

An-Najah National University

Faculty of Graduate Studies

**Effects of self-care and self-efficacy on
glycemic control in patients with type 2
diabetes: A cross sectional study from
Palestine**

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Dedication

This work is humbly dedicated most of all to the one who gives me a chance to live and gives me Strength and faith to overcome all difficulties

Allah (SWT)

And to all valuable treasures in my life:

My Beloved Parents

Abbas and Ayda

My Brothers

Tariq and Mohammed

My sister

Shahd

My Son and daughter

Ibrahim and Mira

My Parents in law

Ibrahim and Amal

Who served as my inspiration and strength during stormy days

And

My Husband

Abdelhaleem

For his love, sacrifices and being my shining armor

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الإقرار

أنا الموقعة أدناه ، مقدمة الرسالة التي تحمل العنوان:

Effects of self-care and self-efficacy on glycemic control in patients with type 2 diabetes: A cross sectional study from Palestine

أقر بأن ما اشتملت عليه هذه الرسالة إنما هو نتاج جهدي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، و أن هذه الرسالة كاملة، أو أي جزء منها لم يقدم من قبل لنيل أي درجة أو لقب علمي أو بحثي لدى أي مؤسسة تعليمية أو بحثية أخرى

Declaration

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

Student's Name:

اسم الطالب:

Signature:

التوقيع:

Date:

التاريخ:

List of abbreviation

FPG	Fasting plasma glucose
OGTT	Oral glucose tolerance test
NCDs	Noncommunicable diseases
CVD	Cardiovascular disease
PEPPI	Patient physician interaction
WHO	World health organization
IDF	International diabetes federation
DM	Diabetes mellitus
MENA	Middle East and North Africa
PHCs	Primary health centers
BMI	Body mass index
HbA1c	Glycosylated hemoglobin
PPC	Patient-provider communication
SPSS	Statistical package for Social sciences
IRB	Institutional Review Boards
SES8C	Self-Efficacy for diabetes 8-Item Scale

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Abstract

Background: Type 2 diabetes mellitus has become a significant public health problem in many countries including Palestine where it is considered the fourth cause of death. Self-care/self-efficacy has been shown to have strong correlation with glycemic control among patients with type 2 diabetes. However, such evidence is lacking in Palestinian primary health care centers.

Objectives: To examine if there is any significant relationship between self-efficacy/self-care and blood glucose control, to determine factors associated with self-efficacy and self-care behavior, to determine factors associated with glycemic control, and to estimate the prevalence of glycemic control among diabetic patients.

Method: This cross-sectional study involved 380 type 2 diabetes patients attending Al-Makhfeyyeh primary health care center in Nablus/Palestine during July to September, 2017. Patients were assessed for self-care/self-efficacy behaviors, and glycemic control (HbA1c).

Results: of the total 380 patients, 82.4% had a poor glycemic control, as was indicated by HbA1c levels of $> 6.5\%$. SES8C scale analysis revealed that high education level is a strong predictor for good type 2 diabetes self-efficacy behaviors (p value= 0.001). PEPPi scale analysis revealed positive

direct effect between self-efficacy score with married participants (p-value was 0.034) and with high educated participants (p-value was <0.001). Significant correlation between participants in daily activities score was shown in participants <65 years old (p-value <0.001), single or divorced (p-value 0.043), low educated (p-value 0.008), using monotherapy (p-value 0.034), using insulin injection (p-value <0.001), having ≥ 3 chronic diseases (p-value <0.001), and having high blood pressure (p-value 0.001). Physical activity shows positive correlation with young age, males, married, educated participants, not using insulin injection, and not suffering from any chronic diseases. No significant association was found between self-care/self-efficacy with glycemic control (p-values > 0.05).

About half of the participants using insulin injection (48.7%). Only 12% of patients prepare a list of questions to ask their doctors about their illness and about 42% never discuss any personal problems that may related to their illness with their physicians.

Conclusion: This study has found that higher self-efficacy behaviors were among high educated patients, and married participants. No relation between self-care/self-efficacy and glycemic control was found. Healthcare providers should encourage patients to increase their daily physical activity, having regular feet-care examination, and measure their blood glucose level regularly. Also patients should trust their physicians more and communicate with them to increase their knowledge about their illness and treatment.

Chapter One

Introduction

1. Introduction

1.1 Definition and background

Diabetes is known as chronic lifelong metabolic disorder where patients and caregivers need to learn self-management behaviors in a good way and maintain it for life (Fain, 2012, Funnell et al., 2011).

Diabetes Mellitus type 2 can be defined as the elevated blood glucose level for prolonged periods of time as a result of insulin resistance, low or insufficient insulin secretion, and increased glucagon production (ADA, 2009). Diagnosis of type 2 diabetes happens when a fasting plasma glucose (FPG) level (blood sample withdrawn after an overnight fast) is higher than or equal 126 mg/dL (7.0 mmol/L), a 2-hour plasma glucose level is higher than or about 200 mg/dL (11.1 mmol/L) during a 75-g oral glucose tolerance test (OGTT), or a random blood sugar level of 200 mg/dL (11.1 mmol/L) or higher in a patient with any of the signs and indicators of hyperglycemia or hyperglycemic crisis (Song et al., 2012, ADA, 2009) . Symptoms that can help in diagnosis of diabetes include severe thirst, feeling hungry most of the time, excessive urination, losing weight, blurred vision and tiredness (WHO, 2018).

1.1.1 Diabetes as a worldwide problem

Diabetes is one of the major and most important noncommunicable diseases (NCDs) identified by the world health organization along with cancer, chronic respiratory disease, and cardiovascular disease (CVD), which includes heart attack, angina and stroke. It is associated with more than double the increase in cardiovascular mortality and stroke (IDF, 2015, MoH, 2016).

As declared by to WHO and the International diabetes federation statistics, in 2017 there are more than 425 million adults all over the world have diabetes, 43million of them living in the eastern Mediterranean region. More than 90% of them are diagnosed with type 2 Diabetes Mellitus and almost half of them are undiagnosed (IDF, 2017, WHO, 2018).

The world prevalence of diabetes among adults (aged 20–79 years) was expected to be 6.4% in 2010 and will increase to 7.7% by 2030 (Shaw et al., 2010). Between 2010 and 2030, there will be a 69% surge in numbers of adults with diabetes in developing countries and a 20% surge in developed countries. It is striking that Arab world (North Africa, Middle East, and Gulf area) will have the second highest surge in fraction of people with Diabetes Mellitus in 2030 compared to other areas of the world (Shaw et al., 2010). Saudi Arabia, Kuwait and Qatar are considered among the top ten countries universally for the prevalence of type 2 Diabetes Mellitus according to the International Diabetes Federation (IDF) statistics 2013 (IDF, 2017). Dependable data about management outcomes, problems, and economic effects of Diabetes Mellitus are available from

Middle East in general and from Palestine in particular (Husseini et al., 2009).

1.1.2 Diabetes in Palestine

As the incidence and prevalence of diabetes increased dramatically especially in the last two decades, the disease has become a significant public health problem in many countries including Palestine leading to disastrous medical and economic consequences. Diabetes Mellitus in Palestine has become the fourth cause of death ended the life of 869 diabetic patients in 2015 which presents 8.9% of total mortalities, and 576 diabetic patients in 2016 which presents 8% due to diabetes complications (MoH, 2016). Diabetic complications can be considered the major cause for disability and diminished quality of life in diabetic patients (Khader et al., 2012).

Travel restrictions, security checkpoints, and difficult life under occupation in Palestine play important role in increasing rate of diabetes. According to the International Diabetes Federation, the age-adjusted prevalence of diabetes in Palestine in 2017 was 12 percent as shown in Figure 1 (Huang et al., 2017). Figure 1 also shows that Palestine is considered moderate in terms of age-adjusted prevalence of diabetes in MENA (Middle East and North Africa) region. Moreover, the union of Palestinian medical relief committee estimated that 18 percent of Palestinian population has diabetes. This percent may increase to 30 when taking into account those with pre-diabetes and those who are unaware of their diabetes (TJF, 2018). The differences in the percentages between the two sources are due to the fact

that it was age adjusted in the first one and not in the second one. Age Adjustment is a technique used to let populations to be compared when the age profiles of the populations are quite different, which is the case of

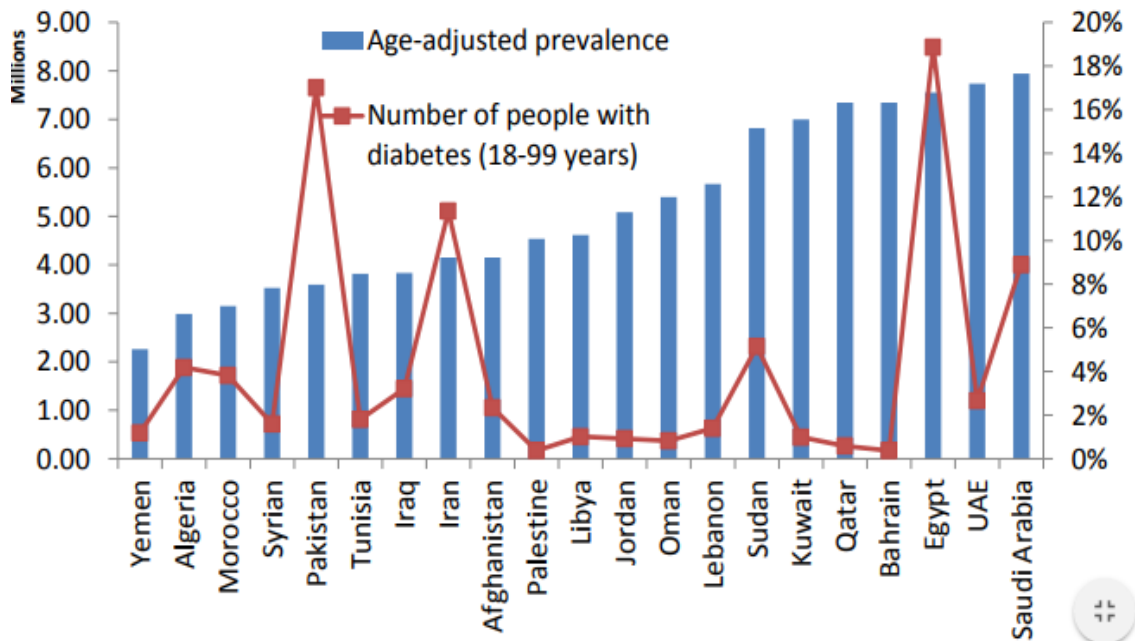


Figure 1-1 Age-adjusted diabetes prevalence ranked by countries and the number of people with diabetes in each country in MENA region

diabetes. As shown in Figure 2, Diabetes prevalence increases from age 18 and peaks around age 65 years (almost 25% in women) in MENA countries (including Palestine) (Huang et al., 2017).

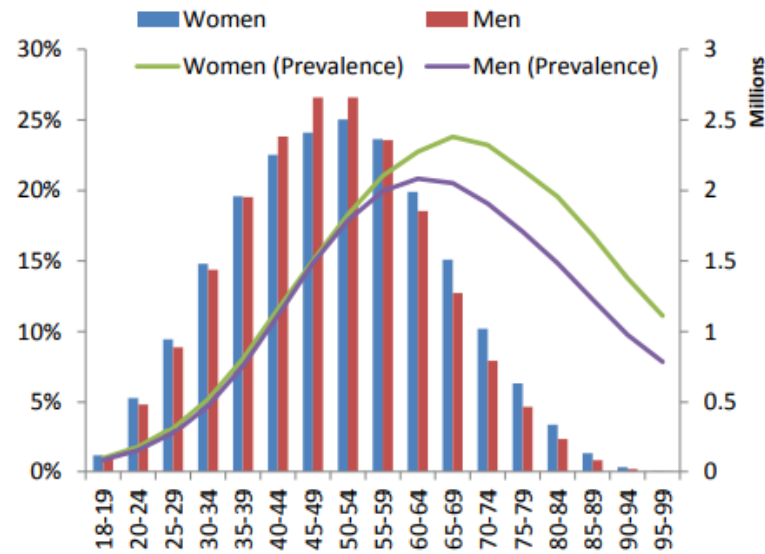


Figure 1-2 Diabetes estimates by different age groups in women and men in MENA region

Since the establishment of the Palestinian authority in 1994, a significant progress in Palestinian healthcare system has been observed (Mataria et al., 2009, Radwan et al., 2017). The primary health centers (PHCs), which belong to ministry of health and found all over West Bank and Gaza, are considered the primary diabetes management and follow up centers for Palestinian diabetic patients (Radwan et al., 2017).

1.1.3 Factors that affect diabetes

The elements that play a major role in increasing the incidence of this chronic disease include: Aging of the population, unhealthy nutrition, lack of physical exercise, rapid urbanization, Tobacco use, Family history of diabetes and overweight (Koponen et al., 2017).

Most of type 2 diabetes patients suffer from obesity that can be defined as increased body mass index above 24.9 kg/m^2 (Abuyassin and Laher, 2015). Obesity is considered as the major risk factor for the increased prevalence

and incidence of type 2 diabetes globally in general and in Arab world in particular (Abuyassin and Laher, 2015, Sigal et al., 2004). For example, in Saudi Arabia, which has the fifth highest rate of diabetes world wide, 36% of its population is obese (Abdesslam et al., 2012). In Palestine, a study conducted in 2012 revealed that 38% of the Palestinian population between 18 and 64 years old are overweight and 24.4% are obese (Abdeen et al., 2012). Obesity can worsen the prognosis of type 2 diabetes and increase the rate of microvascular complications and mortality in those obese diabetics (Abuyassin and Laher, 2016, Logue et al., 2013, Tobias et al., 2014). This makes type 2 diabetes a source of suffering to both patients and their caregivers as well as to the governments that suffering from large economic costs of treatment, management of complications, disability and loss of productivity resulting from diabetes (ADA, 2009, Assaad-Khalil et al., 2013). Some of the major factors that cause the recent rise obesity in the Arab world are: rapid urbanization, consumption of high fat food, mid night snacking, watching television during meals, inactive life style, lack of outdoor activities due to the climate in this region, ethnic differences between populations since the Arab population is widely distributed across both Asia and Africa (bin Zaal et al., 2009, Musaiger et al., 2013), With women being at higher risk than men (Kalter-Leibovici et al., 2007, Monteiro et al., 2004). Obesity increases the risk of hypertension, cardiac diseases and some type of cancers furthermore increases the risk of diabetes and these complications are the main cause of death in Arab area (WHO, 2018).

Improving healthcare services and influencing life style, socioeconomic position and access to education are of the main advantages observed after urbanizing of many rural areas within the Arab world (Abuyassin and Laher, 2016). On the other hand, urbanization was associated with increased consumption of unhealthy fatty food and more sedentary lifestyle, which lead to increasing rate of obesity and non-communicable diseases including diabetes type 2 (Aung et al., 2018, Pan et al., 2012). In addition, urbanization was associated with high rate of stress coming from increasing overcrowding, low employment rate, poverty and poor housing. This long-term stress can increase the risk of Diabetes mellitus (Kisch, 1985, Wilkinson and Marmot, 2003). There is an obvious difference in the rate of prevalence of type 2 diabetes between rural and urban communities. According to international diabetes federation statistics in 2017, there is more than 279million people with diabetes, which form two thirds of diabetic patients worldwide, live in and around cities (IDF, 2017). In Palestine, a study conducted in the West Bank community revealed that about 9.8% of diabetic patients are living in rural areas (Husseini et al., 2000).

