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Quality of life and its determinants among Type 1 Diabetes Mellitus Patients attending the MOH primary health care clinics in the northern districts of the West Bank

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Thesis Approval

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Dedication

To the spirit of my dear father; the first and great teacher in my life; God bless him, for his honest and principles that lighted and guided my life.

To my mother, for her sacrifice and patience for the sake of family and children.

To my dear brothers Adnan and Ahmed, for their love and support.

To my dear sisters, for making my life meaningful and full of hope.

To my aunt, and dear nephews for their moral support.

To my husband, for his support and patience.

To all whom I love I dedicate this work.

Declaration

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

Signature: ……

Rasha Abdelrahman Abdelraouf Alkarmi

Date:.....

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Concepts and Definitions

Concept	Definition
Diabetes mellitus	A group of metabolic disorders characterized by hyperglycemia due to defect in insulin secretion, insulin action or both(ADA, 2012)
Diabetes mellitus type 1	A chronic disease occurs as a result of the autoimmune destruction of beta cells in the pancreas responsible for insulin production leading to absolute insulin deficiency (ADA, 2012).
Quality of life	An individual perception of their position in life in the content of the culture and value system in which they live and in relation to their goals, standards, and concerns (WHO, 1993).
HRQOL	"The patient's perception of the way diabetes affects his/her physical, psychological, and social functioning" (Polonsky 2000).

Abbreviations

DM	Diabetes Mellitus
T1DM	Type 1 Diabetes Mellitus
PMOH	Palestine Ministry of Health
MOH	Ministry of Health
ADA	The American Diabetes Association
WHO	World Health Organization
QOL	Quality of Life
HRQOL	Health Related Quality of Life
WHOQOL	World Health Organization Quality of Life
CDC	Centers for Disease Control and Prevention
PCBS	Palestinian Central Bureau of Statistics
PHC	Primary Health Care
SPSS	Statistical Package for Social Sciences
BMI	Body Mass Index
PF	Physical functioning
RF	Role Limitation (physical)
RE	Role Limitation (emotional)
BP	Bodily Pain
EWB	Emotional wellbeing
SF	Social functioning
EF	Energy / Fatigue
GH	General health perceptions
GLM	General Linear Model

CTGA	The Catalogue for Transmission Genetics in Arabs
DQOLY	Diabetes Quality of Life for Youth scale
PedsQL 4.0	Pediatric Quality of Life Inventory 4.0
HUI	Health Utility Index
DHP	Diabetes Health Profile
CHQ-CF87	Child Health Questionnaire-Child form 87
DQOL	Diabetes Quality of Life Measure

Abstract:

Background

Type 1 diabetes mellitus (T1DM), the third most common chronic disease in children and adolescents, impacts the achievement of normal developmental tasks not only on the individual but also on his family and which in turn has a significant effect on the person's health-related quality of life.

Aim

The study aimed at measuring the quality of life (QOL) and the identification of its determinants among T1DM patients registered at the MOH clinics in the northern districts of the West Bank.

Method

This descriptive cross-sectional study conducted in the period between April and December 2011 among T1DM patients registered in the primary health care centers in the northern districts of the West Bank aged 14 years old and above (728 patients). Of those 252 (34.5%) patients were randomly selected, stratified by districts, and investigated for their QOL. 9 subjects refused to participate, so 245 subjects only were studied. Patient's quality of life was measured by means of SF-36 (version 1) quality of life questionnaire. Another questionnaire that included questions on the patients' socio demographic and health status variables and a file review of the patient medical file were also used to identify the potential determinants of the QOL. Means and medians of the QOL domains were calculated to quantify it's level. Means of the QOL within the studied variables categories were compared using T-test, ANOVA and GLM models in identification of the determinates.

