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**Knowledge, Attitude and Practice of Foot Care
Among Diabetic Patients at UNRWA Health Centers
in Gaza Strip**

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M.P.H. Thesis

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Diabetic Patients at UNRWA Health Centers
in Gaza Strip**

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Thesis Approval

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Dedication

I dedicate this simple work to ...

To the spirit of my father,
To my mother,
To my wife, sons and daughters,
To my brothers and sisters,

To all those who gave me every opportunity of success.

Saeed Mohammed Shaheen

Declaration

I certify that this entire thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed

Saeed Mohammed Shaheen

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Abstract

Diabetes is a chronic condition affects large segment of population through out the world and can cause a number of serious complications. Problems with the feet are one of the most common. Foot problems are a global problem resulting in major economic consequences for the patients and their families. Self-reported preventive practices have been linked with decreased risk for lower-extremity amputations.

The aim of this study is to investigate the level of knowledge, attitude and practices of diabetic patients about foot care at UNRWA primary health clinics of the middle area of Gaza Strip. A descriptive analytic cross sectional study was conducted for this purpose. A sample of 300 type 2 diabetic patients both males and females over 18 years old were randomly selected using systematic sampling method. Data were collected through face to face questionnaire.

The results show that the level of participants knowledge and practice of foot-self care was less than 60 % while the level of attitude toward foot-self care was more than 60%. The results of the study show statistical significance relationship between participant awareness (knowledge, attitude and Practice) about foot care and their, gender, age, marital status, educational level, work status, type of work, family income per month, number of family member, the duration of diabetes and the presence of previous foot complications as independent variables.

Participants level of knowledge about foot care: Males are having more knowledge than Females, married participants have more knowledge than widowed, employed participants are having more knowledge than unemployed ones. There are positive relationship between participant level of knowledge about foot care and their level of education, number of their families members and the duration of diabetes.

Participants level of attitude toward foot care: young diabetics show more positive attitude than old ones, married participants more than widowed and diabetics who do not have foot complications are having more positive attitude than those who have foot complications. there are positive relationship between participants level of attitude toward foot care and their level of education as well their families income per month. There are negative relationship between participants level of attitude toward foot care and the number of their families members as well the duration of diabetes.

Participants level of foot care practice: there are positive relationship between participants level of daily foot care practice and their level of education as well their families income per month.

Results show that,11 % of participants were having foot problems (ulcers or amputations). 61% of participants barriers to foot-self care were related to knowledge deficit about foot care wile 39% of the barriers were related to participants themselves, like participants do not have the time to practice foot care or they cannot do these practices alone.

The patient himself plays the crucial role in the prevention of diabetic foot disease and therefore education on foot care must provided to all people with diabetes until they can describe foot care practices and demonstrate these practices into their daily life. more attention must provided to females, old diabetics and poor ones

ملخص الدراسة

مرض السكري يعاني منه الكثير من الناس في مختلف أنحاء العالم ويسبب مضاعفات كثيرة. من أهم هذه المضاعفات الأضرار التي تصيب القدمين والتي ينتج عنها تقرح القدم أو بتر القدم. تعتبر مضاعفات القدمين مشكلة عالمية تتسبب في أضرار اقتصادية كبيرة لكل من المريض وأسرته ومجتمعه الذي يعيش فيه. العناية اليومية بالقدمين تعتبر وسيلة مهمة وناجحة للحد من هذه الأضرار.

الهدف من هذه الدراسة هو التعرف على مستوى المعرفة والميول والممارسة لدى مرضى السكري بالنسبة للعناية بالقدمين في عيادات الوكالة في المحافظة الوسطى من قطاع غزة. هذه الدراسة هي دراسة وصفية تحليلية مقطعية، أجريت على 300 مريض من النوع الثاني من مرضى السكري من كلا الجنسين والمسجلين في العيادات تم اختيارهم بطريقة العينة العشوائية المنتظمة. وقد جمعت المعلومات اللازمة من ملفات المرضى ومن الاستبيانات التي تم تعبئتها من قبل الباحث من خلال مقابلات أجريت مع المرضى في العيادات.

وقد وجد أن مستوى كلا من المعرفة والممارسة لدى المشاركين بالنسبة للعناية بالقدمين اقل من 60%، وميول المشاركين للعناية بأقدامهم أعلى من 60%. وتبين من الدراسة وجود علاقة ذات دلالة إحصائية بين وعي المشاركين بالنسبة للعناية بالقدمين ومتغير كلا من العمر والجنس والحالة الشخصية ومستوى التعليم والعمل ومستوى الدخل الشهري للأسرة وعدد أفراد الأسرة للمشاركين ومدة المرض وكذلك وجود أو عدم وجود مضاعفات سابقة في القدمين.

مستوى المعرفة لدى المشاركين بالنسبة للعناية بالقدمين: أظهرت الدراسة أن الذكور لديهم معرفة بالعناية بالقدمين أعلى من الإناث، والمتزوجين لديهم معرفة أعلى من الأراامل، كذلك المرضى العاملين لديهم معرفة أعلى من الذين لا يعملون. كما تبين من نتائج الدراسة وجود علاقة موجبة بين مستوى المعرفة لدى المشاركين بالنسبة للعناية بالقدمين ومستوى التعليم وعدد أفراد الأسرة وكذلك مدة المرض لدى المشاركين.

ميول المشاركين بالنسبة للعناية بالقدمين: أظهرت الدراسة أن المرضى الذين تقل أعمارهم عن 45 سنة لديهم ميول للعناية بالقدمين أعلى من المرضى الذين تزيد أعمارهم عن 60 سنة، والمتزوجين لديهم ميول أعلى من الأراامل، كما أن المشاركين الذين لا يعانون من مضاعفات القدمين لديهم ميول أعلى من الذين يعانون من مضاعفات القدمين. كما تبين من الدراسة وجود علاقة موجبة بين ميول

المشاركين بالنسبة للعناية بالقدمين ومستوى التعليم وكذلك مستوى دخل العائلة الشهري لدى المشاركين. كما تبين وجود علاقة سالبة بين ميول المشاركين بالنسبة للعناية بالقدمين وعدد أفراد الأسرة وكذلك مدة المرض لدى المشاركين. مستوى ممارسة العناية بالقدمين لدى المشاركين: أظهرت الدراسة وجود علاقة موجبة بين ممارسة المشاركين للعناية اليومية بالقدمين و مستوى التعليم وكذلك مستوى دخل الأسرة الشهري لدى المشاركين في الدراسة.

كما أظهرت النتائج أن 11% من المشاركين يعانون من مشاكل في القدمين. أما بالنسبة للمعيقات التي تمنع المشاركين من العناية بالقدمين فقد تبين أن 61% من هذه المعوقات ترجع إلى عدم المعرفة بكيفية العناية بالقدمين, وأن 39% من المعوقات ترجع إلى المشاركين أنفسهم مثل: ليس لديهم الوقت الكافي للقيام بذلك أو أنهم لا يجدون من يساعدهم.

أن الدور الأكبر للوقاية من مضاعفات القدمين يقع على مريض السكر نفسه, لذلك يجب عليه أن يتعلم الطرق الصحيحة للعناية بالقدمين وممارسة هذه الطرق في حياته اليومية. كما أن تعلم هذه الطرق يجب أن توفر لجميع مرضى السكري وخاصة الإناث وكبار السن والفقراء.

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Definitions

Attitude: Attitude is an emotion that all people get when they have other emotions. Attitudes are positive, negative or neutral views of an attitude object like; person, behavior or event (Wikipedia, 2007).

Diabetes mellitus: is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels (ADA,1997).

Gestational diabetes mellitus: is an operational classification rather than pathophysiologic condition, identifying women who develop diabetes mellitus during gestation. Women with diabetes mellitus before pregnancy are said to have "pregestational diabetes" and are not included in this group. Women who develop type 1 diabetes mellitus during pregnancy and women with undiagnosed asymptomatic type 2 diabetes mellitus that is discovered during pregnancy are classified with gestational diabetes mellitus (ADA,1997).

Knowledge: is seen as a dynamic system, organized into certain structures forming an internal relationship between man and his environment, and Learning is a change in this relationship occurring as a result of the individual interpretations often within the knowledge system (Brown, 1990).

Other Specific Types of diabetes mellitus: a group of DM includes types of diabetes mellitus of various etiologies as: persons with genetic defects of beta-cell function (maturity-onset diabetes in youth, MODY), or with defect of insulin action; persons with diseases of exocrine pancreas, such as pancreatitis; persons with dysfunction associated with other endocrinopathies; and persons with pancreatic dysfunction caused by drugs, chemicals or infections (ADA,1997).

Practice: Practice is to do or to perform habitually or customarily or repeatedly in order to acquire a skill (Wikipedia, 2007)

Type 1 diabetes mellitus: is formerly called type I, Insulin Dependent Diabetes Mellitus (IDDM) or juvenile diabetes, characterized by beta cell destruction caused by autoimmune process, usually leading to absolute insulin deficiency. Over 95 percent of persons with type I diabetes mellitus develop the disease before the age of 25, with an equal incidence of both sexes and an increased prevalence in the white population (ADA,1997).

Type 2 diabetes mellitus: is formerly called type II, None Insulin Dependent Diabetes Mellitus (NIDDM) or adult-onset Diabetes. This type characterized by insulin resistance in peripheral tissue and deficiency in insulin secretion. This is the most common form of diabetes mellitus and is highly associated with a family history of diabetes, older age, obesity and lack of exercise (ADA,1997).

List of abbreviations

AAH	Ahli Arab Hospital
ADA	American Diabetic Association
BC	Before crest
BRFSS	Behavioral Risk Factor Surveillance System
CI	Confidence Interval
DM	Diabetes Mellitus
GDM	Gestational Diabetes Mellitus
GDP	Gross Domestic Production
GNP	Gross National Production
GS	Gaza Strip
HRQOL	Health Related Quality Of Life
IDDM	Insulin Dependent Diabetes Mellitus
LSD	Less Significance Difference
MODY	Maturity Onset Diabetes in Youth
MOH	Ministry Of Health
NCDs	Non-Communicable Diseases
NGOs	Non-Governmental Organizations
NIDDM	Non- Insulin Dependent Diabetes Mellitus
OR	Odds Ratio
PCBs	Palestinian Central Bureau of Statistics
PHC	Primary Health Care
PNA	Palestinian National Authority

RCTs	Randomized Controlled Trails
UK	United Kingdom
UKPDS	United Kingdom Prospective Diabetes Study group
UNRWA	United Nation Relieve and Work Agency
USA	United States of America
WB	West Bank
WHO	World Health Organization

Chapter (1)

Introduction

The disease diabetes has been known to mankind since antiquity. It was described earlier by the ancient Egyptian since 1500 BC. Diabetes is a common and wide spread disorder occurring in every part of the world. It can occur at any time regardless of race, sex or background. The inception of insulin therapy over 70 years ago has enabled diabetic patients to live a full life. In their later years they often suffer degenerative complications; particularly vascular disorders, kidney disease, neuropathy, blindness, and it can give rise to foot lesions, which may progress to gangrene and limb amputations (Bloom and Ireland, 1992).

Foot problems are indeed a global problem and there is no area in the world that does not report the development of foot lesions as a consequence mainly of neuropathy and peripheral vascular diseases as complications of diabetes mellitus. It is estimated that approximately 15% of the more than 150 million people with diabetes world-wide will at some stage develop diabetic foot ulceration. Most of these complications can be prevented with a little extra foot care. If complications do occur, daily attention will ensure that they are detected before they become serious. It may take time and effort to build good foot care habits, but self-care is essential. In fact, when it comes to foot care, the patient is a vital member of the medical team. The patient himself plays the crucial role in the prevention of diabetic foot disease and therefore education on foot care is important (Litzelman, et al, 1997).

The prevalence of active foot ulceration varies from approximately 1% in certain European and North American studies to more than 11% in reports from some African countries. 84% of diabetic foot ulcers can be attributed to external factors such as ill-fitting shoes and socks or mechanical trauma. Although there have been many developments in recent years which encourage optimism for future improvement in diabetic foot care, there is still much

to be done. However, many countries still lack proper podiatry and specialist nursing provision and there remains much to be done to improve the care for diabetic patient with foot problems (Boulton, 2000).

Most of the day to day responsibilities for the care of chronic illnesses fall on patients and their families. Therefore, to enable patients to play an active role in their care, health services must not only provide good medical treatment but also optimize self care interventions that are based on cognitive behavioral principles. They start with an assessment of patients' attitudes and beliefs about their illness and their chosen coping behaviors. Integral care for diabetes patients should cover psychosocial and cultural aspects. Therapeutic education is fundamental to inform, motivate and strengthen patients and families to live with the chronic condition. Structured education is an established component of diabetes care and in specific, foot care. Education should be provided to all people with diabetes until the person can demonstrate and describe foot care practices (Michael, et al, 2002).

Persons newly diagnosed with diabetes must have the opportunity to learn proper foot care practices and the incorporation of these practices into their daily lives may help patients prevent future wounds and possible amputations. The benefit of good foot care, including periodic foot examinations in decreasing the risk of lower-extremity amputations is well documented, therefore it is reasonable to expect reduction in population-level risk for amputation if population-level improvements in foot examinations are achieved. The expected outcome of this objective is a reduction in amputations (Kyle, 2005).

When the diagnosis of diabetes has already been made, a complete medical evaluation should be performed to classify the patient, detect the presence or absence of diabetes complications, assist in formulating a management plan, and provide a basis for continuing

care. The adoption of preventive strategies to reduce the rate of foot problems thus represents an important priority. All individuals with diabetes should receive an annual foot examination to identify high-risk foot conditions. The foot examination can be accomplished in a primary care setting. This examination should include assessment of protective sensation, foot structure, vascular status, and skin integrity. People with one or more high-risk foot condition should be evaluated more frequently for the development of additional risk factors. People with diabetes must be fully aware of the serious effect of diabetes on foot and how to prevent foot problems before they occur, to recognize problems early, and to seek the right treatment when problems do occur. Diabetics should learn how to examine their own feet and how to recognize the early signs and symptoms of diabetic foot. They should also know what is reasonable to do at home as routine foot care, how to recognize when to call the doctor, and how to recognize when a problem has become serious to seek emergency treatment. A person with diabetes should follow special guidelines for good foot care to prevent unnecessary complications (ADA, 2006).

The aim of this study is to investigate the knowledge, attitudes and practice of foot care among diabetic patients at UNRWA health centers in the middle area of Gaza Strip.

1.1. Justification of the study:

Globally Foot complications are one of the most serious causes of morbidity, disability, poor quality of life, and resources use among diabetic people (Humphrey, 1996).

Foot ulcers and amputation are major causes of emotional and physical cost for people with diabetes. Early recognition and management of independent risk factors for ulcers and amputations can prevent or delay the onset of adverse outcomes (Mayfield, et al, 1998).

The vast cost of lower limb complications has been increasing concern in recent years, the volume of research and presentations in this area has been increasing worldwide. Data from the United Kingdom show that patient with diabetes are 4 times more likely to be admitted to hospital, the cost of bed occupancy alone in one hospital for patients admitted for limb-threatening diabetic foot disease was (400,000\$) 5 years ago. A study on 7 million of diabetic patients in the United States, who have health insurance show that in 2 years the total expenditure for treated diabetic foot ulcers was 16 million \$ (Boulton, 2000).

According to the WHO global estimate and the epidemic nature of diabetes, the prevalence of diabetic is expected to increase in Palestine (WHO, 1998).

The prevalence of DM in Palestine is about 9%, it constituted 3.6% of the total population deaths. The average annual mortality rate of DM was 12.4 per 100,000 population in the last five years (MOH, 2005).

In Gaza UNRWA, (2005) reported that the estimated prevalence rate of DM among Palestinian refugees aged 40 years and above was 4.3% in 2000 and 4.7% in 2001. In 2003, the incidence rate of new reported cases was 242 per 100,000 of the refugees (UNRWA, 2005).

In professional level, I am an employee working in Ahli-Arab Hospital (AAH) in Gaza as staff nurse in the operating theater, I observed many cases of diabetic patients who had amputations of toes or feet. About 20% of the diabetic patients who are admitted to the hospital in the year of 2004 were exposed to either debridement or amputation of foot (AAH, 2004).

Studies about diabetes mellitus from the different aspects were done before at the school of public health in Gaza-Strip, but no one highlighted on this important part of diabetes mellitus complication.

1.2. Objectives

General:

To assess the knowledge, attitudes and practice of diabetic patients about foot care at UNRWA health centers in Gaza-Strip.

Specific:

- 1- To evaluate the level of knowledge among diabetic patients about daily foot self-care.
- 2- To assess the attitudes of diabetic patients towards foot care.
- 3- To estimate the level of foot care practices among diabetic patients.
- 4- To investigate the effect of diabetics socio-demographic factors on foot self-care.
- 5- To identify diabetic patients barriers to daily foot care.

1.3. Research Questions

1. What is the level of knowledge, attitude and practices of diabetic patients about foot care?
2. What are the effect of diabetics socio-demographic status on their daily foot care?
3. What are the barriers that prevent diabetic patients from taking care of their feet?

1.4. research hypothesis

The researcher assumed that the level of awareness (knowledge, attitude and practice) of diabetic patient about foot care is less than 60%.

1.5. Demographic characteristics of Gaza Strip

1.5.1. Geography:

Palestinian National Authority (PNA) territories comprise two areas separated geographically: West bank and Gaza Strip. Gaza Strip is a narrow piece of land lying on the coast of the Mediterranean Sea, about 50Km long and 5–12Km wide with a surface area of about 360 square Km. Its position on the crossroads from Africa to Asia made it a target for occupiers and conquerors over the centuries. The last of these was Israel who occupied the Gaza Strip from Egyptians in 1967. Gaza strip is divided into five provinces, North Gaza, Gaza town, Mid-Zone, Khanyounis and Rafah (MOH, 2004).

1.5.2. Population:

The population of Palestine was estimated with 3.6 million at the end of 2004, 2.3 million (63.2%) in West Bank and 1.3 million (36.8%) in Gaza Strip.

Gaza Strip is very crowded place; the population is mainly concentrated in the cities, small villages, and eight refugee camps that contain two thirds of the population. The number of males is 676 thousands compared with 660 thousands females, the sex ratio is 102.4. Population pyramid of age distribution showed that 46.0% was less than 15 years old. The age group under 5 years old still constitutes the largest proportion with a percentage of 17.7% of population. The age of 60 years and over constitutes 4.4% of population. The density rate in Gaza Strip was about 3,806 inhabitants per one square Kilometer. 42.6% of the population in Palestine is refugees. They are estimated with 1,541,337 individuals at the end of 2004, about 884,376 individuals in Gaza Strip with a percentage of 66.1% out of the total population of Gaza Strip (PCB, 2005).

