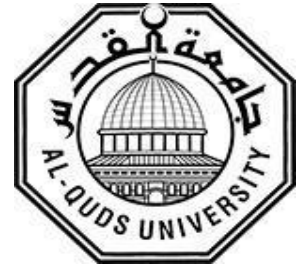**Al-Quds University**

Deanship of Graduate Studies

Treatment satisfaction, its relation with beliefs about medicine, quality of life and adherence among diabetic patients.

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M.Sc. Thesis.

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Treatment satisfaction, its relation with beliefs about medicine, quality of life and adherence among diabetic patients.

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Thesis Approval

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Jerusalem – Palestine

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Dedication:

I dedicate my master thesis to My Deceased father who gave me a better life and my lovely Mother, who gave me love encouragement and endless support all the way.

Declaration

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

Signed: ....

Heba Bassam Said Awadallah

Date: 14/12/2019

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Abstract.

Objectives and Background: Diabetes mellitus (DM) is a progressive disease resulted from inadequate insulin secretion, insulin sensitivity problems, or both resulting in increased blood glucose that diabetes distinguish with it. Insulin's function as an anabolic hormone associated with carbohydrate, lipid and protein metabolic disorders .The aim of this study was to assess medication adherence and its association with glycemic control, treatment satisfaction, patients' beliefs about medicines and Health related Quality of life.

Methodology: Three hundred and eighty patients from primary clinic in Ramallah were recruited in the current cross sectional study. Medication adherence were measured using Morisky four-item Medication Adherence Scale (MMAS-4). Last value of HbA1c test was used to measures glycemic control. Treatment Satisfaction Questionnaire for Medication (TSQM 1.4) was used to assess treatment satisfaction. Beliefs about medicines was measured using Beliefs about Medicines Questionnaire (BMQ). Health related quality of life was measured by using EQ-5D (EuroQol 5 Dimensions Patients). Medical records were used to collect the patients' demographic and clinical information.

Results: The result of our study indicated that 220 (57.9%) of the diabetic patients were classified as high adherent to their medications and 160 (42.1%) were classified as low adherent according to MMAS-4. 174, (45.7%) of patients had good glycemic control (HbA1c $\leq$ 7), whereas 206, (54.2%) had poor glycemic control (HbA1c >7). The mean $\pm$ SD of satisfaction domains of adherent patients were 78.81$\pm$25.8 and for non-adherent were 68.89 $\pm$ 36.4 for effectiveness, while mean $\pm$ SD of adherence were 41.85 $\pm$ 40.8 and non-adherence 44.86 $\pm$ 40.2. For side effects satisfaction domains, mean $\pm$ SD of adherence were 57.76 $\pm$ 38.2 and non-adherence 63.26 $\pm$ 37.3 for convenience and the mean $\pm$ SD of global satisfaction of adherence were 68.66 $\pm$ 34.2 and non-adherence 61.31 $\pm$ 36.4. There was a positive significant correlation between effectiveness and adherence level (P =0.04). Mean of Specific necessity scale 17.9 (SD=6.43). This

represent that the patients had a strong belief in their need to their medications to maintain their health. Scores for patient's concerns of their prescribed medication (Specific-Concerns scale), with a mean of 13.81 (SD=6.05). This represents that the patients had medium concerns about the side effects of their mediations .Glycemic control had significant correlation with global Satisfaction domain (p=0.01). The classification of patient's responses to EQ-5D Domains. Pain/Discomfort were the most influenced dimensions (173 patients reported problems, 36.1%), Anxiety and depression (128 patients reported problems, 33.7%) and the mobility (115 patients reported problems,30.3%). Treatment satisfaction had significant association with anxiety domain (p=0.031).

Conclusion: More than half of the patients in this study were classified as high adherent to their medications and believed strongly that their medicines had to be used. Controlled glycemic level was significantly associated with treatment satisfaction. Many patients were satisfied with their treatment; more satisfied patients were more adherent to the medication and had better quality of life.

List of Abbreviations

DM   Diabetes Mellitus

BMI   Body Mass Index

BMQ   Beliefs about Medicines Questionnaire

FPG   Fasting Plasma Glucose

GDM   Gestational Diabetes Mellitus

HbA1c   Glycosylated Hemoglobin

MMAS-4 4-item Morisky Medication Adherence Scale

OGTT   Oral Glucose Tolerance Test

PPAR-γ   Peroxisome Proliferation Activated Receptor-gamma

T1DM   Type 1 Diabetes Mellitus

T2DM   Type 2 Diabetes Mellitus

TSQM 1.4 Treatment Satisfaction Questionnaire for Medication

GDM   Gestational Diabetes Mellitus

GLP-1–receptor agonists   Glucagon-like Peptide-1receptor Agonists

DPP-4   Dipeptidyl peptidase 4

GLP-1   glucagon-like polypeptide-1

GIP   glucose-dependent insulinotropic polypeptide

IAPP   islet amyloid polypeptide

HRQoL   Health related quality of life

WHO   World Health Organization

ADDQOL Audit of Diabetes-Dependent Quality of Life

WHOQOL-BREF World Health Organization Quality of Life – Brief

EUROQOL The European Quality of Life

UNRWA United Nations Relief and Works Agency

NGO   nongovernmental organizations

UUTH   University of Uyo Teaching Hospital

UCTH   University of Calabar Teaching Hospital

HFS-II   Hypoglycemia Fear Survey

MDQoL modified diabetes quality of life

EFF   Effectiveness

SE   Side Effects

QoL   Quality of life

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Chapter One

1. Introduction.

1.1 Background.

1.1.1 Diabetes definition and classification.

As a chronic disease, diabetes mellitus (DM) is resulted from inadequate insulin production resulting in hyperglycemia. Thus, the ability to control the levels of glucose in the blood and the sensitivity of cells to insulin are hindered. The major complications associated with diabetes are divided into micro-vascular and macro-vascular complications, which cause destruction of many functions of the body([1]). This epidemic's global prevalence is rising at a shocking rate. Recently, the World Health Organization (WHO), reported that worldwide, around 366 million people suffer from DM and that by the year 2030, there will be 552 million diabetics, making DM one of the world's leading causes of death ([2]).

The pathogenesis of the progression of diabetes involves the damage of the beta cells in the pancreas and resulting in inadequate insulin secretion. In addition, other processes can lead to insulin resistance. For example, carbohydrate, fat and protein metabolism disorders are resulted from inadequate insulin activity in target tissues due to the cell's resistance to insulin or an insulin deficiency ([3]).

1.1.2 Epidemiology of DM.

The number of diabetic patient is rapidly on the rise due to the increase in the population age, obesity, rapid urbanization, physical inactivity and lifestyle changes. DM is a major health issue for both the developed and the developing world. In Asia, the prevalence of DM is high. For example, in 2007, there were about 110 million patients with diabetes

(4). In addition, a previous study on the prevalence of DM showed that the number of people with diabetes in the Middle East Crescent is estimated to increase from about 20 million in 2000 to 53 million by 2030 (5). In 2011, a number of Arab countries showed a high prevalence of DM, and according to the International Diabetes Federation (IDF), some of these countries were ranked among the top 10 countries in the world, with respect to DM prevalence. Moreover, these countries are estimated to maintain this high prevalence among adults (20-79 years) by the year 2030 (6). In Palestine, the prevalence of DM in adults over the age of 30 was reported to be 9.0% in 2000. In addition, recent data from 2010-2011 shows that the average prevalence of DM in the 25-64 age group is 12.7%, with a prevalence of 14.2% and 11.1% for men and women, respectively (7).

1.1.3 Pathophysiology.

The understanding of the essentials of the metabolism of carbohydrates and the action of insulin contribute to the mechanism of the pathophysiology of diabetes. Carbohydrates are reduced to sugar molecules in the intestine after we eat food. These sugars are absorbed into the bloodstream and result in elevated levels of blood glucose. This rise in blood glucose enhances insulin production from the beta cells in the pancreas. Most cells need insulin to enable the entry of glucose. Insulin enter the cell by binding to specific receptors and permits for the entry of glucose into the cell to be consumed as energy. The rise in pancreatic insulin secretion and the resulting cellular use of glucose contribute to decreasing levels of glucose in the blood, this will lead to decrease insulin secretion. Because DM affects insulin production and secretion, it also alters blood glucose dynamics. The reduced insulin production, leads to less glucose entering the cells, which causes hyperglycemia. A similar effect ensues when insulin is produced by the pancreas but is not utilized correctly by its target cells. Reduction of blood glucose levels (hypoglycemia) is resulted from increased production of insulin , because an abundance of glucose is permitted to enter the cells, leaving very small amounts in the bloodstream. A number of hormones affect blood glucose levels. For example, the only hormone responsible for lowering levels of glucose in blood is insulin. On the other hand, hormones, including glucagon, catecholamines, growth hormone, thyroid hormone, and

glucocorticoids, all function to increase blood glucose levels, along with their other properties (8).

1.1.4 Diagnosis.

DM is clearly diagnosed if a patients shows the classic signs of hyperglycemia and displays a random sample that is 200 mg/dL (11.1 mmol/L) or higher. For the basic diagnosis, a number of tests are utilized. For example, to test for diabetes and pre-diabetes, a fasting plasma glucose (FPG) test can used to asses blood glucose after the absence of food intake for about 8 hours or an oral glucose tolerance test (OGTT) can be used after the patient fasts for at least 8 hours and then 2 hours after the patient ingests a glucose-containing beverage. The FPG test is favored in the diagnosis of diabetes because it is easy, convenient and inexpensive. However, certain cases of diabetes or pre-diabetes are missed with the FPG test and detected with the OGTT. The reliability of the FPG test is greater if it is conducted in the morning. However, compared to the FPG test, the OGTT is shown to be more sensitive for the pre-diabetes diagnosis, even though it is not as easy to conduct. A random plasma glucose test, which is also known as a casual plasma glucose test, is used to asses blood sugar levels. These tests are used to diagnose diabetes, in conjunction with clinical signs, but this is not the case for pre-diabetes. If a test indicates that a person has diabetes, another sample should be tested other day is recommended. The current guidelines diagnostic criteria for diabetes are a FPG $\geq$ 7.0mmol/l (126mg/dl) or 2–h plasma glucose $\geq$ 11.1mmol/l (200mg/dl) (3). The HbA1c test is an additional test that serves as a gauge of glycemic control. HbA1c is used to determine of the amount of glucose in red blood cells that are bound to hemoglobin (Hb). The higher the HbA1c indicates higher levels of glucose over the past 2-3 months (9).

1.1.5 Complications of Diabetes Mellitus.

Acute and chronic complications and other risk factors resulting long-term hyperglycemia. DM is related with a greater chance of developing an assortment of microvascular and macrovascular . Microvascular complications included nephropathy, neuropathy and retinopathy. On the other hand, macrovascular ones included coronary artery disease, peripheral arterial disease and stroke are considered (10).

1.1.6 Types of DM.

DM is primarily divided into four main types, including type 1, type 2 , gestational and others. The others include genetic defects related to islet ß-cell function, genetic defects related to the action of insulin action, pancreas disorders, drug or chemical-induced Diabetes, unusual forms of immune disorders and other genetic syndromes occasionally connected with DM (11).

T2DM is often a chronic illness and remains undiagnosed until complications are present. The treatment of T1DM requires multiple daily insulin injections, and the treatment of T2DM typically begins with oral hypoglycemic medicines, and insulin is then used when blood glucose is no longer controlled by oral hypoglycemic agents. Glycemic control and lowering the HbA1c to below 7% are the treatments goals that are known to decrease diabetes complications (11).

1.1.7 Management of DM:

DM management is a long lasting and complicated process. It requires much effort from patients rather than on any health care provider, to reach effective management**.** DM self-management includes sticking to a healthy diet, physical activity, self-monitoring of blood sugar, DM medications and behavioral management (12).

1.1.8 Diet:

Diet management is a vital element of DM control. All individuals with DM should get individualized diet management. A registered dietitian is preferred to provide diet management that meets the individual nutritional needs, implementing the patient's personal and cultural preferences and it should promote eating satisfaction by presenting meaningful food choices.

Diet management should not focus on individual macronutrients, micronutrients or a single meal; rather it should provide DM patients with realistic resources for daily meal preparation. Generally speaking, DM diet is not only a healthy diet for DM patients but for all people. Yet patients with DM need more to balance DM medications with the type, timing and amount of food they consume

1.1.9 Physical activity:

Physical activity is an exercise that requires large amounts of energy over a period of time. Practicing regular physical activity in DM patients leads to decreased cell resistance to insulin action, decreases fat levels, including cholesterol and triglycerides, reduces weight gain and helps the patient cope better with stress and work out frustrations. It also dramatically decreases the levels of HbA1c and lowers the instance of long-term cardiovascular complications and death (13).

For patients with DM, there is no special physical activity required. DM patients should just perform some physical activity based on their desires and physical abilities to fit their lifestyle. Two hours after a meal is the best time for a physical activity. It is necessary to start physical activity with a length of 10 minutes and then gradually increase. Adult should undergo at least 150 minutes of physical activity per week. They should also disrupt sustained sitting periods with about 15 minutes of walking after eating a meal, and glycemic control can be improved with light walking for 3 minutes every 30 minutes.

1.1.10 Treatment of Diabetes Mellitus:

It is suggested that the pharmacological treatment for diabetes mellitus should started when the fasting blood glucose level exceeds 1600 mg/L. The treatment of T2DM starts with an oral hypoglycemic agent. Oral therapy is typically introduced in patients with T2DM when the patient has failed to achieve glycemic control by adjusting their diet and introducing exercise. However, although the initial response from patients after using oral hypoglycemic agents is good, as time goes on, the efficacy is lost in a high number of diabetics (14). The oral hypoglycemic agents are listed below:

Sulphonylureas:

These agents are known to reduce blood glucose levels because they stimulate pancreatic β-cell insulin secretion in patients with residual β-cell function. The absorption of these agents is good, with varying half-lives and durations of action. First generation agents, such as chlorpropamide , tolbutamide, tolazamide and acetohexamide, second generation

agents, including glyburide and glipizide and third generation agents, such as glimepiride (Amaryl) are included in this group. Mild hypoglycemia is a popular adverse effect of these agents, and severe hypoglycemia is not as likely.

Acutely, sulphonylureas stimulate pancreatic β-cell insulin secretion. Chronically, β-cell resistance is increased, tissue glucose absorption improved and gluconeogenesis is decreased. (15). Patients who respond best to sulphonylurea treatment include T2DM patients who were diagnosed before they were 40 years old, those with a disease duration of less than five years prior to the commencement of the drug therapy and those with blood glucose levels below 3000 mg/L (16).

Biguanides:

These primary means by which these agents improve insulin sensitivity is by reducing hepatic gluconeogenesis. They also improve skeletal muscle glucose absorption, lower plasma triglycerides and LDL-cholesterol, and secondarily, they improve peripheral sensitivity to insulin. However, these agents do not improve insulin levels or trigger weight gain, and when they are taken alone, hypoglycemia does not occur (17).

Metformin is an example of a biguanide. It is used alone or with a sulfonylurea to manage of T2DM. As a monotherapy, metformin does not trigger hypoglycemia (18).

α-Glucosidase Inhibitors:

Acarbose and Miglitol are examples of α-glucosidase inhibitors. These agents are used as a monotherapy or with sulfonylureas to manage T2DM. The function of these agents is blocking degradation of complex carbohydrates this will cause lowering post-meal glucose levels and postponing monosaccharide gastrointestinal absorption (19).

Thiazolidinediones:

This is a special class of drugs called "insulin sensitizers." This drug class facilitates skeletal muscle glucose uptake, and such agents enhance the muscle and liver to insulin action, increasing plasma triglyceride levels. However, these reductions are correlated with fluid retion and increase body weight and increased levels of LDL cholesterol.

Moreover, these agents are very costly ([14]). These drugs bind to peroxisome proliferator-activator receptor-γ (PPAR-γ), a protein located primarily on adipocytes. In T2DM patients, thiazolidinedione therapy reduces free faty acids (FFAs)levels in blood and the turnover of FFAs deposits, reduces fat content in the liver and reduces peripheral insulin resistance ([20]).

Meglitinides:

These agents work to quickly induce insulin production. In pancreatic β-cells, the drugs regulate ATP-dependent potassium channels, stimulating calcium channel opening and increasing insulin release. Repaglinide is one of these agents. It was introduced in 1998 which is the first in this class. It has the same mechanism of action and safety profile of the sulfonylureas. This drug is taken with meals two to four times daily and works quickly. Repaglinide is considered an acceptable substitute for sulphonylurea therapy when the patients have a severe sulfa allergy. The drug is used alone or with metformin. However, for older patients and those with renal or hepatic dysfunction, it has to be carefully titrated ([21]).

Glucagon-like Peptide-1 receptor Agonists (GLP-1–receptor agonists):

GLP-1–receptor agonists are also referred to as incretin mimetic drugs. This group includes exenatide, liraglutide, albiglutide, lixisenatide and dulaglutide. GLP-1 agonists activate the beta cells of the pancreas by binding to GLP-1 receptors, and this induces insulin secretion, which is mediated by glucose, and suppresses the release of glucagon. Other effects of these drugs include a delay in gastric emptying and suppressing appetite. GLP-1 agonists cause gastrointestinal side effects, such as nausea, vomiting and diarrhea, and acute pancreatitis, but do not cause hypoglycemia ([22]).