Weight control, which can be observed by physical activity and healthy diet, shows great benefits and efficient results for controlling and prevention of some of non-communicable diseases including type 2 diabetes and cardiovascular diseases. Many studies had been conducted in different parts of the world to show the effect of healthy food in general and the Mediterranean diet in particular on these diseases (Esposito et al.,

2004, Estruch et al., 2006, Hu et al., 2001). Mediterranean diet is considered one of the healthiest diets available. It contains a variety of fruits, grains, vegetables and olive oil. It is also poor in saturated fatty acids (Knoops et al., 2004). This low consumption of trans fatty acids, moderate consumption of alcohol, high consumption of fiber, and monounsaturated fatty acid (from olive oil) are considered the major protective characteristics of Mediterranean diet against diabetes. This monounsaturated fatty acid improves lipid profile and glycemic control by improving insulin sensitivity and secreting antidiabetic hormone (Glucagon like peptide 1) in vitro in people with diabetes (Paniagua et al., 2007, Rocca et al., 2001, Ros, 2003). The United Food and Agricultural Organization studied the dietary intake of 20 countries in Middle East and North Africa. They found that there is high consumption of the protective diets such as fruits, vegetables, seafood and virgin olive oil, but a higher consumption of harmful diets like processed meat and trans fatty acid. This explains the high and non-optimal BMI in this area, which is considered the second leading risk factor for cardio-metabolic disease mortality (Afshin et al., 2015).

Physical activity can be considered as a key element in prevention and reducing severity of type 2 diabetes. It helps people with diabetes in several ways by increasing cardiorespiratory fitness, improving glycemic control and blood pressure, decreasing insulin resistance, improving lipid profile, improving quality of life, maintaining weight loss and decreasing mortality (Colberg et al., 2010, Snowling and Hopkins, 2006). Despite all

these benefits, only 19% of adolescents in the eastern Mediterranean countries are physically active (Subhi et al., 2015). All forms of physical activity and exercise can produce small benefits in glycemic control. These effects are similar to health dietary, drug and insulin treatments (Wing et al., 2001, Snowling and Hopkins, 2006, Subhi et al., 2015). Regular exercise should be prescribed and incorporated in the treatment plan of diabetic people since maintaining regular exercise in addition to healthy diet for at least 6 years has found to be efficient in reducing the incidence of type 2 diabetes by 43% and reducing glycosylated hemoglobin (HbA1c) by 0.66%. This can reduce the complications of type 2 Diabetes Mellitus (Boulé et al., 2001, Li et al., 2008). But many with this chronic disease do not become or stay regularly active because they worry about hypoglycemia or being injured during exercise (Sigal et al., 2013).

1.1.4 Self-efficacy/self-care

Self-care by definition includes the behaviors the patients learn to achieve in order to enhance their life, health, wellbeing and prevention or treatment of their disease. It is an ability that the patient gains to create a balance between his abilities and the existing needs for care that life processes create. It is very important for the patients to perform self-care behaviors to improve their comfort, functional abilities and disease processes (Mohammad Hasani et al., 2010).

Maintaining the glucose level in the normal and healthy level is the major target in diabetes care as this will help in preventing long term diabetes

complications (Koponen et al., 2017, Bradley and Gilbride, 2008). Diabetes is considered as a self-managed disease as patients provide most of their own care (Sharoni and Wu, 2012). Self-efficacy is an important factor affecting self-care behavior in type 2 diabetes care (Sharoni and Wu, 2012, Wu et al., 2013, Wynn Nyunt et al., 2010). It helps and courage the involvement of patients in therapy and self-care to achieve higher quality treatment (Mohammad Hasani et al., 2010). In Palestine there are no studies on self-efficacy and self-care behavior in type 2 diabetes and it is important to recognize the correlation between self-efficacy/self-care behavior and glucose control, and looking for factors that affect self-efficacy before starting treatment. Self-efficacy is influenced by several factors such as: educational status, knowledge about diabetes, employment, availability of family support, physician-patient relationship, and positive mental attitudes which will affect the health care delivery input leading to ultimately improving the disease outcome (Grinslade et al., 2015, Venkataraman et al., 2012). Effective and good self-care is a substantial factor in improving health outcome, reducing further hospitalization and considered as significant part of successfully preventing or delaying diabetes complications of patients with type 2 diabetes (Kav et al., 2010). Self-care can be affected by several factors including self-efficacy and the attitude of an individual (Abedi et al., 2013).

According to self-efficacy theory, the interactions between behavioral, personal, and environmental factors affect the behavior that the patients will engage in. Such behaviors can significantly improve self-management,

which is very critical in diabetes care. Diabetic patients are expected to perform this self-management on a daily basis to reduce the morbidity and mortality related to diabetes (Lorig and Holman, 2003).

Long-term complications of diabetes include retinopathy, nephropathy, peripheral neuropathy, and high incidence of cardiovascular disease. Retinopathy is the leading cause of vision loss, and may affect more than one-third of all people with diabetes. Nephropathy may lead to end stage renal disease, which is 10 times higher in people with diabetes. Peripheral neuropathy and lower limb amputation with risk of foot ulcer can be reduced up to 50% in diabetic patients if Diabetes Mellitus is controlled properly (Moxey et al., 2011). High incidence of cardiovascular disease can be 2 to 3 times more in diabetic people compared with non-diabetic people (Moxey et al., 2011, Abu Obaid, 2017, IDF, 2017). Diabetes self-care intervention includes adherence to treatment regimen which is an important determinant of therapeutic outcome, maintaining good healthy eating habits, regular exercise and monitoring glucose level (Sarkar et al., 2006, Kav et al., 2010).

There is a strong correlation between maintaining glycemic level in good, healthy level and reduction in type 2 Diabetes Mellitus-related complications. Intensive therapy approved its validity and effectiveness in delaying the onset and slowing the progression of microvascular and neurologic complications by maintaining blood glucose concentrations close to the normal range. Studies have shown that 1% reduction in the HbA1c results in a 35% reduction in the risk of microvascular

complications such as retinopathy, nephropathy and neuropathy and 25% reduction in diabetes-related mortality (Radwan et al., 2017, TDCCTRG, 1993).

1.2 Problem statement

To the best of our knowledge, despite the limited number of reports on the assessment of associations between self-efficacy, self-care, and glycemic control in many studies (Al-Khawaldeh et al., 2012, Beckerle and Lavin, 2013, Gao et al., 2013, Sarkar et al., 2006, Sharoni and Wu, 2012, Sousa et al., 2005, Walker et al., 2014), maintaining the glucose level in the normal and healthy range is the major target in diabetes care because low glycemic control can worsen and increase complications among diabetic patients, so we need to increase glycemic control which could be obtained by improving medical adherence, patients knowledge, physical activities and other self-care/self-efficacy behaviours (Bradley and Gilbride, 2008, Koponen et al., 2017).

1.3 Significance of the study

Control of blood glucose level by adherence to treatment regimen, maintaining good healthy eating habits, regular exercise and monitoring blood glucose level can lead to a decrease in the costly complications and improve the disease outcome (Venkataraman et al., 2012). Several studies have indicated that individuals with chronic diseases like diabetes who have high level of self-efficacy were more able to perform healthy behaviors more than those with lower self-efficacy (Sousa et al., 2005).

The significance of the study comes from the fact that diabetes type 2 and its complications are very common in Palestine and was considered the fourth cause of mortality (MoH, 2016). This study is one of the first to investigate the effect and relationship of self-efficacy and self-care on glycemic control in the country. Therefore, the results of this study are of significant value to the following:

1. The ability to identify the effect and relationship of self-efficacy and self-care on glycemic control during the evaluation of patients with DM is crucial for both improving clinical care and determining targets of intervention for prevention, early detection, diagnosis and treatment.
2. For researchers, these data could enhance the selection of patients for clinical trials in future studies, and thus the findings from the current study have important practice and policy implications in the revision of guidelines for the management of patients with DM.
3. The Ministry of Health could utilize the findings from this study for in-service training and capacity building of health-care professionals working in the field of primary care and clinical pharmacy, in order to increase their knowledge and skills.

1.4 Objectives

1.4.1 General objective

The general objective of this study is to assess the level of self-efficacy and self-care behavior among patients with type 2 diabetes mellitus.

1.4.2 Specific objectives

The specific objectives are

- To examine if there is any significant relationship between self-efficacy/self-care and blood glucose control, and to study the correlation between self-efficacy and self-care behavior.
- To determine factors associated with self-efficacy and self-care behavior among diabetic patients.
- To determine factors connected to glycemic control among diabetic patients.

Chapter Two

Literature Review

2. Literature Review

Several studies have been published in several countries all over the world discussing whether self-efficacy and self-care having any effect on glycemic control (Al-Khawaldeh et al., 2012, Beckerle and Lavin, 2013, Gao et al., 2013, Sarkar et al., 2006, Sharoni and Wu, 2012, Sousa et al., 2005, Walker et al., 2014).

A study was performed by (Song et al., 2012) in Baltimore, Washington to describe the principal sources of social support and the degree of unmet needs for support and to examine the effect of unmet needs for support on self-care activities in a sample of 83 Korean American patients with type 2 diabetes. They measured diabetes self-care activities performance (diet, exercise, blood glucose testing, foot care and medication compliance) among participants. They found that the principal source of social support varied according to gender. The results show that 83.3% of men received support from their spouse. On the other hand only 60% of the women required support from their spouse. Unmet needs for care were significantly linked with self-care activities, but the extent of care needs and of social support received were not linked with self-care. They observed that unmet needs for social care are a significant strong predictor of poor type 2 diabetes self-care activities. On the other hand self-care

activities were positively linked with age and self-efficacy. Persons who were older and had advanced level of self-efficacy and less unmet needs for social care were more likely to do better in terms of self-care activities. Also, self-efficacy was positively linked with age and time of having diabetes and negatively linked with unmet needs of social care. Individuals with lower self-efficacy, females, and families with smaller numbers were more likely to experience unmet needs for support. They found that female gender, an advanced education level, and longer period of having diabetes were linked with significantly higher self-care activity level.

A study had done in Malaysia in 2011 included 388 participants with type 2 diabetes to measure and investigates the relationship between self-efficacy and self-care behavior, to conclude the amount of self-efficacy and to test differences in self-efficacy according to patient variables, including state of health among these participants. The data was collected from December 2010 to February 2011 at the teaching hospital, University Malaya Medical Centre located at Petaling Jaya, Malaysia.

The study has displayed that self-efficacy and self-care behavior is dominant among Malaysian patients as the amount of self-efficacy was moderately high. It also shows that Self-efficacy can be used as a model to recognize self-care behavior. There was a strong relation between level of education and the glucose control as patients with high education level and diagnosed with diabetes more than 10 years before, with no other chronic conditions and with no diabetic complications were more confident about administering their medication and had a better self-efficacy score. There

was a significant difference in self-efficacy for different durations of diabetes as respondents who had been diagnosed with diabetes more than ten years before were more assured about managing their medication than those diagnosed less than ten years before. Also there was a significant difference in self-efficacy between those with and without other chronic illnesses or diabetic problems, as respondents who without other chronic illnesses and without diabetic complications were more assured about using eating plans and undertaking physical exercise than those with other chronic illnesses or with diabetic problems (Sharoni and Wu, 2012).

Sarkar et al., 2006 conducted a research in San Francisco, USA to inspect the association between diabetes self-efficacy and self-management behavior in an urban, diverse, low-income population with a high prevalence of inadequate health literacy. To do so, they performed a questionnaire to measure self-efficacy, health literacy, and self-management behaviors using recognized instruments. By performing statistical analysis, they tested for relations between self-efficacy, race/ethnicity, and health literacy on self-management. Their outcomes show that diabetes self-efficacy was linked with four of the five self-management fields. The four fields that were associated with self-efficacy were optimal diet, exercise, self-monitoring of blood glucose, and foot care. The domain that was not associated was medication adherence. They also found that these results were consistent through race/ethnicity and healthcare literacy levels.

In another research conducted in Southeastern United States in 2014, (Walker et al., 2014) tested the influence of self-efficacy on glycemic control, self-care behaviors, and quality of life in low-income, minority adults with diabetes. To do so, they examined 378 type 2 Diabetes mellitus patients who had scheduled appointments at two adult primary care clinics in the southeastern United States and used multiple linear regression to assess the relationship between self-efficacy, HbA1c, medication adherence, diabetes awareness, self-care behaviors and quality of life. They found that self-efficacy was significantly associated with glycemic control, medication adherence, mental health factor of quality of life, and most self-care behaviors (diet, exercise, and blood sugar testing). Their results show that higher self-efficacy is linked to improved glycemic control, medication adherence, self-care behavior and mental health related quality of life. And found that there was no significant link between self-efficacy and physical health component of quality of life or diabetes awareness in this low-income, mainly minority population. Emphasis on self-efficacy is relevant for educational interventions developed for low-income, minority populations with type 2 Diabetes mellitus.

Gao et al., 2013 conducted a study in China to examine a theoretical model that theorizes how self-efficacy, social care and patient-provider communication impact glycemic control through self-care behaviors in Chinese adults with type 2 diabetes. They did so by conducting a cross-sectional study of 222 adults with type2 diabetes in one primary care center. They gathered information on demographics, self-efficacy, social

care, patient-provider communication (PPC) and diabetes self-care. They also noted Hemoglobin A1c values. The prevalence of good glycemic control ($\text{HbA1c} < 6.5\%$) among participants in the study was 52.7 %. They found positive direct effects from period of diabetes and waist to hip ratio to HbA1c as HbA1c values in Patients with central obesity and longer duration of diabetes were significantly greater than those of normal patients. Their results show that diabetes self-care had a straight effect on glycemic control. However, they did not observe any straight effect for self-efficacy, social care or patient provider communication on glycemic control. They concluded that having better patient provider communication, social care, and higher self-efficacy was linked to performing diabetes self-care behaviors; and these behaviors were directly related to glycemic control. They observed that patient provider communication was positively linked with social care.

To examine the association of effective daily self-management of diabetes on the attainment of glycemic control, Beckerle and Lavin, 2013 conducted a study in Missouri, USA, in 2013. To do so, they used a retrospective cohort design to assess the predictive association of self-efficacy and self-care behaviors on HbA1c level. They examined 60 medical records of adults with type 1 or type 2 diabetes who regularly visited a primary care center located in an urban area. Their results show that there are no statistically significant relations between global measures of self-efficacy and self-care and HbA1c levels. However, they found two practices significantly related to controlled HbA1c. These are choosing appropriate

foods when hungry and the capability to exercise for 15–30 minutes, four to five times per week. They also found that positive expectation of results and confidence in one's ability to manage the illness will result in successful daily management of diabetes.

Norris et al., 2002 performed a meta-analysis to assess the efficacy of self-management education on glucose hemoglobin in adults with type 2 diabetes. To do so, they searched for English language trials in many databases and they manually searched for review articles and relevant journals. They computed net change in glucose hemoglobin. They also inspected the effect of baseline glucose hemoglobin, follow-up interval, and intervention characteristics on glucose hemoglobin. Their results show that the intervention reduced glucose hemoglobin more than the control group at immediate follow-up, at 1–3 months of follow-up, and 4 months of follow-up. They also found that glucose hemoglobin reduced more with extra contact time between participant and educator. In other words, Self-management education enhances glucose hemoglobin levels at immediate follow-up, and improved contact time increases the effect.

