An-Najah National University
Faculty of Graduate Studies

Effect of Diabetes Education Program on Type 2 Diabetic Patients in Tulkarm Directorate of Health

By

Osama Abdulkareem Abdurrahman Rashed

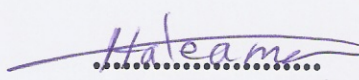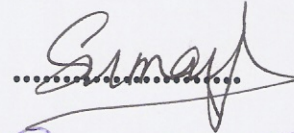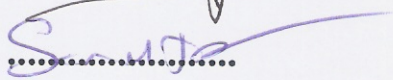## Supervisor

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Dedication

To those who have supported me all the time…

To the Spirit of my Father
To my mother,
To my wife,
To my sisters and Brothers
To my colleagues,
To my patients,

With all my love and respect

Acknowledgement

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الإقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

Effect of Diabetes Education Program on Type 2 Diabetic Patients in Tulkarm Directorate of Health

اقر بأن ما اشتملت عليه هذه الرسالة إنما هي نتاج جهدي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، وان 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.

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Declaration

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

Student's Name: اسم الطالب:

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List of abbreviations

ADA	American Diabetes Association
BMI	Body Mass Index
BP	Blood Pressure
CE	Cholesterol Esterase
CHOL	Total Cholesterol
CO	Cholesterol Oxidize
DBP	Diastolic Blood Pressure
DCCT	Diabetes Control and Complications Trial
DM	Diabetes Mellitus
DOIMP	Diabetes Outpatient Intensive Management Programme
DSMT	Diabetes Self-Management Trial
FBS	Fasting Blood Sugar
GCC	Gulf Cooperation Council
GK	Glycerokinase
HbA1c	Glycosylated Haemoglobin
HBM	Health Belief Model
HC	Hip circumference
HDL	High Density Lipoprotein
HT	Height
IBS	One Pound which equals 0. 0.453 kilograms.
IDF	International Diabetes Federation
IGT	Impaired Glucose Tolerance
LDL	Low Density Lipoprotein
LPL	Lipoprotein Lipase
MNT	Medical Nutrition Therapy
MOH	Ministry of Health
MSHA	Mountain State Health Alliance
NIS	New Israeli Shekels

PHCC	Primary Health Care Center
PHIC	Palestinian Health Information Center
POD	Peroxidase
PPBS	Post Prandial Blood Sugar
RBC	Red Blood Cells
RD	Registered Dietician
SBP	Systolic Blood Pressure
SDPI	Special Diabetes Program for Indians
SMBG	Self-Monitoring Blood Glucose
SPSS	Statistical Package for Social Sciences
TG	Triglycerides
UKPDS	United Kingdom Prospective Diabetes Study
UNRWA	United Nation Relief and Works Agency
USAID	United States Agency for International Development
WBC	White Blood Cells
WC	Waist Circumference
WHO	World Health Organizations
WT	Weight

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Abstract

Background: In the Palestinian community, lifestyle changes, rapid urbanization and socioeconomic development, stress, smoking, changes in food habits may increase the risk of non-communicable diseases especially diabetes mellitus. Diabetic complications can be prevented if the glycaemic status of diabetic patients is maintained within a nearly normal range. Therefore, patient education is critical in controlling blood glucose levels within the normal range.

Objective: This study aimed at measuring the effect of diabetes educational program for type 2 diabetic patients attending the Diabetic clinic in Tulkarm Directorate of Health.

Methods: A quasi-experimental study with pre and post-test was carried out through the diabetic clinic in Tulkarm Directorate of Health based on educational intervention program.

In total, a convenient sample of 215 patients were attended a group-based educational intervention session about diabetes which is conducted by the researcher .This session is a four hours education program. It was presented once at the sports clubs and different civil society organizations and sometimes at the patient's houses according to a previous appointment. The program includes definition of diabetes mellitus, symptoms, risk factors, types, treatment and complications and main aspects of self-care of the

disease (foot care, eye care, and blood glucose monitoring), main aspects of dietary management, weight reduction, blood pressure, smoking, periodic investigations, home monitoring and importance of physical activity) for diabetic patients. Knowledge evaluation questionnaire were evaluated pre and post study. Anthropometric measurements (WT, BMI, WC) and lab tests (FBG, HbA1c, Chol, and TG) were measured at the beginning and at the end of the study.

Significance of the results was assessed by paired t- test at 95% confidence interval using SPSS version 16.

Result: The participant's mean age was 51.07, ranged between 31 and 70 years. Of the total number of participants (215), 41.4 % were males and 58.6% were females. A significance in weight reduction (p =0.000) was found, the mean weight and standard deviation before intervention was 80.81kg ± 14.95 (82.6 for males and 79.5 for females) had decreased to 78.9±14.33 (81.1 for males and 77.3 for females) after educational intervention program, accordingly, BMI was also decreased significantly (p =0.000) after educational intervention. While, waist circumferences decreased significantly (p=0.036.) after intervention from 96.36 ± 12.34 to 95.51 ± 11.25. On the other hand, a significant decrease were observed in FBS after educational intervention (p =0.049), the mean fasting blood sugar was 188.65±71.45 before educational intervention decreased to 177.7±66.11 after the educational intervention. Moreover, a significant decrease in glycosylated haemoglobin after educational intervention (p = 0.000) were reported, the mean glycosylated haemoglobin was 8.57± 1.21 before educational intervention have decreased significantly to 7.95±1.42 after educational intervention. In addition, a significant decrease

was observed in cholesterol level after educational intervention (p=0.000).The mean value of cholesterol before educational intervention 183.27± 37.74 decreased to 169.57±34.23 after educational intervention .Whilst, a slight significant decrease in triglycerides level were reported after conducting educational intervention (p=0.025), the mean triglycerides value decreased after educational intervention from 209.85±171.04 to 183.28±152.4.

Moreover, a significant increase in knowledge evaluation test scores were shown after educational intervention (p = 0.000). The mean score of knowledge questionnaire before educational intervention was 60.6±20.65 increased to 78.1±13.4 after conducting educational intervention

Conclusion: The results from this short educational intervention program on Type 2 diabetic patients in Diabetic clinic in Tulkarm Health Directorate indicates that lifestyle changes involving dietary, exercise and diabetes self-management being effective in significant decrease in weight, FBS,GhA1c ,Chol and TG and effective in improving patient's knowledge.

Recommendations: Diabetes education is a cornerstone in the management and care of diabetes and should be an integral part of health planning involving patient's family, diabetes care team, community and decision makers in the education process.

CHAPTER ONE
Introduction

Summary: This chapter presented a current World Health Organization (WHO) definition, classification and diagnosis of diabetes, and stated the major risk factors of diabetes mellitus. The magnitude of the disease as a problem and it's impact on national and individual economy as well as on the quality of life worldwide and regionally are discussed. Diabetes self-management education which is an important part of treatment plan has been considered and highlighted with special attention to the factors affecting diabetes education program. In addition the importance of the study was explained and the study objectives were stated with the study questions and hypothesis.

1.1   Introduction

This thesis focuses on the effectiveness of educational intervention program for patients with diabetes. WHO defines diabetes mellitus as a metabolic disorder of multiple aetiology characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both [1]. Poorly controlled diabetes is associated with long term damage, dysfunction and failure of various organs especially the eyes (Retinopathy) which is the leading cause of blindness especially in diabetic adults[2], kidneys (Nephropathy) as 10% - 20% of diabetic patients die from renal diseases[2,3], nerves (Neuropathy) which affect up to 50% of diabetic patients[4], and cardiovascular and cerebrovascular diseases whereas the rate of heart diseases and stroke in diabetic adults is 2-4 times higher than those without diabetes[5].Therefore, the importance of diabetes educational intervention in improving self-care of diabetic patients in order to prevent these complications.

1.1.1 Classifications and Risk factors

Diabetes mellitus is classified into two major types that have in common the major sign of clinical feature(hyperglycaemia)but that differ in possible aetiology, mode of onset, risk factors, progression and mode of treatment[5,6].

A. Type 1 Diabetes: It accounts for about 5% - 10% of diagnosed cases [6]. Patients are usually have lean body and most often are children and young adults. The disease is characterized by beta cell destruction, usually leading to absolute insulin deficiency [5].

B. Type 2 diabetes: It accounts for about 90% - 95% of diagnosed cases, associated with overweight and mostly are over 30s, but also seen increasingly in younger people, ranging from predominantly insulin resistance with relative insulin deficiency to predominantly insulin secretion defect with or without insulin resistance. Lifestyle interventions with oral agents are often effective [6]. Diabetes is diagnosed if the fasting plasma glucose value is $\geq$ 126 mg/dl, and/ or if the causal plasma glucose value is $\geq$ 200 mg/dl, or if the plasma glucose value 2 hours after a 75g oral load of glucose $\geq$ 200mg/dl [7].

Impaired Glucose Tolerance (IGT*)* is not a category of diabetes but it is an intermediate metabolic stage between normal glucose homeostasis and diabetes. It indicates a high risk for diabetes and cardiovascular diseases [6]. IGT is diagnosed if fasting plasma glucose is from 100 – <126 mg/dl and 2 hours post glucose load is $\geq$ 140 and < 199 mg/dl [7].

There are many factors that can lead to type 2 diabetes or at least can exacerbate and interact with the occurrence of the disease. Individuals with

blood glucose level in the range of impaired glucose tolerance and impaired fasting glucose are at increased risk for developing of type 2 diabetes, heart disease and stroke [8]. Behavioural and lifestyle related factors such as obesity mostly central obesity, Physical inactivity and sedentary lifestyle can contribute to diabetes where one third of deaths in the developed countries have been attributed to sedentary lifestyle and lack of physical activity [5, 9, 10]. Increasing age in most populations in spite of rising prevalence of type 2 diabetes in children, genetic factors and family history plays an important role in developing type 2 diabetes [11].

1.1.2 Diabetes Prevalence Globally

Diabetes is undoubtedly one of the most challenging health problems in the 21st century [12]. And it is rapidly getting worse; leaving the biggest impact on adults of working age in developing countries [13].In 2011, according to International Diabetes Federation (IDF) estimates, 366 million people have diabetes is expected to rise to 552 million by 2030. Most of them (80%) live in low and middle-income countries. Moreover, 185 million (50%) with diabetes are undiagnosed [13].

In Palestine, the prevalence of diabetes was based on a study conducted in 2000 in cooperation with Al Quds University and Ministry of Health (MOH) .The preliminary results indicated that the prevalence of diabetes in Palestine is about 9%.It is around the reported prevalence rate in Egypt and Tunisia and less than in Saudi Arabia (16%) and Oman (13%)[14].

1.1.3. Diabetes Prevalence in the Mediterranean Region

Diabetes now affects seven percent of the world's adult population .Middle East occupies the second region after North America with the highest

diabetes prevalence rates (9.3%) and this number is expected to double in less than 20 years [13].

When it comes to the percentage of adult population living with diabetes, the new data reveal the devastating impact of diabetes across the gulf region, where five of the gulf region are among the top ten countries affected which are United Arab Imarets (18.7%), Saudi Arabia (16.8%), Bahrain(15.4%),Kuwait (14.6%) ,Oman (13.4%) and Egypt (10.1%)[13].In addition, IDF estimates that there are as many as 19.2 million people still undiagnosed. It also shows that the prevalence of type 2 diabetes in the region for younger age group is substantially higher than the global average [15].

1.1.4. Morbidity and Mortality
Morbidity

Impaired glucose tolerance and impaired fasting glucose are risk categories for future development of diabetes and cardiovascular disease. In some age groups, people with diabetes have a two-fold increase in the risk of stroke. Diabetes is the leading cause of renal failure in many populations in both developed and developing countries. Lower limb amputations are at least 10 times more common in people with diabetes than in non-diabetic individuals in developed countries; more than half of all non-traumatic lower limb amputations are due to diabetes. Diabetes is one of the leading causes of visual impairment and blindness in developed countries. People with diabetes require at least two to three times of health-care resources compared to people who do not have diabetes, and diabetes care may account for up to 15% of national health care budgets [16].

Mortality

Diabetes and its complications are major causes of early death in most countries. Cardiovascular diseases are one of the leading causes of death for people with diabetes and can account for 50% or more of deaths due to diabetes in some populations. Estimating the number of deaths due to diabetes is challenging because more than a third of countries do not have any data on diabetes-related mortality and also because existing routine health statistics underestimate the number of deaths due to diabetes.

Some 4.6 million people 20-79 years of age died from diabetes in 2011, accounting for 8.2% of global all-cause mortality of people in this age group. This estimated number of deaths is equivalent to one death every seven seconds. 48% of deaths due to diabetes are in people under the age of 60. The highest number of deaths due to diabetes is in countries with the largest numbers of people with diabetes like India, China, United States of America, and Russian Federation. Where, more than 80% of diabetes deaths occur in low and middle – income countries. The number of deaths attributable to diabetes in 2011 shows a 13.3% increase over the estimates for the year 2010. This increase is largely due to increases in the number of deaths due to diabetes in the South and Central America, Western Pacific, North America and Caribbean, and Middle East and North Africa Regions. This can be explained by a rise in diabetes prevalence in some highly populated countries in each region. While there has been a documented decline of the mortality due to some non-communicable diseases in some countries, but no such decline has been reported for diabetes [12].

1.1.5. Economic Burden

Diabetes cost the world economy at least US$ 376 billion in 2010 or 11.6% of the total world health care expenditure. By 2030, this number is projected to exceed US$ 490 billion .More than 80% of diabetes spending is in the world's richest countries and not in the poorer countries, where over 70% of people with diabetes now live [12].

An estimated average of US$ 703 per person spent on diabetes in 2010 globally. Expenditures spent on diabetes care are not evenly distributed across age and gender groups. The estimates show that more than three-quarters of the global expenditure in 2010 used for persons who are between 50 and 80 years of age. Also, more money is expected to be spent on diabetes care for women than for men [12].

Besides excess healthcare expenditure, diabetes also imposes large economic burdens in the form of lost productivity and foregone economic growth. The American Diabetes Association(ADA) estimated that the US economy lost US$58 billion, equivalent to about half of the direct healthcare expenditure on diabetes in 2007, as a result of lost earnings due to lost work days, restricted activity days, lower productivity at work, mortality and permanent disability caused by diabetes. Such losses are perhaps relatively larger in poorer countries because premature death due to diabetes occurs at much younger ages. The WHO predicted net losses in national income from diabetes and cardiovascular disease of US$ 557.7 billion in China, US$ 303.2 billion in the Russian Federation, US$ 236.6 billion in India, US$ 49.2 billion in Brazil and US$2.5 billion in Tanzania between 2005 and 2015 [12].

1.1.6. Diabetes Management and Care

Health education

Any combination of planned learning experiences using evidence based practices and/or sound theories that provide the opportunity to acquire knowledge, attitudes, and skills needed to adopt and maintain healthy behaviors [17].

Diabetes Management

Diabetes management is a multidimensional process involving screening and diagnosis, education, psychological care, lifestyle management, follow up and relevant clinical examination achieved to delay or prevent the onset of acute and long-term complications of the diseases by a qualified health care team [18, 19, 20].

Diabetes Education

Diabetes education is a process of teaching people to manage their diabetes including changing behaviour , self – monitoring blood glucose, reduce fat and calories intake and increased physical activity, stop smoking, weight loss through gaining the knowledge and skills needed to modify behaviour to become successful in self – management of the disease [8].

Eliot P.Joslin was the first champion of diabetes education in 1898. He thought that understood information alone was not enough, but he also trained nurses to become highly skilled in the care of diabetic patients [21]. In USA (1984) a group of organisations focusing on diabetes convened a group of health professionals who were charged with the task of developing national standards for diabetes education [21]. Nowadays diabetes

education focuses on diabetes self-care and on helping people live better with their diabetes. Educational strategies produced more positive effects if they included more patients' involvement and collaboration within the class rather than lecture style strategies. In addition, patients enrolled in educational programs in which they were more frequently contacted by educational staff members were able to continue to improve or at least maintain improvement in glycaemic control in the long term [22, 23].

Diabetes education has become over the years an essential part of diabetes care as patients struggle or integrate diabetes and its treatment into their lives. A research shows that educational interventions for diabetic patients are most effective when educational strategies incorporate a behavioural component (missing link between knowledge and action). Thus, a multidisciplinary team of physicians, nurse educators, psychologists, dietician, and exercise physiologists are integral to the success of the treatment and education [8].

1.1.7. Diabetes Education Models

Diabetes is serious disease that requires a patient to make daily decisions about his/her self-care .To promote his/her health, the patient needs a proficient in key self-care behaviors which include nutrition, exercise, coping, monitoring and medication adherence [8].

As diabetes education has become more patient centered and theoretically based, diabetes self-management programs are now putting a greater emphasis on providing the ongoing support to sustain self- management gains made by patients as a result of education and incorporating self-management support into their structure. Educators must consider

expanding their roles and responsibilities to facilitate diabetes education at three levels [8].

1. Patient –Educator Interaction Models

Clinical improvement is possible only when knowledge promotes a positive change in self-care behavior .Models and frameworks at the end support the facilitating of behavior [8].

Theoretical Models and Diabetes Education

 Diabetes educators are encouraged to use a variety of theoretical constructs because they serve as a framework for a comprehensive plan of care, provide guideline for teaching and facilitate clinical practice [8].

1) Health belief model

This model hypothesize that adherence to medical advice depends on holding a particular set of beliefs .These beliefs in relation to diabetes suggests that the person's willingness to adhere the management plan , accepting the seriousness and believing that the benefits of the health action exceed the costs[8].

2) The Empowerment model

It is based on the frameworks of self-determination and autonomy support. It is intended to enable patients to make informed decision about their own diabetes care. Facilitating patient empowerment requires a specific set of skills and attitudes [8].

3) Self –efficacy and social cognitive theory

The concept of self-efficacy is based on social cognitive theory which describes the interaction between behavioral, personal and environmental factors in chronic diseases .it is proposed as a basis for identifying strategies to enhance diabetes self-management. The more confident the person feels about performing a set of behaviors, the more likely it is that the person will perform those behaviors. Self-efficacy theory can be used to learn more about the patient's convections and beliefs [8].

4) Transtheoritical model

It focuses on stages of behavioral change, the central hypothesis of this model is that not all individuals are prepared to take action to change their behavior at any given time .Stages of this model are pre-contemplation, contemplation, preparation, action and maintenance .This model offers an approach in helping diabetes educator to identify where a patient is in the learning process [8].

2. Practice Level Models

Beyond the patient-educator interaction, the provision of diabetes education requires attention at the practice level so that adequate services are provided to support diabetes self-management education. Because the number of patients who receive diabetes self-management are small (35-40%), it is critically important that educators use systemic approach to address barriers to education services. A potential barrier to the provision of diabetes self-management education is access to education. Another potential problem may be a traditional way in which education is delivered, where most health care practices are based on traditional model of acute,

accidental care. So there is a need to explore new strategies to redesign practices [8].

3. Health System Models

The delivery of diabetes education resides within programs that are often part of health system environment where educators find themselves as advocates for system changes. Models that are focused on both outcomes and prevention have been developed and proposed as viable alternatives to our current care systems .The chronic care model provides a paradigm shift from current model of health care delivery to a system that is prevention based and focused on avoiding long term complications. Due to it's multi-faceted nature, diabetes care requires integration of the patient into health system which promotes long term management .The premise of the model is that quality diabetes care is not delivered in isolation, but with community resources, delivery system design, decision support and clinical information system working in tandem leading to productive interactions between practice team and prepared activated patient [8].

The chronic care model provides an ideal framework to support diabetes self-management as a model for diabetes educator to explore collaboration with partners in their local health care systems and communities. Partners include organization administrators, financial officers, information system, insurers, employers, and policy makers. This leads to search for opportunities outside of traditional educator roles, such as the development of business models for sustainability, strategic planning, and integrating technological approaches and data management [8].

After reviewing the literature, the researcher modifies the following model which presents a various factors influencing diabetes education program.

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          ┌─────────────────────────────────┐
          │  Weight Control (WT, BMI, WC)   │
          └─────────────────────────────────┘
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| Socio-Demographic Factors (Age, Sex, Place of residence, marital status, Educational level, Occupation, Income and Family size) |

| Glycaemic Control (FBS, HbA1c, Chol, TG) |

| D. Education Program Elements (Dietary Management, Physical Activity, Smoking Cessation and D. Self-Management) |

| Patients Characteristics and interpersonal |

| Life Style (Smoking, Physical Activity, Diet and Diabetes self-management) |

| Diabetes Related Factors (Duration of DM, treatment, and family history) |

| Diabetes Complications |

Figure 1.1: Factors influencing Diabetes Education Program

The model includes the following factors:

1. Socio-demographic factors:

which include age, sex, place of residence, marital status, level of education, occupation, income and family size. As Neglaa, M. and others [24] pointed out, the effect of different socio-demographic factors on diabetes education, a significant difference between males and females regarding level of knowledge were noticed, also a significant positive relationship between the level of knowledge and educational level, working status, residence place[24]. Male patients, of middle social class, literate, working, residing urban areas and below 50 years of age were significantly more likely to acquire adequate knowledge [24].

2. Patients characteristics and interpersonal factors:

Diabetic patient's knowledge is an important aspect of diabetes education. Literacy is identified as an important factor in patient's perceptions and believes about their disease and prevention of its complications. Perceptions of health in the presence of illness, understanding of susceptibility to illness and perceived efficacy of therapies and conceptualization of diabetes may have a strong impact on adherence to diabetes education behaviours [25].

3. Presence of diabetes complications:

Patients who are not maintaining glycaemic control may begin worry about complications especially if they have early signs of complications. This phase often triggers patients to take action to regain control of their diabetes, this response, if unfulfilled or unstructured, it may result in depletion. Diabetes depletion is evidenced by feeling of being overwhelmed by diabetes self-care, of being controlled by diabetes and of

constantly worrying about taking care of diabetes and becoming unmotivated or unwilling to continue with diabetes education practices.

4. Disease related factors:

Duration of the disease and family history may play a barrier to follow diabetes education practices. The diagnosis of diabetes itself provokes a sad process with rejection or anger responses that may affect the adherence to diabetes education practices [8]. Reactions to diagnosis may produce apathy, of which may impede behavioural change and may present barrier to metabolic control. The progressive nature of the disease may add further psychological stress. Poor patient provider relationships discourage patients from participating in diabetes education programs [8].