Dipeptidyl peptidase 4 (DPP-4) inhibitors (Gliptins):

DPP-4 inhibitors block the breakdown of the enzyme DPP-4, and this results in increased concentrations of both glucagon-like polypeptide-1 (GLP-1) and glucose-dependent insulinotropic polypeptide (GIP). This leads to elevated insulin secretion as well as a reduction in glucagon secretion, and decrease glucose production by hepatocytes and the

stomach absorption of the glucose and promotes satiety. The currently approved drugs in this class include sitagliptin, vildagliptin, saxagliptin, linagliptin and alogliptin. The adverse effect of DPP-4 inhibitors include angioedema/urticaria and other immune-related dermatological complications.

Amylin analog:

Amylin, or islet amyloid polypeptide (IAPP), is 37 amino acids long and is normally secreted in conjunction with insulin from the β-cells of the pancreas. Pramlintide is a subcutaneous injectable synthetic analog of human amylin. Pramlintide reduces glucose secretion after a meal by lowering excessive glucagon secretion, reducing gastric emptying and increasing satiety. This induces weight loss and lowers the insulin dose. Pramlintide is indicated for patients with T1DM or T2DM who use insulin at mealtime but are not able to realize their glucose targets. This is notwithstanding the optimum therapy is with exogenous insulin and sulfonylurea agent at the same time and/or metformin. The most side effect of pramlintide is nausea and vomiting, which is likely because of the excitation nausea and vomiting in the brain (23).

Insulin:

The management of T1DM patients depends mainly on insulin therapy. Patients with T1DM usually use multiple doses of basal and prandial insulin injections per day. The insulin doses should be compatible with carbohydrate intake, pre-meal blood glucose and expected physical activity.

The management of many T2DM patients eventually requires insulin therapy. The need for insulin is due to the natural course of T2DM, which is described as a gradual degeneration of the β-cell mass and function. In T2DM patients, insulin should be used with any combination regimen when the patients has severe hyperglycemia, which means that the blood glucose level is between 300-350 mg/dL and/or the HbA1c is between 10–12 .

The most common sites for insulin injection include the subcutaneous tissue of the upper arm or the anterior and lateral parts of the thigh, buttocks and abdomen. The injection site

needs to be rotated to prevent lipohypertrophy or lipoatrophy. It is preferred to rotate within one area rather than to rotate to another area with each injection. This habit help to decrease inconsistencies in the day-to-day absorption. The fastest absorption occurs in the abdomen, followed by the arms, thighs and buttocks. The rate of absorption from the injection sites can be increased with exercise because of the increased blood flow to the skin.

Because of the variations in the specific need of each patient, a number of insulin formulations, with different onsets of action, peak effects and durations of action, have been developed (24).

1.1.11 Treatment satisfaction:

Treatment satisfaction is defined as a cognitive assessment of care to assess if it meets or exceeds the personal subjective standards of the patient. Patient reported outcomes (PROs), such as treatment satisfaction, are helpful for considering the perspective of the patient with regard to their existing treatment and distinguish between alternative therapies. Treatment satisfaction is a significant result because it is connected with the patient's commitments and adhere to medication treatment. Other PROs, including quality of life, diabetes symptoms, physical activities and other end-points,

are a consequence of direct reports from the patients. These PROs are typically used to assess the influence of the disease and the treatments on the patient's ability to function, their health status, and other daily activities in clinical trials and other studies (25) .

Whether a patient satisfied with their medication affects their treatment-related activities, including the probability that they will continue to use the medication, that they will use is accurately and that they will adhere to the medication schedules. The literature reports a variety of disease-specific measures to assess patient treatment satisfaction (TS) and their treatment satisfaction with their medication (TS-M). However, limited studies have endeavored to evaluate general measures of TS-M that might allow for comparisons to be made across Patient's type of medicine and their health status. The widely-used Treatment Satisfaction Questionnaire for Medication (TSQM) assesses TS-M and has been well validated in a different sample (26).

Measuring treatment satisfaction is typically used for the development of health systems and for enhancing pharmacological agents or medical devices (27). Treatment satisfaction has an effect on the health related decisions made by patients (28). When a patient decides to adhere or to change medical regimin, several factors are involved, including the patient's health status, if the patient had prior experience with certain management options, the capacity to engage in treatment-related decision-making and the patient's actual or expected beliefs about the effectiveness or harm of the treatment (29). Patient satisfaction, with regard to their treatment or the services they receive, is a predictor of treatment success, continuance of treatment, the proper use of services, medical adherence and follow-up with treatment programs. For clinical studies, treatment satisfaction provides information about the attitude of a patient towards diabetes treatment.

Treatment satisfaction is an important factor that determine of health-related choices in diabetic patients, such as adherence (30). In addition, treatment satisfaction is linked to an improved glycemic control and a morbidity reduction (30). Furthermore, increased patient satisfaction with treatment is related to improving HRQoL (31).

1.1.12 Medication adherence:

For chronic disorders, adherence defines as the degree to which a patient's performance, when it comes to taking medication, following a diet, perporming lifestyle changes, and follow healthcare provider advices (32).

WHO classified factors affecting adherence, including patient- related factors, such as forgetfulness and careless, therapy-related factors, such as side effects, number of prescribed medications and dosing frequenceise, disease-related factors, such as severity type and the gravity and extent of the illness (28).

The WHO provides methods used to measure medication adherence was divided into subjective and objective measurements (32)**.** Another was to classified them is as direct and indirect. Ultimately, every method has its prons and cons. There is no gold standard method.

Subjective measurements can be used to evaluate how a patient adhere to taking their medication (33). These are considered self-report measures and include questionnaires, interviews, online assessments and diaries. Because of the low cost and ease of implantation, this approach is widely used. However, the sensitivity and precision of this process may be weak, due to the input of false data by the patients, either intentionally or accidentally.

The 4-item Morisky Medication Adherence Scale (MMAS-4) is one of the most commonly used self-reporting medication adherence measures. Morisky sacle is a nonspecific self-reported, the action of taking medication gauge. The Morisky scale has been widely utilized for numerous diseases, including DM, hypertension, schizophrenia and epilepsy, and among different cultural groups. The original English-language MMAS-4 is a dependable and acceptable assessment. A number of varieties of the scale have been psychometrically evaluated in different languages. Reasonable levels of reliability and validity were founded in all of the translated versions. However, as a self-administered medication adherence measure for T2DM patents, the Arabic version of Morisky scale exhibited reliability and validity in a satisfaction rate (33).

Objective measures, such as pill counts, electronic devices , electronic data analysis and drug serum measure, signify an enhancement over subjective measures. Thus, objective measures are to be used to validate and correlate with the subjective measures. However, the main drawback of this method its high cost.

Other Classifications:

➢ Direct measures involve measuring the Substance or its accumulation of metabolites in plasma or urine, and determine the existence of a biological marker provided with the drug and also by directly observing the patient's actions while taking the medication (34). However, thes methods are very costly and challenging to perform because many technicians and specialists are needed to check the procedures and conduct the tests.

➢ Indirect measures involve pill counting, patient self-reporting, using electronic medication monitors, measuring physiologic markers, assessing the clinical response

of the patient and ascertaining the rates of refilling prescriptions (35). Indirect methods are reasonably easy to conduct, but they are vulnerable to falsification by a patient, which can lead to overvaluing the patient's adherence by the health care provider (35).

1.1.13 Patient's believes about medicine:

A patient's belief about medicine may influence their medication adherence. Some believe it may increase adherence. For example, a patient has a feeling of susceptibility to the illness or its complication, and thus, the patient believes that the disease or its effects could have serious health complications, and the patient thinks that the treatment will be effectual. To the contrary, if a patient fears the treatment, the patient thinks that the disease is unmanageable, and sometime religious beliefs (like believing that the disease is God's will and is unmanageable or inbred fears and supernatural beliefs) contribute to a decrease in medication adherence (36).

There are many instruments available to explore a patient's beliefs when it comes medicines. For example, the "Beliefs about Medicines Questionnaire (BMQ)" is a comprehensive tool for measuring behavior. Thus, it assesses a patient's behavior concerning specific medicines or their behavior about medicines in general. The tool can also assess a positive attitude, as measured by necessity feelings, and even detects a negative attitude by determining a patient's worries about medicines. Together, this is achieved in an easy form that can be implemented in every environment and can be deduced to help advance the behaviors of patients and thus the predicted therapeutic outcomes (36).

1.1.14 Quality of life (QoL):

 QoL from a personal perspective is an assessment of how good or bad a person's life. It evaluates the satisfaction of a person's life in many aspects, including psychological, environmental, social and physical. HRQoL concerns of health aspects as well as the general QoL; it is the understanding of the impact of the disease by the patient or the treatments on their QoL. These two concepts, QoL and HRQoL, are used interchangeably (37).

QoL was defined by the WHO in 1947 as the perception of the individual's position in life, including the person's satisfaction of physical health, psychological health and social relationships. QoL is subjective; each person thinks of specific dimensions when he/she wants to evaluate their life, it also changes over time and is influenced by many effects (37, 38).

QoL measurement:

The pronounced interest in the QoL measurement is recent occurrence. At first, the measurement depended on factors like physical symptoms, anxiety and depression or the ability to attend to school. It is used in clinical trials, especially for chronic diseases, in order to measure improvements in the patient's feeling and daily functioning.

The QoL measurement is done using generic measures or disease specific measures. Disease specific measures provide detailed information about the disease and treatment care impact on QoL, while generic instruments assess the more global effect of the disease and complications on QoL. Diabetes specific measurements contain domains that are specific for diabetic patients, such as diet and enjoyment of food. Diabetes specific instruments include the Diabetes Quality of Life, Diabetes-39, Problem Areas in Diabetes (PAID) survey, Audit of Diabetes-Dependent Quality of Life (ADDQOL) and Diabetes Specific Quality of Life (39).

Generic measures, such as the World Health Organization Quality of Life – Brief (WHOQOL-BREF) and The European Quality of Life (EUROQOL), are preferred by many scientists, because they are more concerned about psychosocial factors.

1.2 Problem statement:

Evidence shows that the incidence of DM in Palestine has increased dramatically over the past few years. This is correlated with a higher risk of comorbidities, mortality and spending on health care. Patients, therefore, need to improve their control over DM and its complications. Treatment Satisfaction is an important factor in deciding treatment outcomes and is considered a key feature for effective therapy. Treatment satisfaction is related with glucose level improvement and decreased morbidity (30).

A large amount of studies have characterized treatment satisfaction in diabetic patients. Caring for those patients is a global challenge, with the increasing in the total of diabetics in the population. It is necessary to establish rigorous glycemic control in order to avoid or prolong the complications associated with diabetes and improve diabetes outcomes.

The number of studies in Palestine that have measured the correlation between treatment satisfaction and medication adherence among diabetic patients is limited. Therefore, this is the first effort to define the association between treatment satisfaction, adherence, beliefs about medicine and QoL in Palestinian diabetic patients.

Improving the quality of life those patients is a critical and important task. Therefore, the purpose of this current study is to examine the association between patient treatment satisfaction, adherence and quality of life. The research also evaluates the variables that influence satisfaction with the use of a questionnaire that aims to create guidelines for health care centers and decision-makers. The results of the treatment satisfaction survey thus have broad implications for enhancing diabetic patient's health related QoL.

1.3 Significance of the Study.

The concept of treatment satisfaction has been widely debated in healthcare literature. This is because it has become an established outcome indicator for the quality and efficiency of healthcare systems (40).

From a clinical perspective, three different consequences of treatment satisfaction were identified. Firstly, patient satisfaction is related to an improved adherence to treatment recommendations (25). Although adherence to medication is a significant and multifaceted medical problem, there are a few studies to empirically show the relationship between medication satisfaction and adherence. This deficit reveals that, in general, there is a limited number of studies that measures patient's treatment satisfaction. In fact, most of the findings on satisfaction that incorporate adherence report on patient satisfaction with care, instead of their satisfaction with medication. Within these treatment recommendations a second consequence of treatment satisfaction is embedded, namely patients who are satisfied with the healthcare accept new forms of intervention, which might be attributed to a higher confidence in their healthcare provider

(41). In addition, treatment satisfaction is linked to the continuity of care. Lastly, treatment satisfaction is believed to have a positive influence on the patient's quality of life.

Treatment satisfaction is a key factor that determines achieving good adherence to medication, and it is a key determinant for realizing optimum glycemic control and the subsequent management of DM to reduce its complications. In addition, treatment satisfaction provides a means to allow health care professionals and public health experts identify ways to decrease the modifiable risk factors associated with diabetic medication non-adherence. However, in general, studies assessing medication adherence and those focused diabetic patients in particular are very limited in Palestine.

Numerous studies have characterized HRQoL in diabetic patients. Taking care of these patients is a global challenge, especially because Diabetic patients are on the rise. Thus, an evaluation of QoL in these patients is essential to measure psychosocial well-being. Many studies found that the association of the complications with diabetes, such as cardiovascular disease and neuropathy, decreases the quality of life and increases depression and anxiety. Diabetic patients face daily obstacles in order to obtain a good glycemic control. For example, the need for blood glucose monitoring, diet changes, medical visits, etc. Most diabetic patient QoL studies have been administered in developed countries, and there are only a few in developing countries.

Accordingly, the significance of this research emerged from the fact that it is the first of its kind in West Bank to evaluate not only medication adherence but also patient treatment satisfaction, beliefs about medicine and quality of life.

1.4 Aim of the study:

The aim of this study was to evaluate treatment satisfaction and its relation with beliefs about medicine, adherence and quality of life among diabetic patients in Ramallah.

1.4.1 Objectives of the study:

1-To assess the medication adherence among diabetic patients.

2- To study the association between medication adherence and treatment satisfaction.

3- To assess patients' beliefs toward medicines.

4- To examine the relationship between medication adherence and glycemic control.

5-To examine a relationship between beliefs and adherence.

6- To examine the correlation between treatment satisfaction and patients beliefs about medicines.

7- To assess for any correlation between treatment satisfaction and the patient's quality of life.

8- To study patient socio-demographic factors, patient diabetic history and co-morbidities and patient medical history.

9- To discuss plans for anti-diabetic drug prescribing.

10- To analyze the similarities between treatment satisfaction and patient glycemic control.

Chapter Two

2. Literature Review:

A general overview of studies and related research specifically in Palestine concerning treatment satisfaction in relation to glycemic control, adherence, beliefs about medicine and quality of life (QoL) among Diabetic patients is provided in this literature review.

2.1Treatment Satisfaction and QoL:

A descriptive survey conducted by Sa'ed et al. (2015) assessing the association of treatment satisfaction to health-related quality of life among type 2 diabetes Palestinian patients, in Nablus, West Bank, Palestine. The Arabic versions of Treatment Satisfaction Questionnaire for Medication (TSQM 1.4) and European Quality of Life scale (EQ-5D-5L) were used to evaluate treatment satisfaction and health-related (HR)QoL, respectively. The results show that elderly and comorbid conditions are not related risk issues for poor HRQoL. Both health related quality of life and treatment satisfaction have been shown to be influenced by patient's socio-demographic and clinical information. Improvement of Diabetic patient's QOL was dependent on that more attention is paid to older diabetic patients health and economic status (42).

DePablos-Velasco et al. (2014), in a research conducted in Spain, evaluated QoL in T2DM subjects and QoL association with treatment satisfaction. Glycosylated hemoglobin (HbA1c) was measured using the same method to measure HbA1c in all patients, who also filled other surveys . The outcomes of this research suggested that Diabetic patients in Spain who suffers from hypoglycemia had worse Health related Quality of life and are more scared from other comparators.

Hypoglycemia was also related with lower satisfaction about medication and prevented adequate medication adherence. Hypoglycemia symptom severity is also related with lack of HbA1c control (43).

Pascal and Nkwa (2016) conducted a cross-sectional study measures correlation between Treatment Satisfaction, Adherence to Medication, confidence in Physician and Quality of life in Hypertension Patients, which was conducted between May 2015 and September 2016. The results of this study showed a correlation among improved treatment adherence, higher global satisfaction, and higher QoL. Improvement of medication adherence was related to Patient's satisfaction with their antihypertensive medications and their confidence in their doctor (44).

In a prospective, observational study conducted by Chaturvedi, Desai, Patel, Shah, and Dikshit (2018) at the diabetes outpatient department (OPD) in the Department of Medicine, Civil Hospital, Ahmedabad, in India, the effect of hypoglycemic agents on treatment satisfaction and quality of life in patients of diabetes mellitus was evaluated. Results from this survey showed that less drug use provided better satisfaction with treatment and better QoL in DM patients. Frequent measurement of QoL and treatment satisfaction is required in DM (45).

Jneid et al. (2018) conducted a survey in South India. The study measures the evaluation of quality of life diabetic patients using (MDQoL)-17 questionnaire. In general, type II diabetes with or without complications has a negative impact on patients' QoL. It also indicates that diabetes influence different aspects in a patient's life, including physical and social functions, mental health, economic status, and general health, all factors that impact the QoL. It is therefore recommended that patients have sufficient glycemic control to improve their QoL and prevent the disease progression.

