتج من هذه الدراسة أن هناك خمسة عوامل خطر مهمة من الولادة المبكرة وهي :

أولا وولادة التوعم، ثانيا وجود أسباب طبية للولادة المبكرة، ثالثا وجود أمراض وحالات صحية مرافقة للحمل، رابعا نزول السائل الامنيوسي قبل الولادة، خامسا وجود ولادات مبكرة سابقة .