1.2. Importance of the study

In the Palestinian community, lifestyle changes, rapid urbanization and socioeconomic development, stress, smoking, changes in food habits may increase the risk of non-communicable diseases such as cardiovascular diseases, hypertension and diabetes mellitus. This growing problem looms as a potential challenge to health services in Palestine where an alarming prevalence rate of diabetes is estimated at 9.6% and 10% in females and males respectively in age group 30-65 years in a cross-sectional study conducted by Birzeit University in 2000 [26]. Whilst the prevalence of impaired glucose tolerance was 8.6%: 10.3% in females and 6.2% in males [26]. Thus, the prevalence of total glucose intolerance (diabetes and impaired glucose tolerance) was 18.4% [26]. The prevalence of diabetes in Palestine is similar to the neighbouring countries like Jordan, while the prevalence of the disease in Gulf Cooperation Council (GCC) is near to the quarter of the population. In Palestine, diabetes is the fourth leading cause of death after cardiovascular diseases, cancer and cerebrovascular diseases,

where the death rate due to diabetes and its complications is 8.6% from the total death among Palestinians [27]. According to the Palestinian Health Information Center (PHIC), an increase of 17,867 new patients from 2007 until the 2011were reported [27].These results indicate that more attention should be paid to this problem at the national level and there is a need for effective intervention in diabetes management. A good glycaemic control in reference to Glycosylated Haemoglobin(HbA1c) levels was only achieved in 17% of diabetic patients registered in Primary Health Care Centers(PHCC) according to the Ministry of Health(MOH) report of 2008 [29]. Many studies[2,8,18,29,33,] have indicated that fasting blood sugar(FBS), HbA1c values, body weight and Triglycerides are all improved by diabetic education intervention program, in addition to improving patient's knowledge of diabetes self- management. Moreover, the researcher think that in the Diabetic Clinic in Tulkarm Directorate of Health, there is a lack of knowledge, awareness and behaviours concerning diabetes management and it is a serious problem among type 2 diabetic patients due to growing numbers of patients with diabetes complications particularly eye, kidney, cardiovascular diseases. Hence, the researcher wishes to study the effect of diabetes educational program on type 2 diabetic patients in Tulkarm Directorate of Health.

1.3 Study Objectives

1.3.1. Purpose

This study aims at evaluating the effectiveness of diabetes educational intervention program on type 2 diabetic patients in diabetic clinic in Tulkarm Directorate of Health.

1.3.2 Specific Objectives

1. To identify distribution of socio-demographic characteristics (age, place of residence, marital status, occupation, income and family size) of the study sample in relation to sex.

2. To identify distribution of diabetes related factors (duration of diabetes, family history, type of treatment and complications) of the study sample in relation to sex.

3. To determine distribution of health education information (previous diabetes educational program) of the study sample in relation to sex.

4. To describe distribution of lifestyle factors (smoking, routine physical activity, and food pattern) of the study sample in relation to sex.

5. To describe anthropometric measurements and lab tests characteristics of the study sample in relation to sex.

6. To assess diabetic patients anthropometric measurements (weight, BMI, Waist Circumference (WC)) at pre and post diabetes educational intervention program.

7. To assess diabetic patients lab tests (FBS, HbA1c, Cholesterol, and Triglycerides) at pre and post diabetes educational intervention program.

8. To assess diabetic patient's knowledge and perceptions at pre and post diabetes educational intervention program.

1.4. Study Questions

This study will answer the following questions:

1.4.1. Main Study question:

Is there any effect of diabetes educational intervention program on type 2 diabetic patients in Tulkarm Directorate of Health?

1.4.2. Specific Study Questions

1. Are there any statistically significant differences between males and females at the level of 0.05 regarding to socio-demographic characteristics among the studied sample?

2. Are there any statistically significant differences between males and females at the level of 0.05 regarding to diabetes related factors among the studied sample?

3. Are there any statistically significant differences between males and females at the level of 0.05 regarding health education information among the studied sample?

4. Are there any statistically significant differences between males and females at the level of 0.05 regarding lifestyle factors among the studied sample?

5. Are there any statistically significant differences between males and females at the level of 0.05 regarding anthropometric measurements and lab tests among the studied sample?

6. Are there any statistically significant differences at the level of 0.05 between anthropometric measurements (wt, BMI, WC) on type 2 diabetic patients at pre and post diabetes educational intervention program?

7. Are there any statistically significant differences at the level of 0.05 between lab tests (FBS, HbA1c, Chol and TG) on type 2 diabetic patients at pre and post diabetes educational intervention program?

8. Are there any statistically significant differences at the level of 0.05 between diabetic patient's knowledge at pre and post diabetes educational intervention program?

1.5. Study Hypotheses

1. There are no statistically significant differences between males and females at the level of 0.05 regarding to socio-demographic characteristics among the studied sample.

2. There are no statistically significant differences between males and females at the level of 0.05 regarding to diabetes related factors among the studied sample.

3. There are no statistically significant differences between males and females at the level of 0.05 regarding health education information among the studied sample.

4. There are no statistically significant differences between males and females at the level of 0.05 regarding lifestyle factors among the studied sample.

5. There are no statistically significant differences between males and females at the level of 0.05 regarding anthropometric measurements and lab tests among the studied sample.

6. There are no statistically significant differences at the level of 0.05 between anthropometric measurements (Weight, BMI, WC) on diabetic patients at pre and post diabetes educational intervention program.

7. There are no statistically significant differences at the level of 0.05 between lab tests (FBS, HbA1c, Chol and TG) on diabetic patients at pre and post diabetes educational intervention program.

8. There are no statistically significant differences at the level of 0.05 between diabetic patient's knowledge at pre and post the diabetes educational intervention program.

CHAPTER TWO
Literature Review

Summary: This chapter aims at reviewing the literature on the effect of patient education on diabetes in relation to several outcomes including knowledge, self-management, behaviours (dietary habits, physical activity, foot care, adherence to medical treatment, self-monitoring of blood glucose and Smoking), Clinical outcomes (glycaemic control, HbA1c, lipids, blood pressure and body weight), psychosocial outcomes (well-being, quality of life, depression, anxiety, empowerment and self-efficacy), Long-term outcomes mortality complications (cardiovascular, end stage renal failure and retinopathy, foot ulceration and amputation).

2.1. Literature Review

One of the most important aspects of diabetes management is diabetes education which is considered as key component of prevention of diabetes related complications. In addition to improve the glycaemic control, diabetes education improves patients and their families' self-care knowledge, health believes skills and confidence, enabling them to take increasing control of their lives. Diabetes education also promote the patients in making therapeutic decision in order to manage their diabetes through instituting life-style changes to minimize the impact of chronic complications of diabetes [18,19, 20,30,31].

Literature suggesting that, patient education improves diabetes knowledge and its management as well as physiological measures such as metabolic control, body weight and blood pressure [29]. Of equal importance, the literature suggests that patient education improves the quality of life for diabetic patients when it is appropriate to the culture context of the population [29]. The evidence on the effect of diabetes education on people with diabetes is rarely discussed. This chapter will briefly review some of the studies done to evaluate the effectiveness of diabetes educational intervention program in managing diabetes as shown in the following tables:

Table 2.1: Summary of related Studies in USA

	Miller et al (2002) [32]	Jeremy et al(2003) [33]	Redmond et al (2006) [34]	Hamdan.M (2007)[2]	Stegal , R(2008) [35]	Ramaeesh et al(2008) [36]	Conti.K(2007 [38]
Authors Year	Miller et al (2002) [32]	Jeremy et al(2003) [33]	Redmond et al (2006) [34]	Hamdan.M (2007)[2]	Stegal , R(2008) [35]	Ramaeesh et al(2008) [36]	Conti.K(2007 [38]
Main Objective	Evaluate the impact of nutrition intervention on blood glucose & lipoproteins of diabetic older adults	Evaluate the effect of community –based group centered lifestyle intervention on glycemic control type 2 diabetics	Examine the effects of nutrition and education intervention on improving HbA1c levels	Measure the impact of diabetes education in increasing knowledge	Determine the feasibility of a paraprofessional –led multifaceted nutrition education program	Evaluate the impact of the Special Diabetes Program for Indians(SDPI)	Effect of culturally educational intervention on Northen.Plain Indians with type 2 Diabetic
Study design/ setting	Randomized Controlled trial /USA	Randomized Controlled Community –Based / Costa Rica	Before– After Study/North Georgia/USA	Cohort study / USA	Quasi xperimental design(control and experimental group) / USA	Retrospective analysis of data from 1994-2004/USA	Case – Control /USA
Sample size	Sample were randomized to experimental and control group (N=98)	Sample were assigned to intervention and control group (N=75)	A convenient sample of older diabetic adults (N=105)	Type 2 diabetic patients (N=6)	African-American control=(N=22) Experimental(N =29)	7735 records analysed three time period(pre-SPDI, transition and SPDI	Sample randomized to intervention and usual care groups (N=114)
Main variables	-Metabolic Control(FBS and HbA1c)- T. Chol	-Metabolic Control(FBS and HbA1c) -Weight	-HbA1c knowledge -HbA1c level	-HbA1c -Weight	-WC.HC, -,WT.BMI, -BP,-Lipids –HbA	-HbA1c -LDL - Chol -TG- BP	-Blood glucose -Weight -BMI
The interventi on used in the study	10-weeks nutrition intervention incorporated principles from information processing, learning theory	12 –weeks lifestyle intervention(Nutrition and Exercise)	8- lessons of Nutrition and Diabetes Education culturally based intervention	Three Educational classes program and training between 2004-Oct 2005	Six weeks of nutrition education intervention	Special Diabetes Program for Indians(SPDI) intervention	Six months of dietary education intervention culturally based
Results	In Experimental group - Sig improvement in FBS(p=0.05)andHbA1c(p<0.05) - Sig improvements in T.Chol (p<0.05)	In Intervention group -lost 1±2.2kg compared with weight gain in control (0.4±2.3kg) -FPG decreased 19±55mg in intervention and increased 16±78 in control-HbA1c dec 1.8±2.3 in intervention	-HbA1c level sig decreased by 0.66% and 1.46% among with pre-test HbA1c >6.5% and >8% respectively -HbA1c levels decreased -Number of HbA1c knowledge Q answered correctly 42 -65%	-Diabetes management knowledge were improved significantly -HbA1c levels decreased -Weight decreased	In Experimental group - Sig decrease in systolic BP 9.24mm/hg -Sig decrease in FBS 25.6mg/dl -Sig decrease in TG 32.29mg/dl -Sig decrease in Chol 26mg/dl	-Significant improving in HbA1c ,Total Chol, LDL, TG, and BP	-Educational group report a significant weight loss(3±0.8lbs) and decrease in BMI(1±0.1)

Table 2.2. Summary of related studies in Europe

	Davis et al(2006) [39]	Strajtenberger et al (2010) [40]	Molenkovic et al(2001) [41]
Authors Year			
Main Objective	Evaluate the effectiveness of a structured group education program on biomedical , psychological and lifestyle measures	Assess the impact of structured educational program on glycaemic control and knowledge in type 2 diabetics	Evaluate the influence of a structured teaching program for diabetic patients
Study design/ setting	Multicentre Cluster Randomized controlled trial/ UK	Before –After Study/ Croatia	Follow up study for one year/ Macedonia
Sample size	Control (N=105) Intervention (N=102)	Random sample (N=32)	Convenient sample (N=110)
Main variables (measures)	-HbA1c -BP -Weight -Blood lipids	-HbA1c - BMI - BP - Knowledge	-Well –Being -Metabolic control
The intervention used in the study	Structured group education program for six hours in the community	4 weeks program consisted of four educational units	4 days of structured teaching program/ Interactive group education
Results	In Intervention Group -HbA1c level at 12 months decreased by 1.49%. -Sig weight loss -2.98kg at 2 months -The odds of not smoking is 3.56 higher at 12 months -Sig changes in illness belief scores. -low depression scores.	-Sig improvement in glycaemic control(p=0.011) -Sig decrease in BMI (p<0.001) -Sig knowledge improvement (p>0.001)	-Sig decrease in HbA1c (9.2 - 7.7%) -Diabetes related knowledge improved 49%- 85%(p<0.05) -Overall well-being improved 46 – 54 (p>0.05) ((depression , anxiety, and increase in energy))

Table 2.3 Summary of related studies in Asia

Authors Year	Kia et al (2008) [42]	Malagi.U et al (2004) [43]
Main Objective	Evaluate the impact of comprehensive diabetes program for Taiwanese typ2 diabetes	Impact of diet modification and educational intervention on management of DM
Study design / setting	Follow-up study / Taiwan	Intervention study / India
Sample size	Convenient sample of type 2 diabetic patients (N=211)	Sample assigned into four groups Case (Diet group,education group, diet and education group) and Control (N= 26)
Main variables (measures)	-FBS -T Chol - HbA1c	-FBS -PPBS -T.Chol -TG -HDL
The intervention used in the study	Comprehensive diabetes care program	Diet modification and educational intervention for six months
Results	-Sig decrease in FBS(164 -137mg/dl) -Sig decrease in T.Chol(198-187mg/) -Sig increase in HDL (43 -46mg/dl) -Sig decrease in LDL(121-113mg/dl) -Sig decrease in HbA1c (8.1 -7.6%)	In Case group (Diet group ,Education group , Diet and Education group) -Sig decrease in FBS and PPBS and Chol, LDL and TG.

Table 2.4. Summary of related studies in Iran and Turkey

	Hydari et al (2003) [44]	Shabbidar.S et al (2005) [45]	Syyednozadi,M et at(2007) [46]	Hazavehei.M et al (2007) [47]	Acik.Y et al (2004) [48]
Authors Year					
Main Objective	Effectiveness of short term diabetes education on BMI reduction and metabolic control	Assess the effectiveness of dietary education in reducing plasma glucose in type 2 diabetics	Evaluate the role of physical activity and diet of type 2 diabetic patients	Determine the effect of educational program based on HBM on diabetic foot care of type 2diabetics	Determine effect of patient education ,exercise and diet on type 2 diabetic patients
Study design / setting	Semi-experimental study /Iran	Randomized Control / Iran	Comparative study 4 groups /Iran	Prospective,quasi-experimental study/Iran	Case-control /Turkey
Sample size	Sample were selected systematic randomly (N=125)	Sample were randomly assigned case and control (N=135)	Sample were selected by aim-based method (N=50 in each)	Sample were randomly assigned into experimental and control (N=108)	Sample assigned into diet group(33),exercise and diet group (28) and control(39)
Main variables (measures)	-FBS -Chol -TG -Weight	-FBS -Chol -TG, -HDL&LDL -BMI & BP	-FBS -2HPPBS -HbA1c -HT,WT - BP	Knowledge perceived susceptibility, severity, barrier and benefits	-HbA1c -BMI
The intervention used in the study	Educational program for seven months using Face to face , BUZZ groups , and problem solving	11 week nutrition classes	Community –based intervention method for 2 months	Educational intervention consisted of three sessions based on HBM framework	8 weeks educational intervention involving lifestyle changes (Diet and exercise)
Results	-Sig fall in FBS (216 – 178mg/dl) -Sig decrease in Chol (194- 172) -Sig decrease in TG (214 – 192) -Sig decrease in BMI (26 -24)	In Intervention group -Weight lost 1.5±2.2kg -Sig decrease in FPS 21±55mg/dl -Sig decrease in HbA1c 1.9±2.1%	In Physical activity group -Sig decrease in FBS,PPBS, HbA1c In Diet group -small decrease in FBS Both groups(Diet & Physical) -improved variables but not sig	In experimental group - Mean score of HBM elements changed significantly	In Diet and Diet –Exercise group - Sig decrease in BMI values In Diet-Exercise group -Sig decrease in HbA1c

Table 2.5. Summary of related studies in Arab countries

	Al-Robeeie (2006) [49]	Hurani.H (1991) [50]	Neglaa.M et al (2009) [24]	Al-Humrani.A (2009) [29]
Authors Year	Al-Robeeie (2006) [49]	Hurani.H (1991) [50]	Neglaa.M et al (2009) [24]	Al-Humrani.A (2009) [29]
Main Objective	Examine the effect of diabetes education among adult diabetic patients in Yemen	Evaluate the effectiveness of dietary educational program in a Jordanian diabetic pats	Evaluate the effectiveness of educational program on type2 diabetic pts	Examine the impact of health education delivered by PHCC setting on control of diabetes
Study design/ setting	Intervention study /Yemen	Intervention study / Jordan	Pretest – post test study /Egypt	Retrospective case control Study /KSA
Sample size	Sample randomly distributed into intervention and control (N=200)	Sample randomly assigned into 53 (case) 17 (control)	Sample selected by systemic random sampling (N=125)	198 typ2diabetic files were analyzed
Main variables (measures)	-FBS -PPBS -Weight -Knowledge level	-WT -BMI -FBS -HbA1c -T Chol. and LDL	-RBS -HbA1c	-FBS -Chol -BMI
The intervention used in the study	Six months of diabetes educational intervention	9 months of dietary intervention	Health education massages in a form of group discussion in a three sessions	Health education program delivered by PHCC
Results	In Intervention group -Sig improvement in knowledge on diabetes -Sig decrease in FBS and PPBS -Sig decrease in Weight	In Experimental group -Sig reduction in WT, BMI, HbA1c,T.Chol and LDL	-Sig improvements in patient's knowledge and attitude. -Sig improvements in FBS and HbA1c	-Females had sig higher BMI&FBS than men -Females had sig poorer diabetes control than men

2.2. Globally

A cohort study has been carried out in United States of America in 2001 when Miller,CK. *et al.* evaluate the impact of nutrition intervention on blood glucose and lipoprotein levels for 92 type 2 diabetic patients aged more than 65 years old. Sample was randomized to an experimental and control group and introduced a ten weeks nutrition education intervention. When the patients were evaluated, the experimental group showed a greater improvement in fasting plasma glucose (p=0.05) and glycosylated hemoglobin (p< 0.01) than the control group. So it is clear that the older diabetic patients need additional education to achieve metabolic control to reduce morbidity and mortality associated with diabetes [32].

In 2002, a randomized controlled community -based study was conducted by Jermy,D. *et al* in rural Costa Rica, 75 adults with type 2 diabetes were assigned to the intervention and control group and participate in a 12 weeks community-based of nutrition classes and exercise. It was found that the intervention group lost 1 ± 2.2 kg with a weight gain in the control group of 0.4 ± 2.3kg (p=0.028). Fasting plasma glucose decreased 19 ± 55mg/dl in the intervention group and increased 16 ± 78 mg/dl in the control group (p=0.048). While glycosylated hemoglobin decreased $1.8 \pm 2.3\%$ in the intervention group and $0.4 \pm 2.3\%$ in the control group (p=0.028). Thus the glucose control of type 2 diabetic patients can be improved effectively in developing nations through community-based, group-centered public health interventions addressing nutrition and exercise [33].

Educational and nutritional interventions was observed to have improved the diabetic patient's self-management activities with concurrent decrease in A1c levels according to the study by Redmond, E and others in 2006[34]

.This study was carried out on a convenient sample of 91 older adults with diabetes in ten senior centers in North Georgia who completed eight lessons in nutrition and diabetes intervention delivered by trained educators over three to five months at each site. When the patients were evaluated regarding A1c knowledge and levels .They showed a significant decrease by 0.66% among those pretest A1c level > 6.5% and 1.46% among those pretest A1c level > 8% ($p \leq 0.01$). Compliance with healthy diet, testing blood sugar and inspecting shoes was also increased significantly ($p \leq 0.05$). Moreover, numbers of A1C knowledge questions answered correctly were increased from 42% to 65% ($p < 0.001$) following intervention. There were several limitations to the study .The study were not a randomized trial, so the effect on outcomes may be not based on the intervention, the sample size was small, and there was no control for comparison [34].

To evaluate long term – effect of diabetes educational program in increasing knowledge and promoting healthy lifestyle behaviors in adult patients with type 2 diabetes. A study was conducted by Hamdan, M in which six patients enrolled in (Caring For your Diabetes) educational program classes sponsored by Mountain State Health Alliance (MSHA) between October 2004 and October 2005. At the end of the program, results reported a good knowledge of diabetes management among the participants. In addition, a positive relationship between A1c and weight changes of all six participants were reported as weight decrease, A1c decreased. While the effect of medications or insulin was not taken into considerations and small group sample size may be limitations of the study [2].

In the contrary, the result of a short-term study conducted by Robin Lee Stegal to determine the feasibility of paraprofessional –led multifaceted six week education program ((three lessons from *From My Pyramid to the Plate* and other three lessons are cooking sessions and recipes from the *((Dining with Diabetes*)) by a Clemson Extension paraprofessional in adult African Americans of lower income and educational level with type 2 diabetes suggested that the paraprofessional model of nutrition education is an effective way to improve important health measurements and then decrease the diabetes related health costs to the community[35].

A quasi-experimental design consisted of a control group and an experimental group with pre and post test administration was applied. The experimental group showed a significant decrease in systolic blood pressure by 9.24mm/hg, Fasting blood sugar decreased by 25.6mg/dl, triglycerides decreased by 32.29 mg/dl and cholesterol decreased by 26mg/dl, these results may lead to a reduction in complications among African Americans. In addition a significant improvement in knowledge twice than that in a control group were reported [35].

The Alaska Native Medical Center diabetes program analyzed diabetes care and outcomes audit data from 1994-2004 by Rameesh and others to evaluate the impact of special diabetes program for Indians (SDPI) funding on process and intermediate outcomes. The study analyzed 7735 randomly selected records for trends over three time periods (pre-SDPI, transition and SDPI). Fewer than 4% of patients on any time period had type 1 diabetes. A1c, total cholesterol and LDL cholesterol, triglycerides and blood pressure significantly improved from the pre-SPDI to the SPDI period. However, as the number of people with diabetes increased, the percentage

of patients receiving foot, eye and dental exams decreased as did the percentage receiving nutrition, exercise and diabetes education. The benefits of this retrospective study reinforce the value of SPDI as an essential part of diabetes care and suggest that an enhanced health care infrastructure, an accurate registry, standardized guidelines for care and annual evaluation and feedback to clinicians have resulted in positive changes in intermediate outcomes for people with diabetes[36].

Several studies have been done to determine whether attendance at the nutrition and education program had any effect on the A1c knowledge and A1c blood levels. A study was conducted by Sara Burnet in 2002 in which 105 type 2 diabetic patients in senior centers in North Georgia were included. Eeight lessons were offered at each Senior Center over a three to five months period based on the interest and available dates for scheduling at each Senior Center. At baseline, 57% of participants had blood A1c levels >6.5% and 53% scored <30% on the A1c Knowledge Questionnaire. Higher A1c knowledge at baseline was negatively associated with age $(P < 0.05)$ and blood A1c levels $(P < 0.07)$, but not with gender $(P = 0.57)$ or race $(P = 0.77)$. Following the intervention, the percent of participants who scored 40% or higher on A1c knowledge increased from 48% to 82% $(P < 0.001)$. Blood A1c decreased by 0.66% (mean decrease from 8.46% to 7.80%) in those with initial A1c >6.5% $(n = 43, P < 0.01)$ and by 1.46% (mean decrease from 9.92% to 8.46%) in those with initial A1c levels of >8.0% $(n = 21, P < 0.01)$ [37].