Findings

The age of the participants ranged from 14 to 58 years old with a mean of 25.2, 48.6% were males and 51.4% females, (45.7%) were at age group 19-29 years. A proportion of 35.9% finished secondary education, (31%) finished academic degree. About 29% of the participants had been diagnosed for diabetes since duration less than 5 years and rest had it for longer periods. The mean score for the eight RAND SF-36 domains ranged from 51.73% to 75.64%, the highest was for bodily pain and the lowest was for general health perception. The RF domain was the most significantly influenced one by socio-demographic, lifestyle and diabetes-related associated factors and this was reflected by the high portion of variance in the domain explained by GLM of analysis (R^2 0.433), the second most explained variability was for the domain GH (R^2 0.406) while the physical functioning (PF) domain wasn't influenced by any of the socio-demographic, lifestyle and diabetes-related factors (R^2 0.023). Compliance with medical dietary recommendations and the presence of one or more chronic diabetic complications had the most pronounced effect on the domains scores, since these variables affected at least four domains of the QOL. Participants level of education; presence of additional family resources; smoking, physical activity, BMI, HbA_1c levels, number of insulin injections per day, presence of co-morbidities, and occurrence of hyperglycemic episodes significantly affected one or more

of the QOL domains. Other factors such as age, gender, marital status, family monthly income, current occupation, parental educational level, diabetes duration, and occurrence of hypoglycemic episodes had no significant effect on any of the quality of life domains.

Conclusion and recommendations

The T1DM patients' QOL was moderate to high and could impair their life at many aspects. Factors have been identified that could help in improving the life, its quality and care of the patients. Certain public health and medical interventions, educational and counseling interventions designed with multidimensional perspective should be performed to insure better quality of life.

CHAPTER ONE

1.1 Introduction

Health is a privilege for people and they should be responsible in keeping and maintaining it in order to remain functional members in the society which will lead to a healthy community.

World Health Organization (WHO) in 1948 defined health as "A state of complete physical, mental and social well-being and not merely the absence of disease" (WHO 1997). Health status as a multidimensional construct includes some of the variables that are important in measuring health such as premature mortality and life expectancy, various symptoms and physiologic states, physical functions, emotional and cognitive functions, and perceptions about present and future health (CDC 2000). Saving lives of the individuals by providing better treatment for existing disease and delaying mortality isn't less important than improving their lives through improving their quality of life (NIH 1993, Gill 1994).

1.2 Diabetes mellitus

Diabetes Mellitus (DM) is a group of metabolic disorders characterized by hyperglycemia due to defect in insulin secretion, insulin action or both(ADA, 2012). It is classified into five categories according to its cause; these categories are: type 1 diabetes that occurs as a result of the destruction of beta cells of the pancreas responsible for insulin production due to autoimmunity. Type 2 diabetes occurs due to insulin resistance at older age. Impaired Glucose Homeostasis which is a metabolic stage intermediate between normal glucose homeostasis and diabetes. Gestational diabetes recognized first in pregnancy. Other specific types caused by other identifiable etiologies such as drug or chemical use and infection (PMOH, 2003).

Diabetes mellitus is a very important public health issue all over the world. Its prevalence is increasing worldwide; it was estimated to be 2.8% in the year 2000 with 171 million cases, and is expected to reach 366 million cases (4.4%) in the year 2030 (Wild, et al 2004). In the Arab world the prevalence of diabetes increased from 2-3% prior to 1980 to the prevalence of 5-16% (Bloomberg, 2003); among adult males and females in the Eastern Mediterranean Region its prevalence ranges from 3.5% - 30%, while the highest prevalence is in Countries of the Gulf Cooperation, it is 11.5% - 30% (Wild et al 2004, Khatib, et al 2005). The prevalence of diabetes mellitus is expected to be more than double in Africa, the Eastern Mediterranean and South-East Asia regions (Diabetes Atlas, 2003). This increase is related to many factors such as long life expectancy, increased detection, sedentary life style and high fat diet. Adding to its importance is that DM is associated