Across sectional survey was done in Kerala, India by Manjula and Premkumar, 2015 to evaluate self-care and self-efficacy behavior of 150 randomly selected participants with type 2 Diabetes Mellitus and its association with socio demographic and morbidity. They used diabetes self-efficacy scale which developed by researchers to evaluate self-efficacy, and a group of diabetes self-care activities to assess self-care behavior. They studied the effect of diet, exercise, medication and insulin

administration, and blood sugar monitoring on glycemic control. Only 6% of the patients had good self-efficacy and about 10% of them had good self-care behavior. Appositive association was founded between self-efficacy and self-care behavior. Also improved self-efficacy and self-care behavior was associated with a decrease in HbA1c. In this study it was found that HbA1c and self-efficacy was strongly linked with age and type of treatment. Period of the disease and family history of diabetes affected strongly HbA1c, self-efficacy and self-care. On the other hand self-care behavior was not affected by age or type of treatment. High values of HbA1c linked to increased risk of presence of complications. This research revealed that an increase in self-efficacy causes an increase in self-care behavior. Also founded that reduction in HbA1c values result when there is increase in self-care and self-efficacy.

Another cross-sectional study was performed in India by Sasi et al., 2013 where 546 type 2 diabetes patients were interviewed at Dr. Pinnamaneni Siddhartha Institute of Medical Science and research Foundation, which is a rural tertiary health care hospital and assessed for HbA1c control, Diabetes distress and self-care activities. 49%of the patients in the study had poor glycemic control with HbA1c level >7%. 61% of them had good adherence to their medication. They found that glycemic control was significantly affected with age, sex, literacy, duration of the disease, diabetic distress, and self-care activities. Patients with high diabetes distress had poor glycemic control. Bad glycemic control was observed more in Females than in males they explained that to the social stigma

against females which is prevalent in India in general and in rural area in particular. They revealed that longer duration of the disease, non-adherence to treatments, non-adherence to diet and exercise are known to be related to low glycemic control. They recommended that participants should be encouraged to use medications as recommended and to educate patients and their families to increase an adherence to physical activities and diet regimens.

Tharek et al., 2018 directed a cross sectional study to investigate the relationship between self-efficacy, self-care behavior and glycemic control among adults with type 2 diabetes mellitus in two public primary care clinics in Selangor, Malaysia from august 2014 to September 2015, where a total of 340 type 2 diabetic participants were included. The majority of them were female and almost half of them had up to secondary school education. These primary care clinics found in urban areas with heavy patient load and good multiethnic diversity. There was a reasonable level of self-care behavior between the participants in this study. They found a moderate good correlation between self-efficacy and self-care behavior presenting that good self-efficacy was linked to better self-care behavior as it affords a suitable environment for understanding and expecting commitment toward usefulness of self-management in diabetes treatment, and found a weak negative association between self-efficacy and HbA1c. Higher self-efficacy score, shorter period of type 2 Diabetes mellitus and smaller waste circumference were substantial predictors for good glycemic control. The patients were found to be most self-efficacious in tasks

relating to treatment intake and least efficient in blood glucose testing. They explain high self-efficacy for treatment intake as it is a straight forward task that does not need much effort to do, and explain the low self-care behavior for blood glucose testing by the absence of affordable glucometer or glucose strips as these equipment are not presented on prescriptions in public primary care clinics. Those type 2 diabetes participants in this study have reduced glycemic control as only 13.5% of them achieved the glycemic target of $<6.5\%$ which leads to high complication rates.

Another cross sectional study was performed in two private diabetes health center in Yangon, Myanmar (Wynn Nyunt et al., 2010) to evaluate the prevalence of glycemic control by using HbA1c measurements and its related factors between type 2 diabetes patients. Two hundred and sixty six diabetes participants were involved in the study. These participants were above 35 years old, diagnosed with diabetes for at least one year and being treated with anti-hyperglycemic treatment for at least 6 months. The prevalence of good glycemic control in this research was 27.1% which was quite low and was stable with low proportion of good self-care for diet and physical exercise. About 62.0% of the participants had an obvious self-efficacy level, and 30.8% had good self-care behavior. The study revealed that patients aged ≥ 60 years were further than twice likely to have higher glycemic control than those younger than 60 years. This is because older patients had better diabetes self-care behavior and better self-efficacy level than younger participants. They also found that overweight patients were

two times more expected to have better glycemic control than normal or underweight participants as they are more likely to exercise because they are aware of having a higher risk for getting diabetes complications. Good glycemic control was more than two and half times higher in patients taking only one oral hypoglycemic drug than those taking more than one oral hypoglycemic drug or insulin. Patients with a high self-efficacy level were more than five times more likely to have better glycemic control than those with fair or low self-efficacy. To increase glycemic control, it is important to advance participant self-efficacy by educating patients through health care professionals and participant's own family.

Howteerakul et al., 2007 conducted a cross-sectional research in Bangkok, Thailand to evaluate the prevalence of patient adherence to treatment regimens and elements affecting glycemic control among type 2 diabetes patients. 243 diabetes participants whose looking for care at a tertiary hospital diabetic health center were interviewed in this study. They studied the degree and effect of physical exercise, diet regimen and social support on glycemic control between those diabetes patients; they used HbA1c measurements to display blood glucose level. They found that 31.7% of these patients were good adherence to physical exercise, 54.3% were good adherence to diet regimen and about 46.5% were getting good social care for diabetes from their families. Approximately 33.3% of the diabetes patients in the study had HbA1c <7% which considered as good glycemic control. On the other hand more than half of the patients had low glycemic control with HbA1c >8%. They found that adherence to diet control and

exercise were obviously linked to good glycemic control. They also found that Educating patients and their family members is important to improve glycemic control.

Benoit et al., 2005 conducted an observational study in San Diego to define the factors linked to poor glycemic control. The research sample included 573 participants with a racial/ethnic mix, 69% were female, 31% were treated with insulin and more than half of the patients were obese. They found that younger participants, patients having diabetes for long time over ten years, using insulin or multiple oral agents, having no insurance had high HbA1c value indicating poor glycemic control. Most of the younger patients had high HbA1c >7.9%. Asians with HbA1c <7% had improved glycemic control than Hispanics, blacks, and whites. Patients treated with insulin had higher HbA1c than multiple oral treatment users while those on one oral agent or no treatment had the lowest HbA1c <6.5%. Obese patients and participants with high cholesterol levels were correlated with poor glycemic control. They showed no relation between glycemic control and socioeconomic status.

Across sectional design had conducted by Al-Khawaldeh et al., 2012 in 2011 to assess the connections between diabetes management, self-efficacy and diabetes self-management activities and glycemic control. They enrolled a sample of 223 participants with type 2 diabetes who is seeking care at the National Diabetes center in Amman, Jordan. They used Glycosylated hemoglobin as a guide for glycemic control. They observed that Diet self-efficacy and diet self-management activities associated with

high glycemic control, while insulin use was a major predictor for low glycemic control. They found that participants with higher self-efficacy informed better self-management behaviors in diet, exercise, blood sugar testing, and taking medicine. They concluded that more than 50% of patients had poor diabetes control ($HbA1c > 6.5\%$), and only 42% of the participants had attended diabetes education program. The participants had low self-efficacy activities, and they had suboptimal self-management behaviors.

To determine elements linked to poor glycemic control between patients with type 2 diabetes Khattab et al., 2010 conducted a cross sectional study in 2010 in Jordan where a sample of 917 participants was carefully chosen over a period of 6 months. They used a questionnaire to search for information about sociodemographic, clinical characteristics, self-care management behaviors, treatment adherence and behavior towards diabetes. $HbA1c$, fasting blood sugar measurements and lipid readings were acquired from participant' record. They found 65.1% of participants had bad glycemic control ($HbA1c \geq 7\%$). They concluded that longer period of diabetes, bad eating plan, negative attitude to diabetes, and not following diabetes self-care management performances were significantly linked to increased bad glycemic control. They recommend an educational program to increase lifestyle modification and increase importance of adherence to treatment regimen. This program would improve and be of excessive benefit in glycemic control.

Dehghan et al., 2017 performed a cross sectional study in AlqQala, North of Iran to estimate general self-efficacy and diabetes management self-efficacy and to decide their relation with glycemic control in diabetic individual. This study included 251 type 2 diabetes mellitus participants. They used a questionnaire contained Sherer General self-efficacy scale, Diabetes management Self Efficacy Scale, and HbA1c test. They found a no relation between age and general self-efficacy and diabetes self-efficacy. On the other hand, there was a strong relation between general self-efficacy and diabetes self-efficacy. In this study they concluded that General self-efficacy and diabetes self-efficacy has no effect on glucose control in diabetic participants. They observed that length of the illness was the major variable which had a significant effect on the level of HbA1c by making it worst among diabetic participants, as for each year of having the disease the level of HbA1c increased by .084%. So interventions are suggested to help glucose control in participants who are having this disease for longer durations.

A research was performed by Kassahun et al., 2016 in 2016 included 325 adult patients with type 2 diabetes mellitus in Jimma University teaching Hospital, South west Ethiopia. This hospital serves the rural, urban and semi-urban areas. More than half of the participants were males, two-fifth of the participants in the age range 51-60 years. About 33% of the patients had overweight, almost half of the participants had not get social support and about 25% of the participants had family history of diabetes mellitus. They assessed Glycemic level by using fasting blood glucose level. More

than 70.9% of patients in the study had bad blood glucose control. Patients with low educational level had higher probability of low glucose control than those who were in college. Also, poor glycemic control among employed patients was higher than unemployed ones. Participants who took combination therapy of insulin and oral medication were at least five times more likely to have bad glucose control. While the probability of low glucose control among those with bad adherence to their medication were five times higher than participants who had good adherence to their medication. They concluded that taking combination of insulin and oral medication, being employed, and low medication adherence associated statistically with bad glycemic control.

He et al., 2016 performed a cross sectional research to find lifestyle data on the dietary and physical activity of adult type 2 diabetes patients in Zhejiang province of eastern China for better patient education and improvement of clinical management. The study included 607 type 2 diabetes participants carried out in 12 hospitals within 8 cities of Zhejiang province 345 males and 262 females. The majority of participants were above 40 years old and only 8.4% of the patients were young (age 18 to 39). Young patients in the study had the lowest percentage for diet control as they consume larger carbohydrates, protein and fat comparing to the old patients. Also, they found that the average time the young patients spent on moderate to vigorous activity and walking per week was the shortest, and spent longer time on average sitting. They observed that adult patients with type 2 diabetes in the study have relatively high carbohydrate and low

protein diet, with very limited physical activity. They also concluded that females with type 2 diabetes achieved blood pressure control goal and they paid more attention to diet control than male patients.

On the other hand a cross-sectional correlation study conducted by Sousa et al., 2005, used data from a prior study of 141 insulin-requiring adults with type 1 or type 2 diabetes founded that greater self-care agency and self-efficacy lead to greater self-care management, in turn leading to better glycemic control. Also found that self-care management did not mediate between self-efficacy or self-care agency and glycemic control. So attitude for self-care are inadequate to improve glycemic control, but we need self-care management for doing so.

Another study was conducted by Graco et al., 2012 in Australia to decide if there was any association between psychological characteristics and glycemic outcome in a diabetes management program. They examined supported measures of cognition, stage of change, degree of control, self-efficacy, depression and anxiety, and quality of life. They found that cognition, self-efficacy, degree of control, mental health, and quality of life were not associated with improvement in HbA1c. On the other hand, patients with less duration of disease and more contacts with the service were significantly more likely to have better results in HbA1c. This can be explained due to the fact that decrease in insulin production and increase of insulin resistance usually caused and increased by aging, and that the progressive nature of diabetes means that these patients need more intensive medical organization to achieve optimal glycemic control. They

concluded that blood glucose level improved more in patients who were seen earlier in their disease and managed more intensively, regardless to their psychometric status.

Chapter Three

Methodology

3. Methodology

3.1 Study design

The study was a cross sectional design that was conducted between July 2017 and September 2017 to evaluate the association between self-care, self-efficacy and glycemic control in patients with type 2 diabetes.

3.2 Study setting

Nablus city has a high diabetes mellitus incidence rate compared to other cities in West Bank (MoH, 2016). The study was held in Al-makhfeyyeh primary healthcare center which is located in the south of Nablus city, Palestine. This healthcare center is considered a vital healthcare provider for many patients including diabetic patients from Nablus and its surrounding villages.

3.3 Study population

The population was chosen from the diabetic patients who follow-up regularly in Al-Makhfeyyeh primary healthcare center where they are provided medical care and antidiabetic medications.

3.4 Sampling procedure and sample size calculation

This study was a cross sectional survey using Stanford questionnaire. The study was undertaken at a group of diabetic outpatients attending a diabetic clinic of the Ministry of Health in Nablus, West Bank. The estimated sample size was about 380 patients out of the eligible patients in the clinic. An automated software program, Raosoft sample size calculator : (<http://www.raosoft.com/samplesize.html>) was used to calculate the required sample size for this study. Convenience sampling was used to recruit participants.

3.5 Inclusion and exclusion criteria

The inclusion criteria were: 1) aged 18 years and older, 2) able to read or understand Arabic, 3) diagnosed with diabetes mellitus for at least one year, 4) currently under medical treatment for diabetes; 5) willing to participate in this study; and 6) Medical records was reviewed for recent hemoglobin A1C (HbA1C) levels (within 6 months of the inclusion) retrospectively. The exclusion criteria were: 1) diagnosis of chronic kidney disease (CKD) and 2) diagnosis of mental or severe cerebral vascular disease that may affect cognitive ability.

3.6 Instruments and data collection form

This quantitative study used a questionnaire (see Appendix A) as an instrument to collect data from the respondents. The questions in this

survey were adopted from three different questionnaires developed by Stanford University School of Medicine.

The used questionnaire contains 5 sections:

- In the first section, we covered the socio-demographic factors which were provided by participants, such as age (<65, >65), gender (male, female), residency (city, village or Palestinian refugee camp), job, the primary health care center they visit, marital status, and educational level (illiterate, primary, secondary or university).
- The second section of the questionnaire consisted of questions related to DM, such as HbA1c, presence of co-morbid diseases, the medications that are taken to treat DM, the dosage, and the duration of each medication.
- The third section measured perceived self-efficacy depending on perceived efficacy in Patient-Physician Interaction Questionnaire (PEPPI) which obtains medical information and attention to their medical concerns from physicians. Permission to use this questionnaire was obtained. The PEPPI-5 includes five items; each item starts with “how confident are you in your ability to. .?”. Patients had chosen from 1-5 to answer these questions; 1 for not confident at all and 5 for very confident. The total results are in the range of 5 to 25; higher scores indicate that the participant has higher self-efficacy in patient-physician interactions
- The fourth part used Self-Efficacy 8-Item Scale (SES8C) that are common to many chronic diseases, and focuses on the confidence

level of participants for each of these areas based on an 8-item scale, each starting with "How confident are you that you can...?" these areas included symptoms control, role function, emotional functioning, and communication with physicians. The score of each of the eight questions is based on a 10-point rating scale (1 = not at all confident and 10 = totally confident. Total scores of this scale are summed to range from 8 to 80, with higher scores representing higher perceived self-efficacy for managing chronic diseases

- The last part was used to assess self-care activities. The outcome measures included questions related to self-care activities: participants' health status, health behavior, and healthcare utilization.