1.5.3. Education:

The main findings of the educational institutions census 2004/2005 showed that there are 2,190 schools in Palestine (1,662 in WB and 528 in GS). These are distributed by the supervising authority as follows: 1,659 are governmental schools, 273 UNRWA, and private Schools. The average number of students per class by supervising authorities is about 34.5 students in governmental schools, 42.7 students in UNRWA schools and 24 students per class in private schools.

Gaza has four main universities, in which more than 45,000 students are enrolled (Islamic university, Al-Azhar university, Al-Agssa university and Al-Quds open university). The four universities provide education in different specialties including medicine, pharmacy and engineering (MOH, 2005).

1.5.4. Palestinian economy:

According to the Palestinian Ministry of Finance, the Gross National Production (GNP) in Palestine has been subjected to high fluctuation during the last five years. The GNP was 5,454 million US\$ in 1999 and decreased to 3,720 million US\$ in 2004. Gross Domestic Production (GDP) was 4,517 million US\$ in 1999 and decreased to 3,285 million US\$ in 2004. Gross National Production per Capita (GNP/capita) was 1,806 US\$ in 1999 and decreased to 979 US\$ in 2004. Gross Domestic Production per Capita (GDP/capita) was 1,496 US\$ in 1999 and decreased to 865 US\$ in 2004. The number of Palestinian workers in Israel decreased from 135,000 worker in 1999 to 50,100 worker in 2004. The unemployment rate increased from 11.8% in 1999 to 26.8% in 2004, (35.4% in Gaza and 22.9% in West Bank). The percent of families under poverty line was 64.9% with an income average 2 US\$ daily (MOH, 2005).

1.6. Health services in Palestine

Ministry of health (MOH) is the main health provider in Palestine beside other health providers, UNRWA, medical services for police and general security, health services belonging to national and international Non Governmental Organizations (NGOs), and private health sector for profit. MOH is the health authority responsible for supervision, regulation, licensure and control for whole health services (MOH, 2004).

1.6.1. hospitals in Palestine:

There are 77 hospitals in Palestine (22 in GS and 55 in WB), furnished with 4,824 beds. In 2004, there are 43 general hospitals with 3,539 beds; 10 specialized hospitals with 813 beds; 20 maternity hospitals with 315 beds and 4 rehabilitation centers with 1570 beds. The population/bed ratio is 754.05 (672.32 in GS and 811.39 in WB). The MOH owns and operates 22 hospitals (10 hospitals in GS and 12 hospitals WB), furnished with 2,735 beds (1,491 in GS and 1,244 in WB) (MOH, 2005).

1.6.2. Primary Health Care (P.H.C) Centers:

The total number of registered PHC centers in Palestine is 731 centers (125 centers in GS and 606 centers in WB). Distribution by providers shows that, there are 413 centers owned and supervised by the MOH, 53 centers by the UNRWA and the NGOs have 265 centers. In 2004, the total number of PHC centers in Palestine increased to 731 centers compared with 595 centers in 2000, which reveals a rise of 22.8% in the last five years.

In Gaza: the total number of PHC centers is 125 centers in comparison with 100 centers in 2000, which indicates an increase of 25% in the last five years. Although the PHC system in Gaza is unique, well established and functioning well, the high population density of population were responsible for the high ratio of population per center. The highest ratio was recorded in Khan-Younis of 12,982 per center and the lowest ratio in Mid- Zone of 6,247 person per center (MOH, 2005).

1.6.3. UNRWA health services:

UNRWA owns and operates 53 centers in Palestine, (18 centers in GS and 35 in WB). The number of registered refugees in Gaza was 884,376; therefore the ratio of refugees per center in Gaza was 49,132. UNRWA offers primary health services free of charge for all

refugees and plays a noticeable role in the vaccination program in cooperation with MOH, in addition to curative services; UNRWA offers antenatal and postnatal care and other specialized services. Patients who are in need for specialized treatments are referred to MOH hospitals or other private hospitals like Ahli Arab Hospital in Gaza Strip.

One of the important services that offer by UNRWA is the curative treatment of non-communicable diseases, as hypertension and diabetes. Services that deliver include; medications, routine measurement of blood pressure, level of urine and blood sugar and other laboratory tests, insulin syringes, dressing for needed wounds, examinations by specialized physicians and referral of needed cases to governmental hospitals for advanced care. At the end of 2005, the total number of diabetic patients registered at UNRWA clinics is 18,428 (6572 males and 11856 females). The diabetic patients are categorized as; 682 Type 1 diabetes, 8228 Type 2 diabetes, and 9518 diagnosed as diabetes and hypertension. The age distribution of patients show that, the highest percentage of type 1 patients (62%) is in the age of 20-39 years, while in type 2 is in the age of 40-59 years old (60%). But for those patients with diabetes and hypertension the highest proportion (51%) is in the age of 60 years and above (UNRWA, 2005).

1.7. Non-communicable diseases in Palestine

The rapid rise in non-communicable diseases (NCDs) represents one of the major health challenges to economical and social development as well as lives and health of millions of people. Health services today will not be able to meet the challenges of NCDs without a detailed knowledge of the prevalence, incidence, and severity of these diseases.

In Palestine, there is no or weak national data are available on the overall incidence and prevalence of Cardiovascular Diseases, Hypertension Diseases, Diabetes Mellitus (DM) and accidents. In general we depend on mortality data to estimate the impact of these

diseases. The current system counts mainly the visits of the patients to PHC centers, which does not reflect the real prevalence or incidence. Besides there is no classification by age or gender mainly because of no computerized system. Additionally, there is fragmentation in reporting and managing system regarding NCDs in general and DM in specific. This lack of information leads to inability to estimate the direct and indirect cost; resources required as drugs, policy and decision-making regarding prevention and treatment (MOH, 2005).

Chapter (2)

Literature Review

Diabetes mellitus is a chronic disease caused by the body's inability to produce insulin, or by the ineffective use of the insulin produced. Such a deficiency results in increased concentrations of glucose in the blood, which in turn damage many of the body's systems. Diabetic foot problems are caused by changes in blood vessels and nerves that can lead to ulceration and subsequent limb amputation.

Lower extremities amputation due to diabetes cause unnecessary loss of life and disability. More than half of these lower limb amputations could be prevented with adequate detection and foot care (ADA, 1997).

2.1. Definition of Diabetes Mellitus

The American Diabetic association (ADA), (1997) defined Diabetes Mellitus (DM) as "A group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels".

Several pathogenic processes are involved in the development of diabetes. Theses range from autoimmune destruction of beta-cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The basis of abnormalities in carbohydrate, fat, and protein metabolism in diabetes is deficient action of insulin on target tissues (ADA, 1997).

2.2. Classification of diabetes mellitus

In Jun. 1997, an international expert committee released a report with new recommendations for the classification of diabetes mellitus. These new recommendations were the result of more than two years of collaboration among experts from the American Diabetes Association (ADA) and the World Health Organization (WHO). This new classification system and the standardized diagnostic criteria facilitate a common language among patients, physicians, other health care professionals and scientists. The new classification system identifies four types of diabetes mellitus: type 1, type 2, other specific types, and gestational diabetes (Mayfield, 1998).

2.2.1. Type 1 diabetes mellitus:

It is formerly called type I, Insulin Dependent Diabetes Mellitus (IDDM) or juvenile diabetes. This type characterized by beta cell destruction caused by autoimmune process, usually leading to absolute insulin deficiency. Over 95 percent of persons with type I diabetes mellitus develop the disease before the age of 25, with an equal incidence of both sexes and an increased prevalence in the white population (Mayfield, 1998).

2.2.2. Type 2 diabetes mellitus:

It is formerly called type II, None Insulin Dependent Diabetes Mellitus (NIDDM) or adult-onset Diabetes. This type characterized by insulin resistance in peripheral tissue and deficiency in insulin secretion. This is the most common form of diabetes mellitus and is highly associated with a family history of diabetes, older age, obesity and lack of exercise. It is more common in women, especially women with history of gestational diabetes. The etiology of type 2 diabetes is multifactorial and probably genetically based, but it also has strong behavioral components (Mayfield, 1998).

2.2.3. Other Specific Types:

This group includes types of diabetes mellitus of various etiologies as: persons with genetic defects of beta-cell function (this type of diabetes was formerly called maturity-onset diabetes in youth, MODY), or with defect of insulin action; persons with diseases of exocrine pancreas, such as pancreatitis; persons with dysfunction associated with other endocrinopathies (e.g., acromegaly); and persons with pancreatic dysfunction caused by drugs, chemicals or infections (Mayfield, 1998).

2.2.4. Gestational diabetes mellitus:

The definition and diagnosis of gestational diabetes mellitus (GDM) was not altered in these new recommendation. Gestational diabetes mellitus is an operational classification rather than pathophysiologic condition, identifying women who develop diabetes mellitus during gestation. Women with diabetes mellitus before pregnancy are said to have "pregestational diabetes" and are not included in this group. Women who develop type 1 diabetes mellitus during pregnancy and women with undiagnosed asymptomatic type 2 diabetes mellitus that is discovered during pregnancy are classified with gestational diabetes mellitus. However, most women classified with gestational diabetes mellitus have normal glucose homeostasis during the first half of pregnancy and develop a relative insulin deficiency during the last half of the pregnancy, leading to hyperglycemia. The hyperglycemia resolves in most women after delivery, but places them at increase risk of developing type 2 diabetes mellitus later in their life (Mayfield, 1998).

2.3. Epidemiologic Picture of Diabetes Mellitus

Diabetes mellitus (DM) is one of the most important and common metabolic disorder affecting 2-5% of the population in Europe and between 1 and 20% of the population in various other parts of the world (Williams and Pickup, 1999).

The world is currently experiencing what could be described as an epidemic of diabetes: in 1995 it was estimated that there were 135 million individuals worldwide with this disease. By 2025 it is projected there will be 300 million individuals with diabetes across the world. The majority of new cases will be type 2 (NIDDM), with a 42% increase in developed countries and a 170% increase in developing countries (Boulton, 2000).

Globally, the number of people with diabetes is expected to double between 2000 and 2030 while public awareness about this disease remains low (Wild, et al, 2004).

2.4. Diabetes Mellitus in Palestine

Diabetes Mellitus is one of the most common non-communicable diseases worldwide, especially in developing countries including Palestine. According to the WHO global estimate, and the epidemic nature of diabetes; prevalence of diabetes is expected to increase in Palestine and figures should be revised to have more realistic estimation, which enable health providers to be aware of the size of the problem, so that more effective health strategies can be adopted (WHO, 1998).

The prevalence of DM in Palestine is about 9%. This rate is estimated through a study conducted by the MOH and Alquds University in the year 2000, which is around the reported prevalence rate in Egypt and Tunisia (9%) and less than in Saudi Arabia (12%) and Oman (13%). DM did not report as one of the leading cause of death among Palestinians. It constituted 3.6% of total population deaths. 372 persons died with mortality rate of 10.2 per 100,000 (176 males, with mortality rate of 9.5 per 100,000 males and 196 females with mortality rate of 10.9 per 100,000 females). The average annual mortality rate of DM was 12.4 per 100,000 populations in the last five years. In 2004, the highest DM mortality rate was reported in age of 60 years and above (187.2% per 100,000 populations). The proportion of DM mortality among males was 3.0% while for female 4.5% of the total deaths (MOH, 2005).

In Gaza, UNRWA, (2005) reported that, the estimated prevalence rate of DM among Palestinian refugees aged 40 years and above was 4.3% in 2000 and 4.7% in 2001. In 2003, the incidence rate of new reported cases was 242 per 100,000. About 215 person died in Gaza from diabetes, with mortality rate of 16.1 per 100,000 (98 males and 117 females). At the end of 2005, the number of diabetic patients registered at the UNRWA primary health care centers was 18,428 patients, 8910 were diagnosed with diabetes (both type 1 and type 2), and 9518 patients were diagnosed with diabetes and hypertension. The gap between the expected prevalence rate of DM and cases under supervision reflect under registration and under reporting, and requires special efforts to accelerate early case-finding activities in order to avoid high cost of treating the complications and disability consequences of the disease (UNRWA, 2005).

2.5. Complications of Diabetes

Diabetes is a chronic disease and is characterized by serious, costly, and often fatal complications. Long-term complications of diabetes include:

- Retinopathy with potential loss of vision.
- Nephropathy leading to renal failure.
- Peripheral neuropathy with risk of foot ulcers, amputations, and Charcot joints.
- Autonomic neuropathy causing gastrointestinal, genitourinary, and cardiovascular symptoms and sexual dysfunction.
- Patients with diabetes have an increased incidence of atherosclerotic cardiovascular, peripheral arterial and cerebrovascular disease.
- Hypertension and abnormalities of lipoprotein metabolism are often found in people with diabetes (ADA, 2006).

2.5.1. Diabetic foot complications:

Foot complications are one of the most serious causes of morbidity, disability, poor quality of life, and resource use among diabetic people. In addition, foot complications are the most frequent reason for hospitalization in patients with diabetes, accounting for up to 25% of all diabetic admissions in the United States and Great Britain (Pecoraro, et al, 1990). Furthermore, approximately 20% of all diabetic patients hospitalized in the United States are admitted because of foot complications (Debra, et al, 1993).

Lower-limb problems in people with diabetes delineate a group of conditions in which neuropathy, ischaemia and infection contribute to tissue breakdown, resulting in ulceration and possible amputation (Young, et al, 1993).

Ulceration and infections can develop to a greater extent than usual before they are discovered. In addition, the macro-vascular complications of diabetes, if present, can aggravate this situation. Prevalence: 40-50% of all patients with diabetes will develop a neuropathy. About 15% of diabetics will develop foot ulcerations. 50% of all non-traumatic lower limb amputations occur in the diabetic population. A non-healing foot ulcer precedes most of these amputations (ADA, 1997).

The trio of problem leading on to the diabetic foot is neuropathy, vascular changes and infections, which constitute the diabetic foot syndrome. Infection complicates the pathological picture of diabetic foot, and plays a main role in the development of moist gangrene (Smith, et al, 2002).

The leading cause of foot ulcers is peripheral neuropathy (nerve damage). Pressure on the sole of the foot is another cause. Repeated rubbing against the foot can lead to ulcers, as can injuries caused by things like cutting toenails. People with diabetes may have problems with wound healing, so ulcers don't get better. Doctors taking care of patients with diabetes should check their joints for flexibility, they should be aware of the risk factors such as; previous foot ulcers, previous amputation, having diabetes for a long time, trouble controlling blood glucose, and vision problems. They should check patients feet for dry skin, fissures (cracks), and other skin problems. Helping patients understand the causes and treatments decrease the risk of foot ulcers and limb amputations. Published guidelines for doctors recommend that every patient should have a yearly foot examination (Singh, 2005).

2.5.2. Lower extremity amputation:

Foot amputation is a frequent complication of diabetes mellitus, most commonly the result of diabetic foot problems such as ulcers and infection. Ulceration of the feet can result in loss of lower limbs and death (Pecoraro, et al, 1990).

Amputation is about 15 times more common in people with diabetes and half of all lower-limb amputations are in people with diabetes. Nearly half the amputations are "major", involving above or below knee amputation; the remainder are designated "minor", involving toes or feet. Diabetic foot complications are common in the elderly, and amputation rates increase with age: by threefold in those aged 45-74 years and sevenfold over 75 years (Reiber, 1993).

Furthermore, about 50% of all non-traumatic amputations in the United States are done in patients with diabetes. This proportion equates to about 55,000 amputations a year. Patients who undergo an amputation are at greater risk for a second similar procedure on either the same or the other leg. Yet, it has been estimated that about one half of the amputations were done in patients with diabetes, or about one fourth of the total amputations done in the United States, are preventable (Debra, et al, 1993).

Eastman RC., in 1995 stated that the sequence of events leading to lower extremity amputation is well known, in people with neuropathy or peripheral vascular disease, minor trauma to the foot leads to skin ulceration and infection, and to gangrene, resulting in amputation (Eastman, 1995).

The vast majority of diabetic foot complications resulting in amputation begin with the formation of skin ulcers. Early detection and appropriate treatment of these ulcers may prevent up to 85 percent of amputations. Unfortunately, several studies have found that

primary care physicians infrequently perform foot examinations in diabetic patients during routine office visits. The feet of hospitalized diabetics may also be inadequately evaluated (Edelson, et al, 1996).

Payne, et al, 1998, describes the factors that increase the risk of amputation of the lower limbs, which include:

- The loss of sensation from the sensory neuropathy,
- Deformity and gait abnormalities from the motor neuropathy,
- Abnormal blood flow regulation from the autonomic neuropathy,
- Ischemia from the macro-vascular disease,
- Limited joint mobility from the increased glycolation of collagen,
- Poor blood sugar control,
- Increased risk of infection, and,
- Inadequate and inappropriate self-care is a major factor (Payne, et al, 1998).

The loss of a limb is a personal tragedy for those with diabetes, and is associated with a deterioration of functional status and requires long term care (Fitzpatrick, 1999).

2.6. Foot care in patients with diabetes mellitus

Diabetes is a chronic disease that requires a lifetime of consistent and careful daily self-management. Failure to adhere to strict self-care regimens may lead over time to diabetic complications. Careful inspection of diabetics feet on a regular basis is one of the easiest, least expensive and most effective measures for preventing foot complications. Appropriate care of the diabetic foot requires recognition of the most common risk factors

for limb loss. Many of these risk factors can be identified based on specific aspects of the history and a brief but systematic examination of the foot. Meticulous attention to foot care and proper management of minor foot injuries are keys in preventing ulcers formation. Daily foot inspection by the patient is the cornerstone of proper foot care. Gentle cleansing with soap and water, followed by the application of topical moisturizers, helps to maintain healthy skin that can better resist breakdown and injuries. The physician should inspect the patients feet for the presence of foot injuries, cuts, scrapes, blisters and infections (UKPDS, 1998).

David, et al, 1998, warned that, patients should be reminded to avoid hot soaks, heating pads and harsh topical agents such as hydrogen peroxide. They also stated that gentle cleansing of minor wounds and the application of a topical antibiotic to maintain a moist wound environment can help to prevent ulcer formation. In addition, physician should inspect any minor wound that does not heal rapidly. By reinforcing preventive advice and inspecting the patients feet at routine follow-up visits, physician can help diabetic patients develop and maintain good foot-care habits (David, et al, 1998).

In addition, the ADA in the year 2003 indicated that patients with diabetes and high-risk foot conditions should be educated regarding their risk factors and appropriate management. Patients at risk should understand the implications of the loss of protective sensation, the importance of foot monitoring on a daily basis, the proper care of their feet, including nail and skin care, and the selection of appropriate footwear (ADA, 2003).