with many other chronic diseases and medical conditions as hypertension, cardiovascular diseases, stroke and lower extremities amputation; it is the fourth leading cause of death globally, and the first leading cause of blindness and visual impairment, and end-stage renal disease in adults in the developed countries (Diabetes Atlas, 2003). These medical conditions put an economical burden on the countries, for example, The American Diabetes Association (ADA) in 2007 estimated that the United States spends 174 billion in direct and indirect costs treating diabetes and its complications; 116 billion is for medical expenditures resulting from treatment and hospitalization of people with diabetes-related complications and 58 billion is consumed by indirect costs of disease-related productivity of both those in labor force and unpaid workers, unemployment from disease-related disability and increased absenteeism (CDC, 2008). As well, DM alone or in combination with other chronic medical conditions has a significant effect on the person's health-related quality of life since these diseases aren't curable and have long duration which in turn have long life impact on the person's physical, mental, and social functioning (Rubin & Peyrot, 1999).

1.3 Quality of Life

Quality of life (QOL) is a broad multidimensional concept that includes subjective evaluations of positive and negative aspects of life (WHOQoL Group 1998).It has many important domains other than health such as jobs, housing, schools and neighborhood which makes its measurement a challenge; despite this fact; researchers managed to develop useful techniques that helped in conceptualizing and measuring these domains and relate them to each other (CDC 2000).

Quality of life was defined by The World Health Organization (1993) as "An individual perception of their position in life in the content of the culture and value system in which they live and in relation to their goals, standards, and concerns" (WHO 1993).

Health related quality of life (HRQoL), which is patient based, focuses more on the impact of a perceived health state on the ability to live a fulfilling life (Bullinger et al. 1993 as cited in Bowling 1999). The concept "health related quality of life" and its determinants were developed since 1980's in order to include all aspects of life that affect both physical and/or mental health (McHorney1999,Selim et al 2009). HRQoL has both an individual and a community levels. On the individual level, it includes physical and mental perceptions and what is associated with them such as health risks and conditions, functional status, social support and socioeconomic status. On the community level, HRQoL includes resources, conditions, policies and practices that affect the population health perception and functional support (Kindig et al 2010).

1.4 Impact of Diabetes Mellitus on Health-related Quality of Life

Chronic illness not only has an impact on the achievement of normal developmental tasks (Blum, 1992 as cited in Faro 1999 ; Kaplan & Friedman, 1994 as cited in Faro 1999) on the individual and family, also it has an impact among the individual, the family, and the chronic condition (Blum, 1992 as cited in Faro 1999).

In diabetes mellitus, as one of these chronic illnesses, daily management becomes complex and requires major lifestyle modification, personal control and body image are

threatened, and the specter of long-term complications poses a threat to future health and well being (Faro 1999).

Type1diabetes mellitus (T1DM) is one of the most common endocrine metabolic disorders in children and adolescence worldwide with serious acute and chronic complications (Efstathiou & Skordis 2011). It is a multifactorial disease that has an early onset, it may occur at any age of life and account for 5% to 10% of all diagnosed cases of diabetes (Raha et al, 2009). It affects approximately 1 / 400-600 children and adolescents worldwide (Roze et al.2005, Wanger and James 2006) resulting in high morbidity and premature mortality rates that reaches 0.5% due to either acute or chronic complications. The acute complications represented in Diabetic Ketoacidosis (DKA) as a result of hyperglycemia or hypoglycemia causes danger signs such as emotional instability, seizures or unconsciousness (Wolever et al 1999, Schoenle et al 2002) with episodes prevalence ranges from 4-86 episodes/100 patient/year (Diabetes Control and Complication Research Group1994, Goldstein D et al 1981).Chronic complications such as neuropathy, retinopathy and cardiovascular are rare in children (Glastras et al 2005). The prevalence of type 1 diabetes among youth (<19 years) is about 2/1,000, and its annual incidence in children 10-19 years old is about 19/100,000, with 3% annual increase, but faster, in young children (Schwartz, 2008). American Diabetes Association reported in 2009 that there are 23.6 million children and adults in the United States, 7.8% of the population, who have diabetes (ADA 2011). In Europe, Middle East, and Australia, rates of type 1 diabetes are increasing by 2-5% per year (Votey et al 2009); the annual incidence ranges from 1.9 to 7.0/100,000 in Africa, from 0.13 to 10/100,000 in Asia, from 3.4 to 36/100,000 in Europe, and from 2.62 to 20.18/100,000 in the Middle East and approximately 4.4/100,000 in Australasia (CTGA Database), and in India the incidence is 10.6 cases/100,000/year (Raha et al 2009).