3.7 Ethical approval

All aspects of the study protocol, including access to and use of the patient clinical information, had been authorized by An-Najah National University Institutional Review Boards (IRB) and the local health authorities before initiation of this study. Verbal consent was obtained from patients.

3.8 Pilot study

A pilot study (25 participants) had been conducted to test the tool, ensured the availability of the required data, estimate the time and modify the data collection form as appropriate. The patients participating in the pilot study were not included in the final analysis.

3.9 Statistical analysis

Data was entered and analyzed using the Statistical Package for Social Sciences program version 20 (SPSS). Data was expressed as means $\pm$ SD for continuous variables as age and number of medications, and as frequencies (percentages) for categorical variables (yes and no answers). Variables that are not normally distributed were expressed as medians (lower-upper quartiles). Variables were tested for normality using Kolmogorov-Smirnov test. Either the chi-square or the fisher exact test, as appropriate, was used to test significance between categorical variables. The Kruskal-Wallis test or Mann-Whitney test was used to test for differences in the means between categories. A p-value of less than 0.05 was considered to be statistically significant for all analyses.

Chapter Four

Results

4. Results

4.1 Sociodemographic data:

This study was a health care clinic based, cross sectional study which was conducted among 380 patients who had type 2diabetes, who attended Al-Makhfeyyeh health care center which is located in Nablus city in the West Bank of Palestine.

As Table 4-1 indicates, the majority of the participants (about 66%) were younger than 65 years old. It also shows that the majority of them are females (about 71%). Moreover, most of the participants are living in the city (about 60%) and most of them were married (about 75%). In terms of the educational level, most of the participants (about 83%) had at least a primary level schooling.

Table 4-1 also shows that about two thirds of the participants take at least two antidiabetic medication and half of them use insulin injection. It also shows that about 80% of them have at least one chronic disease; more than half of them have high cholesterol and about two thirds have high blood pressure. The mean HbA1c was $8.14(\pm 1.70)$. Only 67participants (17.6%) had good glycemic control ($HbA1c \leq 6.5\%$), and 58 patients (17%) had feet examination at least once during the last 6 months.

Table 4-1 Socio-demographic and clinical characteristics of the study sample

Variable	Frequency (%) N=380
Age (year)	
<65	250(65.8)
≥65	130(34.2)
Gender	
Male	109(28.7)
Female	271(71.3)
Residency	
City	235(61.8)
Village	142(37.4)
Palestinian refugee camps	3(.8)
Marital status	
Married	283(74.5)
Single, Widowed, Divorced	97(25.5)
Educational level	
Illiterate	64(16.8)
Primary	144(37.9)
High school	119(31.3)
University	53(13.9)
Number of antidiabetic medication	
1	106(27.9)
2	238(62.6)
3	34(8.9)
4	1(.3)
Therapy type	
Monotherapy	106(27.9)
Combination therapy	273(71.8)
Insulin injection	
Yes	185(48.7)
No	195(51.3)
Total number of chronic diseases	
0	77(20.3)
1	91(23.9)
2	153(40.3)
≥3	59(15.6)

High cholesterol	
Yes	218(57.4)
No	162(42.6)
High blood pressure	
Yes	237(62.4)
No	143(37.6)
HbA1c	
≤6.5%	67(17.6)
>6.5%	313(82.4)

4.2 Self-efficacy score and socio-demographic variables

Self-efficacy scale (SES8C) consists of 8 questions to measure how confident the participants were about healthy daily activities (self-efficacy activities). These activities include eating meals every 4-5 hours daily, following diet when they have to prepare or share food with non-diabetic, choosing the appropriate food when they are hungry, exercising 15-30 minutes, 4 to 5 times a week, preventing their blood sugar level from dropping while they exercise, knowing what to do when their blood sugar level goes higher or lower, judging when the changes in their illness mean they should visit the doctor, and controlling their diabetes so that it does not interfere with the things they want to do.

The mean of self-efficacy score was 46.06 ± 9.16 . As shown in Table 4-2, the mean confidence score in males was $46.88(\pm 9.06)$, and in females was $45.73(\pm 9.19)$. The mean self-efficacy score for participants older than 65 years was $45.55(\pm 8.93)$, while for participants younger than 65 years was $46.32(\pm 9.28)$. The mean self-efficacy scores in patients living in city, village and Palestinian refugee camps were $46.57(\pm 8.88)$, $45.03(\pm 9.52)$, and $54.33(\pm 8.14)$ respectively. Moreover, the mean confidence score in

married participants was $46.57(\pm 8.84)$ higher than in (Single, Widowed, Divorced) $44.56(\pm 9.93)$. Table 2 also shows that the highest mean self-efficacy score was among participants graduated from university $49.05(\pm 11.15)$, and among participants taking at least 3 antidiabetic medication $47.20(\pm 7.46)$. On the other hand, the mean self-efficacy score was $44.79(\pm 9.72)$ in participants with monotherapy comparing with $46.57(\pm 8.91)$ in combination therapy participants. Low mean self-efficacy score was shown among participants not using Insulin injection $45.79(\pm 9.19)$, and participants with high cholesterol level $45.23(\pm 9.16)$, while high mean confidence score was observed in participants with one chronic disease $47.51(\pm 7.76)$, participants with high blood pressure $46.36(\pm 9.31)$, and those with HbA1c $>6.5\%$ $46.17(\pm 9.09)$.

The median of self-efficacy score was 47.00[interquartile range: 41.00-53.00]. The median self-efficacy score for participant younger than 65 years was 47.00[41.00-53.00] and in Participants older than 65 years were 46.50[40.00-53.00]. High self-efficacy score was associated with male 48.00[41.00-53.50], and married participants 48.00[41.00-53.00]. Participants having high educational level showed higher self-efficacy score 51.00[41.50-55.50] compared to Illiterate participants 44.50[35.00-50.00]. Participants on combination therapy had high self-efficacy score 48.00[41.50-53.00], while low median self-efficacy score was shown among participants on Monotherapy 45.00[38.50-52.00]. Low self-efficacy score was observed among participants with high cholesterol blood level 46.00[40.00-53.00] and with participants without high blood pressure

46.00[40.00-52.00]. Moreover, participants using insulin injection showed the same median self-efficacy scale as participants that do not use insulin injection 47.00[40.00-53.00]. Participants with HbA1c less than 6.5% had median self-efficacy scale 47.00[41.00-53.00] while those with higher HbA1c had median self-efficacy scale 46.00[37.00-54.00].

Table 4-2 shows a significant difference between participants according to Educational level (Illiterate, primary, secondary and university) and self-efficacy score. High self-efficacy score was associated with high educational level (P-value was 0.001). No significant differences were noted between type 2 diabetic patients according to age, gender, residency, marital status, number of antidiabetic medication, therapy type, using Insulin injection, number of chronic diseases, HbA1c, and having high blood pressure or high cholesterol level.

Table 4-2 Confidence scale total score by socio-demographic and clinical variables

Variable	Frequency (%) N=380	Confident score Median [interquartile range]	Mean $\pm$ SD	Mean Rank	P-value
Age (year)					
<65	250(65.8)	47.00[41.00-53.00]	46.32 $\pm$ 9.28	193.02	0.534 ^a
$\geq$ 65	130(34.2)	46.50[40.00-53.00]	45.55 $\pm$ 8.93	185.65	
Gender					
Male	109(28.7)	48.00[41.00-53.50]	46.88 $\pm$ 9.06	198.98	0.340 ^a
Female	271(71.3)	47.00[40.00-53.00]	45.73 $\pm$ 9.19	187.09	
Residency					
City	235(61.8)	48.00[41.00-53.00]	46.57 $\pm$ 8.88	194.80	0.135 ^b
Village	142(37.4)	46.50[40.00-52.00]	45.03 $\pm$ 9.52	181.21	
Palestinian refugee camps	3(.8)	58.00[51.50-]	54.33 $\pm$ 8.14	293.33	
Marital status					
Married					0.074 ^a
(Single, Widowed, Divorced)	283(74.5) 97(25.5)	48.00[41.00-53.00] 46.00[40.00-52.00]	46.57 $\pm$ 8.84 44.56 $\pm$ 9.93	196.39 173.32	
Educational level					
Illiterate	64(16.8)	44.50[35.00-50.00]	42.07 $\pm$ 10.31	151.15	0.001^b
Primary	144(37.9)	47.00[40.00-52.00]	45.52 $\pm$ 8.09	182.54	
Secondary	119(31.3)	48.00[42.00-53.00]	47.52 $\pm$ 7.96	206.23	
University	53(13.9)	51.00[41.50-55.50]	49.05 $\pm$ 11.15	224.32	
Number of antidiabetic medication					
1	106(27.9)	45.00[38.50-52.00]	44.79 $\pm$ 9.72	172.41	0.193 ^b
2	238(62.6)	48.00[41.00-53.00]	46.50 $\pm$ 9.12	196.35	
3	34(8.9)	48.50[43.00-52.25]	47.20 $\pm$ 7.46	203.12	
4	1(.3)			98.00	
Therapy type					
Monotherapy	106(27.9)	45.00[38.50-52.00]	44.79 $\pm$ 9.72	172.41	0.051 ^a
Combination therapy	273(71.8)	48.00[41.50-53.00]	46.57 $\pm$ 8.91	196.83	
Insulin injection					
Yes	185(48.7)	47.00[41.00-53.00]	46.36 $\pm$ 9.15	193.95	0.551 ^a
No	195(51.3)	47.00[40.00-53.00]	45.79 $\pm$ 9.19	187.23	
Total number of chronic diseases					
0	77(20.3)	46.00[39.00-53.00]	45.67 $\pm$ 9.44	183.50	0.348 ^b
1	91(23.9)	48.50[43.00-53.00]	47.51 $\pm$ 7.76	208.03	
2	153(40.3)	47.00[40.00-53.00]	45.70 $\pm$ 9.42	187.73	

≥ 3	59(15.6)	46.00[39.00-52.00]	45.35 $\pm$ 10.07	179.78	
High cholesterol					
Yes	218(57.4)	46.00[40.00-53.00]	45.23 $\pm$ 9.16	181.31	0.058 ^a
No	162(42.6)	48.00[42.00-53.00]	47.16 $\pm$ 9.07	202.87	
High blood pressure					
Yes	237(62.4)	48.00[41.00-53.00]	46.59 $\pm$ 9.31	198.00	0.087 ^a
No	143(37.6)	46.00[40.00-52.00]	45.17 $\pm$ 8.86	178.08	
HbA1c					
$\leq 6.5\%$	67(17.6)	47.00[41.00-53.00]	45.50 $\pm$ 9.53	182.57	0.515 ^a
$> 6.5\%$	313(82.4)	46.00[37.00-54.00]	46.17 $\pm$ 9.09	192.20	

^a Statistical significance of differences calculated using the Mann-Whitney U test

^b Statistical significance of differences calculated using the Kruskal-Wallis test

Bold P-value indicates significant difference

4.3 Patient physician interaction score PEPPI-5 and socio-demographic variables

The PEPPI-5 is a brief and appropriate tool for measuring self-efficacy of patients with type2 diabetes to interact with their physicians. This scale consists of five questions about the confidence of the participants that they know what questions to ask their doctors, how to make doctors to answer their questions, how to make the most of their visit with the doctor, how to get the doctors to take their health concerns seriously, and how to get the doctors to do something about the patients' health concern.

The mean of PEPPI score was 18.05 $\pm$ 6.37. As shown in Table 4-3 the mean PEPPI score in male was 18.70($\pm$ 6.63), and in female was 17.81($\pm$ 6.26). The mean PEPPI score among participants < 65 years old was 18.36($\pm$ 6.25) higher than the mean in participants ≥ 65 years old

17.50(± 6.58). The mean PEPPI scores for participants living in city, village and Palestinian refugee camps were 18.10(± 6.41), 18.02(± 6.38), 17.00(± 3.46) respectively. The mean PEPPI score in married participants was 18.43(± 6.36) higher than the mean in Divorced, widowed and single participants 17.00 (± 6.32). Also the highest mean PEPPI score was among university educational level participants 19.69(± 6.02), Participants on monotherapy 18.45(± 6.39), and those using insulin injection 18.38(± 6.43). While the mean PEPPI score was the lowest in participants have no chronic diseases 17.51(± 6.63). PEPPI score mean was almost the same in participants with HbA1c greater or less than 6.5% 18.04(± 5.99).

The median of PEPPI score was 20.00[interquartile range: 14.00-25.00]. The median PEPPI score for participants younger than 65 years was 20.00[15.00-25.00] and Participants older than 65 years was 19.00[13.00-25.00]. High PEPPI score was associated with male 20.00[15.00-25.00], and married participants 20.00[15.00-25.00]. Participants having high educational level showed higher PEPPI score 21.00[16.00-25.00] compared to Illiterate participants 15.00[10.25-20.00]. Participants on monotherapy had high PEPPI score 20.00[13.00-25.00], while low median PEPPI score was shown among participants on combination therapy 19.00[14.00-24.00]. Low PEPPI score was observed among participants with low cholesterol blood level 20.00[14.75-25.00] and with participants with high blood pressure 20.00[14.00-25.00]. Moreover, participants using insulin injection showed median PEPPI scale 20.00[14.00-25.00] and those not using insulin injection had median PEPPI scale 20.00[13.75-23.00]. No

difference in median PEPPI scale had been observed among participants with HbA1c greater or less than 6.5% $20.00[15.00-23.00]$.

According to Table **4-3** there was a significant difference between marital status and Patient Physician interaction (PEPPI) score (P-value was 0.034). High PEPPI score was associated with married people. Also there was a significant difference between educational level (Illiterate, primary, secondary, and university) and Patient physician interaction score (P-value was < 0.001). High PEPPI score was associated with high educated participants. On the other hand, the other socio-demographic and clinical variables in Table **4-3** had no significant impact on PEPPI score (P-value >0.05).