2.2 Adherence and beliefs about medication:

Alsairafi, Taylor, Smith, and Alattar (2016) conducted a review in Middle Eastern countries analyze treatments of type Diabetes Mellitus . The study examined the association between medication adherence, health and cultural influence and life style changes in Diabetic patients. The results of this review show that the issue of non-

adherence to medications in patients with T2DM in the Middle East is prevalent. This study examined the elements of the non-adherence-related actions of these patients in order to provide treatment and guidelines for these determinants. This type of study should help counteract these detrimental actions and lead to improved regional health outcomes. The study found that lack of health education about diabetic complications, cultural, and medical beliefs significantly affected patient adherence to medication and lifestyle measures. (46).

Sweileh et al.(2014) conducted a research Al-Makhfia clinic in Nablus, Palestine , it studies the relationship between medication adherence, beliefs about medicine and Knowledge about disease. The main result of this research was medication adherence. Several questionnaires and scales were used to assess patient parameters: (1) patient beliefs was evaluated by using t(BMQ); (2) medication adherence was measured by using the Morisky Medication Adherence Scale (MMSA-8); (3) Diabetes-related knowledge was measured by using the Michigan Diabetes Knowledge Test (MDKT. Moreover, patients were strongly convinced of the need for their anti-diabetic drugs and expressed some concerns about side effects of their anti-diabetic medications. Patients had acceptable diabetic knowledge levels (mean MDKT score 8.2 ± 2). Finally, non − adherence is significantly correlated with and: (1) Patient's Knowledge about disease; (2) beliefs about necessity of anti-diabetic medications; (3) concerns about side effects of anti-diabetic medications; and (4) beliefs that medicines in general were deleterious (47).

2.3 Adherence, Treatment Satisfaction, and Glycemic control:

Jamous et al. (2011) conducted a survey in Nablus, Palestine that assessed the correlation between adherence and satisfaction with anti-diabetic agents. The most of patients in this survey had a low level of adherence. The results from this survey showed that low adherence was related with low treatment effectiveness satisfaction. Choosing an effective management regimen should increase satisfaction with treatment and thus promote adherence. A very critical issue is to increase patient's knowledge about adherence to medication and non-adherence-related factors (48).

Pascal and Nkwa (2016) conducted a study in Southeast Nigeria that measured the relationship among treatment satisfaction, medication adherence, and glucose level.

Diabetic therapy satisfaction was shown to be significantly associated with medication adherence and glycemic control. However, treatment satisfaction did not translate to higher medication adherence and glycemic control. Diabetic treatment satisfaction should be incorporated into standard plans of for diabetic patients in primary care settings (44).

Farhat et al. (2019) performed a research in Lebanon measured adherence to anti-diabetic medications, QoL, treatment satisfaction, and severity of the disease. Perceived effectiveness and QoL seem to be critical factor that enhanced medication adherence. Based on results from this study, setting plans for enhancement of treatment adherence and improvement in QoL is important for all diabetic patients (49).

Ajayi, Adedokun, Owoeye, and Akpa (2018) conducted a study in in Ibadan, Nigeria, entitled "Treatment Satisfaction and Medication Adherence among Hypertensive Patients". The most common health-rated problem in hypertension patients is Poor adherence worldwide, and presents an important risk factor for complication-, disability-, mortality. A survey method was used to gather data in this study. Medication adherence was measured by using the MMAS-8 scale, the 9-item treatment satisfaction was measured by using Treatment Satisfaction Questionnaire for Medication (TSQM). Medication adherence was low; however, treatment satisfaction had been separately related to medication adherence and increase it. Treatment intervention packages should have strategies about treatment satisfaction in the patient population (50).

Waari, Mutai, and Gikunju (2018) conducted a research at Kenyatta National Hospital with the purpose of measuring medication adherence and aspects related with low level of medication adherence amongT2DM patients. Adherence levels were measured by response of patients on the MMAS-8 and glycemic control as determined by blood assay for HbA1C. Physiologically low level of medication adherence is correlated with uncontrolled glycemic control that results in rapid damage of vital organs. Medication satisfaction appeared to be a significant contributor to good medication adherence (51).

A survey performed in T2DM patients visiting the endocrinology clinics at the University of Uyo Teaching Hospital (UUTH) and University of Calabar Teaching Hospital (UCTH) measured patient's knowledge among type 2 diabetes patients in two Nigerian states. The

Diabetes Self-care Knowledge (DSCK-30) assessment was applied to evaluate knowledge of self-care habits. Socio-demographic and clinical patient's characteristic and respondent vision on the potential factors(s) to knowledge of self-care were also determined. The results in our study population indicated that Diabetic patients have a high self-care knowledge. Level of Education, patient's salary, duration of disease and negative attitude toward this disease anticipated knowledge level (52).

Ogawa et al. (2017) conducted a retrospective study at Shiraiwa Medical Clinic, Osaka, Japan, that measured treatment satisfaction correlation to medication adherence. Improvements in medication adherence could be interpreted as accompanying treatment satisfaction improvements. It is known that good levels of patient satisfaction with treatment is important factor that determine good adherence (53).

Chapter Three

3. Methodology:

3.1 Study Design:

Our study was a questionnaire, cross-sectional study designed to measures treatment satisfaction among patients with diabetes and their relationship with medication adherence. It also explored the association between medication adherence and demographic, clinical characteristics and diabetic histories and co-morbidities of patients, prescribed anti-diabetic medications, patterns of prescribing, patient QoL, and patient-related beliefs about medicine.

3.2 Setting:

The research was conducted at the Primary Healthcare Unit in the Ministry of Health in Ramallah between Feb. and May 2019.

3.3 Study population:

The target population consisted of men and women who were diagnosed with Diabetes Mellitus.

3.4 Study sample:

A suitable sample of 400 patients who satisfy the inclusion criteria and came to the primary care clinic during the study period from February 2019 to 1 May 2019 were included in the study sample. Only 380 patients approved to take apart and were included in the study. The sample size was estimated based on the worldwide prevalence of diabetes among adults was 7% in 2019 according to Cochran's Formula used to calculate the sample size:

n = [(Z a/2)2 p(1 p)/d2].

The prevalence of diabetes mellitus estimated to be 10% in Palestine, the sample size was calculated to be 338 patients with diabetes. A total of 400 diabetic patients were targeted during the study period for the purpose of reducing errors in results and increasing the reliability of the study.

3.5 Selection criteria:

> **Inclusion criteria:**

1- Male and female patients > 18.

2- Patients who were taking DM medications for > 3 month (in order to ensure that the patients were aware of their medications).

> **Exclusion criteria:**

1- Patients who did refuse to participate.
2- Mentally ill patients.

3- Patients with language difficulties or difficulty interpreting the study tests (hearing problems, senility).

4- Morbid patients unable to communicate with the researcher.

3.6 Ethical approval:

Ethical approval was obtained from the Research Ethical Committee at Al-Quds University (Appendix A). Study approval for data collection was obtained from the Palestinian Ministry of Health in Ramallah (Appendix B). Each patient was also provided with an explanation about the study. Patients were informed that they could refuse to participate, could discontinue their participation at any point, and refuse to answer any questions. Each patient gave a verbal consent form before the beginning of questionnaire completion (Appendix C).

3.7 Data collection:

- Questionnaire that included five sections: (1) demographic and clinical information section (Appendix D); (2) 4-item MMAS-4 (Appendix E); (3) Beliefs

about BMQ (Appendix F); and (4) TSQM 1.4 (Appendix G) and (5) EQ-5D (EuroQol 5 Dimensions) (Appendix H).

- During the data collection period, all eligible patients were approached while in the waiting area when they came in for routine follow-ups in the primary health clinics. Patients who satisfy the inclusion criteria were asked if they were interested to be involved in the study by completing the questionnaire while waiting for the doctor. It took 15 to 20 min to interview a participant.

3.8 Measures:

3.8.1 Beliefs about Medicines Questionnaire:

The BMQ (Appendix F) was used to assess patients' beliefs about medications. The BMQ is a validated 18-item instrument. The internal consistency of BMQ is acceptable with good Alpha value of 0.63-0.82. BMQ divided into two parts: (1) the BMQ-specific part and the (2) BMQ-general part. The two parts of the BMQ can be combined or used alone. The Arabic version of the original BMQ is valid, reliable, and suitable for use in the Arab world. This validity is important, especially when patient concerns, beliefs, and attitudes are the most commonly reported factors for non-adherence in the Middle East.

The BMQ-specific section measures patients' beliefs about DM medications. This section consists of two scales: (1) specific-necessity scale, which comprises five item factors measuring beliefs about the necessity of prescribed medications and (2) specific-concerns scale consisting of five item factors measuring concerns of prescribed medications based on beliefs about the risk of dependence, long-term toxicity, and harmful effects (54).

The BMQ uses a 5-point scale. Each item on the BMQ has five responses (strongly disagree, disagree, uncertain, agree, and strongly agree). The answers were scored from 1 (strongly disagree) to 5 (strongly agree), and points from each scale are added together to give a total scale score.

The total possible scores from the specific-necessity and specific-concerns scales can range from 5 to 25. High specific-necessity scores indicated a high understanding of personal medication needs to preserve health at present and in the future. Higher specific-

concerns scores indicate high perception about the possible medication-related side effects (47).

The BMQ predicts that there is a strong relationship between beliefs about medications and treatment adherence rather than with beliefs about the actual illness. The BMQ estimates that patients understand the necessity and benefits of treatment, concerns about negative effects, and possibility of medication-dependence development. In other words, it discusses the benefits (need) and treatment costs (concerns) of the patient. The

relevance of BMQ in the evaluation of medication adherence in various diseases and populations has been previously demonstrated (55).

3.8.2 Medication adherence measure:

The 4-item MMAS-4 scale (Appendix E) is used to measure medication adherence with questions 1–4 having dichotomous responses (No = 0 score and Yes = 1 score). Total scores are added together and range between 0 and 4 with (0) = high adherence, (1–2) = medium adherence, and (3–4) = low adherence. The internal consistency is satisfactory (Alpha= 0.61).

The classification of non- adherence to medication is usually related to the patient's view. Intentional or unintentional behaviors of medication non-adherence are the major types of classifications. Intentional behaviors of non-adherence is considered an approach in which the patient makes the intentional decision to be non-adherent or follow treatment instructions, presumably after considering treatment costs and benefits. Unintentional behaviors of non-adherence refers to accidental behavior; it is a passive rather than active process. This type of behavior often results from circumstances beyond the control of the patient. This classification is a good indicators for healthcare professionals because it offers a framework for understanding drug-taking habits and therefore affects the type of intervention chosen to enhance adherence (55).

Intentional non-adherence is motivated by the awareness, encouragement, and/or beliefs of the patient about the disease or treatment. Unintentional non-adherence pertains more to socio-demographic and clinical factors, particularly age, than awareness or beliefs of

the patient. However, the result of modern studies indicated that there is a significant correlation between unintentional non-adherence and beliefs about illness, medication, and/or self-efficacy (55).

Medication adherence is believed to be one of the many steps that patients should take to prevent and/or resolve disease-related complications. In this model, adherence is more likely if it makes sense within the individual perception of illness. Adherence is an answer to the cognitive and emotional perception of an individual about their past experiences or knowledge (55).

The MMAS was validated and shown to have reliability in patients with other chronic diseases.

3.8.3 Treatment Satisfaction Measure:

The 14-item TSQM (Appendix G) is a reliable and valid scale for determining patient's treatment satisfaction and provides scores on four scales: (1) side effects; (2) medication effectiveness; (3) convenience and (4) global satisfaction (The internal consistency is Alpha=0.92 for EFF, 0.97 for SE, 0.86 for convince, 0.89 for GS) . In several studies, use of the TSQM with the side effects domain could lead the healthcare providers to determine adverse events (presence or absence) in such a way that is clinically atypical and can interfere with routine medical care (26).

Treatment satisfaction was tested using the Arabic version of the TSQM 1.4. The TSQM is reliable and valid. 14-item instrument consisting of four domains: (1) effectiveness (questions 1–3); condition prevention or treatments, symptom relief, (2)side-effects (questions 4–8); interference with physical, emotional and mental functioning, (3) convenience (questions 9–11); ease of medication use and planning, frequency of medicine use, and (4)overall satisfaction (questions 12–14).

The total sum scores of all domains of TSQM 1.4 range from 0 to 100 and were calculated as recommended by the instrument's authors. Higher scores represent more satisfaction for a particular domain (56).

3.8.4 Health-Related Quality of Life Measure:

The EQ-5D measure (EuroQol 5 Dimensions) (Appendix H), formerly known as EuroQoL (the name of the European research group from five different countries, including Sweden, which developed the instrument), was initially created to establish a health economic-related summary index. The measure consists of the most important five dimensions to patients. Four of these domains are physical domains, and one is psychological domain. Originally, the EQ-5D was designed to be a self-administered complement to other, more global HRQOL instruments, but it has been increasingly used as a stand-alone instrument.

Diabetic health related quality of life was measured using the EuroQoL EQ-5D scale. The EQ-5D questionnaire is a generic, valid, and reliable. EuroQoL group created EQ-5D questionnaire. The EQ-5D-3L essentially consists of parts the EQ-5D descriptive system and the EQ visual analogue scale (EQ VAS). The internal consistency and validity of EQ-5D-3L in this study was measured (Alpha=0.84).

The descriptive system consist of five modalities: (1) mobility; (2) self-care; (3) usual activities; (4) pain/discomfort; and (5) anxiety/depression. Each modality contain three different potential answers: (1) no problems; (2) slight problems; (3) considerable problems. The patient is told to indicate his/her health state by ticking (or putting a mark) in the box next to the most appropriate statement in each of the five modalities (56).

3.9 Statistical analysis:

The data entry process is started by giving a serial number for each patient data questionnaire and coding the variables. The statistical package for social science (SPSS) version 22.0 program was used to enter the data variables from questionnaires into the computer by the researcher after categorizing variables. Chi-squared was used to measure the relation between categorical variables and independent t-test was used to measure the association between means of continuous variables. For all variables, descriptive statistics were performed using means and standard deviations for numerical data. Categorical data as frequencies and percentages were summarized. When the P-values ≤ 0.05, this indicated that the results considered to be statistically significant .

Outcome measures:

➢ Main outcome measures:

Medication adherence level. For each patient, the MMAS-4 score was determined. Accordingly, the patient was classified. Score were added together to obtain a total score and ranged between 0-4:

(0_1) = high adherence.

(2_4) = low adherence.

The medication adherence rate was calculated as the ratio of adherent patients to the total number of participants.

Glycemic control rate: Patients were considered to have good glycemic control if they had an HbA1c ≤ 7% and poor glycemic control if their HbA1c values were > 7%.

Necessity and concern scores: The total sum of possible scores on the specific-necessity and specific-concerns scales ranges from 5 to 25. High specific-necessity scores indicated a high understanding of personal medication needs that are necessary to preserve health at present and in the future. Higher specific-concern scores indicated a high perception of the potential medication-related side effects.

3.10 Null Hypothesis:

H1: No significant association between adherence and treatment satisfaction exists.

H2: No significant correlation between glycemic control and treatment satisfaction exists.

H3: No significant connection between beliefs about medicine and adherence level exists.

H4: No significant interaction between glycemic control and beliefs about medicine exists.

H5: No significant relationship between QoL and treatment satisfaction exists.

Chapter Four

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4. Results:

4.1 Patients' characteristics:

During the study period, 400 patients with diabetes met the inclusion criteria, which make it a convenience sample, 380 patients agreed to participate verbally and gave a response rate of 95%.

Women composed 42.1%, while men composed 57.9% of the study sample. The mean age of the patients was 52.97. Most patients (291, 76.6%) were married and (135, 35.5%) had school tertiary level. Regarding the patient's life style, (250, 65.8%) of patients never smoke.

Many of the patients (116, 30.5%) have been diagnosed with diabetes for at least 10 years. Most patients (207, 78.2%) were obese. The most common co-morbid condition affecting patients was hypertension (196, 51.6%). Fifty five patients (14.5%) had hyperlipidemia as major complication of T2DM, while CVD affected (9, 2.4%) of patients. The most common minor complication, however, was retinopathy, affecting (94, 27.6%) of patients in (**Table 1**)

Table 1: Socio-demographic and clinical patient's information.