 According to a study by Kibbe Conti(2007), a culturally based (Medicine Wheel Model for Nutrition) educational intervention was established on an intervention group of 60 Northern Plains Indians with type 2 diabetes for

six months and 54 usual care group. Comparison between groups reported a significant mean weight loss (3±0.8) Ibs p≤0.05   from baseline to completion whereas the usual care group reported no significant weight change from baseline to completion so the introduction of a culturally based nutrition intervention promote a positive changes in weight control intervention [38].

A cluster randomized controlled trial done by Davis et al from 2004 to 2006, 207 general practices (105 control, 102 intervention)were recruited from 13 primary care sites across the United Kingdom, 824 (387 patients in control, 437 patients in intervention) adult newly diagnosed type 2 diabetic patients were selected , the intervention group was exposed to a structured group education program for six hours delivered in the community by two trained health care professional educators compared with a usual care (control group). When the patients were assessed at 12 months of the study, A1c levels had decreased by 1.49% in the intervention group compared with 1.21% in the control group. Moreover, the intervention group showed a greater weight loss -2.98 kg compared with 1.86kg in the control group. The odds of not smoking were 3.65 higher in the intervention group. The intervention group showed significantly greater changes in illness belief scores (p=0.001). The intervention group had a lower depression score (p=0.032). A positive association was found between change in perceived personal responsibility and weight loss (p=0.008). Whereupon, A greater improvement were noted in weight loss and smoking, beliefs about the disease after introduction of a structured group education program for patients with newly diagnosed type 2 diabetes. The study has shown that the group a structured education for newly diagnosed type 2 diabetic

patients can successfully engage patients in starting additional lifestyle changes sustainable over 12 months from diagnosis [39].

The results of a study done by M. Strajtenberger et al in 2010 on the evaluation of the impact of structured educational program on glycaemic control and knowledge as measured by HbA1c in type 2 diabetic patients constitute an efficient tool to improve the patients knowledge, glycaemic control, BMI and HbA1c. The program was aimed at drawing attention to the importance of patient education in improving knowledge about the disease and glycaemic control in type 2 diabetes .Anthropometric parameters and disease knowledge test and glycaemic control as assessed by HbA1c were recorded at the beginning of the program and at three months after the program , six months after the completion of the program in a random sample of 32 diabetic patients from the Slatina Diabetes Counselling Unit In Croatia who attended 4-weeks educational units program . Patient education was found to have significantly improved glycaemic control (7.94±1.42 vs. 7.52±1.04, p=0.011), body mass index (30.3±4.2 vs. 29.5±4.0, p<0.001) and knowledge about the disease (p<0.001) six months after the program [40].

A one year follow up study was done by Milenkovic, T et al in 2001, to evaluate the influence of a structured teaching program for interactive group education in diabetic patients on insulin therapy on their overall well-being and metabolic control. The study included 110 diabetic patients on insulin therapy at University Department of Endocrinology Diabetes and Metabolic Disorders , School of Medicine in Skopje(Macedonia) .Late complications were present in 65% of the patients ,diabetic retinopathy in 32%, diabetic nephropathy in 7% diabetic neuropathy in 42% of patients,

none of the patients had undergone any similar program , A validated diabetes related knowledge questionnaire and patient's overall well-being , (Depression , anxiety, energy) questionnaire was assessed before participation in the program . The study patients attended a 4 − day program of interactive group education. All parameters measured had improved significantly by one year, a significant improvement in metabolic control, HbA1c decreased from 9.2 ± 1.3 to $7.7\pm1.8\%(p<0.0005)$, diabetes related knowledge improved from 49.1 ± 16.8 to $85.4\pm14.3\%(p<0.05)$ and patient overall well-being improved from 46.6 ± 8.3 to 54.8 ± 5.9 $(p<0.05)$ due to reduction in depression $(p<0.003)$ and anxiety $(p<0.004)$ and increase in energy $(p<0.0006)$ and well-being $(p<0.002)$. Thus, the study confirmed the necessity of diabetes education to achieve the overall well-being of the patients as important outcomes of the diabetic education .A weak point of the study was the fact that it was non-randomized, uncontrolled study [41].

To demonstrate the advantage and effectiveness of comprehensive diabetes care program in type 2 diabetes in Taiwan, a follow up study was performed by Kia, T et al for 211 diabetic patients at Kaohsiung Medical University Hospital. Patients were provided comprehensive care program .Baseline clinical and biophysical variables ((FBS, Cholesterol, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), HbA1c)) were carried out at 3,6,9,12 months . A significant reduction in fasting plasma glucose were observed(164.6 ± 60.4 vs. 137 ± 37.5 mg/dl, $p<0.001$) , also lipid profile were decreased significantly whereas total serum cholesterol (198.7 ± 38.8 vs. 187.2 ± 43.1 mg/dl, $p<0.001$): HDL cholesterol (43.2 ± 10.2 vs. 46.2 ± 11.7 mg/dl, $p<0.001$); LDL cholesterol (121.1 ± 32.9

vs. 113.1±29.6 mg/dl, p<0.005).Moreover, A significant reduction in HbA1c level in male patients were reported (8.16±1.99% to 7.61±1.31% and 7.72±1.40% after 9 months and 1 year respectively , p<0.05) .The change in HbA1c level was significant in patients whose duration of disease was shorter and in those with high baseline HbA1c levels. Thus, introduction of comprehensive diabetes care program was found to improve glycaemic and cholesterol control, especially in males and who had diabetes for shorter periods and had high baseline HbA1c level, so diabetes education should be offered to patients as close to the time of diagnosis as possible [42].

Life style risk factors including diet modification and education (cigarette smoking, overweight, physical activity and monitoring and self-management), if effectively controlled can lead to decreasing of cardiovascular disease risk. In 2004, Malagi,U and Naik,R studied 26 type 2 diabetics above 50 years attending diabetic clinic at Railway Hospital Hubli. Patients were selected and randomly assigned to four groups, diet modification group, education and counselling group, diet and education combined group and the control group. The three groups were taken as intervention group with six to seven patients in each .The diet group was a diet plan for each patient to follow it for six months. Education and counselling group covered causes, risk factors, complications, exercise and monitoring blood sugar .Flash cards, charts, pamphlets hands out, video cassettes and live samples were used. The intervention was assessed at the end of two, four and six months. The intervention group reported a significant decrease in FBS and Post Prandial Blood Sugar(PPBS) at the end of the study(FBS 196.5 fourth month vs. 155.7 mg/dl initial,

p<0.01and PPBS 167.63 fourth month vs. 131.67 initial, p<0.01).The maximum decrease among FBS was in diet group(45mg/dl) followed by education group(35.15mg/dl)and diet and education group (28.85mg/dl) .Among PPBs a maximum reduction was in diet group (71mg.dl) followed by diet and education group(36.15mg/dl)and education group(9.54mg/dl) .The cholesterol level of the intervention group was significantly lower than in control group at fourth month(178.3 vs. 237mg/dl, p<0.01)and at six months (193.4 vs. 232mg/dl, p<0.01) the diet group showed a maximum decrease in cholesterol .About LDL , the diet group showed a maximum decrease (18.78mg/dl) followed by education group(10.63mg/dl) and diet and education group (4.13mg/dl).While , TG values showed more decrease in education group (21.29mg/dl) followed by diet and education group(18.71mg/dl) and diet group(17mg/dl).About HDL was more prominent in diet group (5mg/dl). So, the diet adherence in this study resulted in improvement in FBS, PPBS, Cholesterol. The significant decrease in blood lipids and increase in HDL during intervention shows a decrease in cardiovascular risk [43].

2.3. Regionally

In a semi-experimental study,(2003) Launched at Buali-Hospital Diabetic Clinic in Zahadan(Iran), 125 type2 diabetic patients were selected systematic randomly, mean age of the patients was 47 years , diabetes duration 12±7 years , 52% males and 48% females. Laboratory tests (FBS, Chol, and TG) were conducted before educational program and after constant education. A developed educational program covering all aspects of diabetes took place over seven months. Printed Farsi pamphlets ,hands out were given to the patients , in addition to video films were shown in the

waiting area, .In addition to this program , One to one counselling sessions ,face to face ,buzz groups , problem solving group were arranged .At the end of the program , the diabetic patients significantly increased their consumption at complex carbohydrates , physical activities and decreased fat intake .The mean FBS before education was 216.17mg/dl which fell to 178.39mg/dl after education .The patients had significantly lower cholesterol level (172mg/dl, p=0.005) TG decreased from 214.13mg/dl to 192.37mg/dl after education (p<0.001) ,BMI decreased from 26.8±2.2 to 24.01±2.05 kgm2 (p=0.004). This study clearly demonstrates the great benefits of diabetes self-care education. Results are encouraging as diabetes education is an appropriate and achievable mode of therapy in developing countries whereas, illiteracy is common. This necessitates education by verbal teaching sessions rather than by posters, the challenge is how to continue benefit from long term education [44].

Previous studies had shown that the patient education adds a value to diabetes management particularly dietary management which can improve diabetes control. A Randomized –control study conducted by Shabbidar *et al* to assess the effectiveness of dietary education in reducing plasma glucose levels in type 2 diabetic patients was conducted by Endocrinology Research Center in Razi Hospital (Iran) in 2005 .135 adult patients were assigned randomly to an intervention and control group .The intervention group start a 12 week lifestyle intervention while the control group receive usual care. The lifestyle intervention included 11 weekly nutrition classes offered twice per week about the basic food groups and other related aspects of diet .At the end of the program, the mean BMI decreased 0.5±0.9 kg/m in the intervention group and increased 0.3±2.2 kg/m in the control

group (p=0.022) weight decreased 1.5±2.2 kg in the intervention group band increased 0.5±2.3 kg in the control group(p=0.01) .FBS decreased 21±55 mg/dl in the intervention group and increased 19±78 mg/dl in the control group (p=0.028) HbA1c decreased 1.9±2.1% in the intervention group and increased 0.2±2.2% in the control group (p=0.022). Trends towards decreased medication usage were observed in the intervention group. This study provides evidence that nutrition education can be effectively implemented and important health indicators significantly improve particularly BMI and FBS and HbA1c which reduce risk factors for diabetic complications [45].

Lack of physical activity and inappropriate nutrition habits is one of the lifestyle factors related to increasing prevalence of diabetes particularly in developing countries. Seyyednozadi M et al conducted a community based intervention between 2006-2007 in Persian Diabetes Clinic and Khorasan Diabetes Research Center .In this community based study ,type 2 diabetic patients were allocated randomly in one of the following groups ,recommended physical activity group, recommended diet group, recommended both physical activity and diet group and control group .FBS, PPBS,HbA1c, weight, blood pressure were measured before intervention and after 2 months of the intervention .The study reported that the physical activity group had a significant effect in decreasing FBS, PPBS and HbA1c (P<0.030) whereas, the diet group showed a merely significant decrease in FBS(p=0.32).but the diabetic patients who were recommended for both physical and diet group have improved variables but they are not significant, although they have decreased the weight and drug (p<0.024)while the control group reported an increase the drug use .The

finding of this research confirmed the great role of physical activity in decreasing FBS, PPBS and HbA1c and constitute a critical component of diabetes management . Moreover, following the diet pattern has an important role in controlling the medicine consumption [46].

It has been demonstrated that education and awareness about foot problems can bring about a significant reduction in amputation rates as well as the cost of management. Hazavehei et al conducted a Health Belief Model (HBM) educational program on diabetic foot care for adult type 2 diabetic patients and the effects were studied in 108 patients from Kermanshah city Diabetes Research Center, Iran. The patients aged less than 60 years old, participated in three educational sessions ,60 minutes long based on HBM, using lecturing , question-answers , group discussion, role playing , and practical demonstration methods as well as diabetic foot images related to foot caring .The post intervention was conducted after one month of the educational intervention .The results indicated that the mean scores of knowledge , perceived susceptibility , severity, barrier and benefits were in the mediate level , but the cues to foot care action were at a very low level. The mean scores of all HBM elements of experimental group changed significantly after the intervention and in comparison to the control group. Thus the education courses improve the foot care on the basis of HBM model through promoting perceived susceptibility, severity and perceived threat and also perceived benefits and barriers by using practical methods such as using the educational pictures, increased mean grade scores of foot care in the experimental group so that it was 177 times that in the control group. So education based on HBM model was effective and led to improved foot care [47].

The effect of diet and exercise on the regulation of blood glucose in diabetic patients has been shown in several small and large scale studies .An intervention program was carried out to determine the effectiveness of lifestyle changes involving diet and exercise on efficiency of oral ant diabetic therapy in patients with type 2 diabetes mellitus in primary health care settings in the eastern Turkish city (Elazig) .Acik, Y et al selected randomly two out of sixteen primary health care center present in Elazig city center for involvement of the study. Of total 100 participants , 33 were instructed to follow the standard diet , 28 patients performed exercise in addition to the standard diet and 39 did not participate in either exercise or follow the diabetic diet (control group).The HbA1c levels and BMI was measured before and after 8 weeks program and comparisons between groups were made. The results did not report a significant difference between the groups with respect to the initial BMI. After intervention the BMI values of the diet and the diet-plus exercise groups decreased slightly (p=0.16).The initial HbA1c of patients in diet-plus exercise group were significantly higher than the diet group and the control group (p=0.001). After the 8 weeks intervention program HbA1c for this group were reduced significantly and were no longer significantly different from the other groups (p=0.11). Thus, this 8 week intervention program involving the lifestyle changes of diet and diet-plus exercise achieved better results in glycemic control.

Moreover, reduction in HbA1c through lifestyle changes will delay the onset and slow the progression of microvascular complications and improving the length and quality of life for people with type 2 diabetes [48].

The Arab regions like other developing countries, diabetes looms as a potential challenge to health services. Achieving glycaemic control in diabetic patients has proven a real challenge to health providers in developing countries. To examine the effect of diabetes education among adult diabetic patients in Republic of Yemen. Al-Robeeei. N conducted intervention study at the Diabetic Center located at Sana'a (Yemen), 200 diabetic patients were randomly distributed into intervention and control groups .The patients in the intervention were given diabetes education for 1-2 hours, once a week, every two weeks for six months using posters, pamphlets and other educational materials. Knowledge, FBS PPBS and weight were assessed at baseline and endline. This study revealed that diabetes education improved the patient's knowledge on diabetes and it's management, glycaemic control and body weight over the short period of the study, where the intervention group showed a significant improvement in knowledge ($p<0.001$), and FBS, ($p<0.05$) and PPBS ($p<0.05$).A significant improvement was also observed in weight in intervention group ($p<0.05$).This study has an important effect for initiating diabetes self-management education in Yemen [49].

The results of a study on the evaluation of the effectiveness of dietary educational program in a sample of Jordanian diabetic patients on the improvement of their compliance and control of their body weight, blood sugar and lipids suggested that the patients who attended the educational program had a better compliance and better control of weight, sugar and lipids. .Clinical and anthropometric parameters were recorded at the beginning of the program and nine months after its completion in 53 type 2 diabetic out-patients who attended the program and in 17 type 2 diabetic

out-patient of similar characteristics who did not receive any dietary educational program .At the end of the study ,it was found that the control group maintained the same parameters as compared to the intervention group .A significant reduction (p<0.001) in body weight(2.18kg), BMI(0.8%), FBS(48.8mg/d), HbA1c(1.87%),total cholesterol(47.4mg/dl) LDL (61.6mg/dl).HDL showed a significant Increase (14.6mg/dl) [50].

Moreover, an intervention study was carried out by Neglaa.M et al on 122 randomly selected type 2diabetic patients who attended an educational program in diabetic clinic in Zagazig University(Egypt) in 2009,to evaluate the effectiveness of educational program on patients in the clinic . Educational massages (printed coloured pictures) were prepared covering important items about diabetes applying a group discussion method .Blood samples were taken at the beginning for Random Blood Sugar(RBS) and HbA1c and at the end of the study. Knowledge was significantly poor among females, not educated, low social classes and rural residence .At the end, a significant improvement was revealed in patient's knowledge and attitude regarding different aspect of disease with lowering of their mean level of blood sugar and HbA1c .So, This results reflects that the change that occurred in the patients concerning their knowledge and attitude towards diabetes were effective in changing patient, behaviour. Thus , this study send a strong massage to diabetes health care provider and educators for the actual need for developing education and prevention program about type 2 diabetes at out-patient clinics [24].

Some studies have indicated that FBS,HbA1c,Body weight and blood pressure are all improving by a diabetic education programme especially when appropriate to the culture context of the population .To examine the

impact of health education delivered in PHC setting on the control of diabetes, a retrospective study was conducted in the PHCC of Shamasan in Abha(KSA), where 198 patients files out of 475 type 2 diabetic patients registered were revised concerning socio-demographic data , last FBS, last cholesterol, BMI, health education checklist. Results revealed that FBS levels were significantly higher in females than in males, denoting poor control of diabetes , Males had received significantly more health education sessions than females .Females were significantly more obese than males as significantly poorer diet compliance [29].

2.4. Locally

In Palestine, a follow up descriptive study was conducted in a rural Palestinian community focuses on diabetes self-management showed that poor self-management among diabetic patients in Kobar village indicated by high FBS, HbA1c and signs of the metabolic syndrome which in turn confirms and marks the importance and very urgent need for diabetes education, which encourages and helps lifestyle changes and consequently self-management for diabetic patients [25].

CHAPTER THREE

Research Methodology

Summary: This chapter is devoted to specify the steps and the methodology taken in carrying out the research endeavor. In this chapter, the researcher presents the study design, setting, study population, sampling, inclusion and exclusion criteria. Moreover, intervention program components and instruments used in the study were discussed. In this study, the researcher confirmed the recruitment process and measurements, laboratory tests done in the study were listed in details .The process of preparing and collecting data, the main statistical methods of analyzing the designed study were mentioned.

3.1. Study Design

A quasi-experimental study with pre and post-test was carried out through the diabetic clinic in Tulkarm Directorate of Health based on educational intervention program.

3.2. Study Setting

Tulkarm governorate is an administrative district under the control of Palestinian National Authority. Tulkarm is 68 Km to the north of Jerusalem with a total area of 326 Sq. Km and 188,870 inhabitants according to Palestinian Central Bureau of Statistics estimation in 2009[51]. Tulkarm governate includes 36 surrounding villages distributed among three geographical areas which are:

 1.Asharawya ((Sheweke ,Deir Algosoon,Al-Jaroosheya, Atteel , Illar , Sayda , Zeita, Baqa Asharqeya , Nazlat Essa , and Qafeen))

2.Wadi Ashaeer ((Kufr Ellabad , Balaa , Anabta , Kufr Roman , Rameen, Biet Leid , Safareen and Shofa)) .

3. Alkafreyat ((Faroon , Kufr soor , Kufr Zebad , Kufr Jammal)) in addition to Tulkarm city and refugee camp of Noor Shams and Tukkarm Refugee. Tulkarm Directorate of Health provides primary health care services to the citizens including services to diabetic patients. The clinic that provides services to diabetic patients includes 2159 file(all types of diabetes) from all over Tulkarm district as 612 files from the city and 1547 files from the surrounding villages in 2009[52].

3.3. Study Population and Sampling

The population of this study was all type 2 diabetic patients at any age or sex, on oral hypoglycaemic agents, and visiting the clinic monthly or biannually, registered in the diabetic clinic at Tulkarm Directorate of Health until the date of 31/12/2009, which accounts 959 patients.

A convenient sample of 824 type 2 diabetic patients visiting the clinic over the period from 10/5/2010 to 10/7/2010 was selected and asked to participate in the study. Of the 824 diabetic patients, 689 patients agreed to participate in the study and conducted pre-test, (response rate was 85%). Out of 689 patients, 330 patients attended educational intervention program. Out of 330 patients, 215 patients conducted post-test as shown in table 3.1.

Table 3.1: Study population and sample distribution

Location	Registered in the clinic until date of 31/12/2009	Visited the clinic from 10/5/2010-10/7/2010	Agreed to participate and conduct pre-test	Declined to participate	Attended the educational intervention	conducted post-test
Shweke	31	17	17	0	8	6
Aljarosheye	10	9	3	6	2	1
Attel &Deir Algoson	121	113	103	10	32	24
Zeita	29	28	24	4	16	11
Illar	41	34	27	7	16	11
Saida	21	19	16	3	10	8
Baqa Asharqeye &Nazlat Essa	47	41	34	7	30	21
Anazla Asharqeye	19	14	9	5	2	2
Qafeen	98	86	79	7	34	19
Balaa	39	31	31	0	21	16
Kufr Ellabad	51	47	30	17	21	13
Anabta & Kufr Romman	43	34	27	7	13	9
Rameen	37	31	31	0	23	13
Biet Leid & Safareen	89	69	56	13	26	20
Shoofa	27	24	16	8	8	0
Faroon	12	12	10	2	10	6
Kufr Soor Kufr Zebad & Kufr Aboosh	44	37	31	6	18	12
Kufr Jammal	33	24	21	3	11	6
Tulkarm	167	154	124	30	29	17
Total	**959**	**824**	**689**	**135**	**330**	**215**

3.3.1. Inclusion criteria

- Registered type 2 diabetic patients at any age or sex in diabetic clinic until the date of 31/12/2009.

- On hypoglycaemic agents.

-Visiting the clinic regularly for treatment or follow up. (Monthly or Biannually).

3.3.2. Exclusion Criteria

- Not registered in the diabetic clinic.

- Diabetic patients attending UNRWA and military services

- Unable able to visit the clinic for any reason during the period of the study.

- On insulin or combined therapy.

3.4. Recruitment

-Patients were recruited by the researcher through facilitators in civil society organizations and sport clubs in different locations (place of residence) in the district and given an appointment for the session.

- Each patient was recruited by the researcher through their mobile number one day before the date of the session and immediately before the session or through their routines visit to the diabetic clinic.

-The physician in diabetic clinic asked not to change the medication plan during the study in order to avoid any confounding variables.

-The researcher had a good relationship and trust with the patients prior starting the study which facilitates the implementation of the study.

3.4.1. Non participant's profile

Reasons for patients declined to participate in the study

1) 35 patients declined to participate in the study for social reasons (feeling stigma from the disease, sharing the lectures with their friends, relatives and contacts).

2) 39 patients declined to participate in the study for negative attitudes and beliefs towards attending lectures.

3) 20 patients declined to participate in the study for time reasons (can't skip their work).

4) 41 patients declined to participate in the study for health reasons (physically disabled and can't come to education site).