Table 4-3 Patient-Physician interaction scale (PEPPI) total score by socio-demographic and clinical variables

Variable	Frequency (%) N=380	PEPPI score Median [interquartile range]	Mean $\pm$ SD	Mean Rank	P-value
Age (year)					
<65	250(65.8)	20.00[15.00-25.00]	18.36 $\pm$ 6.25	195.11	0.251 ^a
$\geq$ 65	130(34.2)	19.00[13.00-25.00]	17.50 $\pm$ 6.58	181.63	
Gender					
Male	109(28.7)	20.00[15.00-25.00]	18.70 $\pm$ 6.63	204.11	0.122 ^a
Female	271(71.3)	19.00[14.00-23.00]	17.81 $\pm$ 6.26	185.03	
Residency					
City	235(61.8)	19.00[14.00-25.00]	18.10 $\pm$ 6.41	191.94	0.801 ^b
Village	142(37.4)	20.00[14.00-24.50]	18.02 $\pm$ 6.38	188.93	
Palestinian refugee camps	3(.8)	15.00[15.00-]	17.00 $\pm$ 3.46	152.17	
Marital status					
Married					0.034 ^a
(Single, Widowed, Divorced)	283(74.5)	20.00[15.00-25.00]	18.43 $\pm$ 6.36	197.42	
	97(25.5)	19.00[12.50-22.00]	17.00 $\pm$ 6.32	170.30	
Educational level					
Illiterate	64(16.8)	15.00[10.25-20.00]	15.14 $\pm$ 6.15	137.38	<0.001 ^b
Primary	144(37.9)	20.00[14.00-25.00]	18.20 $\pm$ 6.48	193.51	
Secondary	119(31.3)	20.00[15.00-25.00]	18.75 $\pm$ 6.09	201.99	
University	53(13.9)	21.00[16.00-25.00]	19.69 $\pm$ 6.02	220.65	
Number of antidiabetic medication					
1	106(27.9)	20.00[13.00-25.00]	18.45 $\pm$ 6.39	197.75	0.686 ^b
2	238(62.6)	19.00[14.00-23.25]	17.85 $\pm$ 6.39	186.04	
3	34(8.9)	19.50[14.75-25.00]	18.44 $\pm$ 6.38	195.85	
4	1(.3)			111.50	
Therapy type					
Monotherapy	106(27.9)	20.00[13.00-25.00]	18.45 $\pm$ 6.39	197.75	0.386 ^a
Combination therapy	273(71.8)	19.00[14.00-24.00]	17.91 $\pm$ 6.37	186.99	
Insulin injection					
Yes	185(48.7)	20.00[14.00-25.00]	18.38 $\pm$ 6.43	197.11	0.248 ^a
No	195(51.3)	20.00[13.75-23.00]	17.76 $\pm$ 6.32	184.23	
Total number of chronic diseases					
0	77(20.3)	19.00[12.50-25.00]	17.51 $\pm$ 6.63	182.27	0.862 ^b
1	91(23.9)	20.00[14.00-25.00]	18.17 $\pm$ 6.84	195.30	
2	153(40.3)	20.00[14.00-23.00]	18.18 $\pm$ 5.98	189.88	

≥ 3	59(15.6)	20.00[15.00-24.00]	18.32 $\pm$ 6.40	195.45	
High cholesterol					
Yes	218(57.4)	19.00[14.00-23.00]	17.86 $\pm$ 6.20	185.29	0.278 ^a
No	162(42.6)	20.00[14.75-25.00]	18.33 $\pm$ 6.60	197.52	
High blood pressure					
Yes	237(62.4)	20.00[14.00-25.00]	18.26 $\pm$ 6.40	194.83	0.317 ^a
No	143(37.6)	19.00[14.00-25.00]	17.73 $\pm$ 6.33	183.32	
HbA1c					
$\leq 6.5\%$	67(17.6)	20.00[15.00-23.00]	18.04 $\pm$ 5.99	187.46	0.801 ^a
$> 6.5\%$	313(82.4)	20.00[14.00-25.00]	18.05 $\pm$ 6.46	191.15	

^a Statistical significance of differences calculated using the Mann-Whitney U test

^b Statistical significance of differences calculated using the Kruskal-Wallis test

Bold P-value indicates significant difference

4.4 Daily activities score and socio-demographic variables

Daily activity scale consists of 4 questions to measure how the health condition of the participants interfered with their daily activities. These daily activities include normal social activities with family, friends or neighbors, their hobbies or recreational activities, household chores, and participant's errands and shopping.

The mean of daily activities score was 6.17($\pm$ 5.68). As shown in **Table 4-4** the mean daily activities score in male was 6.33($\pm$ 5.80), and in female was 6.08($\pm$ 5.65). The mean daily activities score among participants <65 years old was less than the mean in participants ≥ 65 years old. The mean daily activities scores for participants living in city, village and Palestinian refugee camps were 6.60($\pm$ 5.76), 5.42($\pm$ 5.51), 5.33($\pm$ 6.11) respectively. The mean daily activities score in Divorced, widowed and single participants was 7.18($\pm$ 6.10) higher than the mean in married participants 5.80($\pm$ 5.50). Also the highest mean Daily activity score was among

uneducated participants 7.84($\pm$ 6.13), Participants on monotherapy 7.15($\pm$ 5.84), and those using insulin injection 7.74($\pm$ 5.60). While the mean Daily activities score was low in participants have no chronic diseases 4.63($\pm$ 5.58), no cholesterol 5.56($\pm$ 5.64), no high blood pressure 4.86($\pm$ 5.36), and patients with HbA1c less than 6.5% 5.86($\pm$ 5.91).

The median of daily activities score was 6.00[.00-12.00]. The median daily activities score for participants younger than 65 years was 4.00[.00-10.00] and Participants older than 65 years was 8.00[.00-13.00]. High daily activities score was associated with male 7.00[.00-12.00], and single, widowed and divorced participants 8.00[.00-12.00]. Non educated Participants showed higher daily activities score 8.50[.00-13.00] compared to university educated participants 4.00[.00-8.00]. Participants on monotherapy had high daily activities score 8.00[.00-12.00], while low median daily activities score was shown among participants on combination therapy 5.00[.00-12.00]. Low daily activities score was observed among participants with low cholesterol blood level 4.00[.00-11.00] and with participants with low blood pressure 3.50[.00-10.00]. Moreover, participants using insulin injection showed median daily activities scale 8.00[1.00-12.00] and those not using insulin injection had median daily activities scale 2.00[.00-9.00]. Median daily activities score among participants with HbA1c greater than 6.5% was 6.00[.00-12.00] which is higher than daily activities score among patients with HbA1c less than or equal 6.5% 5.00[.00-11.00].

Table 4-4 shows a significant difference between participants according to age, marital status (married, single widowed or divorced), Educational level (Illiterate, primary, secondary and university), therapy type, using Insulin Injection, total number of chronic diseases and having high blood pressure with their Daily activities score. Participants older than 65 years old had higher daily activities score than those younger than 65 years old ($p\text{-value} < 0.001$), also single and divorced participant's health condition interfered with their daily activities more than married ones ($p\text{-value} 0.043$). High daily activities score was associated with low educational level patients ($P\text{-value}$ was 0.008), and patients with elevated blood pressure ($p\text{-value} 0.001$). Moreover, health condition for participants using one therapy interfered more with their daily activities than those using combination therapy ($p\text{-value} 0.034$), participants using insulin injection had high daily activities score ($p\text{-value} < 0.001$). Participants with more than 3 chronic diseases their health interfered with daily activities more than participants having less chronic diseases ($p\text{-value} < 0.001$).

No significant differences were noted between our type 2 diabetes patients according to gender, residency, number of antidiabetic medication, HbA1c, and having high cholesterol level.

Table 4-4 Daily activities total score by socio-demographic and clinical variables

Variable	Frequency (%) N=380	Daily activities score Median [interquartile range]	Mean $\pm$ SD	Mean Rank	P-value
Age (year)					
<65	250(65.8)	4.00[.00-10.00]	5.29 $\pm$ 5.32	174.57	0.000^a
$\geq$ 65	130(34.2)	8.00[.00-13.00]	7.80 $\pm$ 6.02	221.13	
Gender					
Male	109(28.7)	7.00[.00-12.00]	6.33 $\pm$ 5.80	194.07	0.679 ^a
Female	271(71.3)	6.00[.00-12.00]	6.08 $\pm$ 5.65	189.06	
Residency					
City	235(61.8)	8.00[.00-12.00]	6.60 $\pm$ 5.76	198.91	0.148 ^b
Village	142(37.4)	4.00[.00-10.00]	5.42 $\pm$ 5.51	176.84	
Palestinian refugee camps	3(.8)	4.00[.00-]	5.33 $\pm$ 6.11	178.00	
Marital status					
Married	283(74.5)	5.00[.00-11.00]	5.80 $\pm$ 5.50	184.00	0.043^a
(Single, Widowed, Divorced)	97(25.5)	8.00[.00-12.00]	7.18 $\pm$ 6.10	209.46	
Educational level					
Illiterate	64(16.8)	8.50[.00-13.00]	7.84 $\pm$ 6.13	221.73	0.008^b
Primary	144(37.9)	6.00[.00-12.00]	6.46 $\pm$ 5.83	197.59	
Secondary	119(31.3)	6.00[.00-10.00]	5.57 $\pm$ 5.33	178.68	
University	53(13.9)	4.00[.00-8.00]	4.60 $\pm$ 5.03	160.07	
Number of antidiabetic medication					
1	106(27.9)	8.00[.00-12.00]	7.15 $\pm$ 5.84	208.67	0.177 ^b
2	238(62.6)	5.50[.00-12.00]	5.85 $\pm$ 5.58	184.21	
3	34(8.9)	4.00[.00-11.00]	5.29 $\pm$ 5.77	173.63	
4	1(.3)			145.50	
Therapy type					
Monotherapy	106(27.9)	8.00[.00-12.00]	7.15 $\pm$ 5.84	208.67	0.034^a
Combination therapy	273(71.8)	5.00[.00-12.00]	5.77 $\pm$ 5.59	182.75	
Insulin injection					
Yes	185(48.7)	8.00[1.00-12.00]	7.74 $\pm$ 5.60	220.31	0.000^a
No	195(51.3)	2.00[.00-9.00]	4.64 $\pm$ 5.36	162.22	
Total number of chronic diseases					
0	77(20.3)	.00[.00-10.00]	4.63 $\pm$ 5.58	160.24	0.000^b
1	91(23.9)	4.00[.00-8.25]	4.87 $\pm$ 5.16	168.34	
2	153(40.3)	8.00[.00-12.00]	6.51 $\pm$ 5.54	197.21	
$\geq$ 3	59(15.6)	12.00[4.00-15.00]	9.16 $\pm$ 5.78	246.78	

High cholesterol					
Yes	218(57.4)	8.00[.00-12.00]	6.60±5.69	199.08	0.070 ^a
No	162(42.6)	4.00[.00-11.00]	5.56±5.64	178.96	
High blood pressure					
Yes	237(62.4)	8.00[.00-12.00]	6.93±5.74	204.78	0.001^a
No	143(37.6)	3.50[.00-10.00]	4.86±5.36	166.84	
HbA1c					
≤6.5%	67(17.6)	5.00[.00-11.00]	5.86±5.91	184.35	0.604 ^a
>6.5%	313(82.4)	6.00[.00-12.00]	6.23±5.64	191.82	

^a Statistical significance of differences calculated using the Mann-Whitney U test

^b Statistical significance of differences calculated using the Kruskal-Wallis test

Bold P-value indicates significant difference

4.5 Physical activities score and socio-demographic variables

Physical activity scale consists of 6 questions to measure the total time the participant spent on different type of exercises. These exercises include stretching or strengthening exercises, walk for exercise, swimming or aquatic exercise, bicycling (including stationary exercise bike), aerobic exercise equipment (Stairmaster, rowing, skiing machine), and other types of aerobic exercise.

The mean of physical activities score was 1.13(±1.74). As shown in **Table 4-5** the mean physical activities score in male was 1.61(±2.07), and in female was 0.94(±1.56). The mean physical activities score among participants <65 years old was higher than the mean in participants ≥65 years old. The mean physical activities scores was the highest among participants living in village 1.34(±1.79). The mean physical activities score in Divorced, widowed and single participants was 0.71(±1.24) less than the mean in married participants 1.28(±1.87). Also the mean physical

activity scores among uneducated, primary educated, secondary educated and university educated participants were $0.68(\pm 1.35)$, $1.10(\pm 1.75)$, $0.92(\pm 1.47)$, $2.22(\pm 2.26)$ respectively. The highest mean physical activities score was among Participants not using insulin injection $1.36(\pm 1.79)$, those not suffering from any chronic diseases $1.64(\pm 1.92)$, no elevated blood cholesterol $1.25(\pm 1.73)$, no high blood pressure $1.51(\pm 1.97)$, and patients with HbA1c higher than 6.5% $1.14(\pm 1.76)$. While mean physical activities score was almost the same in participants using monotherapy or combination therapy $1.16(\pm 1.75)$.

As shown in Table 4-5, the median values for the physical activities score were zeros in almost all of the sociodemographic variables. However, the interquartile range (Q3-Q1) was larger in the variables that have significantly higher score. For instance, the interquartile range for participants who are younger than 65 (3 points) is larger than interquartile range of those who are older than 65 (0 points). For the educational level, the median physical activities score for university graduates was 2.00 and the interquartile range was 4 points. This emphasizes that the education level has a great impact on physical activities.

Table 4-5 shows a significant difference between our participants according to age, gender, marital status (married, single widowed or divorced), Educational level (Illiterate, primary, secondary and university), using Insulin Injection, total number of chronic diseases and having high blood pressure, with their physical activities score. Participants younger than 65 years old (p-value was 0.001), Males (p-value was 0.004), Married

(p-value was 0.024), university educated (p-value was <0.001), not using insulin injection (p-value was 0.006), having no chronic diseases (p-value was 0.005), and without high blood pressure (p-value was 0.001) had high physical activities score.

No significant differences were noted between our type 2 diabetes patients according to residency, number of antidiabetic medication, therapy type, HbA1c, and blood cholesterol level.

Table 4-5 Physical activities total score by socio-demographic and clinical variables

Variable	Frequency (%) N=380	Physical activities score Median [interquartile range]	Mean $\pm$ SD	Mean Rank	P-value
Age (year) <65 ≥65	250(65.8) 130(34.2)	.00[.00-3.00] .00[.00-.00]	1.33±1.83 0.74±1.50	201.99 168.41	0.001^a
Gender Male Female	109(28.7) 271(71.3)	.00[.00-4.00] .00[.00-2.00]	1.61±2.07 0.94±1.56	212.30 181.73	0.004^a
Residency City Village Palestinian refugee camps	 235(61.8) 142(37.4) 3(.8)	 .00[.00-2.00] .00[.00-3.00] .00[.00-]	 1.01±1.72 1.34±1.79 0.66±1.15	 182.20 204.58 174.00	0.076 ^b
Marital status Married (Single, Widowed, Divorced)	 283(74.5) 97(25.5)	 .00[.00-3.00] .00[.00-1.00]	 1.28±1.87 0.71±1.24	 196.82 172.07	0.024^a
Educational level Illiterate Primary Secondary University	 64(16.8) 144(37.9) 119(31.3) 53(13.9)	 .00[.00-.00] .00[.00-2.00] .00[.00-2.00] 2.00[.00-4.00]	 0.68±1.35 1.10±1.75 0.92±1.47 2.22±2.26	 166.74 189.10 180.97 244.41	<0.001^b
Number of antidiabetic medication 1 2 3 4	 106(27.9) 238(62.6) 34(8.9) 1(.3)	 .00[.00-3.00] .00[.00-2.00] .00[.00-2.00]	 1.16±1.75 1.12±1.79 1.08±1.44	 190.46 187.84 201.19 274.00	0.699 ^b
Therapy type Monotherapy Combination therapy	 106(27.9) 273(71.8)	 .00[.00-3.00] .00[.00-4.00]	 1.16±1.75 1.12±1.75	 190.46 189.82	0.952 ^a
Insulin injection Yes No	 185(48.7) 195(51.3)	 .00[.00-2.00] .00[.00-3.00]	 0.89±1.66 1.36±1.79	 176.99 203.31	0.006^a
Total number of chronic					

diseases	77(20.3)	1.00[.00-3.50]	1.64±1.92	220.26	0.005^b
0	91(23.9)	.00[.00-3.00]	1.31±1.94	197.36	
1	153(40.3)	.00[.00-1.00]	0.84±1.52	175.95	
2	59(15.6)	.00[.00-2.00]	0.93±1.60	178.81	
≥3					
High cholesterol					0.132 ^a
Yes	218(57.4)	.00[.00-2.00]	1.04±1.76	184.27	
No	162(42.6)	.00[.00-3.00]	1.25±1.73	198.88	
High blood pressure					0.001^a
Yes	237(62.4)	.00[.00-2.00]	0.90±1.55	178.56	
No	143(37.6)	.00[.00-3.00]	1.51±1.97	210.28	
HbA1c					0.782 ^a
≤6.5%	67(17.6)	.00[.00-2.00]	1.08±1.69	187.63	
>6.5%	313(82.4)	.00[.00-3.00]	1.14±1.76	191.11	

^a Statistical significance of differences calculated using the Mann-Whitney U test

^b Statistical significance of differences calculated using the Kruskal-Wallis test

Bold P-value indicates significant difference

As described in **Table 4-6**, symptoms that participants suffered from in the last week indicates that shakiness or weakness was the most common symptom among them (67.9%), followed by increased thirst and dried mouths, (57.1%) and (56.6%) respectively. Moreover, only 48 participants (12.6%) answered yes for the question asked about suffering from loss of consciousness in the last week, 68(17.9%) participants faced nightmares, and 80(21.1%) of our participants noticed that their appetite was decreased in the last 7 days. On the other hand, 126(33.2%) patients said that they had severe high blood sugar (blood glucose readings of 300 mg or higher), 158(41.6%) suffered from frequent urination at night (had to get up to urinate 3 or more times at night), and about 44 % of participants had night sweats at least once in the past week. While 267(70.3%) patients said that they never had Nausea or vomiting, 291(76.6%) of our type 2 patients had

not suffered from abdominal pain during the last few days. Also Morning headaches and lightheadness were symptoms that 139 (36.6%) 156(41.1%) participants mentioned that they faced in the last week.