Risk factors for type 1 diabetes may be autoimmune, genetic or environmental, but the real cause is still unknown (CDC 2007).

Diabetes mellitus in children cause a lot of imbalances in the lives of the child and as well the family. Once diagnosed with diabetes most patients experience long-term social and psychological and adaptation issues that influence the determination of the patient's health-related behavior. Diabetics feel they are a burden and keep worrying about the future, they suffer from depression more than others in the general population; they have little or no interest in life as they are mentally crushed. Depression leads to heart disease and multiple anxiety disorders it also causes low glycemic control and this increases the risk of retinopathy. Eating disorders such as bulimia are common with young diabetic women and the adult diabetics in general (Faro 1999).

In the case of children, diabetes adversely affects the neuro-cognitive and psychosocial functioning in a big way. While some of the children adjust to their new routines within a year, others don't and stay at risk of continued psychosocial problems and poor metabolic control (Faro 1999).

In adolescence; the transitional period between childhood and adulthood characterized by dramatic biologic, physical, cognitive, emotional, and social changes; hormonal changes trigger the onset of puberty and, body image is the major concern. During this period of time the adolescents try to achieve independence and self identity, therefore, thinking transition occurs from thinking only about the present to thinking about the future, and

from the referent group from parents and family to peers which puts the adolescents in a struggle to cope with these changes, so they often experience mood swings, and may engage risk-taking behaviors (Faro 1999).

All the above mentioned becomes more complicated and difficult to achieve when the adolescents have diabetes, since they have to follow strict diet recommendations, and careful lifestyle choices are only available and this can't be done among peers so as he/she still feels the same as they are which put them in a struggle not only due to their growth and development, but also due to their disease and as a result their quality of life is affected.

The issue of quality of life and its assessment in chronic diseases in both adults and children became of an important interest in order to evaluate interventions, compare outcomes in clinical trials, organizing programs of care and assessing the outcomes of new treatment (Eiser and Mores 2001).

Health-related quality of life (HRQoL) is associated with chronic diseases such as diabetes, hypertension, arthritis and breast cancer as well as with risk factors of these diseases (body mass index, smoking status and physical inactivity), therefore, improvement of HRQoL become a central goal of public health as it helps in determining the burden of preventable disease, injuries, and disabilities, and it provides valuable view to the relationships between HRQoL and risk factors (CDC2000).

Studies on type 1 DM showed that there is a significant impact of DM on HRQoL. Subjects with diabetes experienced decreasing in HRQoL when compared with subjects without diabetes; and the presence of other medical conditions lead to further lowering of HRQoL (Lin et al; 2005). As well the presence of one or more of the diabetic complications such as ischemic heart disease, neuropathy, and retinopathy was found to be associated with low HRQoL (Solli et al 2010, Al-Khour et al 2010). Relationship was detected between high HbA_1c (diabetes indicator) and shorter duration of the disease, being a female and older adolescents and low HRQoL (Al-Khour et al 2010).

Different studies were conducted on adults, adolescents and children with type 1 diabetes mellitus revealed that there are several factors affecting their quality of life and such factors are considered to be identified as the determinants of quality of life among those patients. These studies showed that socio-demographic factors (such as age, sex, level of education, monthly income, and occupation) (ISSA, 2006; AUSSILI, et al 2007, Naughton et al 2008), diabetes-related factors (such as diabetic complications, duration of the disease, glycemic control, number of insulin injections, and co-morbidities) (Franciiosi; 2009, Naughton et al 2008, Delamaler, et al; 1999, Kovacs, et al 1985), and life style behaviors (such as smoking, physical activity, and diet) (AUSSILI et al, 2007, Glasgow, et al 1997) were associated with quality of life.