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┌─────────────────────────────────────────────────────────────────────────┐
│   959 Type 2 diabetic patients (on oral agents or diet) registered and     │
│                   visiting the clinic monthly or biannually                │
└─────────────────────────────────────────────────────────────────────────┘
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┌─────────────────────────────────────────────────────────────────────────┐
│     824 Type 2 diabetic patients visiting the clinic from 10/5/2010 -       │
│                             10/7/2010                                       │
│              Patients were asked to participate in the study                │
└─────────────────────────────────────────────────────────────────────────┘
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Pre-test →	**689 type 2daibetic patients agreed to participate in the study** - Basic information Questionnaire (with informed consent) were filled - Anthropometric Measurement (WT, HT WC, HC) were measured - Blood samples for lab tests (FBS, GHA1c, Chol and TG) were drawn

Intervention	**-330 patients attended an educational intervention in patient's place of resident** - Knowledge evaluation questionnaire were distributed at the beginning of the Session **Session components**: was definition of diabetes mellitus, symptoms, risk factors, complications, main aspects of self-care of the disease. Main aspects of diet and Physical activity

After three months ⟶

Post-test	**215 patients were re-assessed the following:** - Anthropometric Measurement (WT, WC, HC) - Blood samples for lab tests (FBS, HbA1c, Chol, TG)

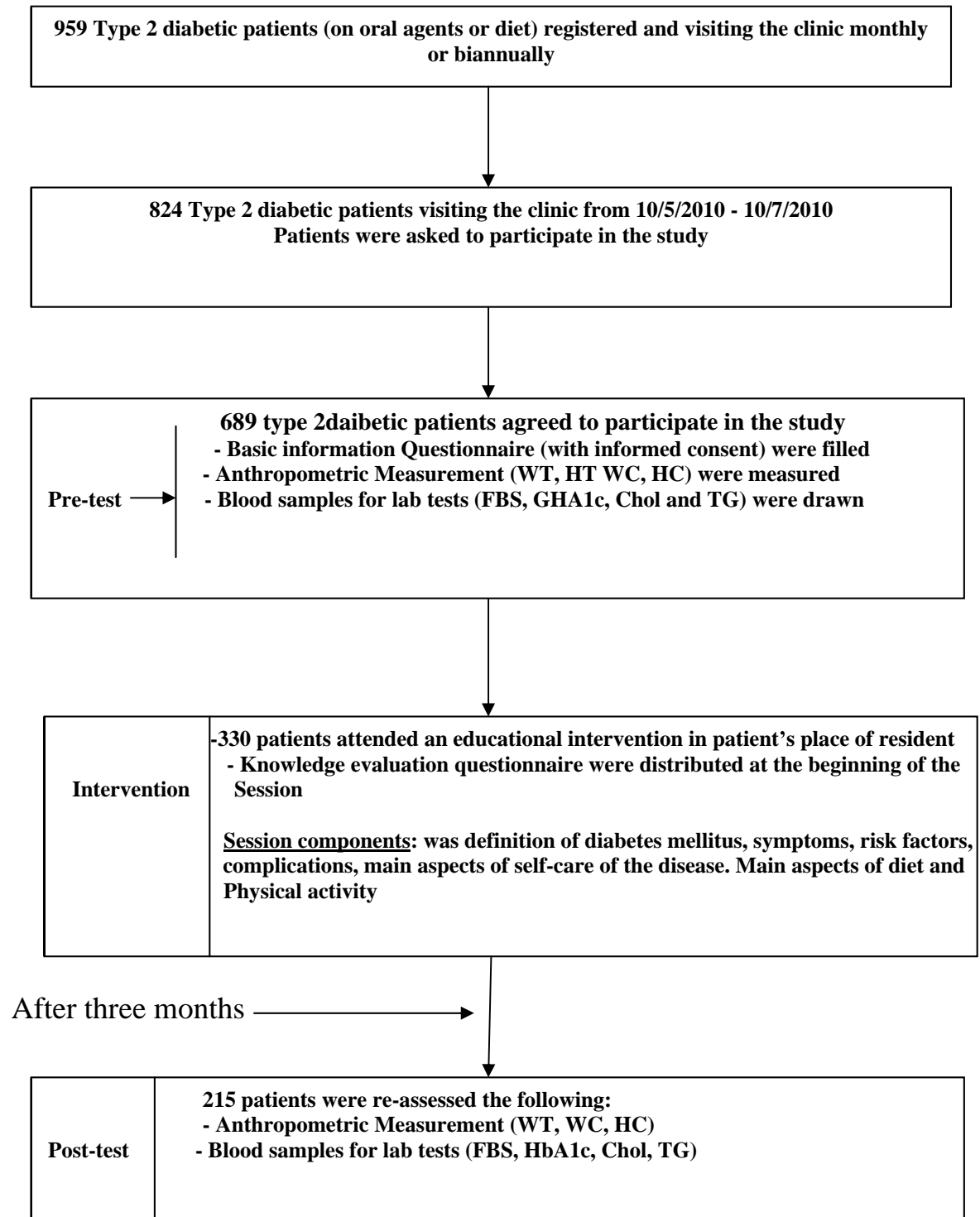**Figure 3.1: Flow chart of the study**

3.5. Pilot Study

The pilot study was carried out in order to identify the possibility of problems to revise the data collection methods before starting the actual research which were the following:-

1. Decide if the selected tools are appropriate.

2. Testing the questionnaire to find out if the questions are understood and easily answered.

3. Assess if the sequence of the questions is logical, clear and translation accurate.

The pilot study was carried out at the diabetic clinic during the patient's routine visit with two weeks interval. A total of 20 registered diabetic patients were asked to answer the basic information questionnaire and knowledge evaluation questionnaire, although, those patients were not included in the study.

The type, sequence, misunderstanding, rephrasing and removing of the questions in both questioners were changed three times after finishing the pilot study.

3.6. Data Collection

Data were collected by the researcher over the period of two months between 10/5/2010 to 10/7/2010 during the patient's routine visit (monthly and biannually) to the diabetic clinic at Tulkarm Directorate of Health.

Patients were interviewed by the researcher using a basic information questionnaire on demographic data, anthropometric measurement and other health variables after their informed consent to take part in the study.

3.7. Intervention Program Components

A group-based educational intervention session about diabetes was conducted by a researcher (who is working as a health educator at the Health Directorate of Tulkarem). This session is a four hours education program. It was presented once at the patient's place of residence according to a previous appointment with patients in the location. A plain flip chart was used as a teaching aid while presenting the session at all locations. The program includes definition of diabetes mellitus, symptoms, risk factors, types, treatment and complications and main aspects of self-care of the disease (foot care, eye care, and blood glucose monitoring), main aspects of dietary management, weight reduction, blood pressure, smoking, periodic investigations, home monitoring and importance of physical activity) for diabetic patients.

At the beginning of the session a pre-test knowledge evaluation questionnaires were distributed to the diabetic patient's attendance. And at the end of the session a coloured educational materials printed in Arabic language were distributed (Appendix 6).The educational materials were developed and approved by Health Education and Promotion Department of the Palestinian Ministry of Health. The educational materials include the following:

- Flip Chart about dietary management for diabetic patients.

- Booklets, brochures and handbooks about definition, types, symptoms and risk factors of diabetes mellitus, complications, diabetic foot, diabetic eye and self-management of diabetes, importance of exercise and investigations especially glycosylated haemoglobin.

In addition, diabetic patients were allowed to ask questions about the topic being presented. The researcher was in a continuous direct contact with the patients through their phone and via e-mails to answer any question for two to three months before starting the post-test.

3.8. Study Instruments

(1) A basic information questionnaire (Appendix 1) was developed

with informed consent and validated by diabetes specialist and then tested on 20 patients. The questionnaire was filled by the researcher through using a clear Arabic language.

The questionnaire includes the following sections:

1. Patients file number, place of residence and telephone number.

2. Socio-demographic data: including sex, age, place of resident, marital status educational level, occupation, income level and family size.

3. Anthropometric measurements and lab tests: including height, weight, body mass index, waist circumference, hip circumference, waist to hip ratio, fasting blood sugar, glycosylated haemoglobin, total cholesterol and triglycerides.

4. Diabetes related data: Duration of disease, family history of diabetes, other treatment, and presence of complications.

5. Health Education data: Previous health education programs.

6. Lifestyle data: including smoking, daily and previous physical activity and dietary history.

(2) A Knowledge evaluation questionnaire (Appendix 2) was designed and implemented by the researcher to measure the degree of knowledge and understanding of patients in managing their diabetes. The questionnaire was filled by the patients before starting the session and after two to three months at the end of the study. The questionnaire consists of 40 multiple choice questions covering different aspects of diabetes including definition, types, risk factors, symptoms, complications, main aspects of self-care, and main aspects of dietary management and importance of physical activity for diabetic patients.

3.9. Reliability and Validity

Testing of the knowledge questionnaire for reliability and validity yielded positive results .Content validity of an original 40 items knowledge evaluation questionnaire was evaluated by diabetes specialists. Based on their feedback, three items were dropped, one item was added, four items were changed and several items were rephrased for clarity. This results in a new version of the instrument which was administered to a pilot sample of 20 patients.

Internal consistency measure (Cronbach,s alpha) were 0.79 for the total questionnaire at the beginning of the study and 0.72 at the end of the study.

Among lab tests which are FBS, GhA1c, Chol, TG, every tenth sample was drawn from the entire study sample for standardization by the same lab

technician and send to Biet Lied laboratory for evaluation which used the same procedures and kits that are used in Tulkarm directorate of Health.

3.10 Anthropometric Measurements

-Anthropometric measurements were measured at the beginning and at the end of the study by the researcher and the same clinic nurse.

-The following anthropometric measurements were obtained twice each time for the diabetic patients and then calculating the average of the two readings (at the beginning and at the end of the study).

*Height (HT): patients were measured stand with heels together without shoes, eyes directed forward and reduced the measuring plate on the scalp to provide the correct level using a mechanical column scale (Appendix 3) without changing the scale location after adjusting it prior to use in order to ensure accuracy of measurements.

N.B. The height was measured at the beginning of the study only.

*Weight (WT): patients were measured wearing light clothes without shoes and standing with their weight balanced on both feet using a mechanical column scale (Appendix 3) without changing the scale location after adjusting it prior to use in order to ensure accuracy of measurements.

*Waist circumference (WC): patients were measured by the researcher for males and by the clinic nurse for females asking them to stand erected and has relaxed the abdominal muscles and breathes normally using a BP-KC5315-500-1 tape measure. (Appendix 4).The tape was placed horizontally at the level of midway between the lower rib margin and iliac crest.

Normal level according to WHO cut-off points (2008) in women is < 80 cm and < 94 cm in men [53].

*Hip circumference (HC): patients were measured by the researcher for males and by the clinic nurse for females using a BP-KC5315-500-1 tape measure (Appendix 4). Hip circumference was measured as the maximal circumference over the buttocks. Normal level according to WHO cut-off points (2008) in women is< 88 and < 102 cm in men [53].

 *Blood Pressure (BP): systolic blood pressure (SBP) and diastolic blood pressure (DBP) was measured by the researcher using a mercury Sphygmomanometer (Appendix 5). Patients were asked to sit in a relaxed position and a large adult – size cuff was used.

Body Mass Index (BMI):* it is a simple index for weight- height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as weights in kilograms divided by squired height in meters

 (BMI = weight ÷ squared height) was calculated for the participants using international classification as shown in table 3.3.

Table 3.2: The international Classification of adult underweight, overweight and obesity according to BMI. [54]

Classification	BMI(kg/m2)
Underweight	< 18.5
Normal Weight	18.5 – 24.9
Overweight	25 – 29.9
Obese	≥ 30

*Waist to Hip ratio (W/H Ratio): It has been used as indicator or measure of a person's health and a risk of developing serious health conditions and

abdominal obesity. It is calculated as waist in centimetres divided by hip in centimetres. A W/H ratio normal level according to WHO cut-off points (2008) in women is < 0.85 and < 0.90cm in men [53].

3.11. Laboratory Tests

Patients were asked to fast for at least 12 – 14 hours. Blood samples were drawn from the patients at the beginning and at the end of the study by a qualified lab technician in Tulkarm Directorate of Health to measure FBS, GHA1c, Chol and TG. Another blood sample was drawn at the same time for analysis in a private lab (Biet Leid Med Lab) using the same procedures and assays for standardization in order to ensure accuracy.

Machine used: Biosysytem which is an interference filter photometer designed for precise and fast execution of the most important tests of clinical chemistry, the light source is 2 wave tungsten lamp, and the wavelength is selected by 5 interference filters and managed by microprocessor.

*Fasting Blood Sugar

Blood Sample Requirements

- 3 ml of blood sample were drawn from the patient's vein.

- The sample were placed in a plain tube (without coagulants) and waited for 15 – 20 minutes at room temperature or water bath at 37c for clot formation.

- Blood sample were centrifuged for 5 minutes 3500 rpm to separate from its contents which are serum (upper part) and White Blood Cells(WBC) and Red Blood Cells(RBC) (lower part).

Procedures

- The reagent (Glucose GOD FS) brought out from the refrigerator and placed at room temperature.

- Four tubes were prepared and labelled which are:

1. Blank (add 1 ml monoreagent glucose)

2. Standard tube (add 1 ml monoreagent glucose) plus 10 microlitter standard.

3. Control tube (add 1ml monoreagent glucose) plus 10 microleter control sample.

4. Sample (add 1 ml monoreagent glucose plus 10 microliter serum (sample).

-Tubes were mixed and left for 30 minutes at room temperature or 5 minutes at 37c.

-The sample and standard were put in adjusted spectrophotometer to read the absorbance at 500 nm against the reagent blank.

-The spectrophotometer used to measure the concentration and give ready results in mg/dl.

Normal ranges: 70 – 115 mg/dl.

*Glycosylated Haemoglobin (HbA1c):

Glycohemoglobin is irreversibly and progressively formed in the erythrocytes throughout the normal cells life span (120 days). Since the concentration of glycohaemoglobin in the erythrocytes reflects the average blood glucose level of the past 4 to 6 weeks and is stable for the life of the erythrocytes, the measurement of glycohaemoglobin provides a very

valuable test for assessing the long term control of diabetic patients. 3 ml of whole blood sample collected in EDTA tube – anticoagulant.

Reagent Preparation and Procedures

1.Standard :vial present with the (Glycohemoglobin HbA1-Test-kit) as lyophilized from packed human erythrocytes used when open new kit to calibrate the spectrophotometer and calculation, we prepared the standards by reconstituted it in the lab by removing aluminium seal and rubber stopper carefully to avoid loss of content, to reconstitute add 1 ml of distilled water to the vial, replace rubber stopper and allow to stand for 10 min at room temperature, swirl content gently while observing for presence of undissolved material until the solution is complete.

2. Hemolysate preparation

-Pipette 0.5 ml of lysing reagent into 2 tubes labelled with (standard) and (sample).

- add 0.1ml of whole blood in sample tube and 0.1 ml of standard in standard tube.

-Mix well and let stand 5 min at room temperature (15 – 30c), to complete haemolysis.

3. Glycohemoglobin Separation

-Pipette 3 ml of Glycohemoglobin Ion Exchange Resin INTO 13*100 mm tubes of standard and sample.

-Before use mix resin well by inverting the bottle at least 6 times to get homogeneous resin.

-Pipette 0.1 ml of the prepared hemolysated into appropriately labelled resin tube standard and sample.

-Position a resin separator in 13 mm tube or rubber sleeve is approximately

 1 – 2 cm above the resin.

-Mix tubes by hand held above the resin for 5 min by continuous inversion. At the end of the mixing, push resin separator into tube until resin is firmly packed in bottom of 13 mm tube pour supernate directly into separate cuvettes for absorbance measurement on photometer Biosystem chemistry analyser at wavelength 405 nm, before that label tube with Blank with distilled water and read the concentration of Hemolysate.

4. Total Haemoglobin Assay

- Pipette 5 ml Deionized water into tubes of standard and sample and add 0.02 ml (20 micrometer) of hemolysate, standard.

- mix well and transfer to cuvette for absorbance reading on the same machine (Boisystem).

Table 3.3. Expected values of Glycosylated Haemoglobin

Non Diabetic	Diabetic
Normal range: 4.2 – 6.23 %	Good Control : 5.5 – 6.8 % Fair Control : 6.8 – 7.6 % Poor Control : > 7.6 %

N.B. The reference range was established by the laboratory.

*Total Cholesterol (CHOL):
The reaction happen by 3 enzymes: Cholesterol Esterase (CE), Cholesterol

Oxidase (CO), Peroxidase (POD)

N.B. Blood Sample Requirements and procedures are the same as

mentioned in fasting blood sugar section.

Table 3. 4. Reference Range of cholesterol level

Range	Level
Normal	< 200 mg/ dl
Desirable	200 – 239 mg/dl
Borderline	> 240 mg/dl

N.B. The reference range was established by the laboratory.

*Triglycerides (TG):
Blood Sample Requirements and procedures are the same mentioned in

fasting blood sugar section.

Table 3.5. Reference values of Triglycerides

Reference	Value
Normal	< 150 mg/dl
Borderline	150 – 199 mg/dl
High	200 – 499 mg/dl
Very High	≥ 500 mg/dl

N.B. The reference range was established by the laboratory.

3.12. Data Analysis

The data obtained from the basic information questionnaire and knowledge

evaluation questionnaire were entered into the Statistical Package for

Social Sciences, (SPSS) Windows version 16) program using the chi-

square test to determine whether there is a significant difference between

males and females at the level 0.05 in the categories listed in the

questionnaire. Paired t – test Correlation was used to assess whether there

is a significant   differences in   anthropometric measurement, lab test and knowledge scores before and after the educational intervention at P=0.05.

3.13. Ethical Considerations

1. The researcher took an official permission (Appendix 7) from the general director of Tulkarm Directorate of Health.

2. Patients were informed and consented for the intervention about the purpose of the study before conducting the interview and investigations and were told that their participation will be voluntary.

3. Some patients refused to participate in the study for different reasons (social, health and time reasons).

4. The researcher was in a continuous direct contact with the patients through their phone and via e-mails to answer any question for two to three months before starting the post-test.

CHAPTER FOUR

Results

Summary: The purpose of this study is to evaluate the effect of diabetes education on type 2 diabetic patients. This chapter consists of eight parts: part (1) deals with the analysis of various socio-demographic and background information variables, part (2) and (3) deals with the diabetes related factors distribution including analysis of the family history, duration of diabetes, presence of complications and the past health education information distribution. Part (4) deals with life style factors distribution .While part (5) deals with the distribution of anthropometric measurements and lab tests distribution of study sample. Part (6) and (7) shows the comparison between anthropometric measurements and lab tests before and after conducting the educational program intervention, and finally part (8) shows the comparisons between knowledge scores before and after conducting the educational intervention.

4.1. Scio - demographic Characteristics

As seen in table 4.1, there was no significant difference between males and females at the level of 0.05 in relation to the place of residency, and number of family members living and eating together ,where most of the participants (84.7%) lived in the villages in the region, as females represent 84.1% and males 85.4%(p=0.80). In addition, the mean number of family member living and eating together was 5.8 for both men and women and 61.9% of the participants had the average number of family member of 0 -6

persons (61.8% males and 61.9% females) (p=0.682). On the other hand, both males and females were significantly different regarding family income. Approximately 43.3% the participants reported that their family income were less than 1500 Israeli Shekels, (48.4% females compared with 36.0% males) (p=0.005).The percentage of married females were significantly less than males (85.7% compared with 97.8%) (p = 0.006). In addition, males were significantly older than females (26.9% of males aged more than 60 years compared with 10.3% females). Moreover, 77.8% from females in the age group 40-60 were significantly more than males 65.2% (p= 0.031). The mean age for men was 52.8 years while the mean age for females was 49.8 years. Females were significant lower education at the 12 years (secondary school or less) than males (80.2% compared with 46.1%), while males had a high significant education more than 12 years (graduate studies) than females (53.9% compared with 19.8%) (p = 0.000). The mean years of education were 10.3 years for both men and women (12.7 for males and 8.7 for females). Females, on the other hand, were mostly not working, 85.7% were housewives compared with 94.3% for working males (p = 0.000).

Table 4.1: The Socio-demographic characteristics by sex

Variable	Male (n = 89)		Female(n = 126)		Total (215)		*P-Value
	N	%	N	%	N	%	
Sex	89	41.4	126	58.6	215	100%	
Age 30 – 39	7	7.9	15	11.9	22	10.3	
40 – 49	29	32.6	47	37.3	76	35.3	
50 – 59	29	32.6	51	40.5	80	37.2	0.031
60 – 69	23	25.8	12	9.5	35	16.3	
≥70	1	1.1	1	0.8	2	0.9	
Place of Residence							
City	13	14.6	20	15.9	33	15.3	0.800
Village	76	85.4	106	84.1	182	84.7	
Marital status							
Single							
Married	1	1.1	13	10.3	14	6.5	
Widow	87	97.8	108	85.7	195	90.7	0.006
	1	1.1	5	4	6	2.8	
Educational Level							
0 – 6	11	12.4	50	39.7	61	28.4	
7 – 12	30	33.7	51	40.5	81	37.6	0.000
≥ 13	48	53.9	25	19.8	73	34.0	
Profession							
Worker	10	11.3	1	0.8	11	5.2	
Farmer	14	15.7	2	1.6	16	7.4	
Gov.Employee	34	38.2	10	7.9	44	20.5	
NonGov Employee	6	6.7	2	l.6	8	3.7	0.000
Special Work	20	22.5	2	1.6	22	10.2	
Not Working	5	5.6	1	0.8	6	2.8	
Others	0	0.0	108	85.7	108	50.2	
Salary							
< 1500	32	36.0	61	48.3	93	43.0	
1500 -2500	22	24.6	39	31.0	61	28.4	
2501 -3500	25	28.1	16	12.7	41	19.1	0.005
> 3500	7	7.9	4	3.2	11	5.1	
Not Applied	3	3.4	6	4.8	9	4.4	
No of people living							
0 – 6	55	61.8	78	61.9	133	61.9	0.682
7 – 13	32	36.0	47	37.3	79	36.7	
14 – 20	1	1.1	1	0.8	2	0.9	
> 20	1	1.1	0	0.0	1	0.5	

*A significant difference by Chi-Square test

4.2. Diabetes Related Factors Distribution

Results presented in table 4.2 revealed that half of the participants (51.2%) had diabetes for less than four years from the time of diagnosis. There was no significant differences between males and females where a nearer proportion of females and males (49.2% compared with 53.9%) (p = 0.110).While one third of the participants (32.6%) had diabetes for less than nine years with no significant differences between both sexes. (27.0% compared with 36.5%). Only, 16.3 % of them had diabetes for a period of more than nine years. Mean duration of diabetes in both sexes were five years. They had also complications in 82.3% of the participants mainly neuropathy with no differences between males and females (79.8% and 84.1% respectively) (p = 0.679). However, males had no significant positive family history of diabetes than females (86.5% compared with 89.7%) (p = 0.746) with at least 88 % of the participants had a family history of diabetes. Only 3.7% of the participants are following lifestyle modification regimen and 40.5% of them depending on hypoglycaemic agents in their treatment regimen, with no significant differences between both sexes (47.2%% compared with 35.7%) (p = 0.176).