	N (number of patients)	% of patients)
Gender		
Male	220	57.9%
Female	160	42.1%
Age (years; mean ± SD)	52.97 ±13.95	

BMI		
Normal	8	2.1
Over weight	75	19.7
Obese	297	78.2
Smoker		
Yes	106	27.9
No	250	65.8
Ex-smoker	24	6.3
Insurance		
Yes	358	94.2
No	22	5.8
Marital status		
Single	50	13.2
Married	291	76.6
Divorced	9	2.4
Widowed	30	7.9
Education		
Primary	12	3.2
Secondary	97	25.5
Tertiary	135	35.5
University	111	29.2
Post-graduate	25	6.6
Job		
Yes	172	54.7
No	208	45.3
Type of diabetes		
Type 1	25	6.6
Type 2	305	92.1
Gestational	5	1.3
Duration		

3 months-1 year	58	15.3
1 year-5 years	115	30.3
6-10 years	91	23.9
> 10 years	116	30.5
Family history		
Yes	257	67.6
No	173	32.4
HA1c		
HA1C <7 CONTROLED	174	45.8
HA1c > 7 uncontrolled	206	54.2
Insulin		
Yes	166	43.7
No	214	56.3
COMPLICATIONS		
YES	238	62.6
NO	142	37.4
Retinopathy	94	27.6
Neuropathy	39	10.3
Nephropathy	20	5.3
Co-morbidities		
Hypertension	196	51.6
MI	18	4.7
Stroke	17	4.5
Hyperlipidemia	55	14.5
CVD	9	2.4
Asthma	3	0.8

4.2 Medications history and manner of prescribing anti-diabetic drugs.

Table 2: Medications history and **manner** *of prescribing of* *anti-diabetic drugs.*

Monotherapy	N (Number of patients)	% of patients
Metformin	312	82.1
Glibenclamide	6	1.6
Dapagliflozin	12	3.2
Glimepiride	118	31.1
Sitagliptin	61	16.1
Vildaglpitin	23	6.1
Sexagliptin	9	2.4
	N (Number of patients)	% of patient
Metformin+Glibenclamide	6	1.6
Metforim+Dapagliflozin	3	.8
Metformin+Glimperide	112	29.5
Metformin+Sitagliptin	52	13.7
Metformin+Vildaglpitin	17	4.5
Metformin+Sexagliptin	6	1.6
Metformin+Dapagliflozin+Sitagliptin	3	0.8
Metformin+Dapagliflzin+Vildagliptin	3	0.8
Metformin+Glimpride+Vildagliptin	3	0.8
Metformin+Dapagflozin+Glimpride+Sitaglipitin	3	0.8

Metformin was the most common prescribed drug (82.1% of patients). Metformin plus Glimpride was the most frequent combination therapy prescribed (29.5% of patients), while Metformin plus Vildagliptin plus Glimepride , Metformin plus Dapagliflozin plus Sitagliptin, Metformin plus Dapagliflzin plus Vildagliptin and Metformin Dapagflozin plus Glimpride plus Sitaglipitin were the least prescribed (0.8% of patients) in (**Table 2**).

4.3 Adherence level.
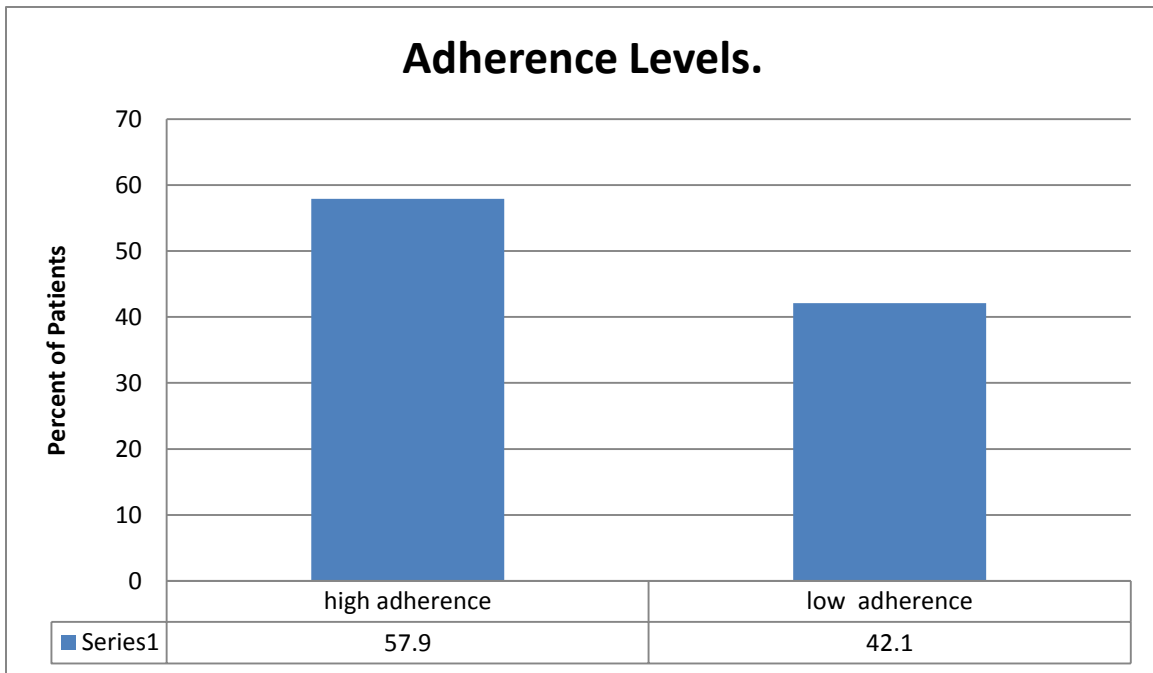
Figure 1: Classification of the study participants according to their adherence level.

The outcome of this research showed that 57.9% of Diabetic patients had high adherence level to their medications and 42.1 had low adherent level (**Figure 1**).

4.4 Type of Non-Adherence.
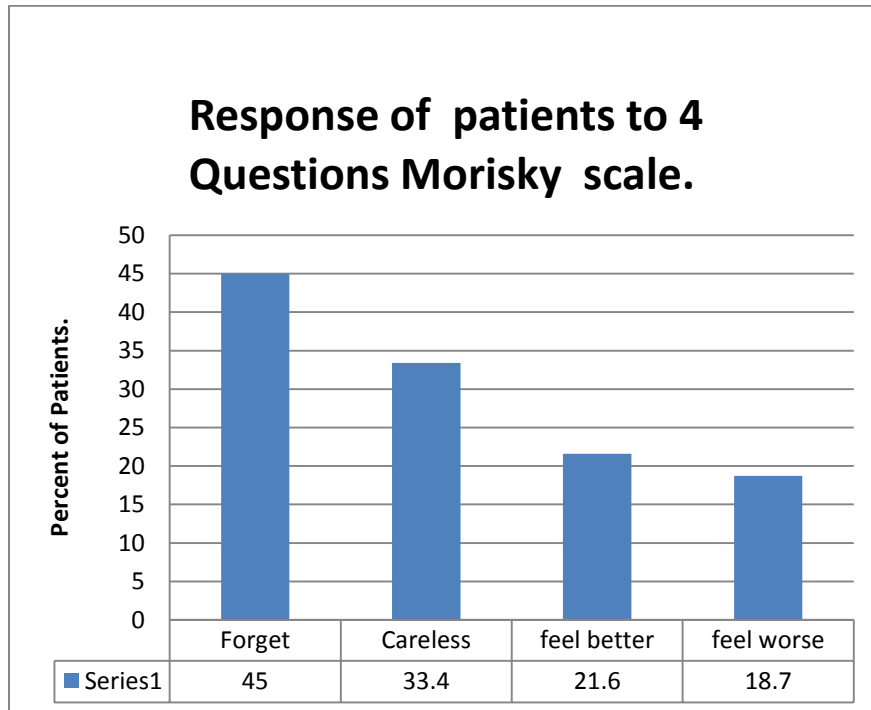
Figure 2: Patients answers to 4 questions in Morisky scale.

According to MMAS-4, 220 (57.9%) patients had an high adherence level and 160 (42.1%) had a low adherence level. Review of MMAS-4 responses found that approximately 171 (45%) of patients forgot to take their medicines; 127 (33.4%) of patients missed taking their medication, 71 (18.7%) of patients decided to not taking their medication without consulting their physician when they felt bad (disease progressed) and 82 (21.6%) of patients decided to not taking their medication when they felt that their health is better and managed (**Figure 2**)

According to our findings in Figure 2, the majority of patients forget to take their medications, this makes the major type of non-adherence in our study is unintentional.

4.5 Glycemic Control level.

Glycemic Control Level

46%

54%

■ good glycemic control
■ poor glycemic control
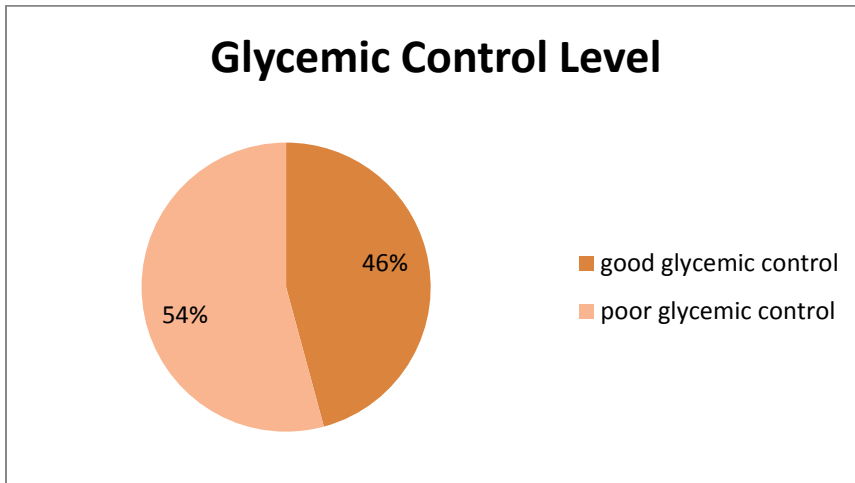
Figure 3: Percent of patients according to HbA1c test.

Patients are categorized into two groups based on their HbA1c test results: patients with good glycemic control (HbA1c ≤ 7) and poor patients with glycemic control (HbA1c > 7). Patient's Glycemic control is determined by results of HbA1c test. Results in (**Figure 3**) showed that (174, 45.7% of patients had good glycemic control (HbA1c ≤ 7), whereas (206, 54.2%) had poor glycemic control (HbA1c >7).

4.6 Patient's beliefs about medicine
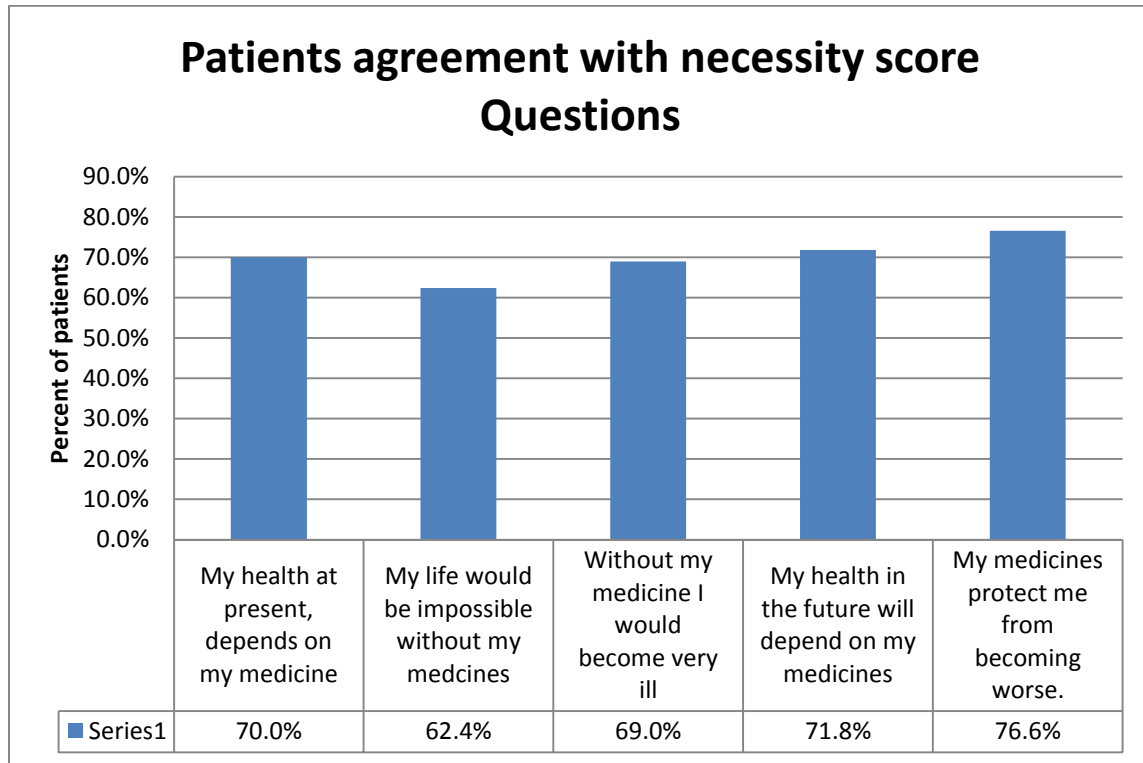
Figure 4 : Percent of patients that agree with the necessity score questions.

The result from our study showed that patients had a strong beliefs about the necessity to take their medications(**Figure 4**),(76.6%) of the patients answered that their medicines protect them from becoming worse , (71.8%) of the patients answered that their health in the future will depend on their medicines, (70%) of the patients answered that their health at present depends on medicines, (69%) of the patients answered that without their medicine I would become very ill and (62.4%) of the patients answered that their life would be impossible without their medicines.

Patients agreement with concern score Questions

Series1	Having to take medicines worries me	I sometimes worry about the long term effects of my medicines	My medicines are a mystery to me	My medicines disrupt my life	I sometimes worry about becoming too dependant on my medicines
	48.6%	55.3%	39.7%	31.9%	57.3%
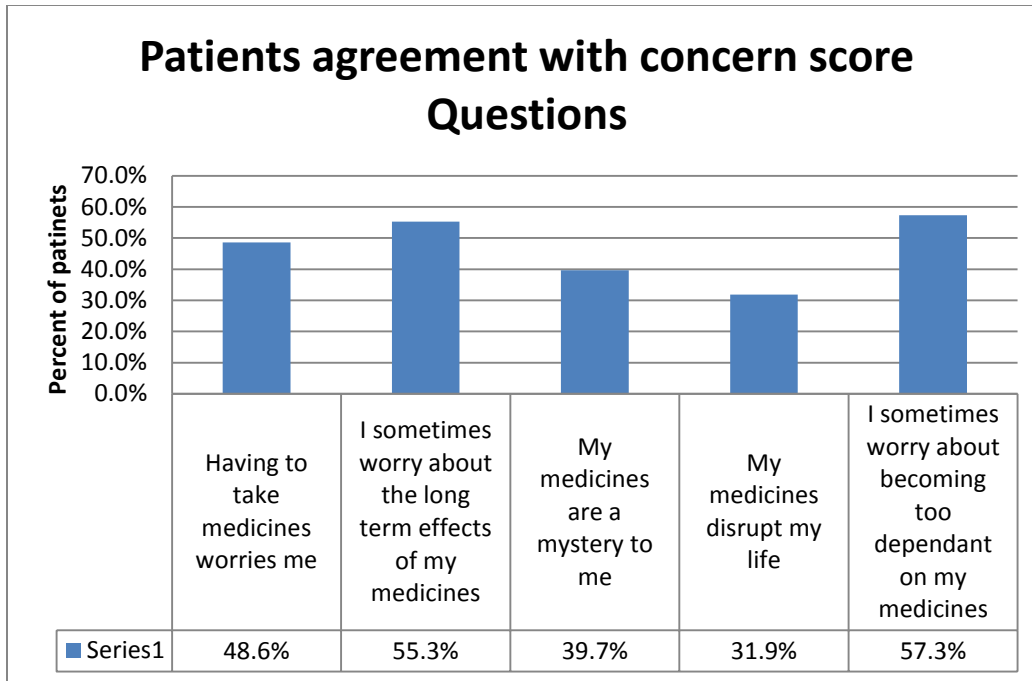
Figure 5 : Percent of patients that agree with the concern score questions.

Despite of the positive beliefs patients had in the necessity score , patient's reported that they had some concerns about their medications(**Figure 5**), (57.3%) of the patients answered that they sometimes worry about becoming too dependent on their medicines, (55.3%) of the patients answered that they sometimes worry about the long term effects of their medicines, (48.6%) of the patients answered that having to take medicines worries me , (39.7%) of the patients answered that their medicines are mystery to them and (31.9%) of the patients answered that their medicines disrupt their life.

High Concerns

| Skeptical | Ambivalent |
| 27 (7.1%) | 80 (21.1%) |

Low Necessity ← → **High Necessity**

| Indifferent | Accepting |
| 55 (14.5%) | 218 (57.4%) |
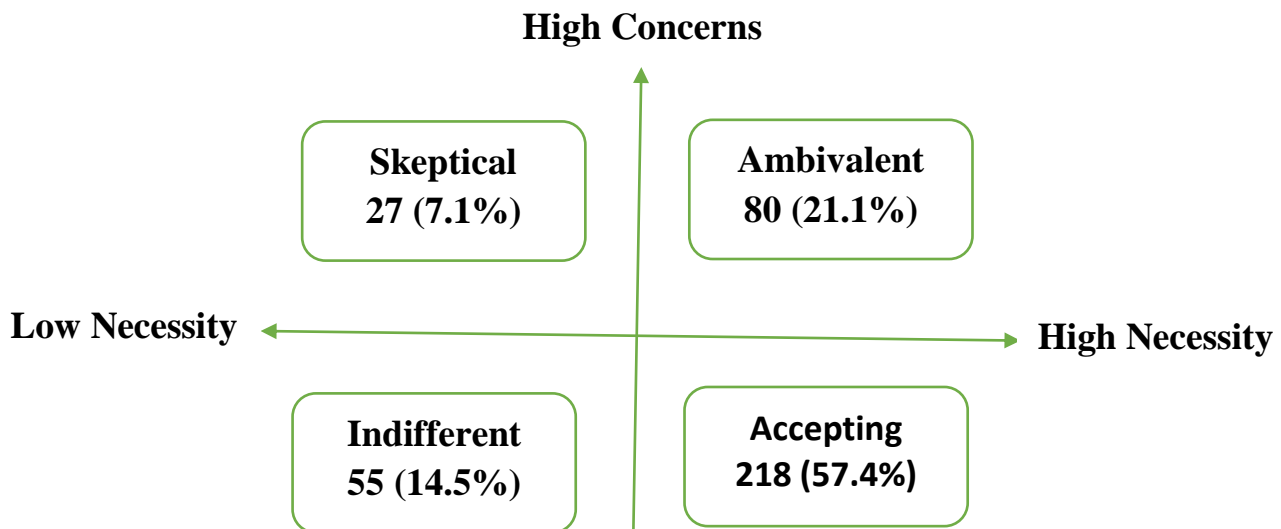
Low Concerns

Figure 6 : Classification of patients on the basis of their beliefs about medicine .