Table 4-6 description for symptoms that patients suffered from in the last 7 days

Symptoms	In (%)
Increased thirst	217 (57.1)
Dry mouth	215(56.6)
Decreased appetite	80(21.1)
Nausea or vomiting	113(29.7)
Abdominal pain	89(23.4)
Frequent urination at night	158(41.6)
Severe high blood sugar	126(33.2)
Morning Headaches	139(36.6)
Nightmares	68(17.9)
Night sweats	169(44.5)
Lightheadness	156(41.1)
Shakiness or weakness	258(67.9)
Loss of consciousness	48(12.6)

Table 4-7 describes the daily activities performed by our type 2 diabetes patients in the last 4 weeks. Only 26(6.8%) of them agreed that their health condition almost totally interfered with their normal social activities, while 157 (41.3%) participants said that health condition never interfered with their social activities and 78(20.5%) showed that their social activities moderately affected by their health condition. About 38% of the participants revealed that their hobbies and activities have never been affected by their health condition, compared to 56(14.7%) who agreed that their health condition almost totally interfered with daily activities, and 58(15.3%) moderately affected. Moreover, when our participants have

been asked if their health condition interfered with their daily household chores, 39(10.3%) of them answered that it is totally interfered, 77(20.3%) answered quite a bit, and 39(10.3%) answered slightly interfered. On the other hand, 148(38.9%) of the participants showed that their health condition has not interfered with their daily house chores at all. And when the patients had been asked if their health condition interfered with their daily errands and shopping, 147(38.7%) participants said not at all, 53(13.9%) saw it is totally interfered, 76(20%) said quite a bit interfered, and 63(16.6%) said that their health condition moderately interfered with daily errands and shopping.

Table 4-7 Description of daily activities by patients in the last 4 weeks

Daily activity	Not at all (%)	Slightly (%)	Moderately (%)	Quite a bit (%)	Almost totally (%)
Health condition interfered with normal social activities	157(41.3)	43(11.3)	78(20.5)	76(20)	26(6.8)
Health condition interfered with hobbies or activities	145(38.2)	38(10)	58(15.3)	83(21.8)	56(14.7)
Health condition interfered with household chores	148(38.9)	39(10.3)	77(20.3)	77(20.3)	39(10.3)
Health condition interfered with errands and shopping	147(38.7)	41(10.8)	63(16.6)	76(20)	53(13.9)

Table 4-8 describes the physical activities our participants had done during the last week. Walk for exercise was the most common physical activity. Although 255 (67.1%) of the participants didn't walk for exercise at all during the last 7 days, 56(14.7%) said they spent more than 3 hours last

week in walking, the same number spent between 30 minutes and 3 hours, and 13 (3.4%) spent less than 30 minutes. Only 11 (2.9%) of our participants spent more than 30 minutes doing stretching and strengthening exercises. Most of the participants 375(98.7%) never had swimming or aquatic exercise, while only 4 participants spent at least 30 minutes in swimming in the last week. Other forms of physical activities were not with better results as almost 100% of the participants said that they never spent time in bicycling, or doing aerobics and other exercises during the last week.

Table 4-8 description for physical activities during the last week

Physical activities	None (%)	Less than 30min/wk (%)	30-60 min/wk (%)	1-3 hrs/wk (%)	More than 3 hrs/wk (%)
Stretching or strengthening exercises	369(97.1)	0.00	5(1.3)	3(0.8)	3(0.8)
Walk for exercise	255(67.1)	13(3.4)	28(7.4)	28(7.4)	56(14.7)
Swimming or aquatic exercise	375(98.7)	1(0.3)	2(0.5)	1(0.3)	1(0.3)
Bicycling	378(99.5)	0.00	0.00	1(0.3)	1(0.3)
Other aerobic exercise equipment	380(100)	0.00	0.00	0.00	0.00
Other exercises	379(99.7)	0.00	0.00	1(0.3)	0.00

Table 4-9 describes the medications that the participants have been using. It shows that the majority 331(87.1%) have been using diabetes pills. About half of the participants (185, 48.7%) have been using insulin injections. On the other hand, the majority of the participants have been

taking high blood pressure and cholesterol pills (67.4% and 85.5% respectively).

Table 4-9 Description for medications patients used

Medication	Yes (%)
Pills for diabetes	331(87.1)
Insulin Injection	185(48.7)
Pills for high blood pressure	256(67.4)
Pills for cholesterol	325(85.5)

Table 4-10 describes the medical care that the participants had during their last doctor visit. The results show that about third of the participants had never or almost never prepared a list of questions for their doctors. Only 45 participants (11.8%) always prepared a list. More than half of the participants (222, 58.4%) asked questions about things they want to know and about their treatment. Only 21 (5.5%) of them said they never asked. Finally, more than half of the participants said they never or almost never discussed personal problems that may be related to their illness. About 27% said they always discussed these problems.

Table 4-10 Description for medical care during doctor visit

Medical care	Never	Almost never	Sometimes	Fairly often	Very often	Always
Prepare a list of questions for your doctor	50(13.2)	83(21.8)	81(21.3)	51(13.4)	70(18.4)	45(11.8)
Ask questions about things patient wants to know and about treatment	21(5.5)	32(8.4)	16(4.2)	28(7.4)	61(16.1)	222(58.4)
Discuss any personal problems that may be related to illness	158(41.6)	48(12.6)	22(5.8)	17(4.5)	32(8.4)	103(27.1)

Chapter Five

Discussion

5. Discussion

This study was one of the first in Palestine that performed to examine if there is any significant relationship between self-efficacy/self-care and blood glucose control, to study the correlation between self-efficacy and self-care behavior, to determine factors associated with self-efficacy and self-care behaviors, and to determine factors associated with glucose control among patients with type 2 diabetes mellitus.

Good glycemic control was defined by the American college of Endocrinology/ American Association of clinical Endocrinologists (2018) as HbA1c level $\leq 6.5\%$ (Garber et al., 2018).

Only 17.6% of participants had good glycemic control ($\text{HbA1c} \leq 6.5\%$) which was quite low compared to 27.1% in Myanmar (Wynn Nyunt et al., 2010), 33.3% in Thailand (Howteerakul et al., 2007), and 52.7% in China (Gao et al., 2013). This low proportion of good glycemic control in this study was associated with low proportion of physical activities (32.9%). Only 17% of the patients had foot care test during the last 6 months.

Our study demonstrated a moderate mean self-efficacy score (SES8C score) (46.06/80), and revealed that high education level is a strong predictor for good type 2 diabetes self-efficacy behaviors. No significant correlation had been observed between self-efficacy score with glycemic

control, age, gender, residency, marital status, presence of other chronic diseases and using insulin.

Mean self-efficacy score (PEPPI score) was 18.05/25. Positive direct effect was shown between self-efficacy score with married participants (p-value was .034) and with high educated participants (p-value was .000). These findings are comparable with a study conducted in Malaysia (Sharoni and Wu, 2012). No significant difference had been observed between HbA1c value and self-efficacy score, similar result was shown in a study performed in China (Gao et al., 2013). Also there are negative relations between self-efficacy and age, gender, therapy type, using insulin injection, and presence of other chronic diseases. But a positive relation between age and self-efficacy had been found in several studies (Sharoni and Wu, 2012, Song et al., 2012), and between self-efficacy with presence of chronic illnesses (Sharoni and Wu, 2012). A study performed in the United States revealed that self-efficacy was significantly associated with glycemic control (Walker et al., 2014).

Shakiness or weakness of the body, increased thirst and dry mouth was among the most common symptoms in our participants complained from (67.9%), (57.1%) and (56.6%) respectively.

Health condition affects daily activities in Participants older than 65 years more than in younger patients (p-value was <0.001). Also positive relations were shown between daily activities and non-educated, single or divorced, and elevated blood pressure participants. Moreover, health condition for participants using one therapy interfered more with daily

activities than those using combination therapy (p value was 0.034). Daily activities depends on whether the patients using insulin injection, or suffered from more than 3 chronic diseases. Negative relations have been observed between glucose control, gender, and residency with daily activities.

Patients younger than 65 years, males, married, educated, using insulin injection, having no chronic diseases and have normal blood pressure presented high physical activity score, while negative associations were shown between residency, glycemic control, number of antidiabetic medication, therapy type, and blood cholesterol level with physical activities. Strong positive relation was observed between physical activity and glycemic control in a study conducted in United States (Walker et al., 2014). On the contrary, a study conducted in Baltimore, USA showed high self-care score among married, females and old patients (Song et al., 2012). Also a study performed in china revealed that self-care had a strong effect on glycemic control (Gao et al., 2013).

Most of the participants agreed that their social activities, hobbies, daily house chores, and daily errands never affected by their health condition. Walk for exercise was the most common physical activity among the participants. Almost half of the patients 48.7% using insulin injection, and the majority of the patients using pills for diabetes, and pills for cholesterol. Two third of the patients are using pills for high blood pressure.

More than half of the patients asked their doctors about things they want to know related to their treatments. Only 11.8% of the participants prepared questions before they go to doctors, and the majority of the patients never shared or discussed personal problems that may be related to their illness with their health givers.

5.1 Strengths and limitations

5.1.1 Strengths

To the best of our knowledge, this study was one of the first to investigate the effect and relationship of self-efficacy and self-care on glycemic control among type2 diabetes patients in Palestine.

5.1.2 Limitations

1. This is a cross-sectional study and it is therefore difficult to prove causal relationships between the scales and their associated factors.
2. This study did not explore other potential factors which may affect self-care/ self-efficacy and glycemic control such as duration of the disease, smoking status, Body mass index, Income.
3. Data were collected via a face-to-face interview which might have introduced interviewer's bias in the results.
4. The sample size and the use of a single center to recruit patients are considered limiting factors in this study.

Chapter Six

Conclusion and Recommendations

6. Conclusions and Recommendations

6.1 Conclusion

In conclusion, this study has demonstrated that higher self-efficacy behavior was among high educated and married patients. High physical activity was among young, male, married, educated participants, patients using insulin injection, having no chronic diseases or high blood pressure. Also good correlations were shown between poor daily activities and non-educated, single or divorced, using insulin injection, and elevated blood pressure participants. No significant relation was found between self-care/self-efficacy and glycemic control. Only 17.6% of our participants had good glycemic control ($HbA1c \leq 6.5\%$). Most of the participants have no physical activity and No foot care. Also poor patient physician relation was concluded in this study.

6.2 Recommendations

Based on the results and conclusions of this study, healthcare providers should encourage patients to improve their daily physical activities, having regular feet and eyes examinations, read more and educate about their illness and treatment, and measure their blood glucose regularly. Patients also should trust and communicate more with their physicians which may improve their health condition and answer all questions and concerns about their health.

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Appendices

Appendix 1: Questionnaire

Name: _____ Today's date: _____

Address: _____

City, state, zip: _____

Telephone: home (____) _____ - _____ Date of birth: _____

work (____) _____ - _____ Sex: ☐ Female ☐ Male

Background

1. Ethnic origin (*check ✓only one*):

- | | |
|---|---|
| ☐ White not Hispanic | ☐ Asian or Pacific Islander |
| ☐ Black not Hispanic | ☐ Filipino |
| ☐ Hispanic | ☐ American Indian/Alaskan Native |
| | ☐ Other: _____ |

2. Please circle the **highest** year of school completed:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23+
 (primary) (high school) (college/university) (graduate school)

3. Are you currently (*check ✓only one*):

- | | | |
|----------------------------------|------------------------------------|----------------------------------|
| ☐ married | ☐ separated | ☐ widowed |
| ☐ single | ☐ divorced | |

4. Please indicate below which chronic condition(s) you have:

- | | | | |
|---|--|---|--|
| ☐ Diabetes type 2 | ☐ Diabetes type 1 | ☐ High cholesterol | ☐ High blood pressure |
| ☐ Heart disease | Type of heart disease: _____ | | |
| ☐ Lung disease | Type of lung disease: _____ | | |
| ☐ Other chronic condition Specify: _____ | | | |

General Health

1. In general, would you say your health is:

(Circle one)

Excellent1

Very good.....2

Good.....3

Fair4

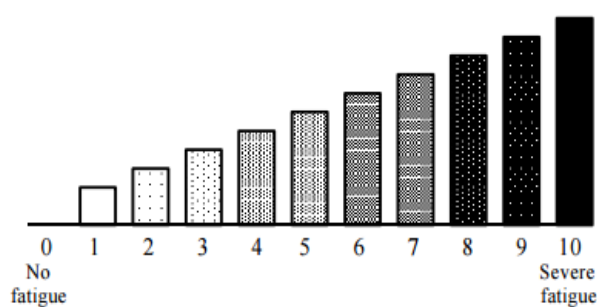
Poor5

Symptoms

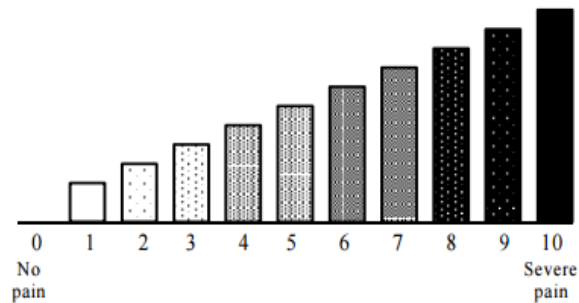
How much time during the **past month**...