1.5 Problem Statement

Diabetes mellitus and its complications are major health problems in the Palestinian territories. Although the reported visits to PHC diabetic clinics for T1DM in Palestine, specifically the West Bank, were 11,106 in 2010 (PMOH, 2010), there is still a lack of sufficient information about the QoL those patients experiencing in the society. While

some studies were conducted to measure quality of life among diabetic patients in Gaza Strip, but not limited to patients with TDM, non was conducted in the West Bank.

So the issue of QoL among patients with T1DM should be considered in order to understand how DM affects their daily lives and to help health care professionals to be more sensitive to their patients' needs and concerns to improve the standards of living for this group of population.

Therefore, the problem statement of this study can be summarized in the following question: what are the determinants of QOL among T1DM patients attending the MOH primary health care clinics in the northern districts of West Bank?

1.6 Study Justification

Like the rest of the developing world, the Palestinian population is undergoing changes from traditional to western lifestyle. Diet is transforming from natural food to processed food, beverages and takes away ones; physical activity also is transforming from walking, working in agriculture to public transports and sedentary activities as watching TV's, working on computers and internet. Smoking is another lifestyle habit that affects health negatively and practiced without or with limited restrictions. These changes had an effect on the disease patterns and burden especially among young age groups (children, adolescents and young adults) by shifting from communicable diseases and high infant mortality to non communicable diseases.

In Palestine diabetes mellitus, as one of the non-communicable diseases, is considered the 6^{th} leading cause of death, it causes 5.7% of death in the total population in Palestine, and there were 484 deaths due to diabetic complications with a proportion of 15.2/100,000 (161 cases in males(6.4/100.000) and 222 cases in females(8.8/100.000) (PMOH, 2010).

The increased prevalence of type 1 diabetes makes it a major public health concern due to the early onset of the disease, recurrent hospitalization, economical burden, and the early occurrence of complications which leads to death at young age. All of these may affect the patient's daily activities, work, social relationships and expose him to great pressure physically, psychologically, socially, and financially which eventually affects his quality of life.

Since the researcher work in the diabetic clinic in Tulkarm primary health care center she noticed the magnitude of the problem and decided to conduct this study in order to reveal the importance of the issue and highlight the quality of life and its determinants among type 1 diabetics in the West Bank. The results of this study would help in improving the living standards of patients with T1DM by helping them to manage their disease and eventually improve their QoL. It would also help to clarify the needs of type 1 diabetics to other people who are dealing with such patients including family members, doctors, nurses, and decision makers in order to help them in applying certain programs to support patients and enable them to get the quality of life they desire.

1.7 Study aim and objectives

The aim of this study was to identify quality of life and its determinants among type 1 Palestinian diabetic patients attending the MOH clinics in the northern districts of the West Bank.

1.7.1 General Objectives of the Study:

To fulfill the overall goal of the study, the following objectives should be attained:

1- To measure the level of each of the eight domains (physical functioning, role limitation due to physical health problems, role limitation due to emotional problems, energy and fatigue, emotional well-being, social functioning, and bodily pain) composing the QoL among T1DM patients who are attending the MOH clinics in the northern districts of the West Bank.

2- To investigate for the associations between the socio-demographic factors, lifestyle factors, and diabetes-related factors and each of the eight domains that composing the QoL among T1DM patients who are attending the MOH clinics in the northern districts of the West Bank.

1.8 Study Hypotheses

1- H_0: There is no association between socio-demographic factors (age, gender, place of residence in the district, marital status, participants' level of education, current occupation, family monthly income, additional family resources rather than monthly income, and parents' level of education) of T1DM patients who are attending the MOH clinics in the northern districts of the West Bank and their QOL.

2- H_0: There is no association between lifestyle behaviors factors (smoking status, physical activity status, and compliance with diet recommendations according to medical instructions) among T1DM patients who are attending the MOH clinics in the northern districts of the West Bank and their QOL.

3- H_0: There is no association between the diabetes-related factors (duration of diabetes since diagnosis, body mass index (BMI), the value of the last HbA_1c test, number of insulin injections per day, the presence of health problems other than diabetes(co-morbidities), the presence of one or more of the diabetic complications (retinopathy, neuropathy, nephropathy, and cardiovascular disease) of T1DM patients who are attending the MOH clinics in the northern districts of the West Bank and their QOL.