Table 4.2: Diabetes related Factors Distribution by Sex

Variable	Male ((n = 89)		Female (n = 126)		Total		*P –
	N	%	N	%	N	%	Value
Date of Onset							
2006 - 2009	48	53.9	62	49.2	110	51.1	
2000 - 2005	24	27.0	46	36.5	70	32.6	0.110
1995 - 1999	12	13.5	17	13.5	29	13.5	
< 1999	5	5.6	1	0.8	6	2.8	
Family history							
Yes	77	86.5	113	89.7	190	88.4	0.476
No	12	13.5	13	10.3	25	11.6	
Type of treatment							
Diet	4	4.5	4	3.2	8	3.7	0.176
Oral agents	42	47.2	45	35.7	87	40.5	
Both	43	48.3	77	61.1	120	55.8	
Complications							
Yes	71	79.8	106	84.1	177	82.3	0.410
No	18	20.2	2 0	1 5 . 9	38	17.7	

*A significant difference by Chi-Square test

4.3. Health Education Information Distribution

The participants were requested to give information about previous diabetes education programs, if any, and about if they follow instructions. Table 4.3 shows that about 61.2% of the participants did not receive any diabetes educational program .Males received significantly more diabetes education program than females (49.4% compared with 31.2%) (p = 0.007). On the other hand, no significant difference were observed between males and females regarding following the diabetes education instructions (97.7% versus 95.0%) (p = 0.579).

Table 4.3: Health Education Information Distribution by Sex

Variable	Male ((n = 89)		Female(n = 126		Total		*P–
	N	%	N	%	N	%	Value
Diabetes Education							
Yes	44	49.4	40	31.2	84	38.8	0.007
No	45	50.6	86	68.8	131	61.2	
Education following							
Yes	42	97.7	38	95.0	80	96.4	0.579
No	1	2.3	2	5	3	3.6	

*A significant difference by Chi-Square test

4.4. Lifestyle Factors Distribution

Because most of the participants were women, smoking is culturally not acceptable for women, so 70% of them did not smoke at all, while 16% were smoked, but 12.6% smoke in the past (table 4.4). Moreover, more than 60% of the participant's work nature needs light working, (mostly females) this means that most of the participants living a sedentary life while only 11.2% needs strenuous working. There were a significant difference between males and females in smoking status and routine physical activity, (p = 0.000).On the other hand, no significant difference were found between males and females regarding practicing physical activity in the past three months (42.5% of males compared with 37.1% of females) (p = 0.427). Otherwise, table 4.4 also shows the meal pattern of the participants, where 55% of the participants reported that they ate three meals daily, whilst, 30% ate two meals daily. On the other hand, 50% of the participants ate between meals and 53% take their meals irregularly. There were no significant difference between males and females regarding meal pattern (58.4% versus 49.2%) (p= 0.076).In contrast, a significant

difference were reported between males and females regarding interest in reading the food label (24.7% versus 34.9%) (p = 0.029).

Table 4.4: Life style factors Distribution by Sex

Variable	Male ((n = 89)		Female(n = 126)		Total		*P–
	N	%	N	%	N	%	Value
Smoking							
Yes	36	40.4	1	0.0	37	16.8	
smoke in the past	25	28.1	2	1.6	27	12.6	0.000
Never smoke	28	31.5	123	98.4	151	70.6	
Routine Physical Activity							
Setting	25	28.1	16	12.6	41	19.0	
Standing	14	15.7	7	5.6	21	9.8	0.000
Walking	33	37.1	31	24.6	64	29.8	
Light Working	13	14.6	52	41.3	65	30.2	
Strenuous Working	4	4.5	20	15.9	24	11.2	
Past three Months Physical Activity							
Yes	37	42.5	46	37.1	83	39.3	0.427
No	52	57.5	80	62.9	132	60.7	
Number of meals							
One Meal	1	1.1	4	3.2	5	2.3	
Two Meals	21	23.6	43	34.1	64	29.8	0.176
Three Meals	52	58.4	66	52.4	118	54.9	
> Three Meals	15	16.9	13	10.3	28	13.0	
Eating between meals							
Yes	45	50.6	60	47.6	105	48.8	0.671
No	44	49.4	66	52.4	110	51.2	
Meal Timing							
Yes	52	58.4	62	49.2	114	53.0	0.076
No	37	41.6	64	50.8	101	47	
Reading the food label							
Much attention	22	24.7	13	10.4	35	16.3	
Interest	22	24.7	44	34.9	66	30.7	0.029
Do not care much	21	23.6	28	22.2	49	22.8	
Do not care at all	24	27.0	41	32.5	65	30.2	

*A significant difference by Chi-Square test

4.5. Anthropometric Measurements and lab tests Characteristics

As clear in table (4.5), the proportion of the participants with obesity

(BMI > 30) was about 60% .Females proportion were mostly significantly

nearly double than males (69.8% versus 45.5%). While the proportion of

over weights was equal between both sexes (37.5% and 26.2%) (p= 0.000).A significant proportion between males and females of abdominal

fat distribution as measured by waist circumference were reported (64.0%

compared with 92.1%) (p = 0.000).

On the other hand, 86% of the participants reporting fasting blood sugar

more than 115mg/dl with no significant difference between males and

females (82.0% compared with 89.7% respectively) (p = 0.105).while 75%

of participants had poor diabetes control with no significant difference

between males and females (82.0% compared with 71.4%) and 17% had

fair control as assessed by GHA1c level (p = 0.069). In addition, no

significant differences between males and females were reported regarding

lipid profile where, 25.5% of the participants had hypercholestremia

(23.6% versus 26.9%) and 55.4% had hypertriglyceridemia (58.4% versus

53.2%) (p = 0.780).

Table4.5: Anthropometric Measurement and lab tests Characteristics by sex

Variable	Male (n =89)		Female(n=126)		Total		*P–
	N	%	N	%	N	%	Value
BMI							
18.5 – 24.99	15	17.0	5	4.0	20	9.3	
25 – 29.99	33	37.5	33	26.2	66	30.8	0.000
> 30	41	45.5	88	69.8	129	59.9	
Waist Circumference							
Male Female							
94 80	4	4.5	3	2.4	7	3.3	
>94 >80	57	64.0	116	92.	173	80.4	0.000
<94 <80	28	31.5	7	5.6	35	16.3	
Waist/Hip Ratio							
Male Female							
0.90 0.85	1	1.1	0	0.0	1	0.5	
>0.90 >0.85	59	66.3	73	57.9	132	61.4	0.198
<0.90 <0.85	29	32.6	53	42.1	82	38.1	
Fasting Blood Sugar							
70 – 115	16	18.0	13	10.3	29	13.5	
> 115	73	82.0	113	89.7	186	86.5	0.105
< 70	0	0.0	0	0.0	0	0.0	
GHA1 c							
5.4 – 6.8	2	2.3	12	9.6	14	6.5	
6.9 – 7.6	14	15.7	24	19.0	38	17.7	0.069
> 7.6	73	82.0	90	71.4	163	75.8	
Cholesterol							
< 200	68	76.4	92	73.1	160	74.5	
200 – 240	11	12.4	25	19.8	36	16.7	0.245
> 240	10	11.2	9	7.1	19	8.8	
Triglycerides							
< 150	37	41.6	59	46.8	96	44.6	
150 – 199	14	15.7	16	12.7	30	14	
200 – 500	35	39.3	45	35.7	80	37.2	0.780
> 500	3	3.4	6	4.8	9	4.2	

*A significant difference by Chi-Square test

4.6. Anthropometric Measurements at pre and post Educational Intervention program

By using paired t-test to compare the weight changes before and after intervention, a significant decrease (p =0.000) in weight was shown in table (4.6) .The mean weight before intervention was 80.81±14.95 had decreased to 78.9±14.33 after educational intervention. Accordingly, BMI was also decreased significantly (p =0.000) after educational intervention , where the mean BMI becomes 31.23±5.8 after educational intervention from 32.1±5.76 before intervention .Also a significant decrease were observed in waist and hip circumferences after educational intervention (p = 0.036 and 0.000).Where, the waist circumferences decreased significantly after intervention from 96.36 ± 12.34 to 95.51 ± 11.25.In addition, the hip circumferences decreased significantly from 108.78 ± 12.06 to 107.26 ± 12.04 after educational intervention. On the other hand, no significant decrease in the mean waist to hip ratio from 0.893±0.1010 to 889 ±0.07 after educational intervention were observed (p = 0.350).

Table 4.6: Anthropometric Measurements at pre and post educational intervention program

Measurements	Before Intervention *M + " SD	After Intervention *M + "SD	P-Value
Weight	80.81 ± 14.95	78.9 ± 14.33	0.000
Body Mass Index	32.1 ± 5.76	31.23 ± 5.80	0.000
Waist Circumferences	96.36 ± 12.34	95.51 ± 11.25	0.036
Hip Circumferences	108.78 ± 12.06	107.26 ± 12.04	0.000
Waist/Hip Ratio	0. 893 ± 0.101	0. 889 ± 0.174	0.350

*M =mean " SD = standard deviation

4.7. Lab tests at pre and post Educational Intervention program

As shown in table 4.7 a significant decrease were observed in fating blood glucose after educational intervention (p =0.049), where the mean fasting blood sugar was 188.65±71.45 before educational intervention became after educational intervention 177.7±66.11. Moreover, a noticed significant decrease in glycosylated haemoglobin after educational intervention (p = 0.000) were reported ,where mean glycosylated haemoglobin was 8.57± 1.21 before educational intervention had been decreased significantly to 7.95±1.42 after educational intervention .In addition, a clear significance decrease were observed in cholesterol level after educational intervention (p=0.000) .The mean value of cholesterol before educational intervention 183.27± 37.74 had been decreased to 169.57±34.23 after educational

intervention .Whilst , a slight significant decrease in triglycerides level were reported after conducting educational intervention (p=0.025).the mean triglycerides value had been decreased after educational intervention from 209.85±171.04 to 183.28±152.4

Table 4.7. Lab tests at pre and post educational intervention program

Investigations	Before Intervention *M + "SD	After Intervention *M + "SD P-Value
Fasting Blood Sugar	188.65 ± 71.45	177.70 ± 66.11 0.049
Glycosylated Hb	8.57 ± 1.21	7.95 ± 1.42 0.000
Cholesterol	183.27 ± 37.74	169.57 ± 34.23 0.000
Triglycerides	209.85 ± 171.04	183.28 ± 152.42 0.025

*M=mean   " SD = standard deviation

4.8. Knowledge Scores at pre and post Educational intervention program

As shown in table(4.8), by using paired t-test a significant increase in knowledge evaluation test scores were shown after educational intervention (p = 0.000). The mean score of knowledge test before educational intervention was 60.6±20.65 had been increased to 78.1±13.4 after conducting educational intervention; the variance was decreased from 20.65 to 13.40 which mean that knowledge becomes more homogeneous after educational intervention than before which gives an indication that educational intervention improves the knowledge for the patients.

Table 4.8: Knowledge Scores at pre and post educational intervention program

Sum of knowledge questionnaire score (100)	*M score ± "SD	t-value	P - value
Before Intervention	60.60 ± 20.65	- 15.654	0.000
After Intervention	78.1 ± 13.40		

*M=mean   " SD= standard deviation

Chapter Five
Discussion

Summary: This chapter will discuss the study results and their implications. Moreover, this study was an effort to measure the effect of diabetes education program on type 2 diabetic patients in Tulkarm Directorate of Health. The effect of diabetes education program on patient's anthropometric measurements, lab tests and knowledge.

5.1. Are there any statistically significant differences between males and females at the level of 0.05 regarding to socio-demographic characteristics among the studied sample?

This study found that the number of female participants is higher than the number of males (126 and 89 respectively) .This reflects the fact that the female's, attendance to diabetic center is higher than male's attendance. In addition, 84% of sample living in the villages around the city of Tulkarm with no significant differences between females and males (84.1% and 85.4% respectively).This may because of the highest percentage of the patients visiting the clinic are from the villages. Moreover, the mean number of family member was 5.8 which is near the outcomes of population census 2007[51]. Furthermore, the sample clarifies that half of the participants with low-income status for both males and females with 36.0% and 48.4% respectively with no differences. These findings indicate that the diabetic patients are among worse economic situation. On the other hand, the married females participants were 85.7% compared with males 97.8% which is consistent with the results of the population census 2007[51]. Females represent around 59% of the participants with 88.1% in the age group more than 40 years which represent the age of onset of type 2 diabetes. While the percentage of those over 40 year old in males were reached to 92.1% with significant difference .This gender imbalance is

likely due to a verity of factors including differences in work schedules and cultural norms[44].In addition to, 66% of the sample, mostly from females(79% compared with 45%) had a significant low educational level less than 12 years than males which is in the line of the finding of the population census 2007[51].which means females often married before completion the secondary school which increases the chance of getting chronic diseases in earlier age than men .While females mostly not working than males(50.7% compared with 2.3%) as most of them are housewives and unemployed.

5.2. Are there any statistically significant differences between males and females at the level of 0.05 regarding to diabetes related factors among the studied sample?

It is clear that at least 50% of the participants had a short duration of diabetes (less than four years) from the time of diagnosis with no significant difference between males and females (53.9% compared with 49.2%), mostly(82%) suffering from complication mainly neuropathy, which trigger and motivate the patient to take action to regain the control of diabetes [8].Many newly diagnosed patients are not understanding and assimilating all the knowledge and skills needed, so the patient may be very wishful to embrace the behavioural change[8].Majority of the participants (88.4%) had a family history of type 2 diabetes with no significant difference between males and females(86.5% compared with 89.7%), this reflects a high role of inheritance of type 2 diabetes.

 Only 3.7% of the participants are following lifestyle modification regimen and 40.5% of them depending on hypoglycaemic agents in their treatment regimen, with no significant differences between both sexes (47.2%

compared with 35.7%).This means, lacking of knowledge or educational resources in the clinic.

5.3. Are there any statistically significant differences between males and females at the level of 0.05 regarding health education information among the studied sample?

The study also shows a significant difference between males and females (50.6% compared with 68.8%) who never receive any educational program before in a busy diabetic clinic which means failure to provide a health education programs in the clinic and hence motivate the patients to seek for educational program.

5.4. Are there any statistically significant differences between males and females at the level of 0.05 regarding lifestyle factors among the studied sample?

5.4.1. Smoking

It was found that people did not change their lifestyle as a consequence of diabetes diagnosis. The reason may be people did not receive adequate information to change their life style.

Modifiable risk factors, like smoking cessation may reduce the progression of complications. Because of most of the participants were females, smoking is culturally not acceptable for them, so 70% of the participants with a significant difference between both sexes (31.5% compared with 98.4%) did not smoke at all, while 16% were smoked, but 12.6% smoke in the past.

5.4.2 Physical activity

60% of the participants are living in a sedentary lifestyle. Females were significantly less active than males (15.9% compared with 4.5%), .this activity group contains all employees and housewives. Social norms in society exclude adults especially females from engaging in public sports .Most of the females spent their times in chatting together with their relatives and neighbours, and watching TV movies and snacking [26].While ,no significant difference between males and females were reported regarding practicing physical activity in past three months.

A number of studies have shown that physical activity and exercise are significantly associated with lower incidence of diabetes, even in the high risk individuals [10].As Palestinian populations become more urbanized, and as lifestyles shift towards reduced physical activity and increased food consumption, the prevalence of obesity is expected to rise. This in turn could be an indicator for an increase in the occurrence of other chronic diseases in the region like diabetes [55].

5.4.3. Number of meals and other food pattern

55% of the participants(52.4% females and 58.4% males) reported that they ate three meals daily, there was no considerable difference between males and females .On the other hand, 50%(47.6% females and 50.6% males) of the sample ate between meals(more snacks), this explains that the majority of females were housewives working at home and their main task is working in the kitchen and preparing food .Whereas males were working outside and eat most of their meals at their workplaces[25].And 53%(49.2%females and 58.4% males) interesting in meal timing, in spite of regular meal timing is difficult in Palestinian culture as sharing food with family and guests is cultural very important [25].While a significant

difference between males and females were found regarding interest in reading the food label before using the food item(24.7% compared with 34.9%).This means females were more likely interest in reading the food labels than males. This suggests that females may be more concerned with health-related and/or weight control issues than males.

5.5. Are there any statistically significant differences between males and females at the level of 0.05 regarding anthropometric measurements and lab tests among the studied sample?

5.5.1 Body Mass Index

It became clear that the participants in this study did not make changes in their lifestyle as a consequence of diabetes diagnosis .This may be due to that the participants did not receive adequate information and support to change their lifestyle.

The results suggests that 59.5 %(45.5% and 69.8% for males and females respectively) of the participants were obese and this is consistent with the available scientific facts about type 2 diabetes as most of type 2 diabetic patients suffering from obesity [8]. In addition to the results showed that females were more obese than males, and this explains that 60% of the participants were females and housewives and did not engage in any type of exercise outdoors[51].Moreover, females especially the housewives, often eat the remaining food after meals, which results in extra weight gain[25].Other related factors may effect on tendency to weight gain were personal attitude toward weight and fatness vary between different social and cultural groups which effect on prevalence of obesity .It is considered in some developing countries as a symbol of affluence[25].

5.5.2. Waist circumference

Waist circumference is a convenient and simple measure which is unrelated to height, correlates closely with BMI and the ratio of waist/ hip circumference, and is an approximate index of intra-abdominal fat mass and total body fat. The results suggests that more than 80% of the participants were high waist circumferences with a significant differences between males and females (64.0% compared with 92.1%) which indicates that a high abdominal fat among females which associated with an increased risk of dyslipidaemia, high blood pressure and heart disease. Since men have greater total lean mass and bone mineral mass, and a lower fat mass than women, these differences continue throughout adult life. Women have substantially more total adipose tissue than men, and these whole body sex differences are complemented by major differences in tissue distribution. Men have greater arm muscle mass, larger and stronger bones, less limb fat and a relatively greater central distribution of fat.

5.5.3 Fasting Blood Sugar

As indicated in the table (4.5) fasting blood sugars levels were more than 115mg/dl in more than 80% of study sample with no significant differences between males and females (89.7% females and 82.0% males). This accounts poor control of daily blood sugar among majority of the participants and may be linked with lack of awareness about the disease. Thus there seems to be reasonably bad compliance toward appropriately prescribed dietary, exercise and medication. Normal value for diabetic patients is 70 – 115mg/dl.

5.5.4 Glycosylated Haemoglobin

GbA1c levels reflect the average level of glucose control over the period of two to three months .The outcomes of diabetes education intervention was

measured in terms of Haemoglobin A1c which was compared with the participants following the diabetes educational program instructions .GbA1c is considered normal or good controlled when the value is less than 6.8%.In this study , at least 75% of the participants had poor control of their diabetes and that they were at a high risk of Cardiovascular Diseases(CVD) .This is in agreement with the results of MOH 2008 report where found 80% of patients registered in diabetic clinics in PHCC had poor control of their diabetes which indicates a poor self-management for diabetic patients in this study and this may be due to lack of knowledge about the disease[28].

5.5.5 Cholesterol and Triglycerides

The blood lipids in this research were identified as total cholesterol and triglycerides .The results showed the discipline of these lipids before educational intervention, where 74% of the sample had normal cholesterol, this explains familial hypercholesterolemia. While triglycerides was high in more than 50% of the study sample .This can be attributed to several reasons including the duration of diabetes in 50% of study sample were less than four years or perhaps some patients were suffering from uncontrolled diabetes mellitus, obesity, sedentary habits and genetics.

5.6 Are there any statistically significant differences at the level of 0.05 between anthropometric measurements and lab tests on type 2 diabetic patients at pre and post diabetes educational intervention program?

It is evident that lifestyle intervention through education can prevent or at least postpone and delay type 2 diabetes and its complications and therefore should be implemented in primary health care [56].

This study provides evidence and proof that diabetes education for type 2 diabetic patients can be effectively implemented and that important health indicators significantly improve.

5.6.1 Weight and BMI

The body weight was measured before and after educational intervention program for study sample as well as body mass Index was assessed. The table (4.6) shows the mean change in weight and BMI before and after educational intervention .The results related to weight showed a significant decrease ($p < 0.05$ level) in weight as the average weight before intervention was 80.81and 78. 9 after intervention with average decrease 1.92 kg .In regard to BMI which is one of the standards of determining obesity , results showed a significant decrease in BMI ($p = 0.000$) where the average BMI before intervention was 32.1 and 31.23 after intervention with average decrease 0.798 .Thus , the past results indicate that the body weight and BMI drop significantly .This drop can be due to the role of educational intervention program in increasing their awareness on the need to maintain their normal weight and avoid obesity and guiding them to practice a continuous physical activity and meal timing. The results of this research were consistence with the results of earlier studies on the effect of diabetes education on weight loss which affects positively on body mass index .The researcher Davis and others found a greater weight loss (-2.98kg) in intervention group compared with (-1.85 kg) in control group at 4 and 12 months follow up from the beginning of group structured diabetes educational program [39].The researchers D.Jermy and others also discovered a significant reduction in mean weight and BMI in the intervention group and increased in control group in a controlled clinical study either community – based or group –centred public health addressing

nutrition and exercise in Costa Rica[33].and this approved in what has been reached in this research as the patients who received the educational program showed a decrease in body weight and thus decrease in BMI and this is due to the role of the educational program intervention to convince the patients about the need to preserve a normal weight so that there is a direct link between weight loss and improved blood sugar level[50].The results in this research revealed that the impact of the individual following the educational diabetes program particularly dietary management section in the extent of the patient's benefit from the program and following the instructions therein on weight reduction and BMI and this approved by the researchers Adachi and others[57].

5.6.2 Waist circumference

The waist circumference was measured before and after educational intervention program. As shown in the table (4.6).The results showed a significant decrease ($p < 0.05$ level) in waist circumference as the mean before intervention was 96.36 and 95.51 after intervention with an average decrease 0.85 cm. This drop can be due to the role of educational intervention program in increasing participant's awareness on the need to reduce their weight and avoid obesity and guiding them to practice a continuous physical activity and meal timing.

There is a continuous positive relationship of all markers of obesity (body-mass index, waist circumference and waist hip ratio) with major coronary risk factors- hypertension, diabetes and metabolic syndrome [58].

These results were agreed with the researchers Deakin, *et al* in UK, where they observe an improved mean of waist circumference other than GHA1c, weight, BMI and cholesterol after patient group –based self-management

program [59]. Moreover, central obesity, as measured by the W/H ratio, is importantly and independently associated with NIDDM, when the association between central obesity, as measured by the waist/hip ratio (WHR), and non-insulin-dependent diabetes mellitus (NIDDM) were studied by , Schmidt MI and others[60].In addition to a small changes were noted in waist circumference after introducing a clinical nutrition education program on a sample of type 2 diabetic patients in Razi hospital in Iran [45].Furthermore, The frequencies of BMI and WC were significantly higher in diabetic females than diabetic males as reported Lahham, H when she compare cardiovascular diseases and risk factors among diabetic patients and non- diabetic individuals living in Nablus district[61].