Foot health is very important for people with type 2 diabetes, when people with diabetes don't take proper care of their feet, they can get skin ulcers (sores). Foot sores take a long time to heal and can lead to complications, like amputation or death (Pound, et al, 2005).

ADA, in 2005, with cooperation of the American Academy of Family Physicians developed guideline instructions for foot self-care in diabetic patients to protect their feet.

This guideline was created on 1999 and updated on 2005, as follow:

- Wash your feet every day with lukewarm (not hot) water and mild soap.
- Dry your feet well, especially between the toes. Use a soft towel and pat gently; don't rub.
- Keep the skin of your feet smooth by applying a cream or lanolin lotion, especially on the heels. If the skin is cracked, talk to your doctor about how to treat it.
- Keep your feet dry by dusting them with non-medicated powder before putting on shoes, socks or stockings.
- Check your feet every day. You may need a mirror to look at the bottoms of your feet. Call your doctor at the very first sign of redness, swelling, pain that doesn't go away, or numbness or tingling in any part of your foot.
- Don't treat calluses, corns or bunions without talking to your doctor first.
- Cut toenails straight across to avoid ingrown toenails. It might help to soak your toenails in warm water to soften them before you cut them.
- Don't let your feet get too hot or too cold, and,
- Don't go barefoot (ADA, 2005).

2.7. The Magnitude of the problem

Research by Alleyne and others at 1989, 1991 revealed the high mortality rate among Jamaican diabetic patients because they were never told specific about their illness nor had they received information concerning the severity of their illness (Alleyne, 1991).

Foot problems in patients with diabetes mellitus are a major public health concern in the United States. In 1990 the national Centers for Disease Control estimated there were 14 millions of people in the United States affected by diabetes of which an estimated 25 percent will develop foot problems. Presently foot problems account for 20 percent of annual diabetic-hospitalization. More than 50 percent of the 120,000 non-traumatic lower extremity amputations each year result from complications of diabetes. Neuropathy, mechanical stresses and Ischemia are the major causes of foot ulcers in diabetic patients (Brike and Novick, 1992).

Debra K, et-al, in 1993, stated that, Diabetic lower-limb problems result in significant social, medical and economic consequences and are the most common cause of hospitalization for people with diabetes. Also they emphasized that all people with diabetes should receive basic foot care education, and regular foot examinations. However, recently the focus has been on preventive strategies that minimize foot damage in diabetic patients and thereby reduce the rates of ulcers and amputations. These preventive strategies are based on two observations: first, those simple efforts on the part of the health care provider or patient can reduce the likelihood of subsequent amputation due to diabetes-associated foot disease; and second, that many of these simple procedures are not being systematically applied by health care providers or patients. For example, studies

indicated that physicians infrequently examine the feet of patients with diabetes. Also, most patients with diabetes do not engage in simple foot-care assessments to identify lesions requiring early treatment. Furthermore, several uncontrolled studies found that implementation of improved foot-care programs can significantly reduce lower extremity complications in patients with diabetes; these studies showed a 44% to 85% reduction in the rate of lower extremity amputations. A recent case-control study also supports the implementation of preventive strategies, such as foot care, use of protective footwear, and aggressive treatment of foot infection by patients or health care providers, to decrease the risk for lower extremity amputation. In addition, Debra and her colleagues stated that, preventive strategies are not systematically applied for several reasons: First, patients may not be aware of foot-care procedures or how to do them, or they may not believe that such procedures can make a difference; second, podiatry and orthopedics services that could assist in foot salvage in diabetic patients may not be available; and, finally, the health care system may make it difficult for patients or health care providers to examine the feet of patients with diabetes. (Debra, et-al, 1993).

Coleman, in 2000, stated that, the center for disease control and prevention in Atlanta recorded that, during the years 1990-1994 there were 56,000 lower extremity amputations performed on diabetic patients. Also, studies reported by the national Center for health statistics in Atlanta cited that for the year 1994 and 1995 the rate of amputations was 67,000 annually. These figures would indicate that current national efforts to lower the rate of amputation are not having big effect on this epidemic. Colman stated that, literatures prove that lower extremity amputation rates can be dramatically reduced by programs that stress patient education, techniques of prevention, and early identification and treatment of injuries. He added that, the increase rate of lower extremity amputation of the diabetic patients is related to two main factors; loss of sensory and diminished

circulation in their lower extremities. These two factors are often misleading both patient and physician into a state of lower motivation to find immediate solutions to foot injuries. He mentioned three factors that complicate the attempts to manage injuries on the feet of persons with diabetes:

1. Without pain, the patient does not take small wounds seriously.
2. Physician often wait for the patient to complain and fail to remove shoes routinely to have a look.
3. Surgeons are sometimes fatalistic about infected diabetic feet and advice amputation too readily.

So, it is fundamental to the management of diabetic foot is the patient attitudes towards his insensate feet. Diabetic patients must be aware of the fact that the sensation of his feet is decreased, so he must routinely (daily) inspect his feet for injuries, redness or any other alterations (Coleman, 2000).

2.7.1. Globally:

In USA, a study done by Stanaszek and McDonald in 1981, to evaluate self-care habits of diabetic patients in relation to their understanding of their disease, a sample of 142 men who had never participated in a formal diabetes education programs was studied. Patients were interviewed about their knowledge and their habits in self-care management of their disease. The result showed that, only 24% of the patients knew the symptoms of hyperglycemia. The importance of foot care was understood by 44% of the patients, but only 13% knew how to remove corns and calluses correctly. An inverse relationship was found between age and knowledge scores, and a direct relationship was found between educational level and knowledge scores. They indicated that, these results should be useful in developing educational programs for diabetic patients (Stanaszek and McDonald, 1981).

Debra K. Litzelman in 1993, evaluated the effect of educational program in foot self-care to reduce the risk factors of lower extremity amputation in patients with non-insulin-dependent diabetes. 352 patients were completed the study for 12-month interventions. Patients received foot-care education and entered into a behavioral contract for desired self-foot care, which was reinforced through telephone and postcard reminders. The results showed that; patients receiving the intervention were less likely than control patients to have serious foot lesions (baseline prevalence, 2.9%; odds ratio, 0.41 [95% CI, 0.16 to 1.00]; $P = 0.05$) and other dermatologic abnormalities. Also, they were more likely to report appropriate self-foot-care behaviors. Debra conducted that, an intervention designed to reduce risk factors for lower extremity amputations positively affected patient self-foot-care behavior (Debra, 1993).

Wylie-Rosett, et al, in 1995 conducted a study aimed to determine documented adherence with guidelines for foot examinations in order to establish guidelines for a diabetes foot examination include assessing circulatory, skin, and neurological status to detect problems early and reduce the likelihood of amputation. Charts of 350 diabetic patients, identified by billing code, were reviewed for foot examination documentation. A documented foot examination was defined as assessing at least two of the three components of a foot examination. The review determined the periodicity and prevalence of foot examinations, referrals to a podiatrist or vascular surgeon during a 2-year period, and risk factors for foot complications. Stepwise logistic regression was used to determine whether risk factors for foot complications predicted foot examination status. They found that, patients had a mean age and duration of diabetes of 57.7 and 8.8 years, respectively; 86% were black or Hispanic. There was no indication of foot examination or referral for 55.7% of the patients during the 2-year period. Patients with foot care referrals were more likely to have foot examinations by their primary care providers ($P = .0001$). Also, they found that almost

a fourfold increase in the odds that patients with diagnosed peripheral vascular disease had foot examinations, with twofold greater odds for each 25-year increase in age. They conducted that, populations at risk of diabetic complications are unlikely to have foot examinations in their primary medical care, but having peripheral vascular disease increases the likelihood. Efforts are needed to improve adherence to foot examination guidelines for patients with diabetes from underserved populations (Wylie, et al, 1995).

A study done by Aileen Ward and other researchers in 1999, to evaluate the effect of an intensive diabetes foot education program for veterans at high risk for foot ulcer. They invited 100 consecutive patients with diabetes for two sessions' educational programs conducted by a nurse diabetes educator 3 months apart. Multiple educational approaches were used to teach patients foot self-examination, foot washing, proper footwear, and encouragement in enlisting proper physician foot care. Knowledge and satisfaction with care was measured before and after each visit. They found that 34 patients who attended both educational sessions improved their foot care knowledge over the course of the program. After the second session, the mean improvement over baseline was 14%. These patients also reported improved satisfaction with foot care; mean improvement was 33%. They concluded that, an intensive education programs improved the foot care knowledge and behavior of high-risk patients. Those who adhered to a foot care education program were more satisfied with their foot care than prior to the program. Ways to improve accessibility of education sessions must be explored (Aileen, et al, 1999).

A study by Chan Bnurs, and Molassiotis in 1999, examined the relationship between diabetes knowledge and compliance among Chinese with non-insulin dependent diabetes mellitus (NIDDM)) in Hong Kong. A cross-sectional design was used to collect data through structured self-report interview based on validated scales assessing diabetes

knowledge, compliance behaviors and demographic data. The diabetic knowledge scale was used to sample knowledge in the major areas of basic physiology of diabetes and general principles of diabetic care. Compliance level was assessed by using the compliance behavior questionnaire and inspection of patients' feet. A convenience sample of 52 Chinese with NIDDM receiving out-patient diabetes care participated in the study on a voluntary basis. The findings indicate that there was no association between diabetes knowledge and compliance. There was a gap between what the patient were taught and what they were actually doing. Most patients gained higher marks on factual knowledge on diabetes but lost marks on the application of knowledge to their real life situation. Strategies are suggested to close the knowledge-practice gap and increase patients motivation and ability to comply with the health regimen (Chan and Molassiotis, 1999).

In India, the researchers in 1999 evaluated the knowledge of diabetic patients regarding the foot problems and the care of feet in order to identify areas that require stress in the education programs. They selected hundred and fifty, consecutive cases of Type 2 diabetes; 176 males and 74 females, all subjects are over 40 years old, the duration of diabetes is between 6 and 13 years. A questionnaire was filled up for each patient by personal interview. The total score was 100 and a score of < 50 was considered as a low score for foot care knowledge. The results showed that, a score of < 50 was obtained in 67.2%. Low score was more common in women (78.5%) than in men (62.5%) ($\chi^2 = 5.26, P = 0.022$). Low scores (< 50) were more common among those with lower level of formal education ($\chi^2 = 70.0, P < 0.0001$) and there were more women with low educational status than men. Also there were significant foot problems like foot ulcer and gangrene present in 27.2% and low scores were more common among those with these complications ($\chi^2 = 8.3, P = 0.004$). In general the scores on awareness of general foot

care principles and basic facts about the foot complications were poor. Most of them (72%) had good knowledge about the right usage of foot wear. There was a trend to have lower scores with poor formal education ($\chi^2 = 51.1$, $P < 0.0001$) and also with increasing age. There was no correlation between the scores and the number of hospital visits. Multiple linear regression analyses showed that 31.2% of the variations in the scores were explained by the level of education. In conclusion, they underscore the importance of patient education on foot care principles, considering the magnitude of the problem of diabetes and the lower levels of literacy and poor socio-economic status of the patients (Viswanathan, 1999).

In Kansas (USA), a cross-sectional telephone survey was conducted by Harsonhena and others in 2000 to assess the prevalence and correlates of recommended preventive care among adults (above 18 years of age) with self-reported diabetes. They defined preventive care as based on four criteria: number of health-care provider (visits per year, 4 times for insulin users and 2 for nonusers), number of foot examinations per year (4 times for insulin users and 2 for nonusers), an annual dilated eye examination, and a blood pressure measurement in the past 6 months. Findings presented that, the mean age of 640 respondents was 61 years, 58% were women and 86% were white; 27% of the respondents reported the appropriate number of foot examinations. The adjusted odds of receiving recommended care were higher for males than for females (Odds Ratio [OR] 1.6; 95% CI 1.1–2.5). In conclusion, they indicated that, preventive care for people with diabetes is not being delivered in compliance with current guidelines, especially for women. Scheduling follow up visits for patients, targeting certain high-risk populations, and developing protocols to improve foot care may be effective in improving care (Harsonhena, et al, 2000).

A study by Donhoe and others (2000), to evaluate a model of integrated diabetic foot care, for identification and clinical management of the high risk diabetic foot, centered on the primary care-based diabetic annual review. A pragmatic randomized controlled study was undertaken with matched cluster randomization of practices from 10 towns drawn from mid and east Devon health authority in UK, responsible for the care of 1939 people with diabetes (age ≥ 18 years). Outcome measures were patients' attitudes regarding the value and importance of foot care, patients' foot-care knowledge, healthcare professionals' foot-care knowledge and pattern of service utilization. The results showed that, attitudes towards foot-care improved in both intervention and control groups (mean percentage change 3.91, 0.68) with a significant difference in change of 3.18 (95% confidence interval) between the groups. Patients' knowledge about diabetic foot problems improved significantly in both groups (mean percentage change 1.09, 1.32) but with no significant difference in change between groups. The were, provision of integrated care arrangements for the diabetic foot has a positive impact on primary care staffs' knowledge and patients' attitudes resulting in an increased number of appropriate referrals to acute specialist services (Donhoe, et al, 2000).

Sanders in 2001 observed that, improving foot-care outcomes can be achieved through increasing physician and patient's knowledge of diabetes and the importance of foot examinations. Also she stated that, in order to improving foot care, we need to assure that patients with diabetes get their feet checked during each visit to their primary care, and to identify barriers to diabetes care and education in general and to preventive foot care practices (Lee, 2001).

A study was carried out by Meijer, et al., in 2001. They randomly selected 50 diabetic patients not known to have foot complications and testing the risk factors and preventive measures of foot self-care, using special risk factors and preventive measures scales. The results showed that 60% of patients were at risk of developing diabetic foot complications; the preventive measures were low in these patients; and patients knowledge was insufficient and foot self care practices were worse. They concluded that, foot complications in diabetes can be decreased by preventive measures (Meijer, et-al., 2001).

Volk GD, et al in 2002, conducted a systematic review of Randomized Controlled Trials (RCTs) to evaluate the effectiveness of patient education in preventing diabetic foot ulcers. Standard search methods of the Cochrane "Wounds Groups" were used. Two reviewers were working independently extracted data and assessed study quality. The results showed that, methodological quality of the 8 included RCTs was poor and the internal validity score (range 0-10) of individual RCTs ranged from 2 to 4. They found that, four trials compared the effect of intensive with brief educational interventions; 2 of these reported clinical endpoints; only one study involving high-risk patients reported a reduction in ulcer incidence (OR 0.28, 95% confidence interval [CI] 0.13-0.59) and amputation rate (OR 0.32, 95% CI 0.14-0.71) after 1 year; and the other RCT did not find an effect after 7 years of follow-up. Also they found that, two trials showed that, participants' foot care knowledge significantly improved with education; one trial showed that, foot care knowledge was significantly worse at 6 months, although foot care behavior improved significantly; one RCT, that compared patient foot care education as part of a general diabetes education program to usual care, showed no reduction in the risk of foot ulceration; and one RCT, patient education as part of a complex intervention targeted at both people with diabetes and doctors reduced the prevalence of serious foot lesions at 1

year (OR 0.41, 95% CI 0.16-1.00) and improved foot care behavior. They concluded that, evidence limited by poor methodological quality and conflicting results, and suggested that, patient education may have positive but short-lived effects on foot care knowledge and behavior of patients and may reduce foot ulceration and amputations, especially in high-risk patients. High-quality randomized controlled trials are needed to establish the efficacy of patient education to prevent diabetic foot ulcerations (Volk, et al, 2002).

To explore beliefs about health and illness among patients with severe diabetic foot lesions that might affect self-care practice and care-seeking behavior, explorative study with purposive sampling procedure was carried out by Katarina, et al, in 2002. They conducted focus group interviews with 10 women and 11 men under 65 years (working age) and six women and 12 men over 65 years (range 23–83 years) with present or previous diabetic foot lesions managed at a specialized multidisciplinary diabetic foot clinic. The results showed that, self-care was practiced by the participants to restore health when ill and in daily foot care. When help was needed it was sought in the professional sector; women were active in self-care and preventive care, searched for information and tried to adapt to the situation and men were more often sought help for acute problems, discussed more foot-related problems, had a pessimistic view of the future, showed a passive attitude, accepted information given and used more complementary care from the lay sector (wife) and/or the professional sector (district nurse, home care staff, podiatrist). They concluded that, foot lesions cause deterioration of perceived health and quality of life due to decreased ability to be active. Also they emphasized the need to take into account the existence of different beliefs about health and illness, especially regarding gender, in the prevention and management of the diabetic foot (Katarina, et al, 2002).

Mulye and Almeida in 2002 stated that, India is home to around 35-40 million diabetics, the largest number of diabetics in any one country. According to the literatures they reviewed, they claimed that diabetics are largely non-adherent; Non-adherent with medication regimens, dietary recommendations, exercise, insulin administration and testing recommendations. In their study, they aimed to examine the factors that affect the adherence of diabetic patients regarding their treatment regimen. They focused on these factors; Socio-demographic factors, personality variables, patients' beliefs and attitudes and other psychosocial factors. They studied a sample of 60 Type 2 diabetes patients, between the ages of 40 and 60 years, attending three private clinics in Mumbai. There were 21 males and 39 females. Most were married (91.7 %), had completed the SSC (26.7%) or graduation (28.3%) and had a monthly income ranging between Rs.10, 000 and Rs.20, 000. The results showed that, about half of the sample were provided with foot care recommendations, the general focus being on suitability of foot wear (53.3%), only a few were given instructions about foot hygiene (36.7%). Overall, the adherence scores of the 60 patients were good. In specific, foot-care adherence was fairly high. Patients were highly satisfied with their adherence. The entire group perceived fairly good family support, but there is no significant difference between patients perceived a fairly good and highly satisfactory family support. Patients believed, to a high degree, that their disease could become severe due to the development of complications. They suggested that, the diabetologists need to be informed that in addition to the recommendations that they usually give, they need to give recommendations in the areas of foot-care. They also emphasized that, Diabetologists need to organize patient education programs that not only present theoretical input but also help patients in developing strategies for solving problems in real-life situations (Mulye and Almeida, 2002).

Another study by Cynthia F. in 2003 to test the effectiveness of educational interventions to improve patients' foot care knowledge, self-efficacy, and self-care practices. By using a prospective randomized approach, 2-groups of a convenient sample of 40 home care patients from a Medicare-certified home health agency were selected. Baseline measures of foot care knowledge, self-efficacy, and reported self-care practices were obtained at study entry and 6 weeks later to control for foot care interventions provided during routine home care services. After obtaining the 6-week baseline measures, patients who were randomized to the intervention group received individualized education about proper foot care. All patients were interviewed a third time 3 months after study entry to determine the effectiveness of the intervention. The result showed that the educational interventions improved patients' knowledge, confidence, and reported foot care behaviors. The researcher concluded that, a brief, individualized educational intervention about standard foot care topics improved patients' foot care knowledge and self-efficacy as well as reported self-care practices (Cynthia, 2003).