1.9 Thesis Chapters' Summary

The thesis consists of six chapters. In chapter one, we discussed the aim, problem statement and justification, and the objectives. Chapter two included literature review of the previous studies and related to present study. Chapter three discussed the theoretical and conceptual framework of the study. While in chapter four included the study methodology, data collection methods, sample size, piloting and statistical analysis of the data were discussed. Chapter five included study results which were presented in tables.

While in chapter six, the study results and findings were discussed and recommendation were presented.

CHAPTER TWO

Literature Review

This chapter provides an overview of literature and researches on the HRQOL and its determinants among type 1 diabetic patients. It includes Quality of life definitions, instruments for assessing quality of life for diabetes mellitus, diabetes mellitus and quality of life, socio-demographic factors and quality of life, lifestyle factors and quality of life , and diabetes-related factors and quality of life.

2.1 Introduction

There is no certainty as to the origin of the term Quality of Life (Snoek, 2000). As stated by the American president Johnson (1964):

> "Goals can't be measured by the size of our bank account; they can only be measured in the quality of lives that our people lead." (Snoek, 2000, p 24).

These words indicated the importance of quality of lives of the populations which became the main interests of social scientists especially in the relationship between social indicators of quality of life and the subjective evaluation of these circumstances (Snoek, 2000).

Quality of life is considered the major goal of health interventions and outcome. It is measured as physical and social functioning, and perceived physical and mental well-being (Rubin and Peyrot, 1999) which is consistent with WHO definition of health in 1948 as it isn't only the absence of diseases and infirmity, but also the presence of physical, mental and social well-being (WHO,1993).

The concept quality of life became more popular in medicine since the early 70's and several studies were conducted including diabetes in order to:

- Evaluate the psychosocial functioning of patients group and to identify specific problems and needs of patients at the different stages of disease process.

- Compare the impact of different treatment regimes on patients' well-being and treatment satisfaction (Haes, 1985 as cited in Snoek, 2000).

Assessment of QOL in chronically ill children and adolescents became important since it decreased the mortality rates due to different chronic diseases and increased the survival rates (Pantell and Lewis, 1987 as cited in Spieth and Harris, 1996). Pediatric QOL refers

to the child's or adolescents functioning areas that are directly affected by the disease or its treatment (Spieth and Harris, 1996).

Diabetic patients had a worse QOL in comparison to people with no chronic diseases because they feel challenged by the disease as well as its day to day demands (Rubin and Peyrot, 1999).

2.2 Quality of life definition

The term Quality of Life has no universally accepted definition (Aaronson (1992); Spilker (1990) as in Spieth and Harris (1996)). It has usage across different disciplines such as geography, literature, philosophy, health economics, advertising, health promotion, medical sciences as well as social sciences (Bowling, 1999).

Campbell and colleagues (1976) defined the term QOL as "a multidimensional construct compromising the individual's perception of physical, emotional and social well-being, including both a cognitive component such as satisfaction and an emotional component such as happiness" (Campbell et al.(1976) as in Rubin and Peyrot (1999)).

Hörnquist (1982) defined QOL as "a broad spectrum of dimension of human experiences ranging from those associated with the necessities of life such as food and shelter; to those associated with achieving a sense of fulfillment and personal happiness"(Hörnquist (1982) as in Snoek, (2000)).

Walker and Rosser (1988) defined QOL in medical settings as "a concept encompassing a broad range of physical and psychological characteristics and limitation, which describe an individual's ability to function and derive satisfaction from doing so" (Walker, and Rosser (1988) as in Snoek, 2000)).

Grand and associates as well defined QOL as "a personal statement of the positivity and negativity of attributes that characterize one's life" (Grand et al.(1990) as in Bowling (1999)).