Patients classified according to their beliefs about medicine by combining the necessity and concerns scores into acc ambivalent and indifferent . The results of our study showed that 5 classified as accepting, 21.1% as ambivalent, 55% as indifferent, and 7.1% as skeptical (**Figure 6**).

4.7 Treatment satisfaction in relation to level of adherence.
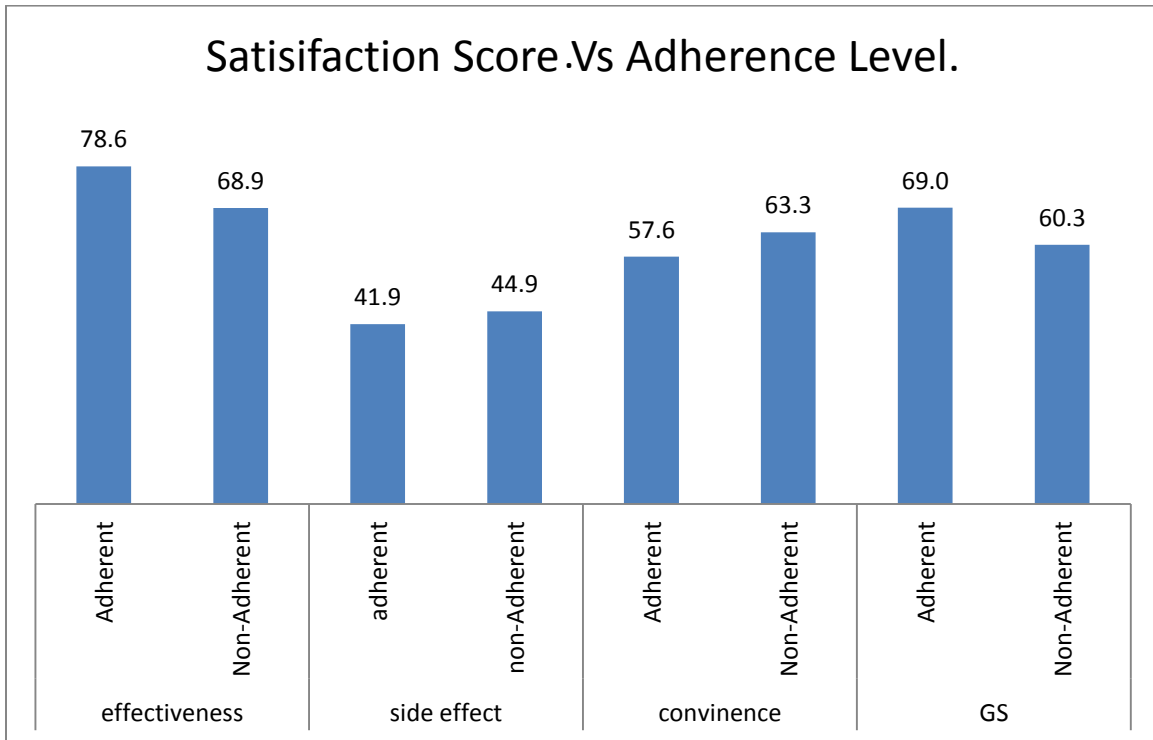
Figure 7: Mean treatment satisfaction scores based on the patient's level of adherence.

The number of patient for adherence was 220 and number of non-adherence was 160, the means ± SD of satisfaction domains of adherence were 78.81±25.8 and for non-adherence were 68.89 ± 36.4 for EFF , while means ± SD of adherence were 41.85 ± 40.8 and non-adherence 44.86 ± 40.2 for SE satisfaction domains , means ± SD of adherence were 57.76 ± 38.2 and non-adherence 63.26 ± 37.3 for convenience and the means ± SD of global satisfaction of adherence were 68.66 ± 34.2 and non-adherence 61.31 ± 36.4 (**Figure 7**).

Table 3: Adherent and non-adherent patients' and correlation with treatment Satisfaction scores.

Score	All Patients Mean(SD)	Adherent Mean(SD)	Non-adherent Mean(SD)	Mean Difference	P-value	CI.95%
Effectiveness	74.25(0.31)	78.61(0.25)	68.89(0.36)	9.28	0.04	0.30-0.16
Side effect	43.12(0.40)	41.85(0.40)	44.86(0.40)	-3.01	0.47	-0.11-0.51
Convenience	60.03(0.37)	57.67(0.38)	63.27(0.37)	-5.6	0.15	-0.13-0.02
Global Satisfaction	65.33(0.35)	68.99(0.34)	60.31(0.36)	8.68	0.18	0.01-0.15

According to **Table 3**, Diabetic patients with high adherence level demonstrated high treatment satisfaction, especially in the Effectiveness and Global Satisfaction domains followed by Convenience and Side Effects domains. Treatment satisfaction had significant association with medication adherence level particularly in Effectiveness domain (P=0.04).

4.8 Glycemic Control in relation to treatment satisfaction.

Glycemic control compared to Treamtent Satisifaction Domains

Series1	effectiveness		side effects		convinence		GS	
	control	uncontrol	control	uncontrol	control	uncontrol	control	uncontrol
	76.3	73.1	44.6	41.8	58.2	61.6	69.2	62.1
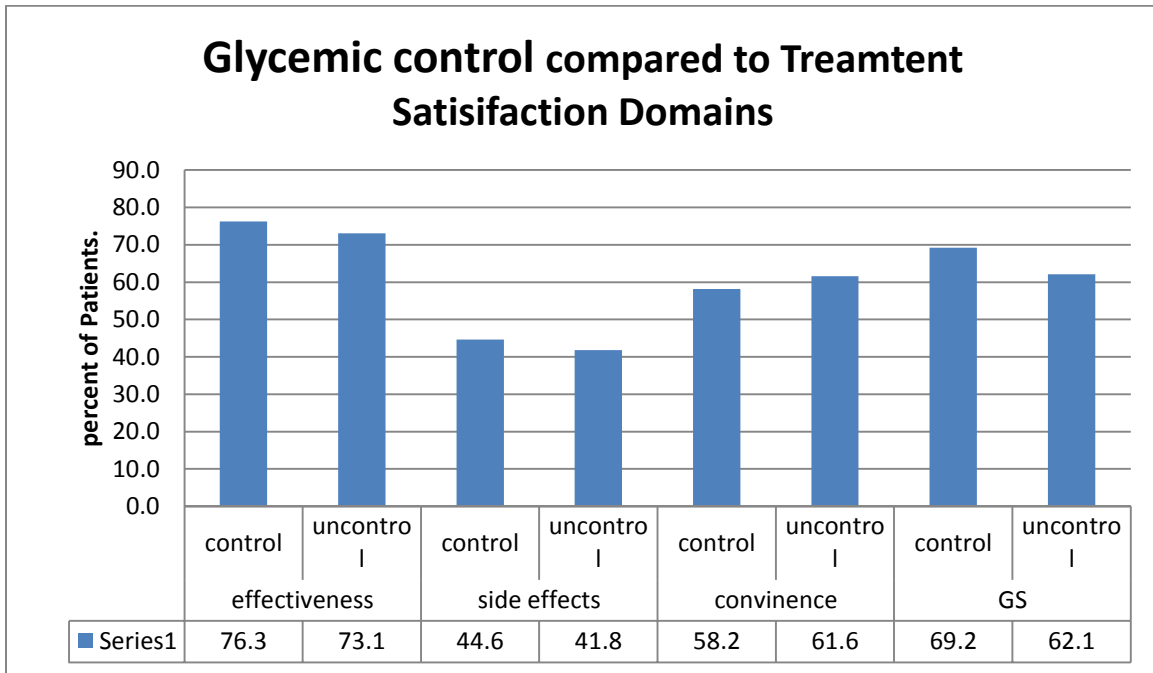
Figure 8: Patient's glycemic control Correlation with Treatment Satisfaction Domains.
Our findings in **Figure 8** showed that glycemic controlled diabetic patients demonstrated high treatment satisfaction, especially in the Effectiveness and Global Satisfaction domains followed by Convenience and Side Effects domains. The mean scores of controlled patients 76.3 for effectiveness domain, 44.6 for side effects domain, 58.2 for convenience domain and 69.2 for Global Satisfaction.

Table 4: Patient's Glycemic Control correlation with Treatment Satisfaction Domains.

	All Patients Mean(SD)	Controlled Mean(SD)	Un-controlled Mean(SD)	Mean Difference	P-value	CI.95%
Effectiveness	74.25(0.31)	76.25(0.27)	73.05(0.33)	3.2	0.31	-0.31-0.09
Side effect	43.12(0.40)	44.62(0.38)	41.48(0.41)	3.14	0.49	-0.05-0.10
Convenience	60.03(0.37)	58.15(0.37)	61.62(0.38)	-3.47	0.37	-0.11-0.41
Global Satisfaction	65.33(0.35)	69.19(0.33)	62.08(0.36)	7.11	0.01	-0.00-0.14

The mean ± SD of satisfaction domains of Glycemic controlled patients discussed in (**table 4**) were 76.25±27.6 and for Un-controlled patients were 73.05 ± 33.7 for EFF, while means ± SD of Controlled patients were 44.62 ± 44.6 and un-controlled patient 41.48 ± 41.3 for SE satisfaction domains. Mean ± SD of controlled patients were 58.15 ± 58.1 and un-controlled patients 61.62 ± 38.1 for convenience and the mean ± SD of global satisfaction of controlled patients were 69.19 ± 33.5 and un-controlled patients 62.08 ±36.6. Only Significance association between glycemic control and Global Satisfaction domain (p=0.01) was found.

4.9 Beliefs about medicines in relation to Adherence level.

BMQ Scales Vs Adherence level.

Series1	Adherence	Non-adherence	Adherence	Non-adherence
	necessity		concern	
	17.9	17.5	13.8	15.3
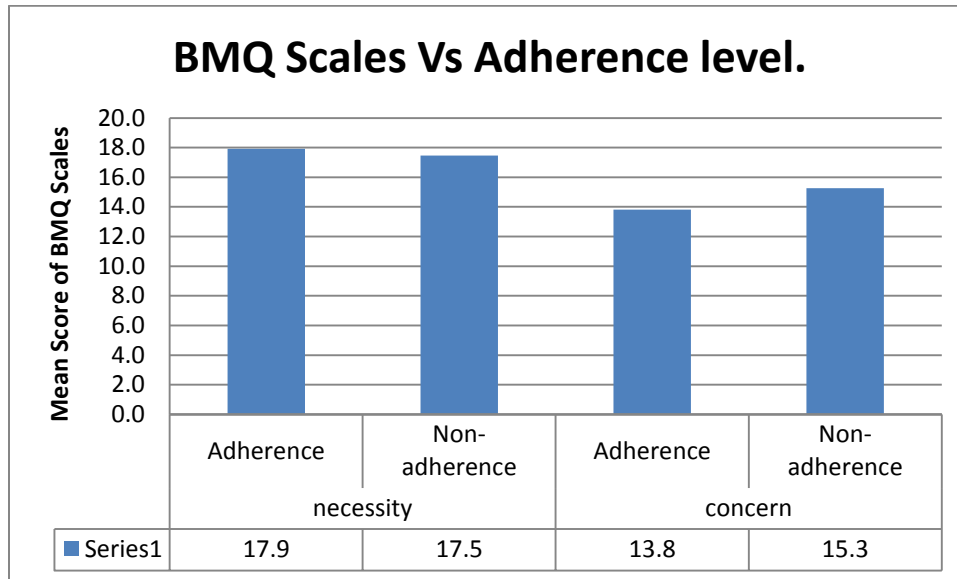
Figure 9: Adherent and non-adherent patients' beliefs about medicines scores.

Results from (**Figure 9**) showed that mean scores in specific necessity scale

17.9 (SD=6.43). This high score reflects that the patients had a strong belief in the patient's need for their drugs to maintain their health.

Scores for patient's concerns of their prescribed medication (Specific-Concerns scale) vary between 5 and 25, with a mean of 13.81 (SD=6.05). This low score represents medium patients' concerns about the possible adverse effects of their anti-diabetic medications.

The mean Necessity scores are higher than the mean concern scores that means the patient adherence to their medications will maintain their health and promote recovery. High Adherence patients had significantly higher specific-necessity belief, lower specific-concern belief.

Table 5: Correlation between Adherence level and beliefs' about medicine scores.

	All Patients Mean(SD)	Adherent Mean(SD)	Non-adherent Mean(SD)	Mean Difference	P-value	CI.95%
Necessity	17.72(5.71)	17.90(6.34)	17.46(4.70)	0.44	0.431	-0.66-1.56
Concern	14.42(5.52)	13.81(6.05)	15.26(4.57)	-1.45	0.008	-0.33--0.38
NCD	3.18(6.03)	3.97(6.83)	2.09(5.32)	1.88	0.03	3.15-3.11

The Results in **table 5** demonstrated that patients with high level of adherence had higher scores in the necessity scale which means that they had a stronger beliefs in their personal need for their medications. Non-adherent patients had higher scores in the concern scale, which means that they are more concerned about the use of their medications for a long time and their adverse effects in the future.

The means ± SD of satisfaction domains of adherence were 17.90±6.34 and for non-adherence were 17.46 ± 4.70 for necessity scale , while means ± SD of adherence were 13.81± 6.05 and non-adherence 15.26 ± 4.57 for concerns scale.

 The mean concern score of 13.81 (S.D=6.05) was significantly associated with adherence level (P=0.008).

The mean Necessity score differential (NCD) was lower in the non-adherent participating group compared with NCD scores in the adherence group (2.09 vs 3.97), revealing that their beliefs in their needs for anti-diabetic agents were close or similar to their concerns about long term use of these medication.

4.10 Glycemic control in relation to Beliefs about Medicines.

Glycemic Control conpared to BMQ Scores.

	necessity		concern	
	controlled	un-controlled	controlled	un-controlled
Series1	18.3	17.1	13.9	14.8
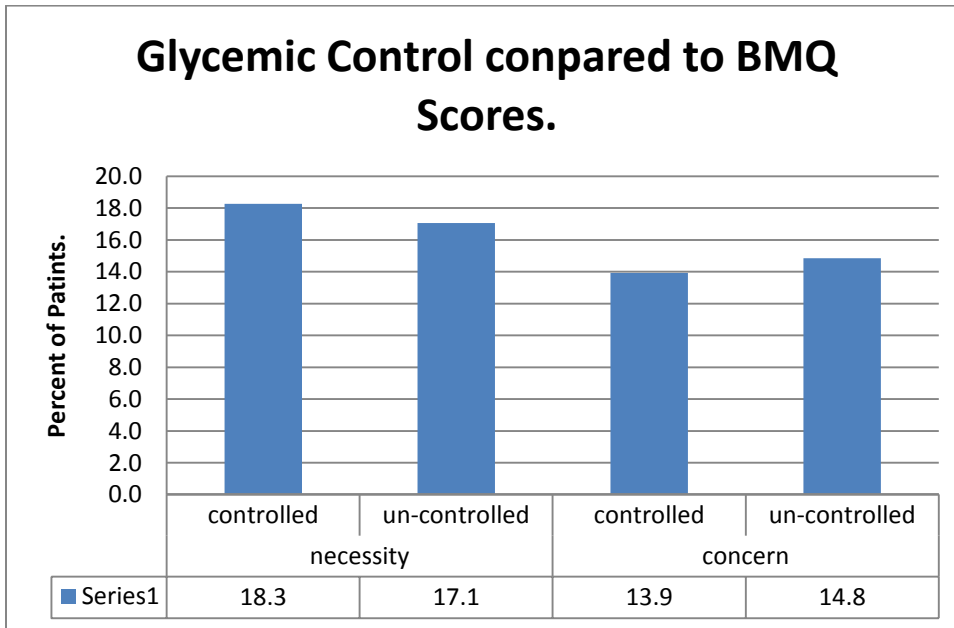
Figure 10: Glycemic Control correlation with BMQ Scores.

Results in **Figure 10** showed that glycemic controlled patients had higher scores in the necessity scale this makes their beliefs that they need their medications stronger and un-controlled patients had higher scores in the concerns scale which means that they are more concerned about the long term medications use and their side effects in the future. The NCD score was lower in the Un-controlled patients compared with NCD scores in the controlled group (3.10 VS 3.25), revealing that their beliefs in their needs for anti-diabetic agents were close or similar to their concerns about long term use of these medication.