Murata, et al, in 2003 tended to describe the clinical, psychological and social factors affecting diabetes knowledge of patients with Type 2 diabetes. They conducted an observational study of 284 insulin-treated patients with Type 2 diabetes from VA Health Care center in New Mexico. All subjects were completed the University of Michigan Diabetes Research and Training Centre Knowledge Test, the Diabetes Care Profile, the Mini-Mental State Examination, the Geriatric Depression Scale, and the Diabetes Family Behavior Checklist. They used the Stepwise multiple linear regressions to develop a model for the diabetes knowledge score based upon clinical and psychosocial variables. The results showed that, age, years of schooling, duration of treatment, cognitive function, sex, and level of depression were independent determinants of the knowledge score (Murata, et al 2003).

In Korea, a study was carried out by Lee in 2003, to identify factors affecting foot-care knowledge and foot-care behaviors. 193 diabetic patients attending a university hospital in Korea, were enrolled during a 1 month period. A clinical nurse specialist conducted patient's interviews and foot examinations. The interview was based on a questionnaire dealing with various aspects of foot-care knowledge and behaviors. Among the socio-demographic variables, the researchers found that sex and age were affected foot-care knowledge and behaviors: Women showed significantly higher level of foot-care knowledge (P=0,039) and foot care-behaviors (P=0.002); young people showed higher level of foot care knowledge than old people (P=0.001). Patients having had higher education showed higher level of foot-care behaviors (P=0.006), and having had higher foot-care education affecting foot-care knowledge (P<0.001) and foot-care behaviors (P<0.001).). Also he found that, Foot care knowledge and behaviors were significantly interrelated ($r=0.375$), (P<0.001). Nevertheless in patients having had previous foot injury, the level of foot care behaviors was higher (P=0.010) than those without previous injury. In conclusion: the researcher reemphasized the importance of foot-care education especially for men and old patients. He suggested that, the emphasizing should be made on foot-care behaviors skills rather than foot-care knowledge. Also he stated that, by comprehensive foot-care education, more patients with diabetes will perform effective foot-care and save their feet from amputations (Lee, 2003).

IN UK, Subrata, et al, in 2004 stated that, the United Kingdom has a diabetic population of approximately 1.2 million. It is estimated that approximately 15% of all patients with diabetes will develop a foot ulcer in their life time. 25% of all patients with foot ulcers will have a major amputation. Also they found several publications demonstrating a reduction of foot ulcer and amputation rate through a range of active educational programs

and ways of improving patient's awareness of the problem. Subrata and her colleagues aimed in their study to examine the awareness and the level of education of the diabetic patients about foot care. They recruited 110 diabetic patients equally from the out-patient clinic and the wards at Southampton hospital. The results showed that, 37 (33%) of the recruited patients claimed they have never received any information about foot care. Of these who had received advice, approximately half had received information or had access to information over the previous 10 years; and in the majority of cases, information had been given once only. They concluded that, 33% of patients with diabetes did not recall receiving any information about foot care (Subrata, et al, 2004).

In USA, John, et-al, 2004 said, Preventive foot-care practices, such as annual foot examinations by a health-care provider, can substantially reduce the risk of lower-extremity amputations. They examined the level of preventive foot-care practices (reported rates of having at least one foot examination by a physician) among patients with diabetes mellitus in North Carolina and determined the factors associated with these practices. They found that, among 1,245 adult respondents to the 1997 to 2001 North Carolina Behavioral Risk Factor Surveillance System, 71.6% reported that they had had their feet examined within the past year, a rate that is much higher than that previously reported by Bell and colleagues in the same population for 1994 to 1995 (61.7%). Also they found that, foot care was more common among insulin users than nonusers, those having diabetes for 20 years or longer than those having diabetes for less than 10 years, blacks than whites, and those who self-monitored their blood glucose level daily than those who did not. They concluded that, diabetes educational services should be directed at populations at high risk of ignoring the recommended foot-care practices indicated in these analyses, thereby reducing diabetes-related lower-extremity complications (John, et al, 2004).

Giorgia De Berardis, et al, in 2004 investigated several aspects related to foot care in 3,564 patients with type 2 diabetes enrolled by 125 diabetes outpatient clinics and 103 general practitioners. Briefly, all patients with type 2 diabetes were considered eligible, irrespective of age, duration of diabetes, and treatment. Foot complications included ulcers, gangrene and non-traumatic amputations. Patients filled out a questionnaire investigating whether they had received information about foot care, how often they had had their feet examined in the last year, and how often they usually checked their feet. Analyses were adjusted for patient case mix and physician-level clustering using multivariate multilevel logistic regression models. The results showed that, the prevalence of lower limb complications was 6.8%. 72% of the patients declared that they had received foot education, but only 49% reported that they had had their feet examined in the last year. Patients with ≤ 5 years of school education (odds ratio [OR] 1.3, 95% CI 1.1–1.6) and those with low income (1.2, 1.0–1.4) were more likely not to receive foot education. Another finding is that, the presence of foot complications, peripheral vascular disease, cardiac-cerebrovascular disease, and diabetic neuropathy were not independently associated with a greater chance of receiving foot education. Also, foot examination was more likely to be performed in low-income patients (1.3, 1.1–1.6) and in those with foot complications (1.5, 1.1–2.1) but not in those with diabetic neuropathy, peripheral vascular disease, or cardiac-cerebrovascular disease. Overall, 33% of the patients declared that they never checked their feet. Patients who had received foot education (OR = 2.5, 95% CI 2.0–3.0) and those who had had their feet examined by their physician (1.7, 1.4–2.0) were more likely to check their feet regularly. Similarly, patients with foot complications (2.2, 1.5–3.2), but not those with peripheral vascular disease, cardiac-cerebrovascular disease, or diabetic neuropathy, were more likely to check their feet. In conclusion, the researchers indicated that, the attention to foot complications is generally poor, and a substantial

proportion of type 2 diabetic patients are not offered foot education and examination, even in those subgroups showing a significant increase in the risk of foot complications. Even in the presence of foot complications or major risk factors, one-quarter of the patients did not pay any attention to foot care. Those patients who had received foot education and had had their feet examined were significantly more likely to regularly check their feet. Finally they underlined the crucial role of physicians in orienting patient practices (Giorgia, et al, 2004).

In USA, Ronny, et-al in 2005 tended to evaluate the level of foot self-care behaviors of older adult's diabetic patients in a rural, multiethnic population and to identify factors associated with foot self-care. They studied a random sample of 701 African American, Native American, and white adults from two rural North Carolina counties. Participants were completed in-home interviews about five foot self-care practices, the level of foot self-care being performed in this population and the demographic, health, medical care, and support characteristics that associated with foot self-care behaviors. They found that, foot self-care behaviors were performed with the highest frequency on 6 to 7 days were washing the feet (75.6%) and not soaking the feet (79.2%). Conversely, 28% of the sample reported checking their feet fewer than 3 days per week, 23% of participants reported not checking their feet at all. 60% of the participants checked inside their shoes fewer than 3 days per week, 54% did not inspect their shoes before wearing them and at least three quarters of the participants had foot care index scores lower than the 6 to 7 range, demonstrating the need for health care providers and educators to continually remind their patients who have diabetes to perform foot self-care. Also they found four factors were independently associated with foot self-care scores; Women were more likely than men to engage in foot self-care activities (this finding is consistent with data from the Behavioral Risk Factor Surveillance System (BRFSS), which shows that the prevalence of

diabetes foot self-care is approximately 10% higher for women compared to men); The participants who had the nerves in their feet checked by a health care professional demonstrated higher foot care index scores compared to those that did not have the nerves in their feet checked; People who were shown how to care for their feet had higher foot care summary scores than those who were not (this finding supports the idea that proper patient education and medical care can improve preventive foot self-care and might help reduce amputations, and participants who did not receive support caring for their feet had better foot care practices overall than those who were receiving support in the care of their feet (this indicates that those who become dependent on either formal or informal support perform foot care worse than those who perform it independently). The results also showed low rates of foot self-care in a rural, predominantly low-income population. In addition, several factors that were hypothesized to be significant independent predictors of foot care were determined to have no significant association with foot care index scores. These factors include: ethnicity, seeing a health care provider for a diabetes-related visit in the past year, seeing a podiatrist in the past year, attending a diabetes class in the past year, higher physical functioning, and higher social support. Despite ethnic disparities in diabetes-related foot amputations, this study showed no differences in the level of foot care across 3 ethnic groups in this population. The researchers concluded that, foot self-care is an important element for the medical management of patients with diabetes. Educators can focus on factors other than ethnicity in improving diabetes foot self-care knowledge and practice. Activities that require patients to become more actively engaged in their foot care appear to have the outcome of better foot self-care practices. This was demonstrated by activities such as being shown how to care for their feet, having a health care provider actively examine their feet while checking the neurological function, and giving the patient the task to perform foot care independently. Finally they recommended that, health care

providers can have an important impact on diabetic foot self-care by showing patients how to care for their feet (Ronny, et-al 2005).

Another study in USA, conducted by Mary Ann Ledda in 2005 to evaluate the effectiveness of preventive, educational program for foot self-care management for improving African Americans' knowledge and skills to carry out proper foot care. They conducted a program that comprises a 15-minute orientation session with a diabetes educator and a take-home packet containing information, instructions, and materials to help carry out proper foot care. The program was developed with collaboration with senior diabetes educators after reviewing the existing materials and patient education guidelines. A pilot study of 24 African Americans with diabetes were completed a telephone interview to obtain feedback on the implementation, feasibility, and usefulness of the program, the effect of the program on daily foot care, the barriers to carrying out daily foot care and the patients' attitudes toward daily foot care. They found that, the program was very well received and reportedly had a positive effect on daily foot care. Patient feedback indicated that the most useful parts of the program were the patient instruction booklet, the foot-care knowledge self-test with correct answers and wrong choices explained, and the large hand mirror. Barriers to daily foot care that were identified included physical problems such as poor vision and joint pain, tiredness, lack of motivation, and family responsibilities. They drawn a conclusion that, the self-care program was acceptable and appreciated by most participants. A hand mirror is a vital part of daily foot care and should be a part of patient education foot care programs (Mary, 2005).

2.7.2. Regionally:

In Egypt, A cross-sectional descriptive study by Kamel, N.M. et al, in 1999 investigated the behaviors of diabetic patients in relation to management of their disease. A sample of 300 diabetic patients was selected randomly from diabetic patients attending one selected diabetic clinic in Alexandria. All diabetic patients were attended the outpatient clinic during the study period. There were more males (52.3%) than females (47.7%). The ages ranged from 26 years to 85 years. Less than one-third of the patients (29.3%) were illiterate and about a quarter (25.7%) could only read and write. Only 13.3% held a primary or preparatory education certificate, while 17.7% had secondary education and 14.0% were university graduates. The duration of diabetes ranged from 1 year to 45 years. The majority of the diabetic patients (97.0%) were categorized as having a very good level of behavior in relation to periodic medical check-ups. Data were collected using an interview schedule. The treatment behaviors addressed included: compliance with dietary regimen, smoking cessation, physical activity, adherence to treatment regimen, periodic check-up, and periodic laboratory tests for glucose in blood and urine and self-care practices (foot care, skin care and weight monitoring). Treatment behaviors were classified as poor (less than 50% of steps carried out), satisfactory (50%-75%) and very good (more than 75% of steps carried out). The results regarding foot care indicated that, three-quarters of diabetic patients administered foot care very well, while 21.3% handled this in a satisfactory way (Kamel, et al, 1999).

In Saudi Arabia, Khattab in 1999 stated that, diabetes mellitus is becoming a major health problem, prevalence has been found to be 11.8% and 12.8% in males and females respectively. Thus, it causes a considerable increase in morbidity, mortality and cost to the society. It is a proven fact that long-term complications of diabetes mellitus can be

prevented or postponed through good care and control of the disease. He studied the compliance among Saudi diabetic patients with diet, medication and the appointment system. The study was carried out for a period of 3 months at AlManhal primary health care (PHC) centre. All the diabetic patients registered with Al-Manhal PHC centre ($n = 294$) were included in the present study. He designed a special diabetic follow-up card for the purpose of the study which comprised three columns to record the assessment by the doctor of the patient's degree of compliance with diet, drugs and the appointment system. Compliance by diabetic patients attending the clinic was judged in accordance with the guidelines laid down by the National Quality Assurance Protocol, Ministry of Health of Saudi Arabia. Statistical analysis was done using SPSS. The total compliance score as dependent variable was compared with the patient, disease and care characteristics as independent variables using linear regression analysis. The results showed that good compliance with diet was significantly higher among males ($P = 0.01$) and those with good diabetic control ($P = 0.01$), while good compliance with appointment systems was significantly associated with type II diabetes ($P < 0.01$) and good care ($P < 0.01$). Compliance with drugs showed no significant association with any of the studied determinants ($P > 0.05$). When multiple regression analysis was applied, the degree of control of diabetes, its duration and the total score of care were the only predictors of the three aspects of compliance ($P < 0.05$). The study highlighted some determinants of compliance with some aspects of the diabetic regimen in the Saudi community. The degree of care and duration of the disease were the most common variables found to predict compliance. He advised that, family physicians could make use of the information on patients' compliance with the various aspects of the prescribed regimen to predict compliance with other aspects of the regimen (Khattab, 1999).

Another study in Saudi Arabia by Abdelmoneim and Al-Homrany in 2002 aimed to examine the impact of health education delivered in PHC setting on the control of diabetes and to investigate any gender difference affecting the validity of the health education message. The study was conducted in the PHC centre of Shamasan in Abha City. The files of 198 diabetic patients (108 women and 90 men) fulfilled the inclusion criteria set for this study. The following data were collected for each patient: age, sex, family history of diabetes (parents), diabetes duration, body mass index, last FBS and cholesterol level, complications if any, number of health education sessions received and crowding index (number of family members/number of rooms in dwelling). Bivariate analysis, comparing men and women, was performed and multiple logistic regression models were designed for the whole population, followed by models for men and women separately. The results showed that females had higher fasting blood sugar levels than men with significantly fewer mean number of health education sessions in the last 12 months. Multiple logistic regression models pointed to the female sex as a significant predictor of poor glycaemic control. The model for females alone showed significantly poorer diabetes control when the number of health education sessions received was less. The study recommended that, female patients should to be taken into account when designing health education messages (Abdelmoneim and Al-Homrany, 2002).

In United Arab Emirates, a study done by Richard L. Reed, et al, in 2005 to evaluate the long-term impact of a structured approach for improving the quality of diabetes care in general practice. Controlled before–after trial within a health district with three Primary Health Care centers (PHCs) in the intervention group and the six remaining serving as controls. Outcomes and adherence to guidelines were measured over the year before the intervention began and for a second 1-year period at the end of the intervention period. Data were collected by chart abstraction. Subjects of 738 patients were continuously

followed in nine PHCs for diabetes care for the period of the study. Structured diabetes care, including the development of general practice diabetes clinics, a patient education program, a health care professional education program, and improved recording of clinical information, was provided for the 33-month time period. The researchers found a statistically significant improvement in three of the process of care variables (ordering Hb, cholesterol, and documenting foot examinations) whereas the four remaining variables did not improve. There was limited impact on outcome variables. In the conclusion, they stated that, the interventions described in this study demonstrated an improvement in some process of care measures suggesting an impact of this type of delivery model in this environment (Richard, et al 2005).

2.7.3. Locally:

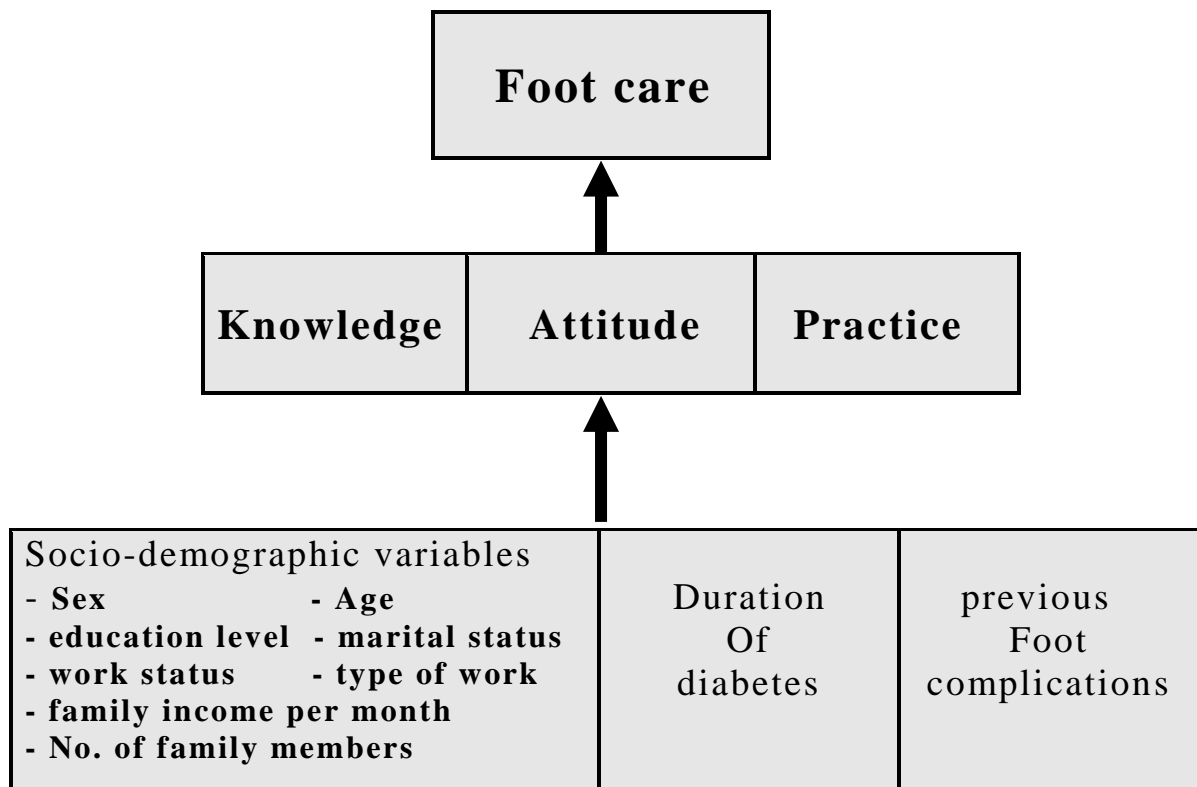
In Palestine, Ashraf Eljedi, et al, in 2006 stated that, Diabetes is known to strongly affect the health-related quality of life (HRQOL) and HRQOL is also influenced by living conditions. Ashraf and colleagues analyzed the effects of having diabetes on HRQOL under the living conditions in refugee camps in the Gaza strip. They studied a sample of 197 diabetic patients who were recruited from three refugee camps in the Gaza strip and 197 age- and sex-matched controls living in the same camps (control group). To assess HRQOL, they used the World Health Organization Quality of Life questionnaire including four domains (physical health, psychological, social relations and environment). Domain scores were compared for cases (diabetic patients) and controls (persons without diabetes) and the impact of socio-economic factors was evaluated in both groups. They found that, all domains were strongly reduced in diabetic patients in comparing to controls, with stronger effects in physical health (36.7 vs. 75.9 points of the 0–100 score) and

psychological domains (34.8 vs. 70.0) and weaker effects in social relationships (52.4 vs. 71.4) and environment domains (23.4 vs. 36.2). The impact of diabetes on HRQOL was especially severe among females and older subjects (above 50 years). Low socioeconomic status had a strong negative impact on HRQOL in the younger age group (<50 years). They concluded that, HRQOL is strongly reduced in diabetic patients living in refugee camps in the Gaza strip. Women and older patients are especially affected. (Ashraf, et al, 2006).