In the year 1993 WHOQOL Group defined the term QOL as: "an individual perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns", this concept is affected by physical health, psychological state, level of independence, social relationships and their relationships to relevant feature of their environment (WHOQOL Group (1993) as in Bowling, (1999)).

Veenhoven distinguished between opportunities for the good life and the good life itself, he divided QOL into four categories each with an effect on the other. These categories are first; live-ability of the environment (environmental chances / social capital); second, life-ability of the individual (personal capacities / psychological capital); third, the external utility of life (a good life must have an aim other than life itself or higher values), and the fourth is the inner perception of life (inner outcome of life / the higher perceived quality of life) (Veenhoven, 2000). Since there was no agreement on the definition of QOL concept, most researches would agree that QOL is a multidimensional construct, encompassing aspects of psychological, social and physical well-being and should reflect the patient's

subjective evaluation of well-being rather than the health care professional's point of view (Snoek, 2000).

In order to narrow the extant of aspects of functioning directly to disease and/or medical treatment, the term health-related quality of life was introduced (Patrick, and Erickson(1988) as in Snoek (2000)).
Health-related quality of life (HRQOL) refers to how health influences an individual's ability to function as well as his or her perceived well-being in physical, mental and social domain of life. The functioning part of (HRQOL), which includes basic activities such as self-care as well as work-related activities and the ability to interact with friends and family, is relatively because self-report information can be compared with other sources of data such as observations and performance measures (Reuben et al., 1995). The well-being part of HRQOL is subjective more than the functioning part because it relies on the internal, subjective perception of the respondent. It includes emotional well-being of the person such as feeling happy, sad or depressed, it also includes if the person is in severe pain or has pain at all, as well as it includes if the person is energetic or lethargic.

2.3 Instruments for assessing quality of life in diabetes mellitus

According to the Patient Reported Outcomes Measurement Group (PROMs), patients' experience of treatment and care is a major indicator of quality and there has been a great expansion in the development and application of questionnaires. PROMs provide a means of having a view into the way patients perceive their health and the impact that treatments or adjustments to lifestyle have on their quality of life. These instruments can be completed by a patient or individual about themselves, or by others on their behalf and had two kinds of instruments, generic and disease instruments (Fitzpatrick et al., 2006).

2.3.1. Generic instruments:

The following are examples on the generic QOL instruments for measuring QOL :

SF-36: Medical Outcomes Study 36-item Short Form Health Survey is a self-, interview-, or telephone-administered questionnaire that was derived from the work of the Rand Corporation during the 1970s. It was published in 1990 for application in a wide range of conditions and with the general population and should capture both mental and physical aspects of health. It assess health across eight domains: bodily pain (BP: two items), general health perceptions (GH: five items), mental health (MH: five items), physical functioning (PF: ten items), role limitations due to emotional health problems (RE : three items), role limitations due to physical health problems (RP: four items), social functioning (SF: two items), and vitality (V: four items), an additional health transition item, not included in the final score, assesses change in health. All items use categorical response options (range: 2-6 options). Scoring uses a weighted scoring algorithm and a computer-based program is recommended. Eight domain scores give a health profile; scores are transformed into a scale from 0 to 100, where 100 represent the best health. Two component summary scores for physical and mental health (MPS and MCS, respectively) can also be calculated (Ware and Sherbourne, 1992; Ware et al., 1994; Ware, 1997).

WHOQOL-BREF (The WHO Quality of Life Abbreviated Questionnaire) was developed to provide a brief version of the WHOQOL-100. It is used in studies needing the

practicality of a short questionnaire, in large-scale epidemiological studies, for audit, and clinical work and intervention evaluation. The WHOQOL-BREF composed of 24 items and provides a profile of scores on four dimensions of quality of life: physical health, psychological, social relationships, and environment. Each item is rated on a five-point scale. This instrument also provides one global rating on QOL and general health (WHO, 1996).

EuroQol-EQ-5D (The EuroQol Group, 1990; revised 1993) is a self or interview-administered and was developed by researchers in five European countries to provide an instrument with a core set of generic health status items. Although providing a limited and standardized reflection of HRQL, it was intended that use of the EuroQol would be supplemented by disease-specific instruments. The developers recommend that EuroQol should be used in evaluative studies and policy research; it can also be used for economic evaluation (Fitzpatrick et al., 2006).