	None of the time	A little of the time	Some of the time	A good bit of the time	Most of the time	All of the time
1. Were you discouraged by your health problems?0		1	2	3	4	5
2. Were you fearful about your future health?0		1	2	3	4	5
3. Was your health a worry in your life?0		1	2	3	4	5
4. Were you frustrated by your health problems?0		1	2	3	4	5

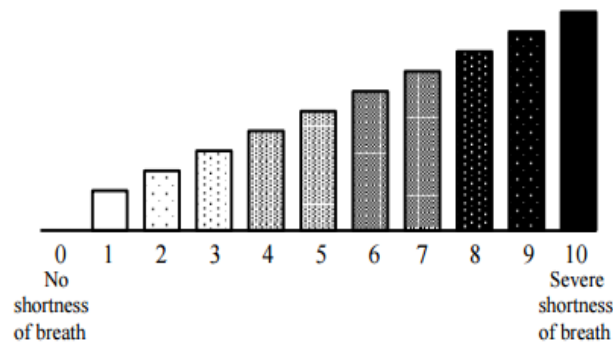
5. We are interested in learning whether or not you are affected by fatigue. Please *circle* the *number* below that describes your **fatigue** in the **past 2 weeks**:



6. We are interested in learning whether or not you are affected by pain. Please *circle* the *number* below that describes your **pain** in the **past 2 weeks**.



7. We are interested in learning whether or not you are affected by shortness of breath. Please *circle* the *number* below that describes your **shortness of breath** in the **past 2 weeks**:



In the PAST WEEK, did you ever have any of the following symptoms...

- | | | | |
|--|-----------------------------|------------------------------|-------------------------------------|
| 8. Increased thirst? | ☐ No | ☐ Yes | ☐ Don't know |
| 9. Dry mouth? | ☐ No | ☐ Yes | ☐ Don't know |
| 10. Decreased appetite? | ☐ No | ☐ Yes | ☐ Don't know |
| 11. Nausea or vomiting? | ☐ No | ☐ Yes | ☐ Don't know |
| 12. Abdominal pain? | ☐ No | ☐ Yes | ☐ Don't know |
| 13. Frequent urination at night? Do you have to get up to urinate 3 or more times a night? | ☐ No | ☐ Yes | ☐ Don't know |
| 14. Severely high blood sugar (blood glucose readings of 300 mg or higher?) | ☐ No | ☐ Yes | ☐ Don't know |
| 15. Morning headaches? | ☐ No | ☐ Yes | ☐ Don't know |

In the PAST WEEK, did you ever have any of the following symptoms...

16. Nightmares? ☐ No ☐ Yes ☐ Don't know
17. Night sweats? ☐ No ☐ Yes ☐ Don't know
14. Lightheadedness? ☐ No ☐ Yes ☐ Don't know
18. Shakiness or weakness? ☐ No ☐ Yes ☐ Don't know
19. Intense hunger? ☐ No ☐ Yes ☐ Don't know
20. Times when you passed out fainted or lost consciousness, even for a short time? ☐ No ☐ Yes ☐ Don't know

Daily Activities

During the **past 4 weeks**, how much...

- | | Not
at all | Slightly | Moderately | Quite
a bit | Almost
totally |
|---|---------------|----------|------------|----------------|-------------------|
| 1. Has your health interfered with your normal social activities with family, friends, neighbors or groups?.....0 | | 1 | 2 | 3 | 4 |
| 2. Has your health interfered with your hobbies or recreational activities?0 | | 1 | 2 | 3 | 4 |
| 3. Has your health interfered with your household chores?0 | | 1 | 2 | 3 | 4 |
| 4. Has your health interfered with your errands and shopping?0 | | 1 | 2 | 3 | 4 |

Your Glucose Testing

1. Do you have a machine to measure your blood sugar (glucose) level? ☐ Yes ☐ No
2. On how many days in the **last week** did you test your blood sugar level? *(If you were sick in the last week, think of the most recent 7 days when you were NOT sick)* _____ days
3. On **days** that you test your blood sugar, how many **times** do you test on **average**? _____ times

Physical Activities

During the past week, even if it was not a typical week for you, how much **total** time (for the **entire week**) did you spend on each of the following? (Please circle **one** number for each question.)

	none	less than 30 min/wk	30-60 min/wk	1-3 hrs per week	more than 3 hrs/wk
1. Stretching or strengthening exercises (range of motion, using weights, etc.)	0	1	2	3	4
2. Walk for exercise	0	1	2	3	4
3. Swimming or aquatic exercise	0	1	2	3	4
4. Bicycling (including stationary exercise bikes)	0	1	2	3	4
5. Other aerobic exercise equipment (Stairmaster, rowing, skiing machine, etc.)	0	1	2	3	4
6. Other aerobic exercise Specify	0	1	2	3	4

Confidence About Doing Things

For each of the following questions, please **circle** the number that corresponds with your **confidence** that you can do the tasks regularly at the present time.

- How confident** do you feel that you can eat your meals every 4 to 5 hours every day, including breakfast every day?
Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Very confident
- How confident** do you feel that you can follow your diet when you have to prepare or share food with other people who do not have diabetes?
Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Very confident
- How confident** do you feel that you can choose the appropriate foods to eat when you are hungry (for example, snacks)?
Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Very confident
- How confident** do you feel that you can exercise 15 to 30 minutes, 4 to 5 times a week?
Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Very confident
- How confident** do you feel that you can do something to prevent your blood sugar level from dropping when you exercise?
Not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Very confident
- How confident** do you feel that you know what
Not at all | | | | | | | | | | Very

to do when your blood sugar level goes higher or lower than it should be? confident 1 2 3 4 5 6 7 8 9 10 confident

7. **How confident** do you feel that you can judge when the changes in your illness mean you should visit the doctor? Not at all confident 1 2 3 4 5 6 7 8 9 10 Very confident
8. **How confident** do you feel that you can control your diabetes so that it does not interfere with the things you want to do? Not at all confident 1 2 3 4 5 6 7 8 9 10 Very confident

Your Diet

1. How many **times last week** did you eat breakfast when you got up? _____ times last week
2. **This morning**, did you eat any of the following foods for breakfast? (*Please check all that apply*)
- ☐ milk (½ cup) ☐ cheese ☐ yogurt
- ☐ eggs ☐ meat, poultry, or fish ☐ beans

If you ate anything else, please write here: _____

Medications

1. In the past week did you take pills for diabetes? ☐ No ☐ Yes ☐ Don't know
- Please specify the name(s) of the diabetes pills you took: _____
2. In the past week did you get insulin injections? ☐ No ☐ Yes ☐ Don't know
3. In the past week did you take pills for high blood pressure? ☐ No ☐ Yes ☐ Don't know
- Please specify the name(s) of the blood pressure pills you took: _____
4. In the past week did you take pills for cholesterol? ☐ No ☐ Yes ☐ Don't know
- Please specify the name(s) of the cholesterol pills you took: _____

Medical Care

1. When you **visit your doctor**, how often do you do the following (*please circle one number for each question*):

	Never	Almost never	Some- times	Fairly often	Very often	Always
a. Prepare a list of questions for your doctor	0	1	2	3	4	5
b. Ask questions about the things you want to know and things you don't understand about your treatment.....	0	1	2	3	4	5
c. Discuss any personal problems that may be related to your illness	0	1	2	3	4	5

2. **In the past 6 months**, how many times did you visit a physician?
Do **not** include visits while in the hospital or the hospital emergency department... _____ visits
3. **In the past 6 months**, how many times did you go to a **hospital** emergency department? _____ times
4. **In the past 6 months**, how many **TIMES** were you hospitalized for one night or longer? _____ times
- a. How many total **NIGHTS** did you spend in the hospital **in the past 6 months**? _____ nights
- b. Were any of these hospitalizations at a skilled nursing facility, convalescent hospital, or other minimum care facility? ☐ Yes ☐ No
5. When was the last time you had your eyes examined?
(example: for glaucoma or any other problem) _____
Month Year
6. How many **times** did the doctor or nurse examine your feet in the last 6 months? _____ times

Patient-Physician Interactions:

For the following questions, please indicate how confident you are on a scale from 1 to 5 where 1='not at all confident' and 5='very confident'.

How confident are you in your ability to:	Not at all confident					Very confident				
1. Know what questions to ask a doctor	☐ ₁	1	☐ ₂	2	☐ ₃	3	☐ ₄	4	☐ ₅	5
2. Get a doctor to answer all of your questions	☐ ₁	1	☐ ₂	2	☐ ₃	3	☐ ₄	4	☐ ₅	5
3. Make the most of your visit with the doctor	☐ ₁	1	☐ ₂	2	☐ ₃	3	☐ ₄	4	☐ ₅	5
4. Get a doctor to take your chief health concerns seriously	☐ ₁	1	☐ ₂	2	☐ ₃	3	☐ ₄	4	☐ ₅	5
5. Get a doctor to do something about your chief health concern	☐ ₁	1	☐ ₂	2	☐ ₃	3	☐ ₄	4	☐ ₅	5

الاسم: _____ تاريخ اليوم: _____

العنوان: _____

المدينة/القرية: _____

رقم الهاتف: _____ تاريخ

اليلاد: _____

الجنس: ذكر / أنثى

معلومات عامة

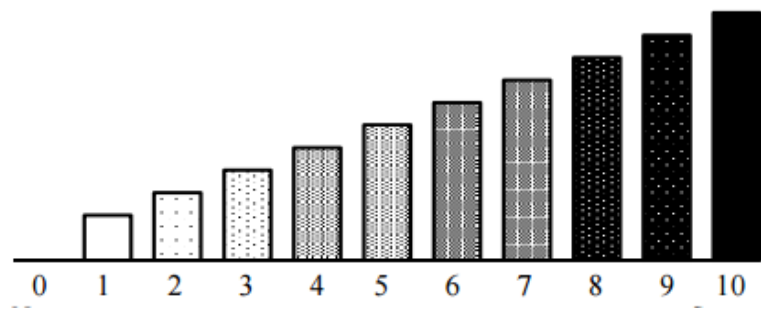
1.	مستوى التعليم	أ. ابتدائي	ب. ثانوي	ج. جامعي	د. دراسات عليا
2.	الوضع الاجتماعي	أ. متزوج	ب. أعزب	ج. منفصل	د. مطلق
هـ.	أرمل				
3.	الأمراض المزمنة التي تعاني منها				
أ.	السكري النوع ب.	السكري النوع ج.	ارتفاع	د.	ارتفاع ضغط الدم
	الثاني	الأول	الكوليسترول		
هـ.	أمراض القلب	نوع المرض	_____		
و.	أمراض الرئة	نوع المرض	_____		
ز.	أمراض مزمنة	نوع المرض	_____		
أخرى					

الحالة الصحية

1.	بشكل عام تصف حالتك الصحية ب:				
أ.	ممتازة	ب. جيدة جدا	ج. جيدة	د. ضعيفة	
هـ.	سيئة				

كم من الوقت خلال الشهر الماضي أبدا	قليل	من بعض	من نسبة جيدة	معظم	طوا	
	الوقت	الوقت	من الوقت	الوقت	ل الوقت	
1. شعرت بعدم الثقة للقيام بأعمالك اليومية بسبب مشاكلك الصحية	0	1	2	3	4	5
2. شعرت بانك متخوف بخصوص صحتك مستقبلا	0	1	2	3	4	5
3. شعرت بان صحتك مصدر قلق لك في الحياة	0	1	2	3	4	5
4. شعرت انك محبط أو منزعج بسبب المشاكل الصحية	0	1	2	3	4	5

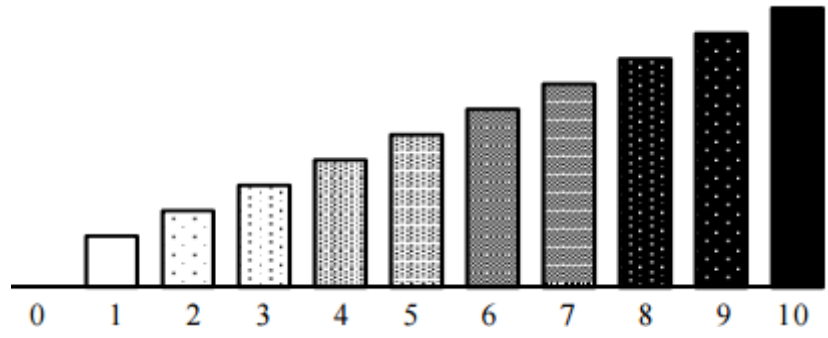
5. نحن مهتمون اذا كنت شعرت سابقا بالتعب او الاجهاد. الرجاء وضع دائرة حول الرقم الذي يعبر عن درجة التعب التي شعرت بها خلال الاسبوعين الماضيين:



لا إجهاد

إجهاد حاد

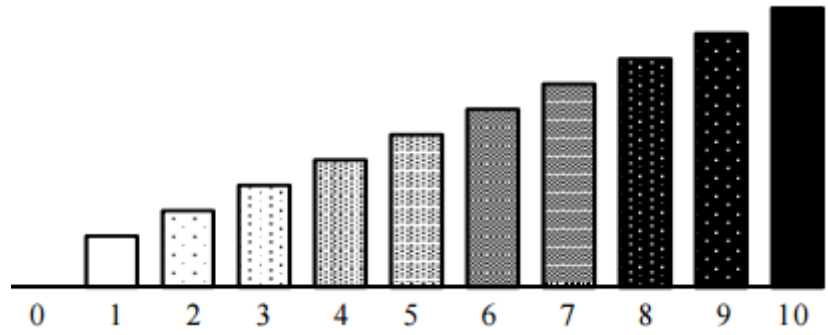
6. نحن مهتمون لمعرفة ما اذا شعرت او تأثرت سابقا بالالام. الرجاء وضع دائرة حول الرقم الذي يعبر عن الالم الذي شعرت به خلال الاسبوعين الماضيين:



لا ألم

ألم حاد

7. نحن مهتمون لمعرفة ما اذا كنت شعرت او تأثرت بضيق النفس. رجاء ضع دائرة حول الرقم الذي يعبر عن درجة ضيق النفس التي عانيت منها خلال الاسبوعين الماضيين:



لا ضيق نفس

ضيق نفس حاد

خلال الاسبوع الماضي هل شعرت او عانيت من احد الاعراض التالية:

8. زيادة العطش؟ نعم لا لا أعرف

9. جفاف الفم؟ نعم لا لا أعرف

10. فقدان الشهية؟ نعم لا لا أعرف

11. زوفان المعدة او الاستفراغ؟ نعم لا لا أعرف

12. ألم البطن؟ نعم لا لا أعرف

13. كثرة التبول اثناء الليل؟ هل نعم لا لا أعرف

اضطرت للاستيقاظ للذهاب الى

الحمام لثلاث مرات او اكثر خلال

الليل؟

14. ارتفاع حاد في سكر الدم؟ (قراءة نعم سكر الدم 300 ملغم او اعلى)	لا	لا أعرف
15. صداع في الصباح؟	لا	لا أعرف
16. كوابيس؟	لا	لا أعرف
17. التعرق ليلاً؟	لا	لا أعرف
18. الدوار؟	لا	لا أعرف
19. ضعف ورجة في اليدين او الجسم؟	لا	لا أعرف
20. اوقات شعرت فيها بفقدان الوعي نعم او الاغماء حتى لو لفترة قصيرة؟	لا	لا أعرف

النشاطات اليومية

خلال الاربع اسابيع الماضية أبدا	قليل	بشكل معتدل	غالبا	كامل الوقت	
1. كم مرة شعرت ان صحتك اثرت على نشاطك الاجتماعي المعتاد مع العائلة , الاصدقاء, الجيران؟	0	1	2	3	4
2. كم مرة شعرت ان صحتك اثرت على اداء هواياتك او نشاطاتك الترفيهيه؟	0	1	2	3	4
3. كم مرة شعرت ان صحتك اثرت على اعمالك المنزلية الروتينية؟	0	1	2	3	4
4. كم مرة شعرت ان صحتك اثرت على مهماتك او تسوقك؟	0	1	2	3	4

فحص السكر

1. هل لديك جهاز لقياس مستوى السكر في الدم؟ نعم لا
2. كم عدد الايام خلال الاسبوع الماضي التي قمت فيها بفحص نسبة السكر في الدم لديك؟ (اذا ____ يوم كنت تعاني من المرض خلال الاسبوع الماضي تذكر اخر سبعة ايام لم تكن تعاني المرض فيها
3. في الايام التي تفحص فيها مستوى السكر في الدم، كم معدل المرات التي تفحص فيها معدل ____ مرة السكر خلال ذلك اليوم؟

النشاط البدني

خلال الاسبوع الماضي حتى لو لم يكن اسبوع اعتيادي في حياتك، كم مجموع المدة الزمنية (خلال الاسبوع كاملاً) التي امضيتها في فعل مايلي:

أبدا	أقل من 30	30-60	1-3	أكثر من 3
دقيقة/اسبوع	دقيقة/اسبوع	دقيقة/اسبوع	ساعة/اسبوع	ساعات في الاسبوع
0	1	2	3	4
رياضة التقوية والتمدد(شد الجسم، رفع الاثقال، الخ)				
0	1	2	3	4
رياضة المشي؟				
0	1	2	3	4
السباحة او تمارين الرياضة				
0	1	2	3	4
المائية؟				
0	1	2	3	4
ركوب الدراجة(سواء الدراجة الهوائية او دراجة التدريب)؟				
0	1	2	3	4
تمارين هوائية (ايروبكس) على الأجهزة (جهاز تجديف، جهاز تزلج،...)?				