Chapter (3)

Conceptual framework

Conceptual Framework for, Knowledge, Attitude and Practice of Diabetic Patients
about foot care



Theoretically, it is found that the level of diabetic patients knowledge, attitude and practice of foot care can affect the outcomes of their daily foot-self care.

On the other hand, the level of diabetics knowledge, attitudes and practice of foot care (dependent variables) can be affected by the socio-demographic variables of diabetic patients as well the duration of diabetes and the presence of previous foot complications (independent variables).

In this study, the researcher will study the relationships between these variables and how they can affect each others.

Introduction

In this chapter, the researcher will talk bravely about knowledge, attitude and practices of diabetic patients which are the variables of the study concern that can affect the outcome of foot care. On the other hand, the study will include descriptions of the most important factors (independent variables) that have an effect on these three variables which in turn affect the level of patient's foot self-care. These factors were determined after reviewing the literatures related to this subject. The factors include:

- Socio-demographic factors (sex, age, level of education, marital status, work status, type of work, total family income per month and number of family member of diabetic patients).
- Duration of diabetes.
- Presence of foot injury or previous foot complication.

3.1. Knowledge

Knowledge is seen as a dynamic system, organized into certain structures forming an internal relationship between man and his environment, and Learning is a change in this relationship occurring as a result of the individual interpretations often within the knowledge system. People with diabetes need sufficient self-care knowledge to manage their diabetes effectively. They may lack this essential knowledge unless they receive education. Education has been considered an important part of diabetic treatment. It is generally effective in increasing patients' knowledge about the disease and self care management. (Brown, 1990).

Patient education is the process by which a patient learns or acquires knowledge about his or her health status (Piccininni and Drover, 2000).

3.2. Attitude

Attitude is an emotion that all people get when they have other emotions. Attitudes are positive, negative or neutral views of an attitude object like; person, behavior or event (Wikipedia, 2007).

Illness is culturally defined as a condition of impaired well-being that has social, moral, psychological and physical dimensions (Foster, 1976).

Different orientation to the disease or illness and to the clinical reality can affect patient care (Kleinman, et al., 1978).

It has long been known that what people believe strongly influences their feelings and behaviors. The ancient Greek philosopher Epictetus stated, "People are not disturbed by things that happen to them, but by the views they take of them. The effects of people's cognitions and attitudes regarding their self-care behaviors have drawn increasing attention from researchers. For example; Cognitive models of health behavior stated that, educating patients and helping them acquire the necessary technical skills is fundamental for reaching a prerequisite self-care behavior. The Health Belief Model proposes that, in addition to the level of knowledge, we need to take into account the beliefs people hold about their vulnerability to medical complications, the benefits and barriers they perceive, and their self-efficacy expectations, i.e., their confidence in being able to perform and maintain the self-care behaviors (Frank, et al, 1999).

3.3. Practice

Practice is to do or to perform habitually or customarily or repeatedly in order to acquire a skill (Wikipedia, 2007)

Diabetes Self-Management is the cornerstone of care for all individuals with diabetes who want to achieve successful health-related outcomes. Recently, increased attention has been paid to the importance of self-care to health and well-being of patients. One important component of self-care includes preventive health care practices, those routine, day-to-day behaviors undertaken to promote health and prevent illness (Wingard, et al., 1982).

Breslow and Breslow (1993) stated that, there is a relationship between health practices and the health status of patients. Patients with poor health practices experienced 50% greater disability and mortality over a 10-year period than those with a pattern of good health practices (Breslow and Breslow, 1993).

3.4. Socio-demographic factors

Research on the relation between socio-demographic factors and health has often focused on individual characteristics such as age, sex, education, income status of the individual and occupation. However, socio-demographic factors include also social relationship and community-level characteristics. There is considerable evidence that the social status of persons with diabetes and the characteristics of their communities or neighborhoods may determine their risk of mortality and diabetes-related complications such as cardiovascular disease, retinopathy, end-stage renal disease, and amputation, as well as their quality of life. Among persons with diabetes, factors such as low income, less education, and living

in a high-poverty area have been associated with higher rates of diabetic complications, and lower rates of behaviors like blood glucose monitoring, examination of the feet, dietary restrictions, and regular exercise. Various studies have addressed the relation between low income position and adverse health outcomes for persons with chronic conditions such as diabetes (Robinson, et al, 1998).

Evidence is strong for the relation between supportive social ties and better physical and mental health and, conversely, between social isolation and greater morbidity and mortality. Poorer persons are at higher risk of social isolation and of having fewer supportive social ties. Among persons with diabetes, higher levels of social support have been associated with better self-management, including adherence to recommended diet and exercise regimens and better foot care behavior (Balfour and Kaplan, 2002).

3.5. Duration of the disease

A diagnosis of diabetes immediately increases the risk of developing various clinical complications. Duration of diabetes is one of the important factors in the pathogenesis of these complications, the risk of ulcers or amputations is increased in people who have had diabetes >10 years (Caroline, 2004).

The researcher tended to study the effect of diabetes duration as an independent factor on diabetic patients' knowledge, attitude and practice about foot care.

3.6. Foot complication

Foot ulcers and lower extremity amputations are disabling complications of diabetes and lower extremity disease. Diabetic foot is adversely affect diabetics in both economic and emotional terms and can negatively affect the quality of life. It is estimated that the risk of diabetes-related foot complications can be reduced by 49% to 85% by proper preventive measures, patient education, and foot self-care. However, the degree to which a person is able to perform diabetes foot self-care is likely to be influenced by a number of factors, including personal health (Karter, 2002).

The researcher will try to test the effect of presence of foot complication on knowledge, attitude and practice of diabetic patients on foot-self care.

Chapter (4)

Methodology

4.1. Study design

The study is descriptive analytical cross-sectional design. Cross sectional design is useful for descriptive purposes. It shows the cause and the effect, and examines the exposure and the outcome at the same time which is useful in conducting and evaluating this type of studies. It is less costly and saves time and efforts. Cross-Sectional study can give some indications about the association among different exposures under investigation and their outcomes.

4.2. Study population

The target population is all registered type 2 diabetic patients both males and females at UNRWA primary health care centers in Gaza Strip. For the convenience of the study four health care centers from the total of 18 centers serving Gaza refugee population were selected namely (Deir El-Balah, Al-Maghazi, Al-Borrage and Al-Nussirat), which compromised the middle area of Gaza Strip UNRWA PHC centers at the time of conducting the study. At the end of 2005, the total number of registered diabetic patients at these four centers is 4,025 patients males and females divided on the four centers as the follow: (916) in Deir El-Balah, (589) in Al-Maghazi, (795) in Al-Borrage and (1725) in Al-Nussirat.

4.3. Eligibility criteria

4.3.1. Inclusion Criteria:

All patients diagnosed with type 2 diabetes mellitus, both males and females, registered at UNRWA primary health care centers at the middle area of Gaza strip.

4.3.2. Exclusion Criteria:

subjects diagnosed with type 1 diabetes mellitus.

4.4. Sample Size

The sample size estimated using Epi-info.6 program (epidemiological information statistical program, version 6). At expected frequency 30%, worst accepted frequency 35% and at confidence interval 95%, the sample size was 300 eligible subjects. Estimating the number of participants in each clinic was calculated proportionally according to the number of diabetic patients registered in each health center.

Table(5.1): proportions of subjects according to their locations.

Health Center	Study Population	Sample Size
Deir El-Balah	916	68
Al Magazi	589	44
Al Burage	795	59
Al Nussirat	1725	129
Total	4025	300

4.5. Sampling Process

Subjects were randomly selected using proportional systematic sampling method. Sample interval was every 13 patient ($4025 / 300 = 13$). The first patient came to the clinic is considered the first subject of the sample. The second subject was chosen in case of non-respondent patient.

4.6. Setting of the Study

The place of the study is the primary health care centers at UNRWA clinics in the middle area of Gaza Strip (Deir El-Balah, Al-Maghazi, Al-Borrage and Al-Nussirat).

4.7. Ethical consideration

Approval was obtained from the Helsinki Committee at the Palestinian MOH as well the UNRWA administration office at Gaza- Strip.

Written consent was obtained from each participant; Every participant received a complete explanation about the purpose of the study, the length of the interview, the risk and benefits of the study and the investigation agency as well as the name of the researcher. They were assured that the information will be confidential and they have the right to participate or not.

All ethical considerations were maintained, including respect of people, truth, and confidentiality.

4.8. Research Instrument

The study instrument is face to face structured questionnaires.

4.8.1. Questionnaire Design:

The questionnaire was designed to cover areas of the study of interests, knowledge, attitudes and practices that affect the outcome of foot care of diabetic patients. It focused to meet the study objectives. The questionnaire constructed and introduced in Arabic language. It is mostly close ended questions and consist of five parts; first part is personal information obtained from the subject. Second part is information from the patients medical files about the medical history of subjects. Third part is questions testing the level patient's knowledge about diabetic disease and foot care. Fourth part is questions testing patients attitudes about foot care. The fifth part is questions testing patients foot care practices. At the end there are three questions testing patients opinions about the care given to diabetic patients at their health care centers. The questionnaire introduced through face to face interviews between the researcher and the subjects in order to avoid misunderstanding and difficulties of interpreting the questions.

4.8.2. Validity of the Questionnaire:

Two types of validity were maintained: First is criterion related validity; the study instrument was constructed after reviewing the literatures related to the subject of the study. Second is content validity; the questionnaire form was checked by expert committee. The objectives of the study were attached with the questionnaire form. Some of the items were added, modified or excluded from the questionnaire design as a result of the committee comments.

4.9. Pilot Study

Pilot study was conducted before the beginning of data collection course. Pilot study is helpful to test the recruitment and response rate. 15 subjects were selected from the UNRWA PHC centers (3 from Deir El-Balah, 3 from Al-Maghazi, 3 from Al-Borrage and 6 from Al-Nussirat) by convenient method and interviewed and they were not included in the study. After piloting, some necessary adjustments on the questions were made. Participants of the pilot study were excluded from the study sample.

4.10. Data Collection

Data were collected by the researcher using face to face questionnaires with the subjects at their health care clinics in 6 months period, started from the first day of January 2006 and ended at the end of June 2006. The average time for each interview was 20 minute. Diabetic clinic in the chosen centers work 6 days per week. The researcher was collected the data in 3 days per week, average of 10 subjects were interviewed per week in Deir El-Balah, Al-Maghazi and Al-Borrage clinics and 15 subjects in Al-Nussirat clinic.

4.11. Response Rate

The response rate was 94%. 18 patients were refused to participate in the study, another 18 patients were selected to replace the them.

4.12. Statistical Analysis

Data was entered and analyzed by the computer using SPSS (Statistical Package for social science, version 8.0). data were checked for entry errors (data clearance).

Characteristics of the sample were obtained through descriptive analysis (frequencies). relationship between different variables were analyzed using T-test for one and two independent variables, one way Anova test and multiple comparison (LSD)test for comparing between groups.

Chapter (5)

Results

In this chapter the researcher will present the results of the study including the socio-demographic and the medical characteristics of the study subjects, the level of knowledge, attitudes and practices of diabetic patients regarding foot care, as well as the effect of different independent variables on them.

In order to achieve this purposes different statistical tests were used, including, frequencies, " T " test, one way Anova test and LSD test (multiple comparison). Results are illustrated in tables for better inferring and understanding.

5.1. Characteristics of participants

Subjects participated in this study were 300 diabetic patients. All are located in the middle area of Gaza strip (Deir El-Balah, Al-Maghazi, Al-Borrage and Al-Nussirat).

5.1.1. Socio-demographic characteristics:

The study subjects showed some variations in the socio-demographic characteristics:

The number of female in the sample is (162), which accounts (54%) is more than the number of male (138), which accounts (46%) of the study sample.

The largest number of participants is located in age group (45-60 years), which accounts (41%) of the study sample, followed by age groups of (above 60 years) and (less than 45 years), which account (38%) and (21%) respectively.

Most of participants are married (261 subject), accounts (87%) of the sample. There is no single or divorced subject found. Widowed participants accounts (13%) of the study sample.

Most of participants are having their secondary education (105 subjects), this number accounts (35%) of the study sample, followed by preparatory educated group (26%), participants who did not enter schools (14%), university group (13%) and primary educated group (12%) of the study sample.

Table (5.2) below summaries the socio-demographic characteristics of the study subjects including (gender, age, marital status and educational level).

Table (5.2): Socio-demographic characteristics of participants

independent variables	frequency	Percent
1. gender		
Male	138	46
Female	162	54
Total	300	100
2. age group		
Below 45 years	63	21
45-60 years	123	41
Over 60 years	114	38
Total	300	100
3. marital status		
Single	0	0
Marred	261	87
Divorce	0	0
Widowed	39	13
Total	300	100
4. educational status		
Primary	36	12
Preparatory	78	26
Secondary	105	35
University	39	13
None	42	14
Total	300	100

5.1.2. Socio-economic characteristics of participants

Most of participants were unemployed (240), which represents (80%) of the sample. The rest (60) were working with a percentage of (20%) of the sample.

Forty two subjects of the employed were having professional work (14%), while the trader subjects and the skilled subjects represent (9%) for each. No one found to have manual work.

The greatest number of participants (135) said to have between (500 and 1500 sh/month) per month, this number represents (45%) of the study sample, while (42%) of subjects said to have (less than 500 sh) and (12%) said to have between (1500 and 2500 sh). No one said to have more than (2500 sh)per month.

Concerning the number of family member, most of participants found to live in families that consist of (5-8 member), this represents about (58%) of the sample, followed by (31%) who lived in big families (over 8 member) and (10%) lived in small families (less than 5 members).

Table (5.3) below summaries the socio-economic characteristics of participants, mainly, work status, type of work, total family income per month and number of family member.

Table (5.3): Socio-economic characteristics of participants

Independent variables	frequency	percent
1. work status		
Working	60	20
Not working	240	80
Total	300	100
2. kind of work		
Professional	42	14
Skilled	9	3
Manual	0	0
Trader	9	3
Not working	240	80
Total	300	100
3. Average family income/month		
Below 500 sh	129	43
500- below1500 sh	135	45
1500- below 2500sh	36	12
Over 2500 sh	0	0
Total	300	100
4. Number of family member		
Below 5 member	30	10
5-8 member	177	58
Over 8 member	93	31
total	300	100

5.1.3. Medical characteristics of the subjects

Medical characteristics of participants were obtained from patients files show that:

All participants are having type 2 diabetes.

About half of subjects (153) are treated with oral hyperglycemic tablets, the number accounts (51%) of the sample, followed by (32%) treated with insulin, (12%) treated with combined treatments (oral hyperglycemic drugs and insulin) and (5%) are on diet.

Subjects who found to have regular visit to UNRWA clinic where (168) subjects, the number represents (56%) of the sample and (44%) do not have regular visit to the clinic.

Regarding participants blood glucose level, (52%) of subjects have controlled blood glucose level according to the last three reading of their medical files and (48%) do not have their blood glucose controlled.

The higher number of participants (99) have diabetes for (5 – 10 years), the number constitutes (33%) of the total sample, followed by (27%) of participants have diabetes for (2 – 5 years), (25%) have diabetes for (more than 10 years) and finally (15%) have diabetes for (less than 2 years).

About foot complications, the results show that (11%) of participants have foot complications and (89%) without foot complications.

Table (5.4) below, illustrates the medical characteristics of the study subjects including, type of diabetes, type of treatments, regularity to clinic visit, controlled of blood glucose level, duration of diabetes and the presence foot complications.

Table (5.4): Medical characteristics of participants

Independent variables	frequency	percent
1. Type of diabetes		
Type 1	0	0
Type 2	300	100
total	300	100
2. Type of treatment		
Diet	15	5
Oral	153	51
Insulin	96	32
Combined	36	12
total	300	100
3. Regularity to clinic visit		
Regular	168	56
Irregular	132	44
total	300	100
4. Controlled of blood glucose level (last three readings)		
Controlled	156	52
Uncontrolled	144	48
total	300	100
5. Duration of diabetes		
Less than 2 years	45	15%
2 - < 5 years	81	27%
5 - < 10 years	99	33%
More than 10 years	75	25%
total	300	100%
6. Presence of foot complication (ulcer or amputation)		
Yes	33	11%
No	267	89%
Total	300	100%

5.2. Participants level of knowledge, attitudes and practice about foot care

To test the level of knowledge, attitudes and practices of diabetic patients about foot care, the researcher assumed that, the level of awareness (sum of the three components, knowledge, attitude and practice) of diabetic patients about foot care is below 60%.

T-independent test is used to test this hypotheses (t-value is equal 1.96). Table (5.5) below illustrates the results.

Table (5.5): Participants level of knowledge, attitudes and practice about foot care

Dependent variables	Sample	Mean	St. dev.	Test value (60%)	T-value (1.96)	Sig.
Knowledge	300	10.6	1.21	10.8	- 2.2	.023 Sig.
Attitude	300	12.3	2.09	9	28	.000 Sig.
Practice	300	10.5	1.28	10.8	- 2.4	.014 Sig.
Sum (awareness)	300	30.6	5.3	29.4	4	.000 Sig.

Table (5.5) shows:

Participants knowledge about foot care: there is statistical significance relationship between the level of participants knowledge about foot care and their daily foot-self care, the t-value is (-2.2) which is more than the scheduled t-value (1.96). the mean value (10.6) is less than the assumed test value at 60% (10.8) which indicates that, the level of participants knowledge of about foot care is below 60%.

Participants attitude about foot care: there is statistical significance relationship between the level of participants attitude toward foot care and their daily foot-self care, t-value (28) is more than the scheduled t-value (1.96). The mean value (12.3) is more than the assumed test value at 60% which indicates that, the level of participants attitude toward daily foot-self care is more than 60%.