Table 6: Association between Glycemic control and beliefs' about medicine scores.

	All Patients Mean(SD)	Control Mean(SD)	Un-control Mean(SD)	Mean Difference	P-value	Cl.95%
Necessity	17.72(5.71)	18.27(5.33)	17.06(6.07)	1.21	0.41	-2.30--0.62
Concern	14.42(5.52)	13.92(6.05)	15.26(4.57)	-1.34	0.104	-2.03-0.19
NCD	3.18(6.03)	3.25(6.26)	3.10(6.36)	0.15	0.819	-1.42-1.13

The means ± SD of satisfaction domains of Glycemic controlled patients were 18.27±5.33and for Un-controlled patients were 17.06 ± 6.07 for Necessity sale, while means ± SD of Controlled patients were 13.92 ± 6.05and un-controlled patient 15.26 ± 4.57 for concern scale. (**Table 6**).

The relationship between Glycemic control and necessity score (p=0.41) and between Glycemic control and concern score were not significantly associated (p=0.104).

4.11 Response to EQ-5D Modalities.

Figure with vertical axis from 0.0% to 100.0% and five bars:

Mobility: 69.7% (No problems), 27.9% (Some problems), 2.4% (considerable problems)

Self-care: 78.7%, 17.9%, 3.4%

Activities: 72.6%, 22.9%, 4.5%

Pain/discomfort: 63.9%, 33.2%, 2.9%

Anxiety/depression: 66.3%, 25.5%, 8.2%

☐ No problems   ☐ Some problems   ☐ considerable problems
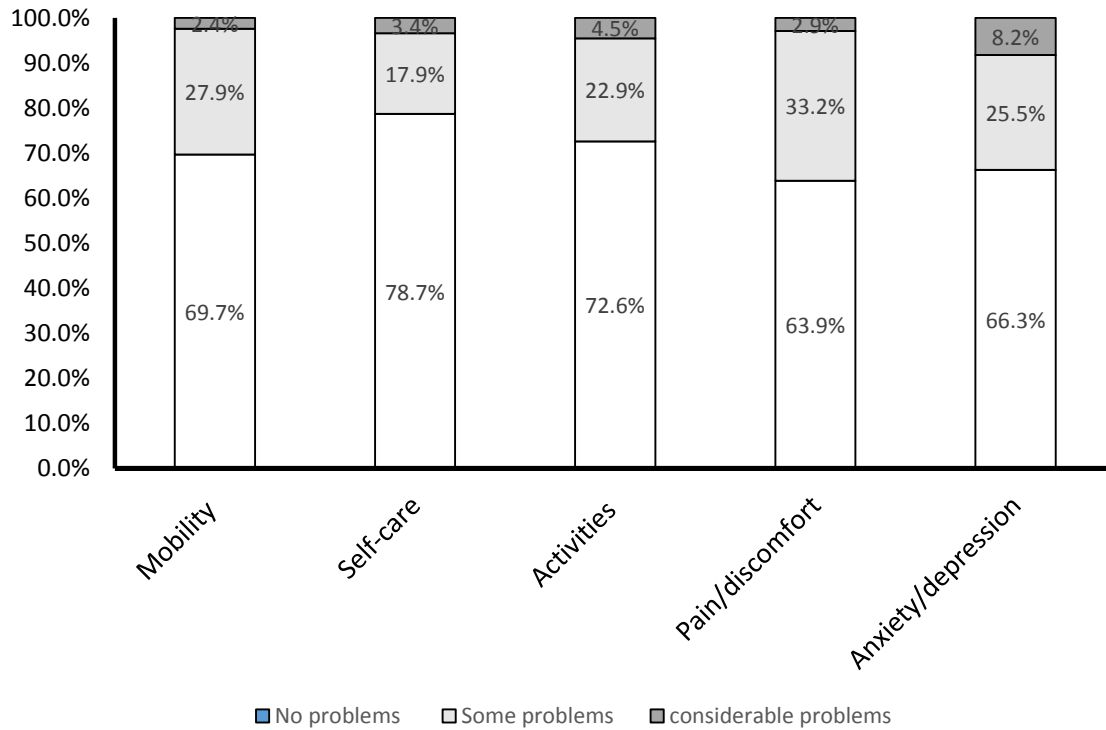
Figure 11: Classification of patient's response to the EQ-5D modalities.

Notes: light segments, no problems; gray segments, some problems; black segments, considerable problems.

The classification of the three different response modalities for the five dimensions of the EQ-5D is presented in **Figure 11**. Pain/Discomfort were the most influenced dimensions (173 patients reported problems, 36.1%), Anxiety and depression (128 patients reported problems, 33.7%), and the mobility (115 patients reported problems, 30.3%).

4.12 EQ-VAS Scores in relation to level of Adherence.
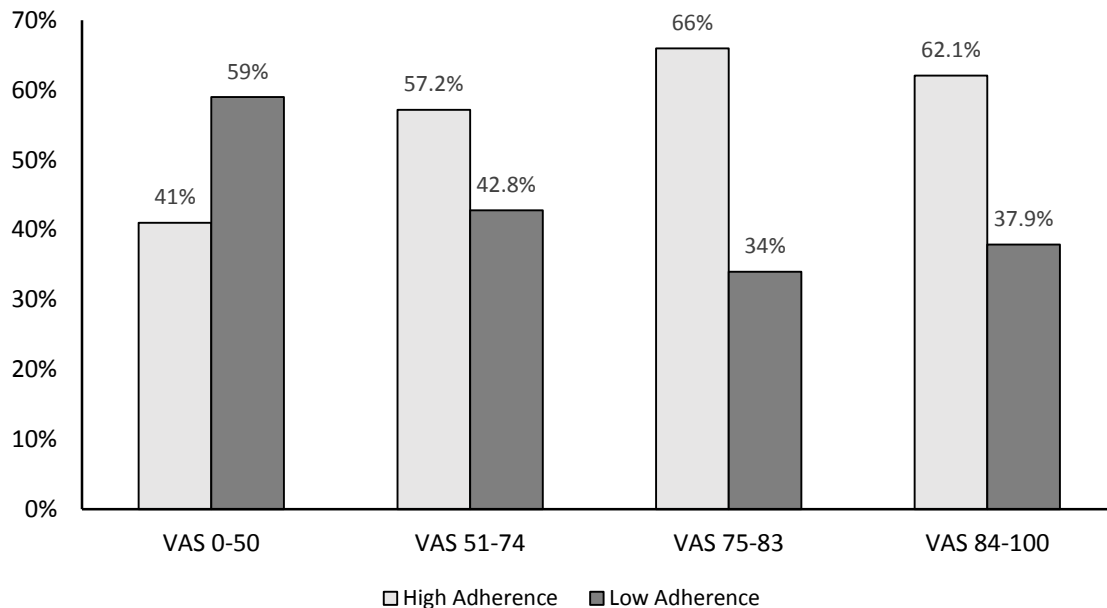
Figure 12: Distribution of patient's EQ-VAS scores according to their Adherence level.

Notes: Light segments, high adherence; dark segments, low adherence. EQ-VAS scores are divided into quartiles: 1st quartile: 0–50; 2nd quartile: 51–74; 3rd quartile: 75–83; 4th quartile: 84–100.

The percent of Adherent patients with a VAS score (75-83) is 66%, (62.1%) is the percent of adherent patients with a VAS score (84-100).

Patients with high adherence to medication had significantly higher VAS scores that indicated good quality of life compared to patients with low adherence to their medication as shown in **figure 10**.

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4.13 Treatment Satisfaction in relation to Quality of life.
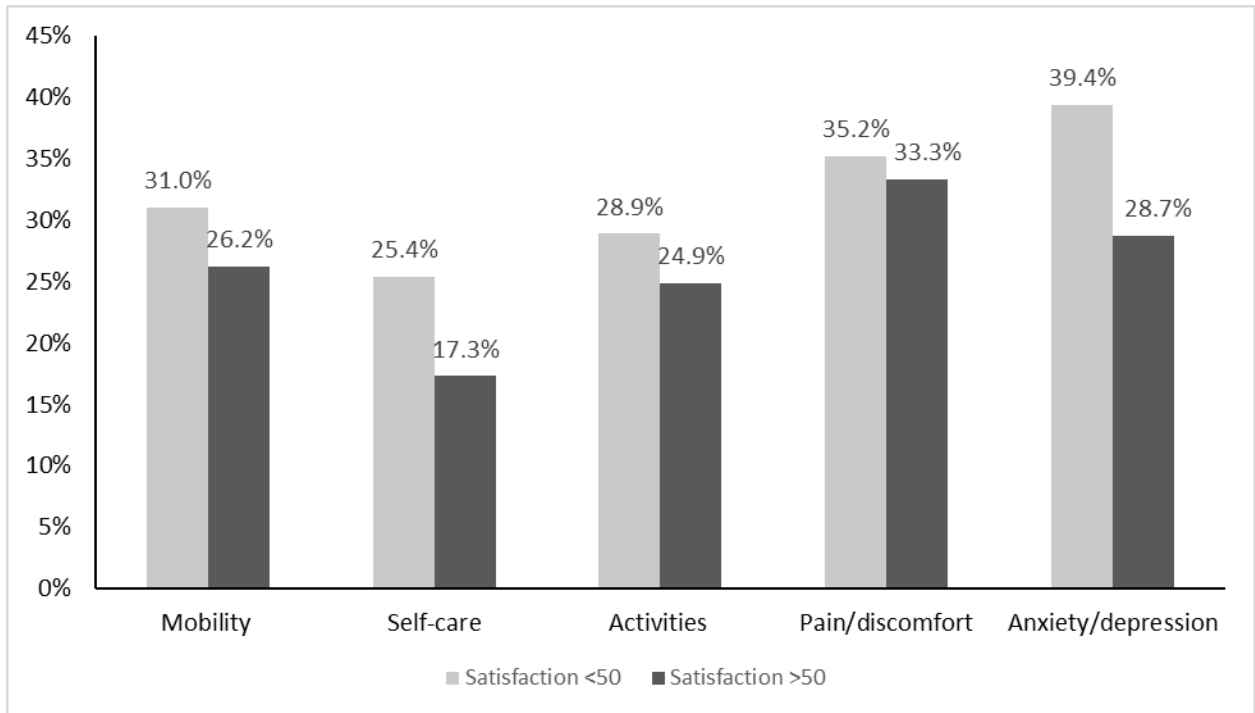
Figure 13: Classification of TSQM response domains for the EQ-5D.

Notes: Data are presented as the percentages of patients confirming some or considerable problems on each dimension of the EQ-5D. Grey columns, TSQM general satisfaction score <50; black columns, TSQM general satisfaction score >50.

Results from **(Figure 13)** indicated that patient's with higher treatment satisfaction > 50 had lower problems in EQ-5D domains(Mobility, activities , self-care, pain and discomfort and anxiety and depression), this results indicated more satisfied patients had a better Quality of life.

Significance association between anxiety and depression and treatment satisfaction(P=0.031). More satisfied patients with their treatment reported significantly better change in anxiety and depression domain compared with not satisfied patients .

Table 7: EQ-VAS score correlation with treatment satisfaction.

	Satisfaction	N	Mean	Std. Deviation	Std. Error Mean
Hscale	yes over all satisfaction < less than 50	144	69.8056	15.09424	1.25785
	no overall satisfaction more than 50	235	73.8043	15.88702	1.03635

In the more the more satisfied patients, the overall EQ-VAS score was significantly higher (73.8±15.09 vs 69.8±15.88; p=0.016; Student's t-test) , this indicated a better QOL.(**tab.7**)

Chapter Five

5. Discussion.

The purpose of our cross-sectional survey is to evaluate the relation between patient's adherence to diabetic medications and treatment satisfaction among a sample of Diabetic patients from a primary care clinic in Palestine. The result in our study that the more than half of the patients (57.9%) classified as adherent and (42.1%) classified as non-adherent. This results is similar to results from other study on adherence among Diabetic patients using same method of adherence assessment, where the adherence rate was reported to be 49.3%(57). In general, the level of adherence to medication among Diabetic Patients ranges from 36 to 93(58). In contrast to our study, other studies showed lower rates of adherence.

The common cause of medication non-adherence in our study was due to patients' forgetfulness , 45% of patients mentioned forgetting to take their anti-diabetic medicines. This findings is compatible with the findings from another study in Brazil, reporting the main cause of non-adherence in epilepsy was forgetting to take the medication(59). Yet, medication non-adherence for some patients was intentional. As an example, 18.7% of patients stopped taking their medications without consulting their physician when they felt bad upon taking them. Moreover, 21.6% of patients thought their health was under control, they stopped taking their medicines. Nevertheless, the majority of patients are unintentionally not adhering to their prescription.

This requires a better understanding and realization of DM treatment schemes for patients. The more knowledge and the perception to disease that patient had pharmacological treatments, the more likely they will adhere to their medicines (60).

In our study we found that 45.8% of patients had good glycemic control (HbA1c ≤ 7), whereas 54.2% of patients had poor glycemic control (HbA1c > 7). This is comparable to a study in Malaysia Hospital on the Outpatient Dietetics Clinic, Universiti Sains , glycemic control was 67.2% of proportion (61). The most of patients (78.2%) were obese or overweight in our study , the main reason for this high BMI to be related with poor glycemic control because of insulin resistance(62). Poor glycemic control among Palestinian T2DM patients was comparable in relation to other Arab countries results. The prevalence of poor glycemic control (HbA1c about 7%) in patients with DM in Jordan was 56.5%(63). In Kuwait, 66.7% of the population had HbA1c levels above 8.(63)

In addition, this may be linked to long-term DM (> 10years) stated in the current study by (30.5%) of patients. Long-term DM is typically correlated with poor glycemic control due to the failure of insulin secretion due to defects in pancreatic cells, which makes it unlikely to respond non-pharmacological intervention alone or oral hypoglycemic agents(64).

Statement of poor glycemic control patients were more likely to have low level of medication adherence. This suggests that good glycemic control can be obtained in this study by enhancing medication adherence among these patients. Our results are identical to results of a study conducted in North West Ethiopia, resulting in high adherence to medicines being associated significantly with good glycemic control. (P value = 0.001) (47).

In our study, most people with Diabetes had strong beliefs about the necessity of their medication with a mean necessity score of 17.6± 6.34, this may be clarified by the fact that many of the patients (54.2%) were poorly controlled by glycemic control (HbA1c > 7). Patients therefore realized that their glucose lowering agents were essential for their current and future health.

In the current study, patients had medium concerns about the negative effects of regularly taking glucose lowering drugs. Their mean score in Specific-Concerns scale was 13.8 ± 6.05. This may be associated with adverse drug effects experienced by patients when taking their medicines and interfering with the daily activities of patients. In addition, health care providers may not have sufficiently addressed the concerns of patients about

their medicines during counseling (53). Similar to the current study, patients in another study had medium concerns about the possible side effects of their anti-diabetic medications. Their mean score in Specific-Concerns scale was $14.0 \pm 4.3(47)$.

Mean score in Specific-Necessity scale (17.6 ± 6.34) was higher than the mean score in Specific-Concerns scale (13.8 ± 6.05). This will lead for the expectation that high levels of medications adherence, this will cause a better glycemic control.

Attitudinal categorization of patients' beliefs about medicine showed that more than half of the patients(57.4%) classified as accepting which means that they had high necessity and low concern, (21.1%) of the patients classified ambivalent which means that they had high necessity and high concern , (14.5%) of the patients classified as indifferent which means that they had low necessity and low concern, (7.1%) of the patients classified as skeptical which means that they had low necessity and high concern.

Non-adherent patients had higher score in concerns about medicine than the adherent group (15.26 vs. 13.81). This means they were more likely to have more concerns about their diabetes.

Our findings were similar with the evidence from a recent analysis that increased adherence was associated with fewer treatment concerns and increased belief in personal need for treatment. A cohort study of type 2 DM patients ,conducted in the city of Boston, USA, concluded that patients belief about medicine is improving symptoms and protecting health in the future was associated with higher drug adherence rates compared to those who did not believe (65), this results is the same as we get from our study.

This study has shown that satisfaction with diabetic treatment was significantly correlated with adherence to medication. Patients who classified as adherent had higher levels of treatment satisfaction than patients who classified as non-adherent patients. Thereby that increasing treatment satisfaction can increase adherence to medication. Medication adherence improvement could be clarified to keep with the enhancement of treatment satisfaction. Patient satisfaction with treatment is well recognized as a major determinant of adherence. Our finding in this study is the same as another study conducted in Japan(53).

There was a positive significant correlation between effectiveness domain and adherence level(P =0.04), and non-significant correlation between side effects , convenience and

global satisfaction score (P = 0.47,0.15 , 0.18) . In other words, we reject the null hypothesis for effectiveness domains, which means that there is a significant correlation between adherence and effectiveness. Non-significant correlation between side effect, convenience and Global Satisfaction.