6. تمارين هوائية (ايروبكس) أخرى 0 1 2 3 4

التفاعل بين المريض و الطبيب المعالج

للأسئلة التالية، الرجاء تحديد مدى ثقتك من خلال مقياس من 1 إلى 5 حيث 1 غير واثق إطلاقا و 5 واثق جدا.

ما مدى ثقتك بقدرتك على غير واثق

واثق جدا

إطلاقا

1. معرفة الأسئلة التي يجب أن تسأل 1 2 3 4 5

للطبيب

2. جعل الطبيب يجيب على كافة 1 2 3 4 5

أسئلتك

3. أن تستغل زيارتك مع الطبيب 1 2 3 4 5

أفضل استغلال

4. أن تجعل الطبيب يأخذ مخاوفك 1 2 3 4 5

الصحية الأساسية بجدية

5. أن تجعل الطبيب يفعل شيئا 1 2 3 4 5

بخصوص مخاوفك الصحية

الأساسية

الثقة من بعض التصرفات

لكل سؤال من الاسئلة التالية الرجاء وضع دائرة حول الرقم الذي يعبر عن مدى الثقة بالتزامك بالافعال التالية في

الوقت الحالي؟

1 2 3 4 5 6 7 8 9 10

1. ثقتك بانك ستلتزم بتناول وجباتك الغذائية كل 4

واثق

الى 5 ساعات يوميا من ضمنها وجبة الافطار

غير واثق

يوميا؟

إطلاقا

جدا

2. ثقتك بانك ستلتزم بحميتك الغذائية بالرغم من
مساهمتك بتحضير ومشاركة الطعام مع اشخاص
اخرين لا يعانون من مرض السكري؟
غير واثق
إطلاقا جدا

3. ثقتك بانك ستختار الطعام المناسب لتناوله في
الوقت الذي تشعر فيه بالجوع (وجبات خفيفة)
غير واثق
إطلاقا جدا

4. ثقتك بانك ستمارس التمارين الرياضيه 15 الى
30 دقيقه ل 4 او 5 مرات اسبوعيا
غير واثق
إطلاقا جدا

5. ثقتك بانك ستتصرف لمنع هبوط مستوى السكر
في الدم اثناء ممارسة الرياضه
غير واثق
إطلاقا جدا

6. ثقتك بمعرفة كيفيه التصرف في حال هبوط او
ارتفاع معدل السكر في الدم عن المستوى
المسموح
غير واثق
إطلاقا جدا

7. ثقتك بتحديد التغيير في حالتك المرضيه الذي

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

واثق

يلزمك بواجب زيارة الطبيب

غير واثق

إطلاقا

جدا

8. ثقتك بقدرتك على التحكم بمرض السكري

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

واثق

وبالتالي لا يمنعك من ممارسة حياتك اليوميه

غير واثق

إطلاقا

جدا

الحمية الغذائية

1. كم مرة خلال الشهر الماضي تناولت وجبة الافطار عند الاستيقاظ من النوم؟ _____ مرة الأسبوع الماضي

2. هذا الصباح، هل تناولت اي من هذه الاغذية على الافطار:

أ. حليب (نصف كوب)	ب. جبنة	ج. لبن
د. بيض	هـ. سمك، لحوم، دجاج	و. بقوليات
إذا تناولت	اي	شئ
آخر	انكره	رجاء

الأدوية

1. خلال الاسبوع الماضي هل تناولت نعم لا لا أعرف

اي حبوب دواء للسكري؟

الرجاء تحديد أسماء أدوية السكري التي تتناولها

2. خلال الأسبوع الماضي هل تلقيت نعم لا لا أعرف

حقن أنسولين؟

3. خلال الأسبوع الماضي هل تناولت نعم لا لا أعرف

أي دواء لعلاج ارتفاع ضغط الدم؟

الرجاء تحديد أسماء أدوية الضغط التي تتناولها

4. خلال الأسبوع الماضي هل تناولت نعم لا لا أعرف

أي دواء لعلاج ارتفاع الكوليسترول؟

الرجاء تحديد أسماء أدوية الكوليسترول التي تتناولها

الأعراض

1. عند زيارتك للطبيب، كم مرة تقوم بما يلي:

أبدا	نادرا	بعض الأحيان	بشكل معتدل	غالبا	دائما
0	1	2	3	4	5
أ تحضير لائحة من الأسئلة للطبيب					
0	1	2	3	4	5
ب تسأل أسئلة عن أمور تود معرفتها و أمور لا تفهمها عن علاجك					
0	1	2	3	4	5
ت تناقش أي مشاكل شخصية تتعلق بمرضك					

2. خلال السنة أشهر الماضية، كم مرة زرت الطبيب؟ لا تتضمن زيارات أثناء الإقامة في المشفى أو في قسم الطوارئ

زيارة _____

3. خلال السنة أشهر الماضية، كم مرة ذهبت لقسم الطوارئ في المشفى؟ _____ مرة

4. خلال السنة أشهر الماضية، كم مرة بت في المشفى لمدة ليلة واحدة أو أكثر _____ مرة

أ مجموع الليالي التي أمضيتها في المستشفى خلال الستة أشهر الماضية _____ ليلة

ب هل كانت احدى هذه المبيتات في مراكز التأهيل أو النقاهة نعم لا

5. متى كانت آخر مرة قمت فيها بعمل فحص للعينين (فحص ضغط العين أو أية مشاكل أخرى) شهر _____ سنة _____

6. كم مرة قام الطبيب أو الممرض بعمل فحص لقدميك في الستة أشهر الماضية؟ _____ مرة

نشكركم على حسن تعاونكم

Appendix 2: Permission and IRB

State of Palestine
Ministry of Health - Nablus
General Directorate of Education in
Health



دولة فلسطين
وزارة الصحة - نابلس
الإدارة العامة للتعليم الصحي

Ref.:
Date:

الرقم: ٢٠١٧/١٠٨٩/.....
التاريخ: ٢٠١٧/.....

الأخ مدير عام الإدارة العامة للرعاية الصحية الأولية المحترم...
تحية واحترام...

الموضوع: تسهيل مهمة - جامعة النجاح

تماشياً مع سياسة وزارة الصحة المتعلقة بتعزيز التعاون مع الجامعات والمؤسسات الأكاديمية
بإتاحة فرص التدريب أمام الطلبة والخريجين والباحثين في المؤسسات الوطنية وإسهاماً في تنمية قدراتهم،
يرجى تسهيل مهمة الطالبة: ربا عباس ابو بكر - ماجستير صيدلة سريرية/ جامعة النجاح، في
عمل بحث بعنوان تقييم الرعاية الذاتية والكفاءة الذاتية على مستوى ضبط السكر عند مرضى السكري
النوع الثاني، من خلال السماح للطلبة بجمع معلومات من خلال مقابلة مرضى السكري لتجربة
استبانته (بعد أخذ موافقتهم) في:

مديرية صحة نابلس - عيادة السكري.

في الفترة ما بين 2017/10/10-7/18. علماً ان البحث تحت اشراف د. سائد الزبيد.

كما انه سيتم الالتزام بمعايير البحث العلمي والحفاظ على سرية المعلومات.

مع ضرورة تزويدنا بنسخة من نتائج الدراسة.

مع الاحترام...



د. أمل أبو عوض
مدير عام التعليم الصحي

نسخة: نائب الرئيس لشؤون الأكاديمية المحترم/ جامعة النجاح

An-Najah
National University
Faculty of medicine
& Health Sciences
Department of Graduate
Studies



جامعة النجاح
الوطنية
كلية الطب وعلوم الصحة
دائرة الدراسات العليا

IRB Approval Letter

Study Title:

Effects of self-care, and self-efficacy on glycemic control in patients with type 2 diabetes: A cross sectional study from Palestine

Submitted by:

Roba Abbas Abu Baker, Dr. Sa'ed H. Ziyoud

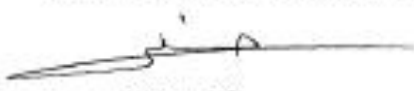
Date Reviewed:

4/4/2017

Date Approved:

25/4/2016

Your Study titled: "Effects of self-care, and self-efficacy on glycemic control in patients with type 2 diabetes: A cross sectional study from Palestine" with archived number (3) March , was reviewed by An-Najah National University IRB committee and was approved on 25/4/2017


Hasan Fitian, MD

IRB Committee Chairman

An-Najah National University

نابلس - ص.ب 7 أو 707 || هاتف 2342901/4/7/8/14 (970) || فاكس 2342910 (09) (970)

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جامعة النجاح الوطنية

كلية الدراسات العليا

تأثير الرعاية الذاتية و الكفاءة الذاتية على التحكم في نسبة السكر في الدم لمرضى السكري من النوع الثاني: دراسة مقطعية من فلسطين

إعداد

ربا عباس سليم أبو بكر

إشراف

د. سعيد زيود

قدمت هذه الأطروحة استكمالاً لمتطلبات الحصول على درجة الماجستير في الصيدلة السريرية
بكلية الدراسات العليا في جامعة النجاح الوطنية في نابلس، فلسطين.

2018

ب

تأثير الرعاية الذاتية و الكفاءة الذاتية على التحكم في نسبة السكر في الدم لمرضى

السكري من النوع الثاني:

دراسة مقطعية من فلسطين

إعداد

ربا عباس سليم أبو بكر

إشراف

د. سعيد زيود

الملخص

خلفية الدراسة: أصبح مرض السكري من النوع الثاني من المشاكل الصحية المهمة في العديد من الدول و من ضمنها فلسطين، حيث يعتبر السبب الرابع للوفاه. أظهرت الدراسات السابقة أن هناك ارتباطا بين الرعاية الذاتية/ الكفاءة الذاتية والتحكم في نسبة السكر في الدم لمرضى السكري من النوع الثاني. لكن هذا لم يتم دراسته في مراكز الرعاية الصحية الفلسطينية.

أهداف الدراسة: تهدف هذه الدراسة لدراسة أية ارتباطات بين الرعاية الذاتية/ الكفاءة الذاتية والتحكم في نسبة السكر في الدم، و لتحديد العوامل المرتبطة بسلوك الرعاية الذاتية/ الكفاءة الذاتية، و لتحديد العوامل المرتبطة بالتحكم في نسبة السكر في الدم، و لتقدير مدى انتشار التحكم في نسبة السكر في الدم لدى مرضى السكري.

المنهجية: شارك في هذه الدراسة المقطعية 380 مريض سكري يتلقون علاجهم في مركز المخفية الصحي التابع لوزارة الصحة الفلسطينية في مدينة نابلس خلال الفترة من شهر تموز و حتى شهر أيلول 2017. تم تقييم سلوك المشاركين من حيث الرعاية الذاتية/ الكفاءة الذاتية و نسبة السكر في الدم.

النتائج: من بين 380 مشاركا 82% منهم كانت نتائج نسبة التحكم في سكر الدم ضعيفة (أكثر من 6.5%). أظهر تحليل النتائج أن مرضى السكري من النوع الثاني الذين يملكون مستوى تعليم مرتفع والمتزوجون كان لديهم تأثير ايجابي على سلوكيات الكفاءة الذاتية الجيدة. أيضا وجدت الدراسة ان القدرة على القيام بواجبات الحياة اليومية كانت أقل عند المرضى الأكبر عمرا، غير المتزوجين او المرتبطين، ذوي التعليم المنخفض، يستخدمون علاجا فرديا، يستخدمون حقن

الانسولين، يعانون من اكثر من ثلاث امراض مزمنه، او لديهم ضغط دم مرتفع. القدرة على ممارسة التمارين الرياضيه اليوميه كانت أعلى عند المرضى الاصغر عمرا، الذكور، المتزوجين، ذوي التعليم المرتفع، لا يستخدمون حقن الانسولين، ولا يعانون من اي امراض مزمنه اخرى. لم يتم ايجاد ارتباط قوي بين الرعاية الذاتية و التحكم بمستوى السكر في الدم. و كذلك لم يتم ايجاد ارتباط قوي بين الكفاءة الذاتية و التحكم بمستوى السكر في الدم.

تقريبا نصف عدد المرضى المشاركين كانوا يستخدمون حقن الانسولين في العلاج. 45 مريض فقط يحضرون اسئلة تتعلق بمرضهم وعلاجهم قبل الذهاب للطبيب و42% من المرضى اجابوا بأنهم لم يشاركوا او يناقشوا طبيبهم بتاتا باي مشكله شخصيه كانت سببا في حالتهم المرضيه.

الاستنتاج: وجدت هذه الدراسة أن الكفاءة الذاتية مرتفعة لدى المرضى ذوي التعليم العالي والمتزوجون. لا يوجد علاقه بين الكفاءه الذاتية/الرعايه الذاتيه مع التحكم بنسبه السكر في الدم. ننصح مزودي الرعاية الصحية بالعمل على تشجيع المرضى بالقيام بالنشاطات الرياضيه اليوميه باستمرار، القيام بفحص دوري للقدمين والعيون لتلافي اي مضاعفات لمرض السكري بوقت مبكر، فحص مستوى السكر في الدم بشكل دوري ومنتظم. يجب ايضا تشجيع المرضى على التواصل والوثوق بشكل أكبر مع الطبيب المعالج حيث يمكن ان يساهم ذلك في زياده توعية المرضى بخصوص المرض والعلاج.