Participants daily foot-self care practice: there is statistical significance relationship between the level of participants practice of foot care and their daily foot-self care, t-value (-2.4) is more than the scheduled t-value (1.96). The mean value is (10.5), which is less than the assumed test value at 60% (10.8), which indicates that, the level of participants practice of foot care is less than 60%.

Participants level of awareness about foot care (sum of knowledge, attitude and practice): There is statistical significance relationship between the level of participants awareness about foot care and their daily foot-self care, t-value (4) is more than the scheduled t-value (1.96). The mean value (30.6) is more than the assumed test value (29.4) at 60% which indicates that, the participants level of awareness about foot care is more than 60%.

The above results indicate that In participants attitude toward foot care is more than 60%, but below 60% concerning their knowledge and practice.

In USA, study conducted by Stanaszek and McDonald (1981), were patients interviewed about their knowledge and their habits in self-care management of their disease. The importance of foot care was understood by 44% of the patients (Stanaszek and McDonald, 1981).

Also Meijer in USA (2001), found that patients knowledge about foot care was insufficient (Meijer, et-al, 2001).

In Egypt, A cross-sectional descriptive study by Kamel, N.M. et al, in 1999 investigated the behaviors of diabetic patients in relation to management of their disease. The results regarding foot care indicated that, (75%) of diabetic patients administered foot care very well, while 21.3% handled this in a satisfactory way (Kamel, et al, 1999).

In India, researchers in (1999), evaluated knowledge of diabetic patients regarding foot problems and foot care. The scores on awareness of general foot care principles and basic

facts about foot complications were poor (Viswanathan, 1999). But another study in India, Mulye and Almeida in 2002, studied the adherence of diabetic patients regarding foot care. They found that foot-care adherence was fairly high (Mulye and Almeida, 2002).

The results are consider satisfied comparing with the above studies. The researcher believe this is related to the significant role of the UNRWA clinics in diabetic patients education about foot care. But more efforts still need to be increase in this field especially in patients knowledge and practice.

5.2.1. Participants level of knowledge about foot care:

Participants were asked (question 28, 29) if they know the special practices of foot care, the results are illustrated in table (5.6):

Table (5.6): Percentage of participants who said they know the foot care practices

Do you know the special practices of foot care	frequency	Percent
Yes	222	74 %
No	78	26 %
total	300	100 %

Table (5.6) shows that, 74 % said that they know the special practices of daily foot care and 26 % said they do not know.

It is clear that there if a gab between what participants say about their knowledge about foot care and what they actually know, table (5.5) before shows that participants knowledge is below 60%.

Participants who said that they know the special practices of foot care were (222), the researcher asked them to mention these practices. Results are illustrated in table (5.7):

Table (5.7): Number of foot care practices known to the participants

Could you tell me what are the special practices of foot care	frequency	Percent
One practice	9	4 %
Two practices	39	18 %
Three practices	84	38 %
Four practices	60	27 %
Five practices	27	12 %
Six practices	3	1 %
Seven practices	0	0
total	222	100 %

The American Diabetic Association (ADA) 2005, listed nine foot care practices as guideline criteria for daily foot care practices. The researcher here concentrated on seven practices and consider the participant who mention four practices is acceptable according to our hypotheses before (four practices represent about 57 % of the total seven practices).

It seems from the above results (table 5.7) that, participants who mentioned four practices or more constitute 40% of the total 222 participants. Also it was noticed that no one mentioned the seven practices.

The above results confirm that, participants knowledge about foot care is below 60%. The participants have knowledge, but they lack in the depth of these knowledge, which make us think of ways to increase their level of knowledge.

5.2.2. Participants level of daily foot care practice

participants were asked in question (37) if they practiced daily foot self care or not, the result were illustrated in table (5.8):

Table (5.8): Percentage of participants who said they practiced daily foot care

Foot care practice	frequency	Percent
Yes	216	72%
No	84	28%
total	300	100%

The results show that when participants were asked if they practiced daily foot care or not (question 37), 72% claimed that, they practiced daily foot care and 28% said no.

The results suggested that, there is a gap between what participants say and what they actually do, when they asked in specific what they are doing in taking care of there feet, less than 60% of participants were practicing foot care as illustrated in table (5.5) before.

It seems to the researcher that, people do not like to say they do not know, may be they do not like any body to blame them or may be they afraid to be responsible about the consequences.

5.3. Relationship between socio-demographic variables and participants level of knowledge, attitudes and practices of foot care

5.3.1. gender role:

To answer the question, what is the relationship between participants gender and their knowledge, attitude and practices of foot care, T-test for one independent variable was used (t-value equal 1.96). table (5.9) shows the results.

Table (5.9): Role of participants gender on their level of knowledge, attitudes and practices of foot care

Dependent variables	gender	number	mean	St. dev.	T- value (1.96)	Sig.
knowledge	Male	138	6.2	1.2	1	.3
	Female	162	6	1.6		Not sig.
attitudes	Male	138	12.4	2.1	.6	.5
	Female	162	12.3	2		Not sig.
practice	Male	114	10.6	1	1.2	.2
	Female	102	10.4	1.5		Not sig.
Sum (awareness)	Male	138	27.5	5.7	3.4	.001
	Female	162	24.9	6.8		Sig.

Table (5.9) shows that, there is no statistical significance relationship between participants gender and their knowledge, attitude and practice of foot care, calculated t-value for each (1), (.6), (1.2) respectively are less than the scheduled t-value (1.96).

There is a statistical significance relationship between participants gender and their awareness about foot care, t-value (3.4) is more than the scheduled t-value (1.96). the mean value for males (27.5) is more than the mean value for females (24.9) which means that, the males are more aware about foot care than females.

The above result is consistent with the previous studies which found a relationship between gender and diabetics awareness about foot care like:

A study that carried out by Katarina, et al, in 2002 found differentiation between men and women in their beliefs about health and illness among patients with severe diabetic foot lesions that might affect self-care practice and care-seeking behavior. They found that, women were active in self-care and preventive care, searched for information and tried to adapt to the situation and men were more often sought help for acute problems, discussed more foot-related problems, and showed a passive attitude (Katarina, et al, 2002).

Murata, and other researchers in 2003 described the clinical, psychological and social factors affecting diabetes knowledge of patients with Type 2 diabetes. They found that sex is one of the independent determinants of the knowledge score (Murata, et al, 2003).

In Korea, a study was carried out by Lee in 2003, to identify factors affecting foot-care knowledge and foot-care practice. The researcher found that sex is among the socio-demographic variables affected foot-care knowledge and behaviors: Women showed significantly higher level of foot-care knowledge and foot care practice (Lee, 2003).

In USA, Ronny in 2005 evaluated the level of foot self-care behaviors of older adult's diabetic patients and the factors associated with foot self-care. One of the results of this study shows that women were more likely than men to engage in foot self-care activities (Ronny, et-al, 2005).

The researcher believes that males are more aware about foot care than females because in our culture males are having more chance to go outside the home, for example they go to work more than females, this offer them more chance to seek for medical advices and to have more information about diabetic foot problems and foot care more than females, beside females are always busy at homes.

5.3.2. Age role:

Participants were divided into three groups according to their age; < 45 years, 45-60 years and > 60 years.

One way Anova test was used to test the effect of participants age on their knowledge, attitudes and practices as well as their awareness about foot care. At ($\alpha \leq .05$), the value of "F" in the schedule is (3).

Table (5.10): Role of participants age on their level of knowledge, attitude and practice about foot care

Dependent variables	Age groups	Sum of squares	df	Mean Square	F (3)	Sig.
knowledge	Between G.	13.6	2	6.8	2.9	.053
	Within G.	682.4	297	2.2		Not Sig.
	Total	696.1	299			
Attitudes	Between G.	40.8	2	20.4	4.7	.009
	Within G.	1266.5	297	4.2		Sig.
	total	1307.3	299			
Practice	Between G.	6.1	2	3	1.8	.153
	Within G.	346.3	213	1.6		Not Sig.
	Total	352.5	215			
Sum Awareness	Between G.	187.7	2	93.8	2.2	.107
	Within G.	12402.5	297	41.7		Not sig.
	Total	12590.2	299			

table (5.10) shows that, there is no statistical significance relationship between participants age and their knowledge practice and awareness about foot care, F-value (2.9), (1.8) and (2.2) respectively are less than the scheduled F-value (3).

Concerning participants attitudes, the calculated F-value is (4.7), which is more than the scheduled F-value. This means that, at ($\alpha \leq .05$), there is statistical significance relationship between participant age and their attitudes towards foot care.

Multiple comparison (LSD) test is used to clarify the age group that have more positive attitude.

Table (5.11): differences between participants attitude toward foot care related to their age groups

Age group	< 45 years (-)	45- 60 years (-)	> 60 years (-)
< 45 years (+)	/	.46	.97 *
45- 60 years (+)	/	/	.51
> 60 years (+)	/	/	/

Table (5.11) indicates that, there is statistical differences of participant attitudes towards foot care related to their age group. This differences is between age group of (< 45 years and > 60 years) in favor the age group (less than 45 years), which indicates that participants who are less than 45 years old are having more positive attitudes towards foot care than participants who are more than 60 years old.

The researcher believes that, people less than 45 years old have more positive attitude than old ones because they often more optimistic and those who are over 60 years old are more depressed and may be get tired from their disease.

This result is consistent with the previous literatures, such as:

Murata, and other researchers in 2003, found that participants age is one of the independent variables that affecting their knowledge about foot care (Murata, et al, 2003).

Lee in 2003, through a study in Korea also found that, young people showed higher level of foot care knowledge than old people ($P=0.001$) (Lee, 2003).

In USA, a study done by Stanaszek and McDonald, in 1981 to evaluate self-care habits of diabetic patients in relation to their understanding of their disease, An inverse relationship was found between age and knowledge scores, (Stanaszek and McDonald, 1981).

5.3.3. Role of marital status:

Participants are either married or widowed, there is no single or divorced.

T – test for two independent variables were used to test the effect of marital status on participants knowledge, attitude and practices as well as their awareness about foot care. the sample contain married and widowed subjects, no single or divorced subjects were found. (t- value equal 1.96).

Table (5.12): Role of participants marital status on their level of knowledge, attitude and practice of foot care

Dependent variables	Marital status	number	Mean	St. dev.	T - value (1.96)	Sig.
Knowledge	Married	261	6.2	1.5	2	.046
	widowed	39	5.6	1		Sig.
Attitudes	Married	261	12.6	1.9	5.1	.000
	widowed	39	10.8	2.3		Sig.
Practices	Married	195	10.5	1.2	.045	.96
	widowed	21	10.5	1.4		Not sig.
Sum awareness	Married	261	26.7	6.2	4.1	.000
	widowed	39	22.2	6.7		Sig.

Table (5.12) shows that, there is statistical significance relationship at ($\alpha \leq .05$) between participants marital status and their knowledge, attitude and awareness about foot care, t-values (2), (5.1) and (4.1) respectively are more than the scheduled t-value (1.96). The mean values for married subjects in each (6.2), (12.6) and (26.7) are more than the mean values for widowed (5.6), 10.8) and (22.2) respectively, which means the married subjects are having more knowledge, more attitude and more aware about foot care than widowed.

The researcher think that social life that offered for married subjects encouraging them to seek for more information about their disease and help them trying to overcome their situation than widowed. Beside, the widowed subjects may become depressed and feel lonely.

To the researcher knowledge, there is no literatures found about the relationship between patients marital status and their awareness about foot care.

5.3.4. Role of educational level:

Participants were divided into five groups according to their educational level; primary, preparatory, secondary, university and none.

One way Anova test (F-value = 3) was used to test the effect of participants level of education on their knowledge, attitudes and practice as well as their awareness about foot care.

Table (5.13): Role of participants level of education on their level of knowledge, attitude and practice of foot care

Dependent variables	Education Groups	Sum of Squares	df	Mean squares	F (3)	Sig.
Knowledge	Between G.	33.7	4	8.4	3.7	.005
	Within G.	662.3	295	2.2		
	Total	696.1	299			Sig.
Attitudes	Between G.	156.1	4	39	10	.000
	Within G.	1151.2	295	3.9		
	Total	1307.3	299			Sig.
Practices	Between G.	51.6	4	12.9	9	.000
	Within G.	300.8	211	1.4		
	Total	352.5	215			Sig.
Sum awareness	Between G.	793.6	4	198.4	4.9	.001
	Within G.	11796.6	295	39.9		
	Total	12590.2	299			Sig.

Table (5.13) shows that, there are statistical significance relationship between participants level of education and their knowledge, attitude, practice and awareness about foot care, calculated F-value for each (3.7), (10), (9) and (4.9) respectively are higher than the scheduled F-value (3).

Multiple comparison (LSD) test is used to test the differences of participants level of education related to their knowledge, attitude, practice and awareness about foot care.

Table (5.14): differences between participants knowledge about foot care related to their educational level

Education level	Primary (-)	Preparatory (-)	Secondary (-)	University (-)	None (-)
Primary (+)	---	-.22	-.75*	-1*	-.7
Preparatory (+)	---	---	-.53*	-.8*	.47
Secondary (+)	---	---	---	-.27	.05*
University (+)	---	---	---	---	.32*
None (+)	---	---	---	---	---

Table (5.14) shows statistical significance differences in participants knowledge related to their level of education between:

- primary and secondary level (-.75*), in favor for secondary level,
- preparatory and secondary level (-.53*), in favor for secondary level,
- primary and university level (-1*), in favor for university level,
- preparatory and university level (-.8*), in favor for university level,
- secondary and not educated subjects (.05*), in favor for secondary level and
- university and not educated subjects (.32*), in favor for university level.

The results indicate that, there is positive relationship between participants level of education and their knowledge about foot care.

Table (5.15): differences between participants attitudes toward foot care related to their educational level

Education level	Primary (-)	Preparatory (-)	Secondary (-)	University (-)	None (-)
Primary (+)	/	-1.7*	-1.4*	-1.6*	.1
Preparatory (+)	/	/	.3	.03	1.8*
Secondary (+)	/	/	/	-.2	1.2*
University (+)	/	/	/	/	1.7*
None (+)	/	/	/	/	/

It is clear from the above table (5.15) that, there is statistical significance differences in the participants attitudes toward foot care related to their level of education between:

- preparatory educated participants have more positive attitudes than primary,
- Secondary educated participants have more positive attitudes than primary,
- University educated participants have more positive attitudes than primary,
- Preparatory educated participants have more positive attitudes than non-educated,
- Secondary educated participants have more positive attitudes than non-educated,
- University educated participants have more positive attitudes than non-educated,

The above results show that, there is positive relationship between participants level of education and their attitude toward foot care.

Table (5.16): differences between participants practice of foot care related to their educational level

Education level	Primary (-)	Preparatory (-)	Secondary (-)	University (-)	None (-)
Primary (+)	/	-.09	.03	-1*	1
Preparatory (+)	/	/	.1	-1.1*	1.1*
Secondary (+)	/	/	/	-1*	1*
University (+)	/	/	/	/	1*
None (+)	/	/	/	/	/

Table (5.16) shows that, there is significant statistical differences of the participants foot care practices related to their level of education. These differences are as the following:

- university educated participants are practicing foot care more than primary, preparatory and non-educated ones.
- Preparatory and secondary educated participants are practicing foot care more than non-educated ones.

The above results show that, there is positive relationship between participants level of education and their daily foot care practice.

Table (5.17): differences between participants awareness about foot care related to their educational level

Education level	Primary (-)	Preparatory (-)	Secondary (-)	University (-)	None (-)
Primary (+)	/	- 5	- 2.6*	- 1*	- 1
Preparatory (+)	/	/	- 2*	- 2*	3.3*
Secondary (+)	/	/	/	- .5	3*
University (+)	/	/	/	/	1.1*
None (+)	/	/	/	/	/

Table (5.17) shows that, there is significant differences of participants awareness about foot care related to their level of education. These differences are between:

- primary and secondary level, in favor for secondary level,
- primary and university level, in favor for university level,
- preparatory and secondary level in favor for secondary level,
- preparatory and uneducated subjects in favor for preparatory level,
- secondary and uneducated subjects in favor for secondary level and
- university and uneducated subjects in favor for university level.

The results show that, there is positive relationship between participants level of education and their awareness about foot care.

The results of the above tables (5.13,14,15,16,17) illustrate that, participants level of education has positive effect on their awareness (knowledge, attitude and practice) about foot care, which is consistent with the study carried out in USA, by Stanaszek and McDonald, in 1981 to evaluate self-care habits of diabetic patients in relation to their understanding of their disease. Direct relationship was found between educational level and knowledge scores (Stanaszek and McDonald, 1981).

Murata, et al, in 2003, found that, years of schooling has positive effect on diabetic patients awareness about foot care (Murata, et al, 2003).

Also Lee in 2003 carried out a study to identify factors affecting foot-care knowledge and foot-care behaviors. The results show that, patients having had higher education showed higher level of foot-care behaviors (P=0.006) (Lee, 2003).

Giorgia De Berardis, et al, in 2004 investigated several aspects related to foot care in 3,564 patients with type 2 diabetes. They found that, patients with ≤ 5 years of school education were more likely not to receive foot education (Giorgia, et al, 2004).

5.3.5. Role of work status:

To test the effect of participant work status on their knowledge, attitude, practice and awareness about foot care, T - test for two independent variables were used.

Table (5.18): Role of participants work status on their level of knowledge, attitude and practice of foot care

Dependent Variables	Work Status	Number	Mean	St. dev.	T-value (1.96)	Sig.
Knowledge	Working	60	6.7	1	3.5	000
	Not working	240	5.9	1.5		Sig.
Attitudes	Working	60	12.8	1.8	1.7	.090
	Not working	240	12.2	2.1		Not Sig.
Practice	Working	60	10.2	1.2	- 1.91	- 1.9
	Not working	240	10.6	1.2		Not Sig.
Sum awareness	Working	60	26.2	6.1	.067	.947
	Not working	240	26.1	6.5		Not sig.

Table (5.18) shows statistical significance relationship between were participant working status and their knowledge about foot care, t- value (3.5) is more than the scheduled t- value (1.96). The mean value for employed subjects are more than the mean value for unemployed ones which indicates that, the employed subjects have more knowledge about foot care than the unemployed ones.

This researcher think that, the employed subjects are having a chance for interaction with other people which offer them time for charring information about diabetes and diabetic foot care more than the unemployed ones. also the employed participants usually are more educated than the unemployed participants.

The researcher couldn't find literatures about relationship between participants work status and their awareness about foot care.

5.3.6. Role of type of work:

Participants participated in the study were three groups, they are professionals or traders or skilled ones, but participants who said that they practiced foot care were two groups, they are either professionals or skilled ones.