5.6.3 Fasting Blood Sugar

The fasting blood sugar was measured before and after educational intervention program for the study sample.

Table (4.7) shows the mean change in fasting blood sugar before and after the educational intervention .The results related to fasting blood sugar showed a significant decrease ($p < 0.05$ level) in fasting blood sugar as the average before intervention was 188.65 and 177.70 after intervention with average decrease 10.95 mg/dl .This large extent of these results can be traced to that the patients who received the educational program followed the instructions concerning the dietary management and exercise which highlighted in the educational program. This confirms the importance of diabetes educational program for the patients and convinces them to follow the dietary management which in turn lead to regulate the amount and type of food they eat and emphasize on the role of the program in guiding the patients to increase the amount of fiber. In addition, the role of weight loss

in regulating the blood sugar. These results agrees with the findings of other researchers where, Seyyednozadi, M. and others noted the role of diabetes education on dietary management and physical activity in controlling the fasting blood sugar where the results showed a significant effect in decreasing fasting blood sugar in diet and physical activity group [46].

Other factors that contributed to decreasing blood sugar are correcting the wrong information and myths about the dietary management. A study conducted to examine the effect of the Diabetes Outpatient Intensive Management Programme (DOIMP) on glycaemic control over a 12 weeks follow-up period for type 2 diabetic patients in Korea. Results showed that the patients in the intervention group had a mean decrease55.3 mg/dl in their FBG level compared with a decrease of 26.8 mg/dl in the control group [62].

5.6.4 Glycosylated Haemoglobin

The table (4.7) also revealed the results concerning glycosylated haemoglobin where a significant effect in decreasing the HbA1c (< 0.05 level) as the mean average before intervention was 8.57% and 7.95% after intervention with average decrease 0.621%. This change after receiving the educational program can be due to following the instruction related to dietary management and physical activity which lower the fasting blood sugar and therefore lowering the glycosylated haemoglobin.

Glycosylated haemoglobin plays an important role to see the discipline of blood sugar because the blood sugar changes from day to day , even from hour to hour and this investigation indicates the level of blood sugar during the preceding period of 2 – 3 months[2].

HbA1c of 6.5% is recommended as the cut point for diagnosing diabetes. A value less than 6.5% does not exclude diabetes diagnosed using glucose tests. The expert group concluded that there is currently insufficient evidence to make any formal recommendation on the interpretation of HbA1c levels below 6.5%. [63].

It is clear from the past results the effect of educational interventional program to reach the normal level of glycosylated haemoglobin in healthy people .the previous studies have demonstrated a decline in the level of glycosylated haemoglobin as a result of diabetes educational program where Davis and others found a reduction in glycosylated haemoglobin by 1.49% at 12 months in the intervention group compared with 1.21% in the control group [39]. Other studies indicate the role of clinical nutrition education on glycosylated haemoglobin as Shabbidar. S noted a decrease in HbA1c 1.9± 2.1% in the intervention group and 0.2±2.2% in the control group [45].Moreover, a study done in Jordan revealed a decrease in HbA1c by 1.87% in the intervention group after attending a dietary educational program [50].While , a significant decrease were noted in the intervention group 1.8±2.3% and 0.4±2.3% in the control group when a randomized controlled community-based nutrition and exercise intervention were conducted in type2 diabetic patients in rural Costa Rica[30].Redmond and others found a significant decrease in HbA1c by 0.66% and 1.46% among those with pre-test of HbA1c > 6.5% and > 8% respectively following the educational intervention [34]. The effect of intensive short diabetes patient education was observed in a decrease in glycosylated haemoglobin [64].

5.6.5 Cholesterol

The cholesterol was measured before and after educational intervention program for the study sample

Table (4.7) shows the mean change in cholesterol before and after the educational intervention .The results related to cholesterol showed a significant decrease ($p < 0.05$ level) in cholesterol as the mean before intervention was 183.27and 169.57 after intervention with average decrease 13.7 mg/dl.

This difference can be attributed to the possibility of that some patients had hypercholesterolemia from other causes, but not from high blood sugar. The former results showed a reduction in cholesterol level after receiving the educational program, which explain the role of educational program in educating the patients to eat less fat from animal sources and replacing it with fat from plant sources .In addition, avoiding the food that rich in cholesterol. The results also showed the role of educational program and following up the patients during the educational period in increasing the amount of fiber which plays an important role in lowering the cholesterol level in the blood. These results are according with the findings of the researchers Shabbidar and others where the cholesterol level were registered a small decrease in the intervention group after exposing the patients to a clinical nutrition education program in Iran[45].As well as the researchers in 8 studies (Randomized Controlled riels(RCT),quesi randomized trials, controlled before and after observational and cohort studies) reported a significant reduction in HbA1c , FPG and total cholesterol , systolic blood pressure ,weight and waist to hip ratio [65].And in a study done in UK by Deakin and others on patient-centred group based

self-management program and after 14 months follow up, total cholesterol level improved in addition to improving in HbA1c, BMI and waist circumference[59]. In Sweden , Hornsten ,in 2005 followed up type 2 diabetic patients for a 5 years compared a group sessions based on participants personal understanding of their disease with conventional diabetes care .He found a small reduction in cholesterol ,HDL,LDL, Triglycerides and BMI[66].

5.6.6 Triglycerides

The triglycerides was measured before and after educational intervention program for the study sample

Table (4.7) shows the mean change in triglycerides before and after the educational intervention .The results related to triglycerides showed a significant decrease ($p < 0.05$ level) in triglycerides as the mean before intervention was 209.85and 183.28 after intervention with average decrease 26.556 mg/dl. This decrease can be explained to several causes including that the duration of diabetes in 51% of the patients were less than three years or perhaps because of some patients had hypertriglyceridemia from other causes((genetic disorders, obesity)) other than high blood sugar .This reduction in triglycerides can be interpreted to the role of educational program intervention in adhering the patients the instructions in particular dietary management and physical activity .In addition to weight loss plays a significant role in reducing the level of triglycerides in the blood .The earlier studies referred to a reduction in triglycerides level in blood where the investigators Shabbidar and others found when they studied the effect of nutrition education on glycaemic control in type 2 diabetic patients a reduction in triglycerides level in blood in the intervention group[45].The

researchers also found a significant difference in triglycerides values in intervention group [46].while Horani found a non-significant decrease in triglycerides in the intervention group when she studied the effect of nutrition education of a Jordanian diabetic patients on lipids[50]. In addition , the studies revealed that the hypertriglyceridemia is one the main problems that the type2 diabetic patients faced which results from uncontrolled diabetes .The educational program had the role in maintaining the normal level of triglycerides through educating the patients mainly dietary management and physical activity. The researchers Fukuda,H. and others found that the intervention group showed a significantly greater reduction in body weight, BMI, body fat ratio, and TG. The HDL value also improved more significantly in the intervention group than in the control when they observe a three – day hospitalization and a six –months follow-up type 2 diabetic patient program [67].While Rameesh,M. and others demonstrate that HbA1c, total and LDL cholesterol, triglycerides and blood pressure significantly improved from the pre-SDPI to the SDPI period[36]. Moreover, Villareal,R determine whether obese type 2 diabetes patients starting intensive insulin therapy experience less weight gain and/or maintain body weight by consuming a high-monounsaturated fatty acid diet compared to patients consuming a conventional diabetic (ADA) diet. Both groups had large decreases in TG level but remained above the goal TG < 150 mg/dl [65].and this agrees with this study.

5.7. Are there any statistically significant differences at the level of 0.05 between diabetic patient's knowledge at pre and post diabetes educational intervention program?

The investigations that have been conducted on a study sample is measuring the knowledge level about the disease to evaluate how the patients take advantage from the educational intervention program ,since this test were conducted before and after the educational intervention program .As shown in the table (4.8), the mean scores before and after educational program were measured. Results clarified a significant increase in the mean scores after conducting educational program ($p < 0.05$).The mean scores before educational intervention program was 60.60where the mean score after educational intervention program became 78.1 with an increase in of 17.43 scores. These results proved a significant improvement in the patient's information about the disease as a result of the educational program role. This approved the findings of the researcher Hourani when the knowledge level increased significantly among a sample of Jordanian diabetic patients to study the effect of nutrition education on them[50].As Mireille Hamdan pointed a good knowledge of diabetes management among subjects participating in education classes for diabetes where they answered most of the questions correctly with an average percentage correct of 89% [2].In a study done by Hampton and others , a structured two-session education program was introduced for newly diagnosed 59 type 2 patients .when they evaluated the knowledge about diabetes , those who attended the education program seemed to have a better knowledge than the non- attenders[69]. According to Stankiewicz and Zablocki, a very significant increase in patient's knowledge was observed after introduction

of an educational program [70]. As Bazian, reported improving knowledge of foot care and changing self-reported behaviour in the short term was appeared after educational intervention about foot ulceration [71]. Moreover, Adolfsson observed the level of confidence in diabetes knowledge is significantly increased ($p<0.05$)[72]. While Davis, MJ. noted a greater positive change in understanding of the patients disease and it's seriousness after introduction of diabetes education and self-management for newly diagnosed patients [39]. However, Al-Rubeea, N monitoring a significant improvement in knowledge on diabetes and it's management in intervention group after introduction of diabetes education class for 1 -2 hours for six months conducted in diabetic Centre at Sana'a /Yemen [49].

And finally , Bawadi,H registered a significant increase($p<0.05$) in knowledge evaluation test scores in three groups (Diabetic Mother, Diabetic Child and Mother and Child group) after introduction of nutrition counseling on diabetic children and /or their mothers[18].

5.8. Conclusion and Recommendations

In conclusion, the results from this short educational intervention program on Type 2 diabetic patients in Diabetic clinic in Tulkarm Health Directorate indicates that lifestyle changes involving dietary, exercise and diabetes self-management being effective in significant decrease in weight , FBS,GhA1c ,Chol and TG and effective in improving patient's knowledge. Therefore, educational intervention program should be developed in diabetic clinics in primary health care centers in Palestine. Since primary health care providers have a better chance to meet with patients, promotion of diabetes education intervention programs by these centers will increase the effectiveness of diabetes therapy and will delay the onset or the

progression of complications, improve the quality of life for diabetic patients and reduce the associated medical costs.

Diabetes education is a cornerstone in the treatment of diabetes and should be an integral part of health planning .There are five target groups in the education process, and these groups are related to each other and need the an appropriate type of health education

1. Patients

-Educating the patients about the disease and the need to follow the suitable dietary management for the disease.

-Educating the patients about the importance of maintaining their weight and monitoring their daily blood sugar and lipids and blood pressure.

2. The family

- Educating the patient's family about diabetic meal planning and their dietary management and the relationship between obesity and the chance of disease occurrence.

- Educating the family in helping and assisting the diabetic patient to live with the disease through his involvement in his social and psychological problems.

- Educating the family about the importance of involvement of diabetic patient's food with family food.

3. Diabetes care team

- The ideal treatment would consist of a comprehensive and multi-disciplinary diabetes team. (Physician, Nurse, Nutritionist, Pharmacist, Social worker, foot specialist and others).

-Training of the diabetes care team on the management of diabetes and how to educate the diabetic patients is one of the major aspects of strategy towards improving diabetes care

- The importance of following the newly diagnosed patients in the family.

4. The Community

- Educating the community about the severity of the disease as a global public health problem and the necessity to follow up the risk groups like obese, and who are their ages more than 40 years and who have a family history of diabetes and who have impaired glucose tolerance.

- Empowerment of different mass media

5. Decision makers

- Establishment of regional records for diabetic patients in order to facilitate health care and health education for them.

-Make an intensive effort to reduce the burden the disease complications and premature death by improving the quality of diabetes care.

- Establish or support establishment of diabetes clubs to raise the awareness about the nature of disease and it's treatment to prevent or delay the complications.

Therefore, education and intervention programs should be developed in the primary health care centers that are involved in first stage health services, but are usually engaged in prescription renewal services. Since primary health care providers have a better chance to meet with patients, promotion of diabetes education and intervention programs by these centers will increase the effectiveness of diabetes therapy, and will delay the onset or the progression of microvascular complications, improve the length and quality of life for diabetes patients and reduce the associated medical costs.

References

1. World Health Organization. **Definition, Diagnosis and Classification of Diabetes Mellitus and it's Complications. Part1: Diagnosis and Classification of Diabetes Mellitus** .WHO/NCD /NCS/99. 2ed. Geneva. WHO,1999.

2. Hamdan, M. **Impact and Efficacy of Diabetes Education Programs among Adults**. East Tennessee: East Tennessee State University; 2007. Available from: UMI Number: 1445283.

3. WHO Media Centre, Facts Sheets: Available at:

http:/ www.who.int/mediacentre/en.

4. Alkaissi, A. Complications of Diabetes Mellitus. Available at: http://www.najah.edu/file/Essays/english/Aidah.

5. El-Barbari, N. **Factor Affecting the Occurrence of Type II Diabetes in Nablus City.** Nablus: An-Najah University; 2003.

6. WHO/IDF Report of consultation. **Definition and Diagnosis of Diabetes Mellitus and Intermediate hyperglycaemia**. World Health Organization/ International Diabetes Federation.2006.

7. World Health Organization**. Screening for Type 2 Diabetes**. Report of a World Health Organization and International Diabetes Fedration meeting. World Health Oragnization.2003.

8. Weinger, K. Carver, C. (2009). **Educating your patient with Diabetes**. New York: Humana Press; 2009. 333p. Library of Congress Control Number: 2008938924.

9. Buzzle.com. Type 2 Risk Factors; 2010; Available from: http://www.buzzle.com/articles/type2-diabetes-risk-factors.html.

10. Dumaidi, K. **Non-Insulin Dependent Diabetes Mellitus(NIDDM) Profile in Nablus District**. Nablus: An-Najah National University; 2000.Avilable from: Library of University of Jordan Number 529520.

11. Nather, A.Wu,P. Diabetes Mellitus and its Complications: A Global Problem. World Scientific Publishing Co. Pt. Ltd. 2005. Available: http://www.worldscibooks.com/medsci/6733.html.

12. IDF Diabetes Atlas, 5th edition. The global burden 2012. Available:

http://www.idf.org/diabetesatlas/5e/the-global-burden.

13. Latest diabetes figures paint grim global picture 2012.Availabele:

http://www.idf.org/latest-diabetes-figures-paint-grim-global-picture.

14. Health Status in Palestine**. Non-communicable Diseases**. MOH-PHIC. 2005.

15. IDF Diabetes Atlas,5th edition. Rates of DM in the Middle East to double in the next 20 years. Available: http://www.idf.org.

16. World Health Organization. **Global status report on non-communicable diseases 2010**. ISBN 978 92 4 068645 8 (PDF).

17. Brown, K. and Torabi, M. **Report of the 2011 Joint Committee on Health Education and Promotion Terminology**. American Journal of Health Education. 2012; 43(2).

18.Bawadi, H**. Effect of Nutritional Counselling of a group of Mothers and their Children with Insulin Dependent Diabetes Mellitus on Body weight and Blood glucose and Lipids**. Amman: University of Jordan; 2000. Available from: Library of University of Jordan Number 520994.

19. AL-Sobhi, L. **Diabetes Education in Oman: Needs Assessment and Development of an Intervention for Health Care Professionals**. Fort Collins: Colorado State University; 2007. Available from: UMI Number 3299751.

20. Parakash, L.etal. Diabetes Mellitus. Available from: http/www.medilam.ac.ir/portals/3 /EBOOK/Diabetes Mellitus.pdf.

21.Barnett DM, Elliott P, Joslin MD. **A Centennial Portrait**. Boston: Joslin Diabetes Center; 1998.

22.Norris SL, Engelgau MM, Narayan KM. **Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trials**. Diabetes Care 2001;24(3):561–87.

23.Gary TL, Genkinger JM, Guallar E, Peyrot M, Brancati FL. **Meta-Analysis of Randomized Educational and Behavioural Interventions in Type 2 Diabetes.** Diabetes Educ 2003; 29(3): 488–501.

24.Neglaa, M and Mohammed, E. **Effectiveness of Health Education Program for Type 2 Diabetes Mellitus Patients Attending Zagazig University Diabetes Clinic, Egypt**. Egypt Public Health Assoc. 2010; 85(3&4): 2070.

25. Al-Sabbah, H. **Diabetes Self-Management in Rural Palestinian Community.** Oslo: Institute of General Practice and Community Medicine; 2000.

26. Husseini, H. Abdul-Rahim, F. Awartani, J. Bjertness J. (2000). **Prevalence of diabetes mellitus and impaired glucose tolerance in a rural Palestinian population**. 6(5/6), 1039-1045.

27. Palestinian Ministry of Health. PHIC. **Health Report**. Palestine. October 2012.

28. Palestinian Ministry of Health, Department of Chronic Diseases Report, 2008. **Result Analysis of Investigation Forms for Diabetes Mellitus, West Bank.**

29. Al-Hamrani, I. 2009. **Health Education in the Management of diabetes on the Primary health care Level in Abha (K.S.A), Is there a difference between males and Females?**

30. Palesinian Ministry of Health report, 2003. **Palestinian Guidelines for Diagnosis and Management of Diabetes Mellitus**.

31**. Diabetes education and self-management**. Document ID: 1593, Version (25), Reference: bgp 25278.

32. Miller, CK. Edwards, L. Kissling, G. Sanille, L. (2002). **Nutrition Education Improves Metabolic Outcomes among Older Adults with Diabetes Mellitus: results from a Randomized Controlled Trial.** Preventive Medicine 34(2): 252-259.

33. Jermy, D. Fiebert, G, Sara, N. Mario, L. (2003). **Randomized Controlled Community-Based Nutrition and Exercise Intervention Improves Glycaemia and Cardiovascular Risk Factors in Type 2 Diabetic Patients in Rural Costa Rica**. Diabetes Care, 26(1): 24-28p.

34. Redmond, E. Burnett, S. Johnson, M. Park, S. (2006). **Improvement in A1c Levels and Diabetes Self-Management Activities Following a Nutrition and Diabetes Education Program in Older Adults**. Journal of Nutrition for the Elderly, 26(1/2): 83-99.

35. Stegall, R. **From Pyramid to the Plate: A multifaceted Nutrition Intervention for African Americans with Type 2 Diabetes**. Clemson University: 2008.

36. Rameesh, M. Schraer, C. Mayer,A. Asay, E. and Koller, K. (2008). **Effect of Special diabetes Program for Indians Funding on System Changes in Diabetes care and Outcomes among American Indian / Alaska Native People 1994-2004**. International Journal of Circumpolar Health. (76).

37. Burnett, S. **A Nutrition and Diabetes Education Program Improves A1c Knowledge and A1c Levels**. BS: The University of Georgia; 2003.

38. Conti, K. **The Medicine Wheel Nutrition Intervention: A Diabetes Education Study with the Cheyenne River Sioux Tribe**. South Dakota: South Dakota State University; 2007. 1-52. available from: UMI Number 1449273.

39. Davies, M.et al.(2008). **Effectiveness of the Diabetes Education and self-Management for ongoing and newly diagnosed type 2 diabetes: cluster randomized controlled trial**. BMJ.

40. Štrajtenberger, M. et al.(2010). **Standardized Educational Program in Persons with Type 2 Diabetes on Oral Hypoglycaemic Therapy: Effects on Glycaemic Control and Body Mass Index**. Diabetologia Croatia 40-2, 2011.

41. Milenkovic, T.et al.(2004). **Influence of Diabetic Education on Patient Well-Being and Metabolic Control**. Diabetologia Croatica 33-3,2004.

42. Tien, K et al.(2008). **Effectiveness of Comprehensive Diabetes Care Program in Taiwanese with Type 2 Diabetes**. Diabetes Res Clin Pract. ;79(2):276-83.

43. Malagi,U. and Naik, R.(2007). **Impact of Diet Modification and Education on Management of Type 2 Diabetes Mellitus**. Karnataka Journal of Agriculture Science. 20(2)

44. Heydari, G. Moslemi, S.Heydari, Q. Kebriaei, A. (2006). **Effects of Proper Nutrition Education on BMI Reduction and Changes on FBS, Chol and TG rates of Type 2 Diabetic Patients**. 6(3), 374-377p.

45. Shabbidar, S. Fathi, B. Shirazifard, N. (2006). **Effects of Clinical Nutrition Education on Glycaemic Control Outcomes in Type2 Diabetes**. Int J Dia Ctries 26(4): 156- 159.

46. Seyyednozadi, M. Shakeri, M. Rajabian, R Vafaee, A. (2008). **Role of Physical activity and Nutrition in Controlling Type 2 Diabetes Mellitus**. Journal of Biological Sciences 8(4): 794-798.

47. Hazavehei, S. Sharifirad, G. Mohabi, S. (2007). **The effect of educational program based on health belief model on diabetic foot care**. 27(1), 18 – 22 p.

48. Aciki, Y. Yildizhan, H. Canan, B. Ardicoglu, O. Ihans, N. (2004). **Effectiveness of a Diabetes Education and Intervention Program on Blood Glucose Control for Patients with Type 2 Diabetes in a Turkish Community**. 35(4).

49. Al-Robieye, A. 2006. **The Impact of Health Education Program on diabetic Patients aged more than 40 years in the capital Sana'a**.

50. Hurani, H. **The Effect of Nutrition Education of a Sample of Jordanian Diabetic Patients on Body Weight and Blood Glucose and Lipids**. Amman: Jordanian University; 1991. 16-75. available from: University Center;

51. Palestinian Central Bureau of Statistics estimation Report, **General Census of Population, Housing and Establishment 2009**.

52. Palestinian Ministry of Health. Tulkarm Directorate of Health **Annually Report.** Diabetic clinic statistics.2009.

53. WHO.(2008). **Waist circumference and Waist –Hip ratio**. Report of a WHO Expert Consultation.

54. World Health Organization report 2004. Available from:

www.//apps.who.int/bmi/index.jsp?introPage=intro_3.html.

55. Abdul-Rahim, HF. Ottesen, G. Stene, LCM. Husseini, A. Giacaman, R.Jervell, J. and Bjertness, E. (2003). **Obesity in a Rural and an Urban Palestinian West Bank population. International Journal for Obesity**. 140 – 146.

56. Asha, A. Pradeepa, R. Mohan, V. (2004). **Evidence for Benefits from Diabetes Education Program**. International Journal of Diabetes in Developing Countries, 24(4): 96-102p.

57. Adachi, M. Yamaoka, k. Watanabe, M. Nishikawa, M. Hida, E. Kobayashi, I and Tango, T. (2010). **Effects of Lifestyle Education Program for Type 2 Diabetes Patients in Clinics: Study Design for a Cluster Randomized Trial**. BMC Public Health.