Patients who had a high level of adherence had significantly higher correlation with effectiveness domain in treatment satisfaction than those in the low adherence categories. Nowadays, in chronic medical condition such as Diabetes Mellitus, treatment satisfaction is as a critical indicator of medication adherence. Our study revealed higher rates of effectiveness, and global satisfaction but lower rates of side effects and convince among adherent patients compared to non-adherent patients. The overall satisfaction with medications represented by the global satisfaction was better in adherent patients than non-adherent patients .The overall adherence correlated with the effectiveness.

Our finding in this study indicated that adherent patients reported greater satisfaction with their medications concerning effectiveness and global satisfaction. Other research on MS conducted in Saudi Arabia found that adherent patients were more satisfied with their medicines on convenience and effectiveness domains (66).

Other study conducted in Saudi Arabia about depression showed that treatment satisfaction was positively correlated with adherence to antidepressants(67) .

In another study on hypertension, the result is a strong relationship between the treatment satisfaction domains (side effects, convenience of treatment, and global satisfaction) and adherence to medication(68).

The result of another study in patients with hypertension indicated a significant difference in mean scores in all domains of the questionnaire except of the side effect domain among patients with different levels of adherence(56).

Medication adherence and treatment satisfaction would had a reflection on the blood level of HbA1C, which is a vital predictor of glycemic control.

This study has demonstrated the correlation between diabetic treatment satisfaction and blood glucose control. This result is similar to the reports that if diabetic patients are satisfied with their treatment, glycemic outcome will expectedly improve.

The result of this survey showed that patients who had higher treatment satisfaction had good glycemic control. This finding is the same as the research studies that have been demonstrated the role of treatment satisfaction on glycemic control (69).

There is a significant connection between glycemic control level and Global Satisfaction domain, which means we reject the null hypothesis in global satisfaction domain (p=0.01).

Our finding showed there is no significant relationship between necessity scale and adherence level (P=0.431), and a significant relationship between concern scale and non-adherence level (p=0.008).

Our finding that there is no significant connection between necessity scale and glycemic control (P=0.41) , and no significant connection between concern scale and glycemic control (p=0.104) , which means no significant association between patient's glycemic control and patient's beliefs about medicine. This is constituent with other study conducted in Kaiser Permanente Northwest found no connection between patient glycemic levels and beliefs about medications. Even physicians beliefs about diabetic treatment and HbA1c goals had restricted association with the HbA1c levels of their patients (70).

More satisfied patients with their treatments reporting a strong HRQoL in our study. In addition, the study population had a positive association between treatment satisfaction and HRQoL. Other study conducted in Palestine about diabetes showed that there is a low connection between treatment satisfaction and HRQol. Other Dutch study showed low correlation between treatment satisfaction and HRQOL and showed that treatment satisfaction and HRQOL are two fairly different incidences (31).

In our study , most of the patients reported problems with pain/discomfort (36.1%) and anxiety/depression (33.7%) than other dimensions of mobility (30.3%). Our finding is comparable to previous studies. In a study from China involving type 2 diabetics, Pain / discomfort was also the most frequent in several other studies among the five EQ- 5D domains. While diabetes does not cause pain directly, its treatments and complications, such as injections of insulin, infections, and wounds and cuts that are slow to heal, healing, can cause pain. Anxiety and depression is the second domain EQ-5D after pain and discomfort that the patients commonly report problems .(71). This finding is similar

with other findings that showed poor psychological health and a high tendency to suffer from depression in patients with diabetes was related to patient's fears about complications and disease progression, and frustration about inadequate therapy response.

In our study, (66%) of adherent patients had a VAS score (75-83), this means that Patients with high adherence to medication had significantly higher VAS scores that indicated good quality of life compared to patients with low adherence to their medication.

The result of this study was that there is significant relation between QOL and treatment adherence, similar to previous results which suggested that patient's had a low level of adherence was correlated with low quality of life. (72).

Adherence to treatment increases the HRQOL of a patient by reducing symptoms, progression of illness, and frequency and severity of exacerbations.

A significant relation between QOL and Treatment satisfaction was noticed in this research (P=0.016) , which indicated that higher satisfied patients had a higher VAS score and higher QOL (73.8±15.09 vs 69.8±15.88).

Significance association between anxiety and depression and treatment satisfaction(P=0.031) which means more satisfied patients had lower anxiety and depression.

Limitations.

All studies have limitations that could bias estimates. In our study the used a questionnaire that may not always be precise (comprehension issues, memory deficits and over / under symptom evaluation), resulting in the possibility of knowledge bias. In addition, since the study was across-sectional design, we cannot conclude whether the different independent variables influence treatment satisfaction or vice versa.

Another determinant that would influence the quality of life and adherence to therapy is hypoglycemia, but this study did not take this into account.

Chapter Six

6.Conclusions and Recommendations

6.1. CONCLUSION.

Several studies had shown that type 2 diabetes is a gradual disease and that pharmacological treatment is important for keeping a good glycemic control and reducing adverse cardiovascular consequence. Even though adherence to medications cause beneficial outcomes, it is often poor.

In our study, more than half of the participant classified as adherent ,some patients classified as non-adherent, the main cause for poor adherence was forgetting to take medication which means unintentional type of non-adherence.

More than 50% of patients had a poor glycemic control , this significantly related with decreased therapy adherence and will resulted in poor quality of life.

Measurement of the patient's treatment satisfaction is important in helping to determine those at risk of being non-adherent patients. High treatment satisfaction regarding effectiveness domain was associated with high level of adherence.

Most of the patients had stronger beliefs about medicine and lower concern about negative effect of medications which resulted in an increase in treatment satisfaction, which will lead to increase level of adherence.

More the half of the patients classified as accepting in their beliefs about medicine attitudes (high necessity , low concern) , which will leads to increase patient's adherence level.

Anxiety and depression were the most common reported problems by diabetic patients.

In our study, most patients were satisfied with their treatment, which make them high adherent to medication and had a good quality of life.

6.2 Recommendations.

The study results show that level of diabetic knowledge is a vital indicator of adherence to medications among diabetes patients.

We recommend that physicians and pharmacists should practice intervention to increase adherence , treatment satisfaction and QoL. They should explain the importance of doing HbA1c test on regular bases.

Our role as pharmacists is to explain the importance of taking Anti-diabetic medication and the importance of patient's beliefs about the necessity to take their medications.

Our role as pharmacists is to help patients remember time of taking medication by connecting drug administration to patients routine daily activity , as the main cause of non-adherence in or study is forgetting to take their medications.

Our role as pharmacists is to support and enhance the use of medicines for accepting patients , to educate the importance about the necessity to take the medication for skeptical patients , to reduce the concern about the side effects of medications and explain that anti-diabetic medications are not addictive and had a long safety profile for ambivalent patients.

Explain to patients the importance of having good glycemic control on the complication and the progression of the disease. Special attention should be paid to patient that report anxiety or fear regarding the disease or treatment, since such anxiety was shown to cause poor adherence and QoL.

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Appendixes:

Appendix A :

Al-Quds Ethical committee approval Letter.

Research Ethics Committee
Committee's Decision Letter
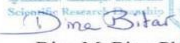
Date: June 8, 2019
Ref No: 80/REC/2019

Dear Dr. Maher Khdour, Miss Heba Awadallah,

Thank you for submitting your application for research ethics approval. After reviewing your application entitled **"Treatment satisfaction and its relation with beliefs about medicine and quality of life and adherence among diabetic patients."**
The Research Ethics Committee confirms that it is in accordance with the research ethics guidelines at Al-Quds University. Please inform us if there will be any changes in your research methodology, subjects, plan and we would appreciate receiving a copy of your final research report.
Thank you again and wish you productive research that serves the best interest of your subjects.

Dina M. Bitar PhD
Research Ethics Committee Chair

Cc. Prof. Imad Abu Kishek - President
Cc. Members of the committee
Cc. file

Appendix B:

Approval letter for the Ministry of Health.

Al-Quds University

Faculty of pharmacy

Abu-Dies, Jerusalem

جامعة القدس

كلية الصيدلة

أبوديس – القدس

التاريخ: ٢٠١٩/٢/٢٠

حضرة الدكتور وائل الشيخ المحترم،،

مدير صحة رام الله
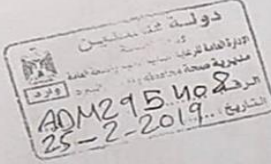
الموضوع: تسهيل مهمة "بحث"

تحية طيبة و بعد،،

أرجو من حضرتكم تسهيل مهمة اجراء البحث العلمي لطالبة الماجستير هبة بسام عوض الله :
البحث بعنوان
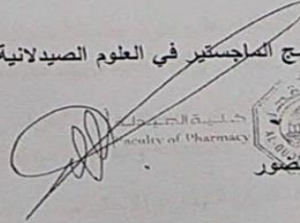
Treatment satisfaction and its relation with beliefs about medicine and quality of life and adherence among diabetic patients.

(مرفق طيه مقترح البحث العلمي وجدول الأعمال المطلوبة)

ملاحظة: المعلومات المطلوبة لأغراض البحث العلمي فقط.

شاكراً لكم حسن تفهمكم وتعاونكم،،

منسق برنامج الماجستير في العلوم الصيدلانية

د. ماهر الخضور

Appendi

<div dir="rtl">

موافقة على المشاركة في بحث علمي.

عنوان البحث:

قياس مدى رضى المرضى عن الادوية الموصوفة لهم وعلاقتها بطبيعة حياة المريض ومدى التزام المرضى بأخذ الدواء.

اسم الباحث:

هبه بسام عوض الله.

اخي\ اختي المتطوع(ة) هذا البحث هو احد الابحاث الطبية التي تقوم بها كلية الصيدلة في جامعة القدس للحصول على درجة الماجستير ويهدف الى تحسين نوعية حياة المرضى.

ارجو ان ابين ما يلي :

ان مشاركتك في هذا البحث طوعية تماما" ، ومن شأنها افادة المجتمع وعملية البحث العلمي بشكل عام، وافادة مرضى السكري بشكل خاص.

في حال مشاركتك بالبحث ، سيبقى اسمك طي الكتمان ، ويحق لك الانسحاب متى شئت من دون أي اثر يذكر عليك .

يجدر الاشارة ان لجنة البحث العلمي في جامعة القدس قد وافقت على اجراء البحث ، وتعتبر هي اللجنة المؤسسية والمرجعية للبحوث والدراسات.

موافقة المتطوع:

انا المتطوع...قرأت المعلومات المذكورة اعلاه وفهمتها ، وبناء عليه فإنني وافق على المشاركة في البحث.

التاريخ: التوقيع:

</div>

Appendix D:

معلومات شخصية عن المريض:

الجنس:

☐ أنثى ☐ ذكر

❖ العمر:.................................

❖ الوزن:.................................

❖ الطول:.................................

❖ ما هو مستوى تعليمك:

☐ ابتدائي ☐ اعدادي ☐ثانوي ☐جامعي ☐ تعليم عالي

❖ الوظيفة :

☐ لا اعمل ☐ نعم اعمل (طبيعة العمل/الوظيفة (_____)

❖ التأمين الصحي :

☐ نعم ☐ لا

❖ الوضع الاجتماعي :

☐أعزب ☐ متزوج/ة ☐مطلق/ة ☐ أرمل/ة

❖ مدخن:

نعم/المدة(_____) ☐   لا ☐   تركت/المدة(_____) ☐

❖ نوع السكري :
☐ النوع الأول   ☐ النوع التاني   ☐ سكري الحمل (النساء)

❖ مدة المرض :
☐ 3 أشهر ـ سنة   ☐ سنة ـ 5 سنوات
☐ 6 سنوات ـ 10 سنوات   ☐ >10 سنوات

❖ هل يوجد لديكم بالعائلة اشخاص مصابين بالسكري :
☐ نعم   ☐ لا

❖ ما هي الأدوية التي تستخدمها بالعلاج:
☐ الانسولين   ☐ الحبوب عن طريق الفم   ☐ كلاهما معا

❖ متى اخر مرة لفحص السكري التراكمي :
(_____)

❖ كم مستوى السكري التراكمي :
(_____)

❖ هل ظهرت أي مضاعفات لمرض السكري :
☐   ☐

❖ اذا كانت الاجابة نعم /أي من هذه المضاعفات ظهرت لديك (يمكنك اختيار اكثر من اجابة) :

ارتفاع في ضغط الدم ☐ مشاكل بالنظر ☐

مشاكل بالاعصاب ☐ مشاكل بالكلية ☐

جلطة قلبية ☐ جلطة دماغية ☐

❖ هل تعاني من أمراض أخرى :

☐ نعم ☐ لا

❖ اذا كانت اجابتك نعم / أذكر ما هي هذه الامراض :

(_____)

❖ ما هي الادوية التي تستخدمها بالعلاج :

(_____)

Appendix E:

مدى الانضباط الدوائي:

❖ هل يحدث ان تنسى تناول الدواء الخاص بك :

☐ نعم ☐ لا

❖ هل انت مهمل في بعض الاحيان في تناول الدواء :

☐ نعم ☐ لا

❖ هل تشعر بالتحسن ,هل تتوقف في بعض الاحيان عن تناول الدواء :

لا ☐   نعم ☐

❖ في بعض الاحيان تشعر انك اسوء ,عندما تاخذ الدواء ,هل تتوقف عن تناوله:

لا ☐   نعم ☐

المعتقدات حول الادوية :

❖ الوضع الصحي في الوقت الحالي يعتمد على تناول ادويتي :

☐ اعارض بشدة   ☐ اعارض   ☐ محايد

☐   اوافق   ☐ اوافق بشدة

❖ حياتي سوف تكون مستحيلة دون تناول ادويتي :

☐ اعارض بشدة   ☐ اعارض   ☐ محايد

☐   اوافق   ☐ اوافق بشدة

❖ بدون ادويتي ساصبح مريضا للغاية :

☐ اعارض بشدة   ☐ اعارض   ☐ محايد

☐   اوافق   ☐ اوافق بشدة

❖ صحتي بالمستقبل تعتمد على تناول ادويتي :

☐ اعارض بشدة   ☐ اعارض   ☐ محايد

☐   اوافق   ☐ اوافق بشدة

❖ ادويتي تحميني ان اصبح اسوء :

☐ اعارض بشدة   ☐ اعارض   ☐ محايد

☐   اوافق   ☐ اوافق بشدة

مخاوف المريض تجاه الادوية:

❖ الحاجة الى تناول ادويتي تقلقني :

☐ا اعارض بشدة   ☐ اعارض   ☐محايد

☐   اوافق   ☐ اوافق بشدة

❖ اشعر بالقلق من الاثار الطويلة الامد لادويتي :

☐ا اعارض بشدة   ☐ اعارض   ☐محايد

☐   اوافق بشدة

❖ ادويتي هي لغز بالنسبة لي :

☐ا اعارض بشدة   ☐ اعارض   ☐محايد

☐   اوافق بشدة

❖ ادويتي تعطل حياتي :

☐اعارض بشدة   ☐اعارض   ☐محايد

☐   اوافق   ☐ اوافق بشدة

❖ اقلق في بعض الاحيان ان اصبح معتمدا جدا على ادويتي :

☐ا اعارض بشدة   ☐ اعارض   ☐محايد

☐   اوافق   ☐ اوافق بشدة

Appendix G:

مدى الرضا المريض العلاجي للدواء :

1- ما مدى رضاك او عدم رضاك عن قدرة الدواء عن الوقاية من حالتك المرضية او علاجها :

☐ غير راض على الاطلاق   ☐ غير راض جدا   ☐ غير راض

☐ راض بعض الشيء   ☐ راض   ☐ راض جدا   ☐ راض للغاية

2- ما مدى رضاك او عدم رضاك عن طريقة تخفيف الدواء للاعراض التي تعاني منها :

☐ غير راض على الاطلاق   ☐ غير راض جدا   ☐ غير راض

☐ راض بعض الشيء   ☐ راض   ☐ راض جدا   ☐ راض للغاية

3- ما مدى رضاك او عدم رضاك عن الفترة الزمنية التي يستغرقها الدواء ليبدأ مفعول :

☐ غير راض على الاطلاق   ☐ غير راض جدا   ☐ غير راض

☐ راض بعض الشيء   ☐ راض   ☐ راض جدا   ☐ راض للغاية

4- هل تعاني من اية اعراض جانبية نتيجة تعاطيك الدواء :

☐ نعم   ☐ لا(اذا كانت اجابتك لا فالرجاء الانتقال الا السؤال رقم9)

5- ما مدى انزعاجك من الاعراض الجانبية للدواء الذي تتعاطاه لعلاج حالتك :

☐ منزعج للغاية   ☐ منزعج جدا   ☐ منزعج بعض الشيء

☐ منزعج قليلا   ☐ غير منزعج على الاطلاق ا

6- الى اي حد تعيق الاعراض الجانبية قدرتك العقلية (اي القدرة على التفكير بالصفاء و البقاء مستيقظا..... الخ)

☐ الى حد كبير   ☐ الى حد   بعض الشيء

☐ الى حد ضئيل   ☐ لا تعيقها على الاطلاق ا

7- الى اي حد تعيق الاعراض الجانبية صحتك البدنية وقدرتك الجسدية (اي القوة ومستويات الطاقة.... الخ)

☐ الى حد كبير   ☐ الى حد ما   بعض الشيء

☐ الى حد ضئيل   ☐ لا تعيقها على الاطلاق ا

8- الى اي مدى اثرت الاعراض الجانبية للدواء على رضاك العام عنه :

☐ الى حد كبير   ☐ الى حد ما   بعض الشيء

☐ الى حد ضئيل   ☐ لا تعيقها على الاطلاق ا

9- ما مدى سهولة او صعوبة استخدام الدواء بشكله الحالي :

☐ صعب للغاية   ☐ صعب جدا   صعب

ا ☐ سهل بعض الشيء   ☐ سهل   ☐ سهل جدا   ☐ سهل للغاية

10- ما مدى سهولة او صعوبة التخطيط لوقت استخدام الدواء في كل مرة :

☐ صعب للغاية   ☐ صعب جدا   صعب

ا ☐ سهل بعض الشيء   ☐ سهل   ☐ سهل جدا   ☐ سهل للغاية

11- ما مدى ملائمة او عدم ملائمة تعاطي الدواء حسب التعليمات :

☐ غير ملائم على الاطلاق   ☐ غير ملائم بدا   غير ملائم

ا ☐ ملائم بعض الشيء   ☐ ملائم   ☐ ملائم جدا   ☐ ملائم للغاية

12- بشكل عام الى اي حد انت واثق من ان تعاطي الدواء مفيد لك :

☐ غير واثق على الاطلاق   ☐ واثق قليلا   ☐ واثق بعض الشيء

☐ واثق جدا   ☐ واثق للغاية

13- الى اي حد انت متاكد من ان ايجابيات الدواء الذي تتعاطاه تفوق سلبياته :

☐ غير متاكد على الاطلاق   ☐ متاكد قليلا   ☐ متاكد بعض الشيء

☐ متاكد جدا   ☐ متاكد للغاية

14- اذا اخذنا جميع الامور بعين الاعتبار , ما مدى رضاك او عدم رضاك عن

هذا الدواء :

☐ غير راض على الاطلاق   ☐ غير راض جدا   غير راض

☐ راض بعض الشيء   ☐ راض   ☐ راض جدا   ☐ راض للغاية

صحتك ورفاهيتك:

ضع علامة في المربع الذي يصف حالتك الصحية من بين المجموعات التالية .