One way Anova test were used to test the relationship between subjects type of work and their knowledge, attitude, practice and awareness about foot care. Table (5.19) below illustrate the results. (F-value = 3).

Table (5.19): Role of participants type of work on their level of knowledge, attitude and practice of foot care

Dependent Variables	Work Groups	Sum of Squares	df	Mean Square	F (3)	Sig.
Knowledge	Between G	1.6	2	.804	.658	.522
	Within G.	69.6	57	1.2		Not sig.
	Total	71.2	59			
Attitudes	Between G.	7.6	2	3.8	1.1	
	Within G.	188	57	3.2		Not sig.
	Total	195.6	59			
Practice	Between G	6.9	1	6.9	5.3	
	Within G.	48	37	1.2		Sig.
	Total	54.9	38			
Sum awareness	Between G	660.5	2	330.2	11.9	
	Within G.	1569	57	27.5		Sig.
	Total	2229.6	59			

Table (5.19), shows that, there is no statistical significant between type of work and participants knowledge and attitude about foot care at ($\alpha \leq .05$).

There is statistical significance relationship between participants type of work and their practice of foot care as well as the sum of the three components (knowledge, attitude and practice), the calculated F-value (5.3) and (11.9) are higher than the scheduled F-value (3).

Multiple comparison (LSD) test is used to test the differences between participants types of work and its effect on the their awareness about foot care. Three types of work were found in our sample, professional, trader and skilled subjects.

Table (5.20): differences between participants awareness about foot care related to their types of work

Type of work	Professional (-)	Skilled (-)	Trader (-)
Professional (+)	/	3.8*	7.7*
Skilled (+)	/	/	11.6*
Trader (+)	/	/	/

Table (5.20) shows significant statistical differences in participants awareness about foot care related to their type of work, these differences are between:

- professional and skilled subjects in favor for professional ones,
- professional and trader subjects in favor for professional ones and
- skilled and trader subjects in favor for skilled ones.

The above results indicates that participants who have professional work are more aware about foot care than skilled and traders and skilled subjects are more aware about foot care than traders.

In order to know the participants who practice more foot care in related to their type of work, T-test for two independent variables were used. In our sample participants who are practice foot care are (39) participant, they are either professionals or skilled ones.

Table (5.21): differences between participants practice of foot care related to their types of work

Dependent Variables	Type of work	Number	Mean	St. dev.	T-value (1.96)	Sig.
Practice	professional	30	10	1.2	- 2.3	.027 Sig..
	skilled	9	11	.86		

Table (5.21) shows statistical significance relationship between participants type of work and their foot care practice, calculated T-value is more than the scheduled T-value. The mean value for skilled subjects (11) is more than the mean value for professionals (10) which indicates that, skilled are practiced foot care more than professional subjects.

This is may related to the fact that, skilled are like practice in general, they like to do something by their hands more than professionals.

The researcher couldn't find literatures about relationship between participants type of work and their awareness about foot care.

5.3.7. Role of total family income:

Participants were divided into four groups in relation to their family income. There are only three groups were found in the sample (< 500sh., 500-1500sh. and 1500-2500sh.).

One way Anova test were used to test the effect of family income per month on participants knowledge, attitude, practice and awareness about foot care, (F = 3).

Table (5.22): Role of participants families income on their level of knowledge, attitude and practice of foot care

Independent variables	Income Groups	Sum of Squares	df	Mean squares	F (3)	Sig.
Knowledge	Between G.	8	2	4	1.7	.177
	Within G.	688	297	2.3		Not sig.
	Total	696.1	299			
Attitudes	Between G.	43.7	2	21.8	5.1	.006
	Within G.	1263.6	297	4.2		Sig.
	Total	1307.3	299			
Practice	Between G.	31.8	2	15.9	10.5	.000
	Within G.	320.6	213	1.5		Sig.
	Total	352.5	215			
Sum (awareness)	Between G.	14.8	2	7.4	.175	.839
	Within G.	12575.4	297	42.3		Not sig.
	Total	12590.2	299			

Table (5.22) shows no statistical significant relationship between total family income per month and subject knowledge and awareness about foot care.

The results indicate a statistical significant relationship between family income per month and participants attitudes toward foot care as well as their foot care practices. F-value (5.1 and 10.5) in both is higher than the scheduled F-value(3).

To know the direction of these differences in the family income on attitudes and practice, multiple comparison (LSD) test is used.

Table (5.23): differences between participants attitude toward foot care related to their families income

Family income	>500 sh (-)	500 - >1500 (-)	1500 >2500 (-)
>500 sh (+)	/	- .73*	- .87*
500 - >1500 (+)	/	/	- .14*
1500 >2500 (+)	/	/	/

Table (5.23) shows significant statistical differences in subjects attitude toward foot care related to the total family income per month between:

- families with (less than 500 sh) and (500 – less than 1500 sh), in favor of families who have the higher income.
- families with (less than 500 sh) and (1500 – less than 2500 sh), in favor for families who have the higher income.
- family with (500 - >1500 sh) and (1500 – >2500 sh), in favor for families who have the higher income.

It is clear that, there is positive relationship between participants family income per month and their attitude toward foot care.

Table (5.24): differences between participants practice of foot care related to their families income

Family income	>500 sh (-)	500 - >1500 (-)	1500 >2500 (-)
>500 sh (+)	/	- .06*	- 1.2*
500 - >1500 (+)	/	/	-1.1*
1500 >2500 (+)	/	/	/

The above table (5.24) shows significant statistical differences in subjects foot care practices related to the differences in their families income between:

- families with (less than 500 sh) and (500 – less than 1500 sh). in favor of families who have the higher income.
- Between (less than 500 sh) and (1500 – less than 2500 sh). in favor of families who have the higher income.
- Between family with (500 - >1500 sh) and (1500 – >2500 sh). in favor of families who have the higher income.

The results indicated a positive relationship between participants family income per month and their foot care practice.

The result is consistent with the study carried out by Giorgia De Berardis, et al in 2004, who investigated several aspects related to foot care in 3,564 patients with type 2 diabetes. They found that, those with low income were more likely not to receive foot education.

I believe, when people have more income, they become more comfortable because their physiological needs as their first interests will be covered, so they start searching for other problems to solve and one of diabetic patients problems is foot care. On the other hand low income people, their first interests is how to obtain their physiological needs.

5.3.8. Role of number of family member:

Participants were divided into three groups according to the number of their family members (< 5member, 5-8 member and more than 8 member).

One way Anova test were used to test the effect of number of family member on participants knowledge, attitude, practice and awareness about foot care, (F = 3).

Table (5.25): Role of participants number of families members on their level of knowledge, attitude and practice of foot care

Dependent Variables	Family member	Sum of Squares	df	Mean squares	F (3)	Sig.
Knowledge	Between G.	23.2	2	11.6	5.1	.007
	Within G.	672.9	297	2.2		
	Total	696.1	299			Sig.
Attitudes	Between G.	117.2	2	58.6	14.6	.000
	Within G.	1190.1	297	4		
	Total	1307.3	299			Sig.
Practice	Between G	7.2	2	3.6	2.2	.109
	Within G.	345.2	213	1.6		
	Total	352.5	215			Not sig.
Sum (awareness)	Between G	617.4	2	308.7	7.6	.001
	Within G.	11972.8	297	40.3		
	Total	12590.2	299			Sig.

Table (5.25) shows statistical significance relationship between participants total number of family member and their knowledge, attitude and awareness about foot care and, F-value (5.1), (14.6) and (7.6) are higher than the scheduled F-value(3).

Multiple comparison (LSD) test is used to clarify the differences in subjects knowledge, attitudes and awareness about foot care related to the number of their family member.

Table (5.26): differences between participants knowledge about foot care related to the number of their families members

No. of Family member	< 5 (-)	5 - 8 (-)	> 8 (-)
< 5 (+)	/	.16	- .44
5 - 8 (+)	/	/	- .61*
> 8 (+)	/	/	/

Table (5.26) shows significant statistical differences in subjects knowledge about foot care related to differences in the number of the family member. The difference is between families witch consist of more than 8 member and families that consist of (5 – less than 8 member), which means that subjects who live in families with more than 8 member have more knowledge about foot care than subject who live in families with (5 - > 8 member).

Table (5.27): differences between participants attitude toward foot care related to the number of their families members

No. of Family member	< 5 (-)	5 - 8 (-)	> 8 (-)
< 5 (+)	/	2*	1.3*
5 - 8 (+)	/	/	- .7
> 8 (+)	/	/	/

Table (5.27) shows significant statistical differences in subjects attitudes towards foot care related to differences in number of family members between:

- families with (less than 5 members) and family with (5 – 8 members), the difference is in favor of families of (less than 5 members).
- families with (less than 5 members) and families with (more than 8 members), the difference is in favor of families of (less than 5 members).

The results indicate that, participants who live in small families have more positive attitudes toward foot care than those who live in big families.

Table (5.28): differences between participants awareness about foot care related to the number of their families members

No. of Family member	< 5 (-)	5 - 8 (-)	> 8 (-)
< 5 (+)	/	.01	- 3*
5 - 8 (+)	/	/	- 3.1*
> 8 (+)	/	/	/

Table (5.28) shows significant statistical differences in subjects awareness about foot care related to differences in number of family members between:

- families with (less than 5 members) and family with (more than 8 members), the difference is in favor of families of (more than 8 members).
- families with (5 - 8 members) and families with (more than 8 members), the difference is in favor of families of (more than 8 members).

The results indicate that, participants who live in big families are more aware about foot care than those who live in small families.

Tables 5.26, 27, 28 show that, participants who live in big families are more aware about foot care in general than participants who live in small families. In specific they have more knowledge.

But participants who live in small families are having more attitudes toward foot care than those who live in big families.

This results suggested that, big families may having more educated persons than small ones who can encourage diabetic members to take care of their feet.

But living in big families may keep diabetic always busy and could not find a time for taking care of their feet.

The researcher couldn't find literatures about relationship between number of family member and participants awareness about foot care.

5.4. Role of duration of diabetes

One way Anova test were used to test the effect of number of family member on participants knowledge, attitude, practice and awareness about foot care, ($F = 3$).

Table (5.29): Relationship between duration of diabetes and participants level of knowledge, attitude and practice of foot care

Independent variables	Duration of disease groups	Sum of Squares	df	Mean squares	F	Sig.
Knowledge	Between G.	21.5	3	7.1	5	.002
	Within G.	419.5	296	1.4		
	Total	441.1	299			Sig..
Attitude	Between G.	112.3	3	37.4	9.2	.000
	Within G.	1195	296	4		
	Total	1307.3	299			Sig.
practice	Between G	5	3	1.7	1	.361
	Within G.	347.2	212	1.6		
	Total	352.5	215			Not sig.
Sum (awareness)	Between G	172	3	57.3	2	.110
	Within G	8368.1	296	28.2		
	Total	8540.2	299			Not sig.

Table (5.29) shows that, there is statistical significance between participants knowledge and attitude toward foot care and the duration of diabetes, calculated F-value in subject practice are (5) and (9.2) respectively, witch is more than the scheduled F-value (3).

To identify the direction of these differences multiple comparison (LSD) test is used. The results are illustrated in the tables below.

Table (5.30): differences in participants knowledge about foot care related to the duration of diabetes

Duration of the disease	< 2years (-)	2 - > 5years (-)	5 - < 10years (-)	> 10 years (-)
< 2years (+)	/	.07	- .66*	.26
2 - < 5years (+)	/	/	- .59*	.19
5 - < 10years (+)	/	/	/	- .4*
> 10 years (+)	/	/	/	/

Table (5.30) shows significant statistical differences in the subjects knowledge about foot care related to the differences in duration of diabetes. These differences are between:

- subjects with (less than 2 years) duration and (5 – <10 years) duration (- .66*). The difference in the favor of (5 – 10 years) duration.
- subjects with (2 - < 5 years) duration and (5 – <10 years) duration (- .59*). The difference for the favor of (5 – 10 years) duration.
- subjects with (5 - < 10 years) duration and (more than 10 years) duration (- .4*). The difference for the favor of (more than 10 years) duration.

The above data indicates that, as the subjects have the disease for long time, they become having more knowledge about foot care than newly diabetes subjects.

The researcher believe that, patients who have diabetes for long time have the time to get more information about the disease and its related problems, he always go to the clinic and seek for medical advice continuously.

Murata, et al, in 2003 tended to describe the clinical, psychological and social factors affecting diabetes knowledge of patients with Type 2 diabetes in New Mexico. They conducted that duration of treatment is one of the independent determinants of the knowledge score (Murata, et al 2003).

Table (5.31): differences in participants attitude toward foot care related to the duration of diabetes

Duration of the disease	< 2years (-)	2 - < 5years (-)	5 - < 10years (-)	> 10 years (-)
< 2years (+)	/	- .77*	- .78*	.1.8*
2 - < 5years (+)	/	/	.01	1.1*
5 - < 10years (+)	/	/	/	1.1*
> 10 years (+)	/	/	/	/

Table (5.31) shows significant statistical differences in the subjects attitudes towards foot care related to the differences in duration of diabetes between:

- subjects with (less than 2 years) duration and (2 – < 5 years) duration (- .77*). The difference for the favor of (2 – < 5 years) duration.
- subjects with (less than 2 years) duration and (5 – <10 years) duration (- .78*). The difference for the favor of (5 – <10 years) duration.
- subjects with (less than 2 years) duration and (more than 10 years) duration (- 1.8*). The difference for the favor of (less than 2 years) duration.
- subjects with (2 - < 5 years) duration and (more than 10 years) duration (- 1.1*). The difference for the favor of (2 - < 5 years) duration.
- subjects with (5 - < 10 years) duration and (more than 10 years) duration (- 1.1*). The difference for the favor of the (5 - < 10 years) duration.

The above results indicates that subjects who have diabetes for about five to ten years have more positive attitudes towards foot care than subjects who have diabetes for less than five years and more than 10 years. On another way, as long as the duration of diabetes increase as the subjects become having more positive attitudes towards foot care until certain level (10 years), and when it exceed this level the participants loss their attitudes towards foot care.

In USA, John White, et-al in 2004 examined the level of preventive foot-care practices among patients with diabetes mellitus in North Carolina and determined the factors associated with these practices. They found that, foot care was more common among those having diabetes for 20 years or longer than those having diabetes for less than 10 years (John, et al, 2004).

5.5. Role of the presence of previous foot complications

T - test for two independent variables was used to test the effect of the presence or previous foot complications. Table (5.32) below shows the results.

Table (5.32) Relationship between the presence foot complications and participants level of knowledge, attitude and practice of foot care

Dependent Variables	Presence of foot complication	Number	Mean	St. dev.	T-value (1.96)	Sig.
Knowledge	No	267	10.6	1.2	- 1.35	.178 Not sig.
	Yes	33	10.9	.57		
Attitudes	No	267	12.7	1.9	8.6	.000 Sig.
	Yes	33	9.7	.76		
Practice	No	189	10.5	1.2	- .39	.71 Not sig.
	Yes	27	10.6	1.2		
Sum (awareness)	No	267	30.8	5.4	1.4	.143 Not sig.
	Yes	33	29.3	4.5		

Table (5.32) shows statistical significance relationship between the presence of foot injuries and the level of subject attitude toward foot care, since the t-value (8.6) is more than the scheduled t- value (3). The mean value for participants who do not have foot complication (12.7) is more than the mean value for those who do have foot complications (9.7) which indicates that participants who do not have foot complications are having more attitude toward foot care than those who do have foot complications.

The study that carried out in Korea by Lee in 2003, to identify factors affecting foot-care knowledge and foot-care behaviors shows that, the level of foot care behaviors was higher in patients having had previous foot injury than those without previous injury (Lee, 2003).

5.6. Participants barriers of foot care practice

participants who do not practicing daily foot care are (84) participants, they were asked in question (38), what prevent them practicing daily foot care, the results are illustrated below:

Tables (5.33): Participants barriers of foot care

Barriers for foot care	frequency	Percent	Total percent
1. I don't have foot injury	27	32	61%
2. No one tell me how	21	25	
3. I don't know how to do that	3	4	
4. I'm always busy	15	18	39%
5. I get tired from doing that	12	14	
6. I cannot do that alone	6	7	
total	84	100	100%

Table (5.33) shows, six main reasons preventing participants foot care practices:

Three reasons were related to knowledge deficit about foot care (1, 2 and 3), which constitute 61% of the total barriers of foot care practice.

Three reasons were related to participants themselves (4, 5 and 6), which constitute 39% of the total barriers of foot care practice.

It is clear from the above results that, the big proportion of barriers to daily foot care were related to knowledge deficit about foot care practices which suggested that, efforts need to be increased in teaching diabetics foot care practices.

A study in USA, conducted by Mary Ann Ledda in 2005 to evaluate the effectiveness of preventive, educational program for foot self-care management for improving African Americans' knowledge and skills to carry out proper foot care. Barriers to daily foot care were identified included physical problems such as poor vision and joint pain, tiredness, lack of motivation, and family responsibilities (Mary, 2005).

Litzelman, et al, 1997, stated that, when it comes to foot care, the patient is a vital member of the medical team. The patient himself plays the crucial role in the prevention of diabetic foot disease and therefore education on foot care is important (Litzelman, et al, 1997).

5.7. Foot care instructions at UNRWA clinics from diabetics point of view

Table (5.34): foot care instructions at UNRWA clinics from diabetics point of view

Questions	frequency	percent
Q. 48. Did the physician or the nurse explain to you how to take care of your feet?		
Yes	201	67%
No	99	33%
Total	300	100%
Q. 49. if the answer yes in the above question, did the instructions were verbal or written?		
Verbal	92	46%
Written	44	22%
both	65	32%
total	201	100%
Q. 50. do you think the instructions given are enough		
Yes	159	53%
No	117	39%
Don't know	24	8%
total	300	100%

Table (5.34) shows that, 67% of patients declared that, they had received instructions about foot care from the physicians or the nurses in the primary health centers at their locations, where 33% said that they had not.

46% of participants from the total 201 who said that they received instruction said that they received verbal instructions, 22% said they received written instructions and 32% they declared they received both.

Percentage of subjects who believe that the instructions which given at their clinic are not enough is 39%, while those who don't know if it is enough or not is 8%.

The above results highlighted the need for increasing our efforts in teaching diabetics about foot care practices and indicating that there still much to do concerning this field.

Chapter 6

Conclusion and recommendations

Conclusion

This study aimed to assess diabetics awareness about foot care through assessing their knowledge, attitude and practices of foot-self care at UNRWA clinics in Gaza strip in Palestine and testing different independent variables that might affect these components. Representative sample of 300 diabetic patients from UNRWA clinics in the middle area of Gaza strip were selected randomly for this purpose. Structured, face to face interview were used in collecting the data. The results of this study shows satisfied level of awareness about foot care among diabetic patients.