58. Gupta, R. Priyanka, R. Sarna, M. Gupta, V. Sharrna, S. and Kothari, K.(2007).**Body-mass index, waist-size, waist-hip ratio and cardiovascular risk factors in urban subjects**. Journal of Association of Physicians of India.

59.Deaken, TA. Ade, JE. Williams, R. and Greenwood, DC. **Structred patient education: the diabetes X-PERT programme makes difference**. Diabetes Med. 2006,23(9): 933-4.

60. Schmidt, MI. Duncan, BB. Canani, LH. Karohl, C.and Chambless, L.(1992). **Association of waist-hip ratio with diabetes mellitus. Strength and possible modifiers**. Diabetes Care, 15(7).p 912-4.

61. Lahham, H. **Cardiovascular Diseases and risk factors Among diabetic Patients in Nablus District**. West Bank, Palestine: Case – control study. Nablus : An-Najah National University; 2009.

62. Song, M. and Kim, H.(2007). **Effect of diabetes Outpatient Intensive Management Program on Glycaemic Control for type 2 Diabetic Patients**. J Clin Nurs.2007 Jul ; 16(7):1367-73.

63. **Screening for type 2 diabetes (Technical Review)**. Diabetes Care 23:1563–1580, 2000.

64. Mani, UV. Syvastava, R. Mani, I. Parekh, A. Shah, V. Mehta, NC. Patel, HR. Dosi, M. and Iver, UN. (1989). **Effect of Diabetic Patient Education in the Management of Diabetes Mellitus**. 200-203p

65. Colagiuri R, Girgis S, Eigenmann C, Gomez M, Griffiths R. **National Evidenced Based Guideline for Patient Education in Type 2 Diabetes**. Diabetes Australia and the NHMRC, Canberra 2009.

66. Hornsten, A. Stenlund, H. Lundman, B. Sandstrom, H. **Improvements in HbA1c remain after 5 years--a follow up of an educational intervention focusing on patients' personal understandings of type 2 diabetes**. Diabetes Res Clin Pract. 2008 Jul;81(1):50-5.

67. Fukuda, H. Muto, T. and Kawamori, R. (1999). **Evaluation of a Diabetes Patient Education Program consisting of a Three-Day Hospitalization and a Six-Month Follow-up by Telephone Counselling of Mild Type Diabetes and IGT.** Environmental Health and Preventive Medicine (4). P. 122-129.

68. Villareal and Ronald. **A randomized Open – Label, Intervention Study to evaluate the Effect of Diet Composition on Weight gain in Obese, Type 2 Diabetes Patients Receiving Intensive Insulin Therapy**. TUI: TUI University; 2009.

69. Hampton, K. **Audit of an education programme for recently diagnosed Type II diabetic patients**. Practical Diabetes International. 2005 Vol 5 (4).

70. Stankiewicz EB, Zablocki M. **The effect of an education and rehabilitation program for blind diabetics on the level of metabolic equalization**. Polskie Archiwum Med Wewnetrznej 1998; 100: 145-52.

71. Bazian, **Evidence Based Guideline for Patient Education in Type 2 Diabetes**. 2008.

Appendices

Appendix 1
Basic Information Questionnaire

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جامعة النجاح الوطنية

كلية الدراسات العليا   2010

استمارة بحث حول ((أثربرنامج تثقيف السكري على مرضى السكري من النوع الثاني في عيادة السكري بمديرية الصحة بطولكرم))

<u>**أخي / أختي مريض /ه السكري**</u>

السلام عليكم و رحمة الله و بركاته

أنا أسامه عبد الكريم عبد الرحمن راشد طالب ماجستير في الصحة العامة بجامعة النجاح الوطنية ، أقوم بدراسةحول((**أثر برنامج تثقيف السكري على مرضى السكري من النوع الثاني في عيادة السكري بمديرية صحة طولكرم**)) لاستكمال برنامج الماجستير في الصحة العامة بالجامعة ، تتكون الاستمارة من ثلاثة أجزاء رئيسية : بعض المعلومات الديموغرافية (العمر، التعليم و غير ذلك) ، و معلومات مرضية و غذائية.لذا نأمل منكم المشاركة الفاعلة و التعاون في تعبئة هذه الاستمارة و الاجابه على تساؤلاتها وتوخي الدقة و الموضوعية و ذلك للمساهمة في وضع الحلول لهذه المشكلة الصحية التي يعاني منها الكثير من آبائنا و أمهاتنا و إخواننا علما بأن هذه البيانات سيتم التعامل معها بمنتهى السرية و الخصوصية و الأمانة

نشكر لكم حسن تعاونكم معنا و نتمنى لكم دوام العافية و موفور الصحة و التعايش مع المرض إن شاء الله

الباحث / الطالب: أسامه عب الكريم عبد الرحمن راشد

</div>

استمارة بحث حول

((أثر برنامج تثقيف السكري على مرضى السكري من النوع الثاني في عيادة السكري بمديرية الصحة بطولكرم))

رقم الأستبانه: ....   جوال: ....

رقم الملــف: ....   مكان السكن: ....

بيانات ديموغرافية

1. الجنس :   □ ذكر   □ أنثى

2. العمر :   □ 30-39   □ 40-49   □ 50 - 59   □ 60 - 69   □ 70

3. مكان السكن :   □ مدينة   □ قرية

4. الحالة الاجتماعية :   □ أعزب   □ متزوج   □ أرمل

5. المستوى التعليمي :   □ 0 - 6   □ 7   12   □ 13

6. ما هي مهنتك الحالية   □ عامل   □ مزارع   □ موظف حكومي   □ موظف قطاع خاص

□ مصلحة خاصة   □ عاطل عن العمل   □ غير ذلك،حدد......

7. ما هو دخلك الشهري :□ اقل من 1500 شيقلا   □ 1500   2500 شيقلا   □ 2501   3500 شيقلا

□ 3500 > شيقلا   □ لا ينطبق عليه السؤال

8. كم عدد الأشخاص الذين يسكنون معك في المنزل بدونك أنت □ 0 - 6   □ 7- 13   □ 14- 20   □ > 20

قياسات أنثروبومترية

2	1	
☐	☐	9. الطول (سم) :
☐	☐	10.الوزن (كغم) :
☐	☐	11.مؤشر كتلة الجسم:
☐	☐	12. محيط الخصر(سم) :
☐	☐	13. محيط الورك (سم):
☐	☐	14. نسبة الخصر إلى الورك :
☐	☐	15. فحص الضغط الانقباضي/ الانبساطي:
	☐	16. فحص السكر ألصيامي (ملغم/ديسيلتر):
	☐	17. فحص الهيموجلوبين السكري (%) :
	☐	18. فحص الكوليستيرول الكلي (ملغم):
	☐	19. فحص الجليسيرايدات الثلاثية (ملغم):

<u>بيانات صحية</u>

20. تاريخ الإصابة بالسكري: □ 2006 - 2009   □ 2000   □ 2005   □ 1995   1999   □ 1999 >

21. هل أصيب احد الأقارب بالسكري :   □ نعم   □ لا.

22. هل تعاني من مضاعفات مرض السكر :   □ نعم   □ لا. انتقل إلى السؤال 23.

□ اعتلال عصبي   □ اعتلال شبكية العين   □ اعتلال الكلى   □ أمراض القلب و الشرايين

□ أمراض دماغية وعائية   □ الضغط   □ مشاكل تتعلق بالقدم   □ أخرى

23. هل انت معتمد على :
□ الحبوب الخافضه للسكر   □ الحميه الغذائيه   □ الحبوب الخافضه و الحميه الغذائية معا

<u>بيانات تتعلق بالتثقيف الصحي</u>

24. هل سبق و أن تلقيت برنامجا تثقيفيا حول مرض السكر :   □ نعم   □ لا. انتقل إلى السؤال 28

25. ممن تلقيت البرنامج التثقيفي :   □ طبيب   □ أخصائي تغذية □ كتب، و نشرات متخصصة

□ معرفة شخصية   □ مصدر آخر، حدد...........

26. هل اتبعت الإرشادات التي قدمت لك :   □ نعم   □ لا. انتقل إلى السؤال 29.

27. إن عدم إتباعك للإرشادات يعود إلى :   □ صعوبة فهم الإرشادات   □ عدم معرفة كيفية استعمالها

□ عدم الاهتمام بما تحتويه هذه الإرشادات

□ أسباب أخرى

<u>بيانات تتعلق بنمط الحياة</u>

28. هل تدخن حاليا

□ نعم   □ لا، و لكن دخنت في السابق.   □ لا ، لم أدخن أبدا .

29. بالنسبة للنشاطات الجسمانية التي تقوم بها في عملك او في البيت ،هل تقضي معظم وقتك :

□ جالسا   □ واقفا   □ ماشيا على ارض مستوية و بسرعة عادية

□ تعمل عملا جسمانيا خفيفا   □ تعمل عملا جسمانيا شاقا   □ لاينطبق عليه السؤال(لا يعمل)

30. خلال الثلاثة أشهر الماضية ، هل قمت بشكل منتظم بنشاط جسدي يستمر على الأقل 20 دقيقة

متواصلة في وقت الفراغ مما يؤدي إلى تنفس سريع و إفراز العرق :

□ نعم   □ لا. انتقل إلى السؤال 31.

31. بأي وتيرة تقوم بالنشاط الجسدي :

□ 4 مرات في الأسبوع و أكثر   □ 3 مرات في الأسبوع   □ 1   2 مرة في الأسبوع

□ 2   3 مرات في الشهر   □ مرة في الشهر أو اقل

بيانات غذائية

32. كم عدد الوجبات الرئيسية التي تتناولها يوميا :

□ واحدة   □ اثنتان   □ ثلاث وجبات   □ أكثر من ثلاث وجبات

33. هل تتناول أي نوع من الطعام أو الشراب بين الوجبات الرئيسية : □ نعم   □ لا

34. هل تتناول وجباتك الغذائية بأوقات منتظمة :   □ نعم   □ لا

35. عندما تشتري منتجات غذائية ، إلى أي مدى تهتم في المعلومات الغائية المفصلة على ورق العبوه :

□ أهتم كثيرا   □ أهتم   □ لا أهتم كثيرا   □ لا أهتم على الإطلاق

شكرا لحسن تعاونكم

Appendix 2

Knowledge Evaluation Questionnaire

الأختبار التقويمي **القبلى** و **البعدي** المتعلق بمدى معرفة مريض السكري بالمرض و كيفية التعامل معه

عزيزي مريض السكري / الرجاء اختيار الأجابه الصحيحة من الأسئلة التالية:

1. مرض السكرى هو : -
(أ)عجز البنكرياس الكامل عن افراز الأنسولين
(ب)عجز البنكرياس الجزئي عن إفراز الأنسولين
(ج)عمل الأنسولين غير فعال   (د) جميع ما ذكر

2. مرض السكري هو حاله من :-
(ب) ارتفاع مستوى السكر بالدم.   (أ) ارتفاع مستوى السكر و الدهون بالدم
(د) لا شيء مما ذكر   (ج) ارتفاع مستوى الدهون بالدم

3. يفرز هرمون الأنسولين من :-
(ب) من البنكرياس فقط   (أ) البنكرياس و مناطق أخرى من الجسم
(د) لا شيء مما ذكر   (ج) من الغدة الدرقية

4. يصيب مرض السكرى :-
(ب) الأطفال و المراهقين   (أ) الأشخاص الكبار فقط
(د) لا شيء مما ذكر   (ج) الأشخاص الكبار و الأطفال و المراهقين

5. أنواع السكرى :-
(أ) النوع الأول هو المعتمد على الأنسولين(سكري الأطفال)
(ب)النوع الثاني غيرالمعتمد على الأنسولين(سكري الكبار)
(ج) سكري الحمل   (د) جميع ما ذكر

6. يتصف سكرى الكبار بـــ :-
(ب)عجز كامل في إفراز الأنسولين   (أ)عجز جزئي في إفراز الأنسولين
(د) لا شيء مما ذكر   (ج) يختفي المرض مؤقتا

7.يعتبر سكرى الكبار من :-
(ب) الأمراض المزمنة   (أ) الأمراض المعدية
(د) لا شيء مما ذكر   (ج) الأمراض المؤقتة

8. إن السمنة أو زيادة الوزن تعرض الشخص للأصابه بــ :-
(ب) ارتفاع ضغط الدم   (أ) السكري
(د) جميع ما ذكر   (ج) ارتفاع الدهنيات بالدم

9. من العوامل التى تزيد من احتمال الإصابة بسكرى الكبار :-

(أ) الزيادة في الوزن أو السمنة   (ب) الضغوط النفسية

(ج)الاستعداد الوراثي   (د) جميع ما ذكر

10. العوامل التالية تؤدى من زيادة احتمال الأصابة بسكرى الكبار

(أ) التقدم بالعمر   (ب) التدخين

(ج) قلة النشاط البدني   (د) جميع ما ذكر

11. من علامات ارتفاع السكر بالدم :-

(أ) كثرة التبول   (ب) العطش

(ج) الكسل العام   (د) جميع ما ذكر

12. من علامات هبوط السكر بالدم :-

(أ) التعرق الشديد   (ب) تسارع ضربات القلب

(ج) الشعور بالجوع   (د) جميع ما ذكر

13. يعرف هبوط مستوى السكر بالدم :-

(أ) عندما يكون مستوى السكر أكثر من 60 .

(ب) عندما يكون مستوى السكر أقل من 60 .

(ج) عندما يكون مستوى السكر أكثر من 120 .

(د) عندما يكون مستوى السكر اقل من 120 .

14. يؤثر عدم ضبط السكر فى الدم :-

(أ) الأعصاب و الكلى   (ب) العيون

(ج) القلب و الشرايين   (د) جميع ما ذكر

15. إن الاستمرار بضبط السكر و الدهن بالدم :-

(أ) لا يؤخر حدوث المضاعفات   (ب) يؤخر حدوث المضاعفات

(ج) يساعد بالشفاء من المضاعفات   (د) لا شيء مما ذكر

16.إن مرضى السكر يعانون من مضاعفات المرض :-

(أ) إذ تم ضبط السكر.   (ب) إذا لم يتم ضبط السكر

(ج) إذا لم يتناولون العلاج الموصوف لهم   (د) اذا لم يتم ضبط السكر و لا تناول الدواء

17. يمكن ضبط مستوى السكر بالدم :-

(أ) بتناول الأدوية الخافضة للسكر   (ب) ممارسة الرياضة اليومية

(ج) التنظيم الغذائي   (د) جميع ما ذكر

18. أى العوامل التالية تساعد على تخفيض الدهون بالدم :-

(أ) تخفيض الوزن   (ب) ممارسة الرياضة

(ج) تنظيم السكر بالدم   (د) جميع ما ذكر

19. من العوامل التي تساعد على ارتفاع السكر بالدم: -

(أ) عدم الانتظام بممارسة الرياضة   (ب) تناول جرعات الدواء بانتظام

(ج) الالتزام بالنظام الغذائي المقرر   (د) ألالتزام بتوقيت الوجبات

20. من التمارين الرياضية المستحبة للسيطرة على السكرى : -

(أ) المشي 20- 30 دقيقة يوميا   (ب) تمارين رفع الأثقال

(ج) المشي و رفع الأثقال معا   (د) لا شيء مما ذكر

21. إن ممارسة الرياضة بانتظام تؤدى إلى :-

(أ) تخفيض مستوى السكر بالدم   (ب) تخفيض ضغط الدم المرتفع

(ج) تخفيض الدهنيات بالدم   (د) جميع ما ذكر

22. لتفادى أية مضاعفات قد تصيب القدم : -

(أ) فحص القدمين و قص الأظافر بشكل صحي و منتظم

(ب) عدم تقريب الأقدام من مصادر الحرارة   (ج) عدم لبس الجوارب الضاغطة المشدودة

(د) جميع ما ذكر

23. من الأحذية المناسبة لقدم مريض السكرى :-

(أ) حذاء ذي كعب منخفض   (ب) حذاء غير ضاغط

(ج) حذاء مغلق من الأمام   (د) جميع ما ذكر

24. إن الفحص الدورى لشبكية العيون:-

(أ) يساعد على تجنب الإصابة بالعمى   (ب) يساعد على تسريع الأصابه بالعمى

(ج) ليس ضروريا لمريض السكري   (د) جميع ما ذكر

25. إن العلاج بالليزر:-

(أ) يمنع مضاعفات السكري على العين

(ب) يضر العين دائما

(ج)ليس ضروريا للمرضى الذين يعانون من ضرر في الشبكية

(د) لا شيء مما ذكر

26. يعتبر جهاز فحص السكر البيتي مهما لأنه :-

(أ) الطريقة المناسبه لمراقبة السكر بالدم

(ب)يساعد على معرفة مدى توافق العلاج مع التمارين الرياضية و التغذية المقررة

(ج) يساعد بضبط السكر   (د) جميع ما ذكر

27. إن المراجعة الشهرية أو النصف سنوية لعيادة السكرى :-

(أ) لا تساعد في علاج المرض   (ب) تساعد في التقليل من المضاعفات

(ج) ليست ضرورية للاكتشاف المبكر للمضاعفات   (د) لا شيء مما ذكر

28. إن زيادة وعي المريض حول المرض :-

(أ) تزيد من احتمالية الوقاية من المضاعفات   (ب) تزيد من سرعة حدوث المضاعفات

(ج) ليس ضروري لضبط السكر   (د) لا شيء مما ذكر

29. إن فحص التراكمي من الفحوصات الدورية المهمة لأنها :-

(ا)تعكس مدى ضبط السكر بالدم خلال الأربعة شهور الماضية

(ب)تساعد في تحديد جرعة و نوع العلاج

(ج) أ + ب

(د) لا شيء مما ذكر

30. النظام الغذائي لمريض السكري يحدده أخصائي التغذية :-

(أ) حسب الوزن و الطول   (ب)العمر و الجنس و النشاط الجسماني

(ج)الحالة الصحية للمريض   (د) جميع ما ذكر

31. إن الهدف من التنظيم الغذائي هو :-

(أ) ضبط مستوى سكر و دهون الدم   (ب)الحصول على الوزن الطبيعي

(ج) الوقاية من المضاعفات   (د) جميع ما ذكر

32. على مريض السكري :-

(ا) تناول الدهون من المصادر الحيوانية مثل دهن اللحوم و الدواجن و الأسماك

(ب) التقليل من تناول الزيوت النباتيه مثل زيت الزيتون

(ج) أ + ب

(د) لا شيء مما ذكر

33. إن التقليل من ملح الطعام والأطعمة المملحة :-

(أ) لا يساعد في الوقاية من المضاعفات   (ب) يساعد في الوقاية من المضاعفات

(ج) يساعد في ضبط السكر   (د) لا شيء مما ذكر

34. إن التقليل من القهوة و الإقلاع عن التدخين :-

(أ) يساعد على الوقاية من المضاعفات   (ب) لا يساعد في الوقاية من المضاعفات

(ج) يساعد في الوقاية من مشاكل تصيب القدم   (د) أ + ج

35. من الأغذية الواجب تجنبها :-

(أ) السكريات مثل السكر و العسل و الحلويات لاحتوائها على نسبة عالية من السكر

(ب) البقوليات و الفواكه لاحتوائها على نسبة عالية من النشويات

(ج)الخضروات و الحبوب لاحتوائها على نسبة عالية من النشويات   (د)جميع ما ذكر

36.من الأغذية التي يمكن تناولها باعتدال :-

(أ) الخضروات و الفواكه و البقوليات و منتجات القمح البلدي لاحتوائها على الألياف

(ب) الأطعمة المحتوية على نسبة قليلة من الألياف كالأرز و الخبز الأبيض

(ج) الزيوت النباتية كزيت الزيتون   (د) جميع ما ذكر

37. لا يسمح لمريض السكر بتناول الأرز بكميات كبيره:-

(أ) لاحتوائه على كمية عالية من النشويات   (ب) لاحتوائه على كميه عالية من الألياف

(ج) لاحتوائه على كميه قليلة من الألياف   (د) لاحتوائه على كمية قليله من النشويات

38. يتميز النظام الغذائي لمريض السكرى باحتوائه على :-

(أ) كمية عالية من النشويات و الألياف

(ب) كميه عالية من البروتين و قليله من الدهون

(ج) كميه قليلة من النشويات و الألياف

(د) كميه قليلة من البروتينات وكميه عالية من الدهون

39.تعتبر الفواكه من الأطعمة الغنية بالألياف :-

(أ) ينصح بتناولها باعتدال   (ب) ينصح بتناولها بكثرة

(ج) ينصح بتجنبها   (د) ينصح بالتقليل من تناولها

40. ينصح مريض السكر بتوزيع ما يتناوله من الوجبات :-

(أ) على ثلاث وجبات منتظمة على الأقل   (ب) وجبتان رئيسيتان منتظمتان

(ج) وجبه واحدة   (د) لا يهم عدد الوجبات و لا توقيتها

41. ينصح مرضى السكرى:-

(أ) بالإكثار من تناول المحليات الصناعية مثل السكرين و الدايت.

(ب) تجنب المحليات الصناعية مثل السكرين و الدايت .

(ج) الاعتدال في تناول المحليات الصناعية مثل السكرين والدايت.

(د) لا شيء مما ذكر

42. يمكن لمرضى السكرى من الأنواع التالية بالصيام شهر رمضان المبارك بدون حدوث مضاعفات : -

(أ) المعتمدون على الحبوب أو النظام الغذائي   (ب) المعتمدون على الأنسولين

(ج) المصابات بسكري الحمل   (د) جميع ما ذكر

مع تمنياتي لكم بالتعايش مع المرض و السعادة و السرور

Appendix 3

Mechanical column scale

Appendix 4

Tape Measure BP-KC5315-500-1

Appendix 5

Mercury Sphygmomanometer

Different Pictures from the Field

Different Pictures from the Field

Appendix: 6

Educational Materials

ماذا تعرف ؟!

جوانب من نمط الحياة الصحي

التعامل مع التوتر

التغذية

وبعض الأمراض المزمنه / غير الساريه

سكري الحمل (نشرة أولى)
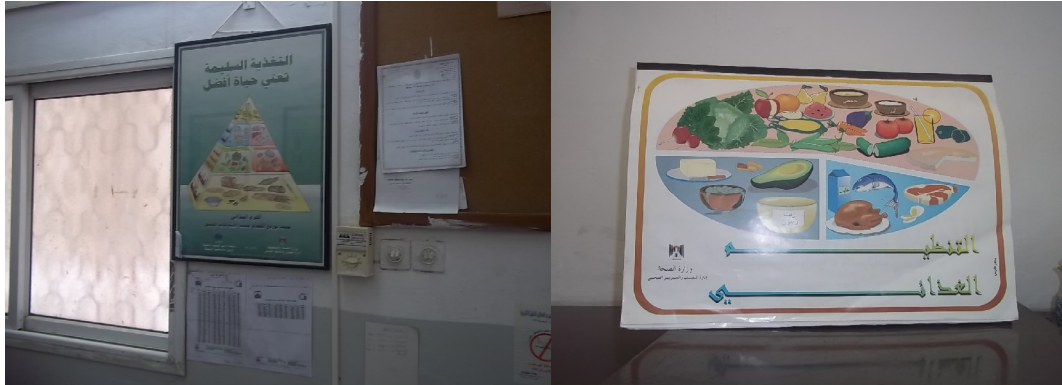
سكري الحمل

هو ارتفاع نسبة السكري في الدم خلال فترة الحمل

نسبة سكري الحمل ٢-٣٪ من مجموع الحوامل

معظم الحالات تعود نسبة السكر الى المعدل الطبيعي بعد الولادة. لكن لوحظ أن هناك ٦٠٪ من حالات سكري الحمل تتحول الى سكري دائم خلال ١٥ سنة من المتابعة بعد الولادة.