- الحركة والتحرك :

☐ ليس لدي مشاكل في المشي

☐ لدي بعض المشاكل في المشي

☐ ملتزم بالسرير ولا أمشي

- الرعاية الذاتية :

☐ ليس لدي مشاكل مع الرعاية الذاتية

☐ لدي بعض المشاكل في الغسل ولبس الملابس بنفسي

☐ لا أستطيع الغسل أو لباس الملابس بنفسي

- النشاطات المعتادة (مثال: العمل، الدراسة، عمل المنزل، العائلة وأوقات الترفيه) :

☐ ليس لدي مشاكل في أداء نشاطاتي المعتادة

☐ لدي بعض المشاكل في أداء نشاطاتي المعتادة

☐ لا أستطيع أداء نشاطاتي المعتادة

- الألم/ عدم الراحة :

☐ ليس لدي ألم أو عدم راحة

☐ لدي ألم أو عدم راحة معتدل

☐ لدي ألم شديد ومفرط

- القلق/ الإحباط والاكتئاب :

☐ انا لست قلقاً أو محبطاً (مكتئباً)

☐ أنا مكتئب أو قلق بشكل معتدل

☐ أنا مكتئب و قلق جداً

يرجى الإشارة على هذا النطاق إلى أي مدى كانت حالتك الصحية جيدة أو سيئة.

أفضل حالة صحية هي ١٠٠ و أسوأ حالة صحية هي (.)صفر

يرجى رسم خط من مربع إلى نقطة على مقياس يشير إلى مدى صحة أو سوء حالتك الصحية اليوم

Best imaginable
health state

1 0 0

9 0

8 0

7 0

6 0

5 0

4 0

3 0

2 0

1 0

0

Worst imaginable
health state

Your
own
health
state
today

Visual Analogue Scale

Please indicate on this scale how good or bad
your own health state is today.

The best health state you can imagine is marked
100 and the worst health state you can imagine is
marked 0.

Please draw a line from the box to the point
on the scale that indicates how good or bad your
health state is today.

علامة صحتك اليوم من صفر بالمية الى ١٠٠% =

شكرا لاستكمالكم هذه الرسالة.

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Results Appendixes:

Adherence Level.

adherence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high adherence	220	57.9	57.9	57.9
	low adherence	160	42.1	42.1	100.0
	Total	380	100.0	100.0	

Response of patients to MMAS-2 Questions.

forget

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	171	45.0	45.0	45.0
	no	209	55.0	55.0	100.0
	Total	380	100.0	100.0	

careless

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	127	33.4	33.4	33.4
	no	253	66.6	66.6	100.0
	Total	380	100.0	100.0	

Feel better

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	82	21.6	21.6	21.6
	no	298	78.4	78.4	100.0
	Total	380	100.0	100.0	

Feel worse

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	71	18.7	18.7	18.7
	no	309	81.3	81.3	100.0
	Total	380	100.0	100.0	

Adherent and non-adherent patients and correlation with treatment satisfaction.

Group Statistics

	adherence	N	Mean	Std. Deviation	Std. Error Mean
effectiveness	high adherence	220	.7861	.25897	.01746
	low adherence	160	.6889	.36454	.02882
Side effect	high adherence	220	.4185	.40103	.02704
	low adherence	160	.4486	.40249	.03182
convenience	high adherence	220	.5767	.38232	.02578
	low adherence	160	.6327	.37310	.02950
GS	high adherence	220	.6899	.34202	.02306
	low adherence	160	.6031	.36409	.02878

T-test for the relationship between adherence level and treatment satisfaction.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
effectiveness	Equal variances assumed	7.950	.005	3.038	378	.003	.09715	.03198	.03426	.16004
	Equal variances not assumed			2.883	270.663	.004	.09715	.03370	.03081	.16349
sidee	Equal variances assumed	.011	.918	-.722	378	.471	-.03013	.04173	-.11218	.05193
	Equal variances not assumed			-.721	342.034	.471	-.03013	.04176	-.11226	.05200
convinence	Equal variances assumed	.586	.444	-1.424	378	.155	-.05601	.03932	-.13333	.02131
	Equal variances not assumed			-1.430	347.460	.154	-.05601	.03917	-.13305	.02103
GS	Equal variances assumed	.993	.320	2.378	378	.018	.08685	.03652	.01504	.15866
	Equal variances not assumed			2.355	329.918	.019	.08685	.03688	.01430	.15940

Correlation between adherence level and beliefs about medicines scores.

	adherence	N	Mean	Std. Deviation	Std. Error Mean
necessity	high adherence	220	17.9091	6.34984	.42811
	low adherence	160	17.4625	4.70366	.37186
concern	high adherence	220	13.8136	6.05204	.40803
	low adherence	160	15.2688	4.57739	.36187
NCD	high adherence	220	3.9773	6.83627	.46090
	low adherence	160	2.0938	5.32444	.42093

T-test for the relationship between beliefs about medicine and adherence level.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
necessity	Equal variances assumed	13.300	.000	.752	378	.452	.44659	.59384	-.72106	1.61424
	Equal variances not assumed			.788	377.863	.431	.44659	.56706	-.66839	1.56157
concern	Equal variances assumed	28.241	.000	-2.555	378	.011	-1.45511	.56941	-2.57472	-.33550
	Equal variances not assumed			-2.668	377.403	.008	-1.45511	.54538	-2.52748	-.38275
nececonc	Equal variances assumed	13.154	.000	2.903	378	.004	1.88352	.64887	.60767	3.15938
	Equal variances not assumed			3.018	376.201	.003	1.88352	.62419	.65618	3.11086

Glycemic control level.

HA1cControl

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<7	174	45.8	45.8	45.8
	>7	206	54.2	54.2	100.0
	Total	380	100.0	100.0	

Glycemic control in relation to treatment satisfaction.

Group Statistics

	HA1cControl	N	Mean	Std. Deviation	Std. Error Mean
effectiveness	<7	174	.7625	.27650	.02096
	>7	206	.7305	.33762	.02352
Side effect	<7	174	.4462	.38756	.02938
	>7	206	.4184	.41322	.02879
convenience	<7	174	.5815	.37598	.02850
	>7	206	.6162	.38169	.02659

GS					
	<7	174	.6919	.33505	.02540
	>7	206	.6208	.36624	.02552

T-test for the relationship between glycemic control and treatment satisfaction.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
effectiveness	Equal variances assumed	2.112	.147	.999	378	.319	.03200	.03204	-.03100	.09499
	Equal variances not assumed			1.016	377.654	.311	.03200	.03151	-.02996	.09395
sidee	Equal variances assumed	4.993	.026	.672	378	.502	.02781	.04136	-.05351	.10913
	Equal variances not assumed			.676	373.853	.499	.02781	.04114	-.05308	.10870
convinence	Equal variances assumed	.000	.986	-.889	378	.374	-.03472	.03903	-.11147	.04203
	Equal variances not assumed			-.891	369.196	.374	-.03472	.03898	-.11137	.04194
GS	Equal variances assumed	1.412	.235	1.959	378	.051	.07108	.03628	-.00025	.14240
	Equal variances not assumed			1.974	375.576	.049	.07108	.03600	.00028	.14187

Glycemic control in relation to beliefs about medicine.

Group Statistics

	HA1cControl	N	Mean	Std. Deviation	Std. Error Mean
necessity	<7	174	17.0632	6.07958	.46089
	>7	206	18.2767	5.33430	.37166
concern	<7	174	13.9253	5.49410	.41651
	>7	206	14.8495	5.51996	.38459
NCD	<7	174	3.1034	6.36652	.48264
	>7	206	3.2524	6.26912	.43679

T-test for the relationship between glycemic control and beliefs about medicine.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
necessity	Equal variances assumed	11.511	.001	-2.072	378	.039	-1.21348	.58561	-2.36494	-.06202
	Equal variances not assumed			-2.050	347.236	.041	-1.21348	.59207	-2.37798	-.04898
concern	Equal variances assumed	1.087	.298	-1.630	378	.104	-.92423	.56714	-2.03937	.19091
	Equal variances not assumed			-1.630	368.006	.104	-.92423	.56691	-2.03902	.19057
nececonc	Equal variances assumed	.087	.768	-.229	378	.819	-.14898	.65010	-1.42724	1.12929
	Equal variances not assumed			-.229	365.515	.819	-.14898	.65095	-1.42905	1.13109

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Responses to EQ-5D modalities.

mobility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no problem	265	69.7	69.7	69.7
	slight problem	106	27.9	27.9	97.6
	moderate problem	9	2.4	2.4	100.0
	Total	380	100.0	100.0	

selfcare

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no problem	299	78.7	78.7	78.7
	slight problem	68	17.9	17.9	96.6
	moderate problem	13	3.4	3.4	100.0
	Total	380	100.0	100.0	

activites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no problem	276	72.6	72.6	72.6
	slight problem	87	22.9	22.9	95.5
	moderate problem	17	4.5	4.5	100.0
	Total	380	100.0	100.0	

pain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no pain	243	63.9	63.9	63.9
	slight pain	126	33.2	33.2	97.1
	moderate pain	11	2.9	2.9	100.0
	Total	380	100.0	100.0	

anaxity

					Cumulative

			adherence		Total
			high adherence	low adherence	
HscaleCAT	0-50	Count	25	36	61
		% within HscaleCAT	41.0%	59.0%	100.0%
		% within adherence	11.4%	22.5%	16.1%
		% of Total	6.6%	9.5%	16.1%
	51-74	Count	79	59	138
		% within HscaleCAT	57.2%	42.8%	100.0%
		% within adherence	35.9%	36.9%	36.3%
		% of Total	20.8%	15.5%	36.3%
	75-83	Count	62	32	94
		% within HscaleCAT	66.0%	34.0%	100.0%
		% within adherence	28.2%	20.0%	24.7%
		% of Total	16.3%	8.4%	24.7%
	84-100	Count	54	33	87
		% within HscaleCAT	62.1%	37.9%	100.0%
		% within adherence	24.5%	20.6%	22.9%
		% of Total	14.2%	8.7%	22.9%
Total		Count	220	160	380
		% within HscaleCAT	57.9%	42.1%	100.0%
		% within adherence	100.0%	100.0%	100.0%
		% of Total	57.9%	42.1%	100.0%

T-test for the relationship between treatment satisfaction and QoL.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Hscale	Equal variances assumed	.333	.564	-2.423	377	.016	-3.99870	1.64998	-7.24303	-.75437
	Equal variances not assumed			-2.454	314.480	.015	-3.99870	1.62979	-7.20538	-.79202

تقييم مدى رضا مرضى السكري عن العلاج وعلاقته بمعتقدات المرضى وجودة الحياة ومدى التزام المرضى بأخذ الدواء.

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المشرف الدكتور : الدكتور ماهر الخضور

الملخص.

الملخص والاهداف : مرض السكري هو مجموعة من الأمراض الأيضية التي تتميز بارتفاع السكر في الدم المزمن الناتج عن عيوب في إفراز الأنسولين أو عمل الأنسولين أو كليهما. الشذوذات الأيضية في الكربوهيدرات والدهون والبروتينات تنتج عن أهمية الأنسولين كهرمون. كان الغرض من هذه الدراسة هو تقييم التزام المرضى بأخذ الدواء المرضى علاوة على ذلك ، بحثت هذه الدراسة مدى التزام المرضى بأخذ الدواء ، ومعتقدات المرضى حول الأدوية وجودة الحياة.

المنهجية : شملت الدراسة المقطعية الحالية اربعمائة مريض سكري من العيادة الاولية في رام الله ، استخدمت الدراسة مقياس موريسكي ذي البنود الاربعة لقياس مدى الانضباط الدوائي احدث قيمة لاختبار خضاب الدم لتقييم انضباط جلوكوز الدم ، مقياس الرضى عن اخد الدواء لقياس مدى رضى المرضى عن العلاج ، اختبار المعتقدات حول الادوية لتقييم المعتقدات حول الادوية، تم استخدام المقياس الاوروبي خماسي الابعاد لقياس جودة حياة المرضى. اضافة الى ذلك فقد استخدمت سجلات المرضى الطبية للحصول على معلومات المرضى الديموغرافية والسريرية.

النتائج: وضحت الدراسة ان مئتان وعشرون(57.9%) لديهم مستوى مرتفع من الانضباط ، ومئة واربعون مريض (42.1%) , لديهم مستوى منخفض من الانضباط حسب مقياس موريسكي حسب البنود الاربعة. مئة واربع وسبعين مريض(45.7%) كان لديهم ضبط جيد لجلوكوز الدم، مئتان و ست مرضى(52.1%) ضبط جلوكوز الدم لديهم سيئ. متوسط الرضى للمرضى الملتزمين بأخذ الدواء من ناحية الفعالية 78.81±25.8 ،متوسط الرضى للمرضى غير الملتزمين بأخذ الدواء من ناحية الفعالية 68.89 ± 36.4 ، متوسط الرضى للمرضى الملتزمين بأخذ الدواء من ناحية الاعراض الجانبية 41.85 ± 40.8 ، ، متوسط الرضى للمرضى غير الملتزمين بأخذ الدواء من ناحية الاعراض الجانبية 44.86 ± 40.2، متوسط الرضى للمرضى الملتزمين بأخذ الدواء من ناحية سهولة استخدام الدواء 57.76 ± 38.2 ، متوسط الرضى للمرضى غير الملتزمين بأخذ الدواء من ناحية سهولة استخدام الدواء 63.26 ± 37.3 ، متوسط الرضى للمرضى الملتزمين بأخذ الدواء من ناحية الرضى العام 68.66 ± 34.2 ، ، متوسط الرضى للمرضى غير الملتزمين بأخذ الدواء من ناحية الرضى العام 61.31 ± 36.4 . قد اكد المرضى على اهمية الدواء

المعالجة لمرض الكسري لحصتهم حاليا ومستقبلا (متوسط الدرجة لمقياس الضرورات الخاصة)
17.9(SD=6.43).

(متوسط الدرجة لقياس مستوى 13. 8(SD=6.05)كما كان للمرضى بشكل متوسط اراء سلبية حول الادوية ككل. الافراط

(p=0.01)هناك ارتباط كبير بين السيطرة على نسبة السكر في الدم ونطاق الرضاء العالمي.

كانت نتيجة مقياس جودة الحياة ان اغلبية المرضى يعانوا من الالم وعدم الراحة بحيث ان

33.7% من المرضى يعانوا من القلق و الاكتئاب ، 30.30% من المرضى يعانوا من مشاكل اخرى.

كان هناك ارتباط كبير بين مدى رضا المرضى عن العلاج مقياس القلق والاكتئاب في مقياس جودة حياة المريض (p=0.031).

الخاتمة: كان اكثر من نصف المرضى في هذه الدراسة ملتزمين بأدويتهم وكان لديهم معتقدات قوية بضرورة استخدام الأدوية الخاصة بهم. وعلاوة على ذلك ، ارتبط عدم الالتزام المرضى بالدواء بشكل كبير مع ضعف السيطرة على نسبة السكر في الدم كان معظم المرضى راضين عن علاجهم ، وكان المرضى الأكثر ارتياحا أكثر تمسكًا بالأدوية وكانت نوعية حياتهم أفضل.