The results show that, awareness of diabetic patients about foot care in general is above 60%, which consider satisfied level comparing with the previous studies. Diabetic patients attitudes was high (above 60%), but patients knowledge and practices of foot care were below 60%.

Findings show significant statistical relationship between participants gender, age, marital status, educational level, work stays, type of work, total family income per month, number of family members, duration of diabetes and the presence of previous foot complications as independent variables and diabetics awareness about foot care in general. The effect of these variables as the following:

- Males are more aware about foot care than females.
- Young diabetics are having more attitude toward daily foot care than old diabetics.
- Married diabetics are having more knowledge and more attitude toward foot care than widowed.

- There are positive relationship between level of education and diabetics level of knowledge, attitude and practice of foot care.
- Employed participants are having more knowledge about foot care than unemployed ones.
- Professionals are having more knowledge than traders and skilled. But skilled participants are practicing foot care more than professionals.
- There are positive relationship between participants families income and their level of attitude and practice of foot care.
- There is positive relationship between diabetics level of knowledge about foot care and the number of their families members. But there is negative relationship between participants level of attitude toward foot care and the number of their families members.
- There are positive relationship between participants level of knowledge about foot care and the duration of diabetes and There are negative relationship between diabetics level of attitudes toward foot care and the duration of diabetes.
- Diabetics who do not have foot complications or previous foot injuries show more positive attitude toward foot care than those who have foot complications.

Recommendations

Diabetic foot care is so important for diabetic patients. It can decrease foot complications which in turn eliminate patients suffering and increase their ability to overcome their problems. In order to achieve this purpose, the researcher recommends some ideas that might help encouraging diabetics to carry out daily foot care.

- Increase diabetics awareness about the importance of foot care through mass media, schools and social workers.
- Social status of diabetic patients should be taken into account when teaching diabetics about foot care practice. Old diabetics, widowed, poor ones and those who having foot complications need to have more attention than other diabetics.
- Home visit for diabetic patients good to be done for teaching diabetics as well their family members the benefit of daily foot care and how they can practice foot care.
- Frequent teaching classes about foot care practices should be done at the clinic. Small frequent concentrating classes give better results than written instructions which patients may or may not read it.
- Diabetics attitudes about foot care can be encouraged through inviting diabetic patients for watching video tabs in the clinic about the sequences of ignoring their feet (foot ulcer or amputations).
- Diabetics feet should be checked in each visit to the clinic. The foot exam should be performed by a qualified health professional with knowledge and experience in the care of diabetic foot problems. Regular checking for patients feet can determine high risk patients, so more attention will be done before the problem do occur.

- Health care professionals are the principal providers of the care and the principal source of knowledge for most patients. All health care providers of people with diabetes should be able to conduct a simple screening exam of the neurological, vascular, dermatological, and musculoskeletal systems.
- Establishment of special centers to provide diabetic patients with the knowledge needed for foot-self care as well caring for diabetes with foot complications.
- Cooperation by the involved personnel (medical staff, diabetics, families, social health workers) is very important to achieve the best ways for encouraging patients foot self-care practices. Diabetic patient must understand that he is a vital member in the team in preventing foot problems.

Suggestions for further researches

- Further studies about diabetic foot care need to be carried out in all areas in Gaza strip and in more depth to have more understanding of the problem.
- Diabetic foot prevalence need to be studied in Gaza Strip.

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Annex (1)

Panel of experts

The questionnaire were examined by a group of experts. Some items were added, modified or excluded as a results of their comments.

- 1. Dr. Suzanne Shasha'a**
- 2. Dr. Ayoup El-Alem**
- 3. Dr. Yehia Abed**
- 4. Dr. Yousif Aljeesh**
- 5. Dr. Talal El-Sharif**
- 6. Mr. Yehia Abo-Msameh**

Annex (2)

Palestinian National Authority
Ministry of Health
Helsinki Committee



السلطة الوطنية الفلسطينية
وزارة الصحة
لجنة هلسنكي

Date: 30/10/2005

التاريخ: 2005/10/30

Mr./ Saeed Shaheen

السيد: سعيد شاهين

I would like to inform you that the committee
has discussed your application about:

نفيكم علماً بأن اللجنة قد ناقشت مقترح دراستكم

حول:-

**Knowledge, Attitude and Practice of Food
Care Among Diabetic Patients at UNRWA
Health Centers in Gaza Strip 2005.**

In its meeting on October 2005

و ذلك في جلستها المنعقدة لشهر أكتوبر 2005

and decided the Following:-

و قد قررت ما يلي:-

To approve the above mention research study.

الموافقة على البحث المذكور عاليه.

Signature

توقيع

Member

Member

Chairperson

عضو

عضو



Conditions:-

- ❖ Valid for 2 years from the date of approval to start.
- ❖ It is necessary to notify the committee in any change in the admitted study protocol.
- ❖ The committee appreciate receiving one copy of your final research when it is completed.

Annex (3)

جامعة القدس



وزارة الصحة



كلية الصحة العامة

School of Public Health

القدس - فلسطين

2005/3/26

حضرة الأخ/ د. أيوب العالم المحترم
مدير برامج الصحة (وكالة الغوث)
تحية طيبة وبعد،،،

الموضوع: مساعدة الطالب سعيد شاهين

يقوم الطالب المذكور أعلاه بإجراء مشروع بحث بعنوان:

" Knowledge, attitudes, and practices of foot care among diabetic patients at UNRWA health centers in Gaza Palestine"

كمطلب للحصول على درجة الماجستير في الصحة العامة. تلمأ بأن المعلومات سوف تكون متوفرة لدى الباحث فقط. و عليه نرجو التكرم للإيعاز لمن ترونه مناسب لتسهيل مهمة الطالب في جمع المعلومات اللازمة. علماً بأن هذا البحث يهدف إلى تقييد المعرفة، والميول والممارسة لدى مرضى السكر عن العناية بالقدمين في مراكز الرعاية الأولية بوكالة الغوث في قطاع غزة .

موافقتكم دعماً للمسيرة الأكاديمية

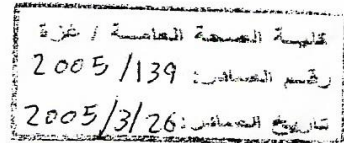
و تفضلوا بقبول فائق التحية ،،،



د. سوزان شعشاعة

مساعد عميد كلية الصحة العامة

مدير البرامج - غزة



نسخة: الملف

Annex (4)

موافقة على إجراء استبيان حول دراسة:

المعرفة والتوجه والممارسة لدى مرضى السكري حول العناية بالقدمين في عيادات الوكالة في قطاع غزة

أنا الباحث "سعيد محمد شاهين" طالب في برنامج ماجستير الصحة العامة في جامعة القدس - أبو ديس - فلسطين، أقوم بإجراء بحث علمي هو جزء من دراستي في الجامعة يهدف إلى دراسة "مدى معرفة مرضى السكري واتجاهاتهم وممارستهم بالنسبة للعناية بالقدمين في عيادات الوكالة في قطاع غزة".

حيث يرجى من نتائج هذا البحث أن تؤدي إلى زيادة وعي مرضى السكري بأهمية العناية بالقدمين، وطريقة القيام بهذه العناية، وحثهم على ممارسة هذه العناية في حياتهم اليومية، من أجل الحفاظ على أقدامهم من المضاعفات الناتجة عن مرض السكري. كما من المتوقع أن تساعد هذه النتائج مقدمي الخدمات الصحية في الدوائر الصحية المختلفة سواء في وزارة الصحة أو الوكالة لوضع خطط أكثر فعالية للتخفيف من معاناة مرضى السكري بشكل خاص ومنفعة الشعب الفلسطيني بشكل عام. تستغرق تعبئة الاستبيان بين 15-20 دقيقة فقط، علماً بأن المعلومات التي سيتم جمعها ستستعمل لأغراض البحث العلمي فقط وستبقى سرية ولن يكشف عن هوية أصحابها، كما أن اسم المشارك لن يكتب في الاستبيان.

المشاركة في هذا البحث طوعية، كما أن المشارك له الحق في عدم إجابة أي سؤال أو أسئلة والانسحاب في أي وقت شاء.

ملاحظة: الدراسة ممولة من الباحث فقط، وقد حصل الباحث على موافقة الجهات المعنية.

وتفضلوا بقبول فائق الشكر

الباحث

سعيد محمد شاهين

استبانة للتعرف على المعلومات والميول و الممارسة لدى مرضى السكر بالنسبة للعناية بالقدمين
في عيادات الوكالة في قطاع غزة . 2005

I . معلومات شخصية:	
1. المركز الصحي:	2. رقم مسلسل:
3. العمر:	4. العنوان:
5. الجنس:	1. ذكر 2. أنثى
6. الحالة الشخصية:	1. أعزب 2. متزوج/ة 3. مطلق/ة 4. أرملة/ة
7. التعليم:	1. ابتدائي 2. إحصائي 3. ثانوي 4. جامعي 5. لا شيء
8. العمل:	1. يعمل 2. لا يعمل
9. نوع العمل:	1. مهني 2. حرفي 3. عامل 4. تاجر 5. غير ذلك
10. معدل الدخل الشهري (للأسرة)/ في الشهر/ شيقل:	1. أقل من 500 شيقل 2. من 500 - أقل من 1500 شيقل 3. من 1500 - أقل من 2500 شيقل 4. أكثر من 2500 شيقل
11. نوع البيت:	1. ملك خاص 2. أجرة 3. غير ذلك
12. عدد أفراد الأسرة

II . معلومات من ملف المريض:	
13. نوع السكري:	1. النوع الأول (IDDM) 2. النوع الثاني (NIDDM)
14. تاريخ التشخيص:	
15. تاريخ التسجيل في المركز:	
16. نوع العلاج:	1. الحمية 2. أقراص 3. أنسولين 4. مختلط
17. انتظام الزيارة للمركز (حسب جدول الزيارة في المركز):	1. منتظم 2. غير منتظم
18. انتظام معدل السكر في الدم (آخر ثلاث قراءات من ملف المريض):	1. منتظم 2. غير منتظم
19. وجود مضاعفات في القدمين:	1. يوجد 2. لا يوجد

3	2	1	III . المعرفة (Knowledge): (1 = نعم ، 2 = لا ، 3 = لا أعرف)
			20. مرض السكر يصيب الكبار فقط.
			21. مرض السكر من الأمراض التي يمكن الشفاء منها تماما.
			22. هل تعرف معدل السكر الطبيعي في الدم.
			23. مرض السكر من الأمراض التي لها مضاعفات خطيرة.
			24. مرض السكر له تأثير على القدمين.
			25. وجود تغير في لون الجلد في أي جزء من القدمين يمكن أن يكون دلالة على بداية مضاعفات في القدمين.
			26. بتر القدم من المضاعفات الخطيرة لمرض السكر.
			27. القيام بممارسات خاصة للعناية بالقدمين يمكن أن تمنع تقرحات القدمين.
			28. هل تعرف ما هي الممارسات الخاصة للعناية بالقدمين؟ 1. نعم 2. لا
			إذا كان الجواب نعم، اذهب إلى السؤال (29) - إذا كان الجواب لا، اذهب إلى السؤال (30)
			29. هل يمكنك أن تخبرني ما هي هذه الممارسات؟ 1. غسل القدمين يوميا بالماء الدافئ والصابون. 2. تنشيف القدمين بعد الغسل وخصوصا بين الأصابع. 3. وضع القدمين بالبودرة أو الكريم. 4. فحص القدمين يوميا لوجود احمرار أو تورم أو جروح. 5. قص الأظافر بطريقة صحيحة. 6. عدم تعريض القدمين للبرودة أو الحرارة الشديدة. 7. عدم المشي حافي القدمين. 8. استعمال حذاء واسع. 9. تغيير الجوارب يوميا.
			30. من أين حصلت على هذه المعلومات عن مرض السكر وطرق العناية بالقدمين؟ 1. الطبيب/ة 2. الممرض/ة 3. الصيدلي 4. الأهل أو الأقارب 5. الجيران 6. الإعلام 7. مصادر أخرى

.IV الميول (Attitudes):	
* ما رأيك في هذه العبارات...	
31	القيام بأعمال خاصة يوميا للعناية بالقدمين يقلل من مضاعفات القدمين. 1. أوافق 2. لا أوافق 3. لا أعرف
32	مريض السكر سيعاني من تقرحات القدمين حتى لو قام بهذه العناية اليومية. 1. أوافق 2. لا أوافق 3. لا أعرف
33	مريض السكر يحتاج إلى ملاحظة قدميه يوميا لوجود أية جروح. 1. أوافق 2. لا أوافق 3. لا أعرف
34	العناية بالقدمين كل يوم أمر صعب القيام به. 1. أوافق 2. لا أوافق 3. لا أعرف
35	إذا أخبرك طبيبك أنه من الأفضل أن تأتي إلى المركز لكي تشارك في برنامج لتعلم العناية بالقدمين. ما موقفك من ذلك؟ 1. أوافق 2. لا أوافق 3. لا أعرف
36	عند ملاحظتك جرح صغير في قدمك ، ماذا تعمل؟ 1. أذهب إلى الطبيب أو العيادة . 2. أعمل غيار لقدمي في البيت. 3. لا أعمل شيء.

.V الممارسات (Practices)	
37	هل تقوم بأعمال خاصة للعناية بقدميك؟ 1. نعم 2. لا
* إذا كان الجواب (لا) أذهب إلى السؤال 38 , إذا كان (نعم) السؤال 39	
38	ماذا يمنعك من العناية بقدميك ؟ 1. لا أعرف أن مرض السكر يؤثر على القدمين. 2. لا أعرف كيف أعنتي بقدمي 3. لم يشرح لي أحد من قبل كيف أقوم بذلك. 4. لا أستطيع القيام بذلك لوحدي (لا يوجد لدي من يساعدني). 5. أنا دائما مشغول (لا أجد الوقت الكافي لذلك). 6. لقد تعبت من عمل ذلك (لا أعتقد أن ذلك سوف يفيدني كثيرا). 7. لا أعاني من أي جروح في قدمي.

2	1	* إذا كان الجواب نعم (السؤال 33) - (1 = نعم , 2 = لا)
		39. هل تلاحظ قدميك يومياً؟ (وجود تقرحات, جروح أو تغير في لون الجلد).
		40. هل تغسل قدميك بالماء الدافئ والصابون يومياً؟
		41. هل تقوم بالتنشيف بين الأصابع بعد الغسل؟
		42. هل تقوم بفحص أطراف قدميك وقصهم بعد الغسل؟
		43. هل تلبس الجوارب لمدة طويلة يومياً؟ (أكثر من 12 ساعة/يومياً)
		44. هل تقوم بتغيير الجوارب كل يوم؟
		45. هل تستخدم حذاء واسع؟
		46. هل تقوم بجميع هذه الأعمال لوحدها؟
		47. هل يوجد في أسرتك (جيران أو أصدقاء) من يشجعك أو يساعدك على القيام بهذه الأعمال؟

48. هل شرح لك الطبيب/ة أو الممرض/ة كيفية العناية بالقدمين؟
1. نعم 2. لا

49. إذا كان الجواب نعم, هل كانت الإرشادات بصورة شفوية أم مكتوبة؟
1. شفوية 2. مكتوبة 3. الاثنان معا

50. هل تعتقد/ي أن الإرشادات التي تعطى لمرضى السكر في المركز الصحي كافية؟
1. نعم 2. لا

III- Knowledge: (1 = Yes, 2 = No, 3 = Do not know)	1	2	3
20- DM is a disease that affects old people only.			
21- DM is a disease that could be cured completely.			
22- Do you know the normal blood glucose level.			
23- DM is a disease that has complications.			
24- DM is a disease that could affect the feet.			
25- Foot amputation is one of the major complications of DM.			
26- Presence of abnormal color at any part of your feet could be signs of foot complication.			
27- Using special practices in taking care of your feet may Prevent foot ulcers.			
28- Do you know what special practices in taking care of feet? * If yes- go to Question (29), if No – question (30).			
29- Could you please tell me what these practices are? 1. washing feet daily with warm water and soap. 2. dry feet well after washing especially between toes. 3. apply powder or cream on feet. 4. check feet daily for any redness, swelling or injuries. 5. cut toe nails in proper way, cut them straight especially big toe nail. 6. do not expose feet for coldness or hotness. 7. do not walk bare feet. 8. use wide comfortable shoes. 9. change socks daily.			
30- From where did you get this information about DM and foot care? 1. Physician 2. Nurse 3. Pharmacist 4. Relatives(family) 5. Neighbors 6. Media 7. Other source			

IV. Attitudes: what you think about these statements:	
31- Practicing daily care for your feet can help in preventing foot Complications. What do you think?	1. Agree 2. Do not agree 3. Do not know
32- Diabetic patient will have foot ulcer even if he (she) practice daily foot Care. Do you agree ?	1. Agree 2. Do not agree 3. Do not know
33- As a diabetic patient, you have to inspect your feet for presence of Any wounds daily. Do you agree ?	1. Agree 2. Do not agree 3. Do not know
34- Your Doctor told you that you have to come to the clinic to participate in a training program to teach you how to take care of your feet. What your attitude will be?	1. Agree 2. Do not agree 3. Do not know
35- It is difficult to practice daily foot care. What do you think?	1. Agree 2. Do not agree 3. Do not know
36- If you notes a small wound in one of your feet, what you will do?	1. I have to go to the clinic or the doctor. 2. I will do dressing at home. 3. It is not serous and nothing to do.

V. Practices:	
37- Do you practice special care for your feet?	1. Yes 2. No
* If No, go to question (38) – If yes, go to question (39):	
38- What prevent you from taking care of your feet?	1. I don't know that diabetes has effect on feet. 2. I don't know how to take care of my feet. 3. No one tell me how to do that before. 4. I cannot do that alone (I can't find any one helping me). 5. I always busy (I haven't the time to do that). 6. I get tired doing this (I don't think this will help). 7. I don't have any wounds in my feet.

* If the answer is yes in question (37)- (1=yes, 2=no)	1	2
39- Do you check your feet regularly (every day)?		
40- Do you wash your feet with soap and warm water every Day?		
41- Do you dry between your toes after washing?		
42- Do you cut your toenails or check them after washing?		
43- Do you sock your feet for long period ? (more than 12 hours/day)		
44- Do you change the socks every day?		
45- Do you use flat chose?		
46- Do you do all these practices alone?		
47- Do you have help or encouragement from your family or (friends or neighbors) in doing these practices?		

48- Did the physician or the nurse explain to you how to take care of your Feet?

1- yes 2- No

49- If Yes, Did the instructions were verbal or written?

1- verbal 2- written 2- both

50- Do you think that the instructions that given in your clinic about foot Care are enough?

1- yes 2- No