يجب إجراء فحص نسبة السكر في الدم لهؤلاء النساء ثلاث مرات خلال فترة الحمل وذلك في الفترة ما بين:
- ١٢- ١٨ أسبوع
- ٢٤- ٢٨ أسبوع
- ٣٠- ٣٤ أسبوع

ولجميع الحوامل دون إستثناء في الفترة ما بين ٢٤- ٢٨ أسبوع

النساء الأكثر عرضة لسكري الحمل

* النساء اللاتي أصبن بسكري الحمل في المرات السابقة.
* الوراثة.
* السمنة أو ازدياد الوزن خلال الحمل أكثر من المعدل الطبيعي.
* تاريخ ولادة سيء.

المضاعفات التي يمكن حدوثها نتيجة عدم السيطرة على نسبة السكر في الدم خلال فترة الحمل:

- زيادة وزن الجنين.
- ولادة طفل خداج.
- اعتلال الجهاز التنفسي.
- هبوط نسبة السكر عند الطفل بعد الولادة.
- هبوط نسبة الكالسيوم.
- الاصفرار.
- وفاة الطفل قبل الولادة.
- تشوهات خلقية.

الإجراءات الواجب إتخاذها لمنع المضاعفات قبل الولادة:

- التثقيف الصحي والتخطيط للحمل مسبقا.
- المحافظة على نسبة السكر في الدم بالمعدل الطبيعي خلال الحمل.
- مراجعة طبيب السكري وطبيب الولادة بإستمرار.
- المحافظة على نسبة السكر في الدم وذلك بالمتابعة الدقيقة واتباع العلاج باستمرار.

العلاج

- النظام الغذائي الجيد والنشاط الجسماني حيث أن معظم الحالات يتم السيطرة عليها بهذه الطريقة.
- للحوامل: يمنع استخدام الأقراص الخافضة للسكر بالدم.
- الأنسولين: يستعمل في حالة فشل انتظام الغذائي والنشاط الجسماني.

تستطيع الحامل المصابة بسكري الحمل أن تمر في مرحلة الحمل بشكل إعتيادي وأن تلد طفلا معافى شأنها شأن أى إمرأة أخرى إذا حرصت على السيطرة على نسبة السكر بالدم بصورة منتظمة.

وزارة الصحة — إدارة التثقيف والتعزيز الصحي
تحت إعادة طباعته بدعم من: merlin

السكري — سكري الحمل

السكري (نشرة ثانية)

السكري

عبارة عن خلل في عملية التمثيل الغذائي وينتج عنها ارتفاع في نسبة السكر بالدم نتيجة ل...
- نقص (كامل أو جزئي) في إفراز الأنسولين.
- نقص في فاعلية الأنسولين المنتج.
- الاثنين معا.

أنواع السكري:

١- السكري المعتمد على الأنسولين
يشكل ما نسبة ١٠-٢٠٪ من الحالات وغالبا ما يصيب صغار السن ولكن أحيانا يحدث عند البالغين.
ينتج عن نقص كبير أو انعدام في إفراز الأنسولين.

٢- السكري غير المعتمد على الأنسولين
- يشكل ما نسبة ٨٠-٩٠٪ من الحالات
- غالبا ما يحدث عند البالغين وأحيانا يصيب صغار السن.
- ٨٥٪ من مرضى هذا النوع يشكون من ارتفاع في الوزن.

٣- سكري الحمل
- وهو النوع الذي يظهر او يكتشف لأول مرة أثناء الحمل.

٤- ارتفاع نسبة السكر في الدم الناتج عن ظروف أخرى مثل:
- بعض أمراض البنكرياس
- بعض الأدوية والعقاقير (مركبات الكورتيزول وبعض أقراص منع الحمل)...إلخ.
- بعض أمراض الغدد الصماء.

العوامل المسببة للأصابة بالسكري

- السمنة وارتفاع الوزن: وهي منتشرة كثيرا بين مرضانا.
- العوامل البيئية وبعض الأمراض الفيروسية: ولها التأثير الكبير وخصوصا عند مرضى النوع الأول.
- العوامل الوراثية: وتكتسب أهمية كبيرة في النوع الثاني أكثر من النوع الأول.
- انعدام أو قلة النشاط الجسماني: مما يؤدي إلى ارتفاع الوزن وهذه الظاهرة واضحة بشكل ملموس في مجتمعنا.
- أمراض جهاز المناعة: (عندما يهاجم جهاز المناعة للجسم الجسم نفسه أو بعض مكوناته) مثل مهاجمة جهاز المناعة للخلايا الخاصة بافراز الأنسولين كما هو الحال في النوع الأول.
- بعض العقاقير: مثل مركبات الكورتيزول وبعض أقراص منع الحمل وكذلك بعض الأدوية المدرة للبول.

الأعراض

الأعراض المألوفة للسكري معروفة لدى الكثير وتشمل
- كثرة التبول والتبول الليلي.
- جفاف الفم والعطش وكثرة تناول السوائل.
- تناقص الوزن.
- وهن وضعف في الجسم.
- اضطراب في الرؤية.

بالنسبة لمصابي النوع الثاني فإن كثير من الحالات تكتشف عن طريق الأعراض المألوفة. في النوع الأول فإن ظهور الأعراض أسرع وخطرها اشد (إذا لم نعالج).

أما بالنسبة للنوع الثاني فالوضع مختلف بعض الشيء
* كثير من الحالات يتم اكتشافها بالصدفة عند عمل فحص البول لأغراض أخرى
* بعض حالات السكري تبدأ بمضاعفاتها مما يدل على ان الفترة الزمنية بين الحدوث الفعلي للسكري واكتشافه ممكن ان تكون كبيرة وتقدر بـ٤-١٢ سنة فحص الحالات يتم اكتشافها
* تقرحات في القدمين
* الشفاء البطيء لبعض الجروح
* البعض الآخر عن طريق العجز الجنسي او الحكة في الجهاز التناسلي الانثوي
* شعور بالتنميل والخدران في القدمين...إلخ.

وزارة الصحة — إدارة التثقيف والتعزيز الصحي
تحت إعادة طباعته بدعم من: merlin

السكري

أعراضه:

أ - زيادة لعطش والتبـــــــــول
ب - شـــــــعـــور بـــالتعب والاعياء
ج - آلام في المعدة وشـعور بـالغثيان والتقيؤ
د - وظهور رائحة الاستون (رائحة التفاح المتعفن) فـــي فـــم المصـاب
هـ - ســـرعة وصعوبة في التنفس

علاجـه

يجب نقل المصاب الى أقرب مستشفى

الوقـــايـــة :

أ - أخذ العلاج بـــــــانتظام
ب - للفحص المنتظم لنسبة السكر بـالدم
ج - فحص البول للكشف عن وجود الكيتون وخصوصا اذا كانت نسبة السكر بـالدم أكثر من (٢٤٠)، لو حدث التعرض لمرض حـاد مثل التهاب الفمين أو الإنفلونزا أو الإسهال والقيؤ
د - عند زيادة النشاط الجسماني والاتصال بالطبيب فورا عند ظهور الكيتون في البـــول

علاجـه

في حالة شعورك بهذه الاعراض بامكانك ان تتناول السكريات البسيطة مثل:

نصف كوب عصير - ملعقة كبيرة عسل أو سكر
كوب حـــلـيـب - ثلاث أقــراص جلوكوز

يجب الانتباه الى عدم محاولة إطعام المصاب (اذا كان فاقدا للوعي)، وهناك حقن تعطى في هذه الحـالات (جلوكاجون) في العضل ويجب نقل المصاب للمستشفى.

ب - ارتفاع نسبة السكر بالدم.

الحمض الكيتوني حالة خطيرة، وعادة تصيب مصابين السكري المعتمد على الانسولين في حالة الارتفاع الحاد لنسبة السكر بـالدم.

أسبابـه :

أ - عدم أخذ الكمية المقررة من الانسولين
ب - تناول كميات كبيرة من الطعام وخاصة الحلويات والاقـــلال من النشـــاط الجسماني
ج - الاصابة بـأمراض حـادة أو الغدلات خارجية.

مضاعفات السكري

السكري نوعان من المضاعفات

١- المضاعفات الحادة

تحدث غالبا خلال ساعات أو ايام بسبب عدم التوازن بين العلاج والغذاء

- انخفاض نسبة السكر بالدم.

يمكن حدوثه عند المصابين الذين يعالجون بالانسولين والأقــراص، وذلك للإصــاب للأسبــاب التالية:
زيادة كمية العلاج بصورة خاطئة.
عدم الالتزام بمواعيد الطعام أو عدم تناول الطعام بـعد الانســولين
القيام بمجهود عضلي أكثرمن اللازم.

أعراضـه :

شعور بالرجفة وشعور بالوهن والضعف.
كثرة تصبب العرق.
شعور بالجوع والتعب.
سرعة دقة التركيز وخفقان القلب.
صداع ودوخة وغشاوة بالنظر.
شعور بخدران وتنمّل بالشفتين.
فقدان الوعي.

لقد أثبتت الدراسات وخصوصا عند مصابي النوع الأول انه بـالانتظام الجيد لمستوى السكر بالدم عن طريق الالتزام بـأخذ الأدوية في مواعيدها والالتزام بــالنظام الغذائي المتوازن والنشاط الجسماني يمكن منع أو على الأقل تأخير حـدوث هذه المضاعفات

السكري

مضاعفات السكري

٢- المضاعفات المزمنة

تحدث بعد سنوات من الإصابة بالسكري ويمكن منعها أو تأخيرها بالسيطرة الجيدة على مستوى السكر بـالدم. وهي غالبا ما تحدث نتيجة لإصابة الأوعية الدموية الصغيرة والكبيرة ؛ وإصابة الأعصاب.

العوامل التي تؤدي الى زيادة هذه المضاعفات

- ارتفاع ضغط الدم
- ارتفاع نسبة السكر والدهنيات في الدم
- قلة النشاط الجسماني
- التــدخـيــن

من هذه المضاعفات:

أ - المضاعفات على العيون
ب - المضاعفات على الكلى
ج - المضاعفات على القدمين
د - المضاعفات على القلب
هـ - المضاعفات على الأوعية الدموية في الدمـــاغ

من التمارين المستحبة:

المشي الخفيف من ٢٠- ٣٠ دقيقة يوميا

أما بالنسبة للتمارين التالية فيفضل أداؤها ضمن شروط معينة

- كرة اليد
- كرة السلة
- كرة التنس
- كرة القدم
- الركض
- السباحة

---

* يفضل عدم ممارسة النشاط في حالة المرض او الالتهابات
* يفضل عدم الاعتماد على النشاط كليا كطريقة لتخفيض سكر الدم
* يفضل عدم القيام بالنشاط قبل النوم تلافيا لحدوث إنخفاض سكر الدم أثناء النوم.
* يفضل عدم تمرين العضو الذي حقن بالانسولين.

النشاط الجسماني

ان ممارسة النشاط الجسماني ... مناسب يزيد من القدرة على ... حكم بمستوى سكر الدم حيث ... يصح بأداء النشاط الذى يحتاج ... تا طويلا وجهدا اقل كالمشي. ... انتظر ساعة الى ساعة ونصف ... بعد الانتهاء من الوجبة ... ل البدء بالنشاط.

السكري

النشاط الجسماني

من فوائد النشاط الجسماني

- ضبط مستوى سكر الدم
- ضبط مستوى دهون الدم
- زيادة من فعالية عمل الأنسولين
- زيادة من فعالية عمل غدة البنكرياس
- تقلل من نسبة حدوث مضاعفات المرض

وزارة الصحة
إدارة التثقيف والتعزيز الصحي
تمت إعادة طباعته بدعم من:

merlin

عيادة العيون المتنقلة التابعة لمستشفى سانت جون للعيون - القدس بالتعاون مع جمعية البوهنينا الألمانية

تمويل من الأتحاد الأوروبي دائرة المجموعة الأوروبية للمساعدات الانسانية "ايكو"

EUROPEAN COMMISSION
Humanitarian Aid

أهمية الليزر في علاج اعتلال شبكية العين لدى مرضى السكري

بوهنينا
Johanniter

مستشفى سان جون للعيون
St. John Eye Hospital

Mobile Outreach Eye Clinic

Iplemented By
St. John Eye Hospital - Jerusalem

In Partnership with
Die Johanniter - Germany

Funded By
European Union Through
Humanitarian Aid Department
Of The European Commission
(ECHO)

EUROPEAN COMMISSION
Humanitarian Aid

اعداد : نصر الله حليلة / منسق العيادات المتنقلة

© St. John Eye Hospital - Jerusalem 2004

E.mail: info@commercialpress.ps

Appendix 7

Palestinian National Authority

Ministry of Health

Primary Health Care & Public Health Directorate
Health Education and Promotion Department
TL ; 0097192384771/2/3/4/5/6
Fax; 092384777
Email :hepd_moh@yahoo.com

السلطة الوطنية الفلسطينية

وزارة الصحة

الإدارة العامة للرعاية الصحية الأولية والصحة العامة
دائرة التثقيف والتعزيز الصحي
هاتف 0097192384771/2/3/4/5/6
فاكس 092384777
الإيميل: hepd_moh@yahoo.com

Ref.: ١٥٥٧/ Lu /PHC.

التاريخ: 2012/12/11

حضرة د. أسعد رملاوي المحترم

مدير عام إدارة الرعاية الصحية الأولية والصحة العامة

تحية طيبة وبعد ،،،،

الموضوع: الكتاب المحول من حضرتكم لي بخصوص المثقف الصحي (أسامه عبدالكريم)

بخصوص الاستدعاء المقدم من السيد أسامه راشد حول رغبته في تنفيذ البحث المتعلق بالتثقيف الصحي والسكري فإنه لامانع لدي لقيامه بذلك وخصوصا انه يقوم بشكل دائم بعمل تثقيف صحي للمرضى في عيادة السكري للمرضى والمراجعين وممكن الاستفاده من نتائج بحثه في تعميم التجربه على محافظات أخرى حيث ان التثقيف الصحي جزء اساسي من العنايه بالمرضى ومساعدتهم في السيطره على حالتهم الصحيه وتقليل المضاعفات المحتمله .

ملاحظه :

أعتذر بأني لم أقم بالرد على الكتاب سابقا بسبب انه فهمت ان الكتاب مجرد للعلم بالنسبه لي حيث أنه لم يذكر (لإبداء الرأي)

مــع الاحتــرام والتقـديـر

لبنى صوالحة صدر
مديرة دائرة التثقيف والتعزيز الصحي

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة للرعاية الأولية والصحة العامة
وارد رقم ١٤١٧
التاريخ : ١٢/١٤/٢٠

السلطة الوطنية
وزارة الصحة
الإدارة العامة للرعاية الصحية الأولية
مديرية صحة طولكرم
وارد رقم : ١٩١٩/٦
في : ١٢/١٧

Pre-test / Post-test table:

Meas	1st	2nd	average	Meas	1st	2nd	average
HT	155	155	155	HT	155		
WT	75	74.5	74.75	WT	69	69.5	69.25
BMI	31.28?	31.45	31.107	BMI			
WC	83	84	83.5	WC	69	70	69.5
HC	113	113	113	HC	100	103	101.5
W/H	0.735	0.743	0.739	W/H			0.685
BP	110/70	110/70	110/70	BP	140/90		

	pre-test			post-test	
FBS	113		FBS	112	
GHAK	7.5(?) (9.3 <8.6)		GHAK	6.1 (<6.4)	
Chol	169		Chol	143	
TG	189		TG	66	

standarization

FPG	182	FPG	182			
GHAK	7.9	GHAK	7.4			
Chol	164	Chol	169			
TG	316	TG	370			
FPG	159	FPG	125			
GHAK	8.0	GHAK	7.8 (?)			
Chol	90	Chol	138			
TG	20	TG	73			
FPG	214	FPG	172			
GHAK	8.9	GHAK	8.2			
Chol	180	Chol	203			
TG	161	TG	247			
FPG	94	FPG	95			
GHAK	5.9	GHAK	6.2			
Chol	125	Chol	145			
TG	156	TG	175			
FPG	139	FPG	126			
GHAK	9	GHAK	9.4 (?)			
Chol	126	Chol	145			
TG	279	TG	340			

An-Najah
National University

Faculty of Graduate Studies
Dean's Office

جامعة
النجـــاح الوطنية
كليـــة الدراســــات العليـــا
مكتب العميد

الرقم: 689 ني/د.ع.ص/2010
التاريخ: 2010/4/20

حضرة الدكتور ايمن حسين المحترم

منسق برنامج ماجستير الصحة العامة

تحية طيبة وبعد،

الموضوع : الموافقة على عنوان الاطروحة وتحديد المشرف

قرر مجلس كلية الدراســات العليا في جلسته رقم (220)، المنعقدة بتاريخ 2010/4/7، الموافقة على مشروع الأطروحة المقدم من الطالب / اسامة عبد الكريم عبد الرحمن رائد، رقم تسجيل 10753046، تخصص ماجستير الصحة العامة، عنوان الأطروحة:
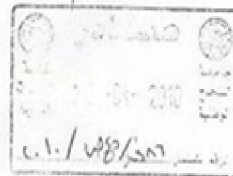
(أثر برنامج تثقيف مرضى السكري من النوع الثاني في مديرية صحة طولكرم)
(Effects of Diabetes Educational Program on Type 2 Diabetic Patients in Tulkarm
Directorate of Health)

بإشراف : د. حليمة صباح

وتفضلوا بقبول وافر الاحترام ،،،

عميد كلية الدراسات العليا

د. محمد أبو جعفر

نسـخة : د. رئيس قسم الدراسات العليا للعلوم الطبيعية
د. عميد القبول والتسجيل
: مشرف الطالب
: الطالب
: الملف

جامعة النجاح الوطنية

كلية الدراسات العليا

اثر برنامج تثقيف سكري على مرضى السكري من النوع الثاني في مديرية صحة طولكرم

إعداد

أسامه عبد الكريم عبدالرحمن راشد

إشراف

د . حليمة الصباح

قدمت هذه الأطروحة استكمالا لمتطلبات درجه الماجستير في الصحة العامة بكلية الدراســـات العليا في جامعه النجاح الوطنية نابلس فلسطين.

2012

اثر برنامج تثقيف سكري على مرضى السكري من النوع الثاني في مديرية صحة طولكرم

إعداد

أسامه عبد الكريم عبدالرحمن راشد

إشراف

د . حليمة الصباح

الملخص

يمر المجتمع الفلسطيني كباقي مجتمعات الدول النامية في العالم بتغير سريع و مذهل في نمـط الحياة العام و تطورات اجتماعية متسارعه حيث يزداد التعرض للضغوطات النفسيه و ارتفـاع بنسب المدخنين و تغير ملحوظ في العادات الغذائية و هذا بدوره يزيد مـن فرصـة الأصـابه بالأمراض غير المعدية و خصوصا مرض السكري . ان المضاعفات المرافقة لمرض السكري يمكن تلافيها أو التقليل من فرصة حدوثها إذا تم المحافظة على مستوى السكر بالدم في اغلـب الأحيان و لعل أفضل الطرق لتحقيق هذا الهدف هو توعية المريض حول كيفية ضبط مـستوى السكر بالدم.

هدف الدراسة

تهدف هذه الدراسة الى قياس اثر برنامج التثقيف السكري على مرضى السكري مـن النـوع الثاني في مديرية صحة طولكرم

طريقه إجراء البحث:

اجريت دراسة تدخليه شبه تجريبيه من برنامج تثقيف صحي مع فحص قبلي و بعـدي لعينـة الدراسه.

الفحص القبلي والبعدي تضمن بعض القياسات البشرية (الوزن و الطول و معامل كتلة الجسم و محيط الخصر) و بعض الفحوصات المخبريه الروتينية للمريض (مستوى السكر بالدم و معدل

التراكمي و مستوى الكوليستيرول و الدهون الثلاثية) بالإضافة الى فحص لمستوى المعرفة عند المريض.

عينه الدر اسه:215 مريض سكري من النوع الثاني و الذين لا يعتمدون على الأسولين

النتائج

تكونت عينة الدراسة من (41.4%)من الذكور ، والإناث (58.6%) وكان متوسط العمر لدى العينه (51.07 سنه).

لقد اظهرت الدراسه النتائج التاليه:

-انخفض الوزن انخفاضا ذات دلاله معنوية (على مستوى الدلالة المحسوب 0.000) من 80.8 الى 77.3كغم على وتبعا لذلك انخفض معامل كتلة الجسم

-انخفض محيط الخصر انخفاضا ذات دلاله معنوية (على مستوى الدلالة المحسوب0.036) من 96.36 الى 95.51 سم

-انخفض مستوى السكر بالدم انخفاضا ذات دلاله معنوية (على مستوى الدلالة المحسوب (0.049) من 188.65 الى 177.7 ديسيلتر .

-انخفض مستوى التراكمي انخفاضا ذات دلاله معنوية (على مستوى الدلالة المحسوب (0.000) من 8.57 الى 7.95%

-انخفض مستوى الكوليستيرول انخفاضا ذات دلاله معنوية (على مستوى الدلالة المحسوب (0.000) من 183.27 الى 169.75 ملغم كما انخفض مستوى الدهون الثلاثية (على مستوى الدلالة المحسوب (0.025) من 209.85 الى 183.28 ملغم.

زد على ذلك أظهرت الدراسة أيضا ارتفاعا ملحوظا ذات دلاله معنوية (على مستوى الدلالة المحسوب (0.000) على الدرجات الحاصل عليها المريض من 60.6 الى 78.1

التوصيات

أظهرت الدراسة ان التثقيف الصحي لمريض السكري ذات تأثير ايجابي عليه لا سـيما على المدى القصير و هذا يثبت ان التثقيف الصحي يشكل الحجـر الأسـاس في عــلاج و ادارة المرض و جزءا لا يتجزأ من عملية التخطيط الصحي و ذلك بإشراك المـريض و عائلتــه و الفريق الطبي المعالج والمجتمع و صناع القرار في عملية التثقيف .