The 15D is a generic, comprehensive (15-dimensional), self-administered instrument for measuring HRQOL among adults (age 16+ years). It combines the advantages of a profile and a preference-based, single index measure. A set of utility or preference weights is used to generate the 15D score (single index number) on a 0-1 scale (Fitzpatrick et al., 2006).

Health Utilities Index (HUI) was designed as a comprehensive measure of health status and health related quality of life. The Health Utilities Index (Mark 3) health status classification was developed by Feeny et al., (1995) to assess capacity on eight dimensions: vision, hearing, speech, ambulation, dexterity, emotion, cognition and pain/discomfort. The utility function reflects community preferences and scores each unique health state on a scale ranging from 0 (death) to 1 (perfect health) (Fitzpatrick et al., 2006).

3.3.2. Diabetes-specific instruments:

The following are examples on the diabetes-specific instruments for measuring QOL:

Diabetes Health Profile/DHP is a multidimensional self-completion instrument that was designed to identify psychosocial dysfunction among adult insulin-dependent and insulin requiring patients in an ambulatory care setting .The DHP-1 comprises 32 items covering three dimensions: psychological distress (14items), barriers to activity (13 items), and disinhibited eating (5 items); and the last may be appropriate as a screening tool for eating problems. Each item has a four-point adjectival scale; items are summed within the three dimensions and transformed to produce a score from 0-100 where 0 represents no dysfunction. The DHP-18 is a modified scale developed for use within type 2 diabetics (non-insulin dependent) patients (Meadows et al.,(1996) as cited in Fitzpatrick et al., (2006); Meadows et al.,(2000) as cited in Fitzpatrick, et al., (2006)).

Diabetes Quality of Life Measure/DQOL: Although the DQOL was originally developed for use in a clinical trial comparing the efficacy of two different treatment regimens on the appearance and progression of chronic complications of patients with IDDM (Jacobson et al.,1988), its structure allows for application to other patients with IDDM and NIDDM. And it can be used in clinical settings as a screening measure to identify patients with concerns about diabetes. The instrument has 46 core items forming four scales: satisfaction with treatment (15items), impact of treatment (20 items), worries

about future effects of diabetes (four items), and worries about social and vocational issues (seven items). It also includes a generic health item that does not contribute to the scales. Adolescent and youth versions of the DQOL have been developed (Ingersoll and Marrero, 1991). The dimensions and DQOL total scores (average score across the four dimensions) are scored 0-100 where 0 represents the lowest possible quality of life and 100 the highest (Fitzpatrick et al., 2006).

3.3.3. Pediatric diabetic-specific instruments:

The following are examples on pediatric generic and diabetes specific instruments:

Child Health Questionnaire-Child form 87 (CHQ-CF87) is a generic quality of life instruments that have been designed for children 5-to-18 years of age. The CHQ measures 14 physical and psychosocial concepts. The parent form is available in 2 lengths - 50 or 28 items. Scores can be analyzed separately, the CHQ Profile Scores, or combined to derive an overall physical and psychosocial score, the CHQ Summary Scores (Health Act CHQ, 2008).

Pediatric Quality of Life Inventory 4.0 (PedsQL 4.0) measures physical, emotional, social, and school functioning of health-related quality of life (HRQOL) in healthy children and adolescents and those with acute and chronic health conditions. It consists of 23 items for use with community, school, and clinical pediatric populations. It is appropriate for ages 2-18; child self-report ages 5-7, 8-12, 13-18; and parent proxy-report for ages 2-4, 5-7, 8-12, and 13-18).The PedsQL™ Measurement Model integrates both generic core scales and disease-specific modules into one measurement system (Varni, 1998).

Diabetes Quality of Life for Youth scale (DQOLY) is a diabetes-specific and self-administered instrument developed by Ingersoll Gary M. to assess the psychosocial impact of treatment regimens for diabetes in youth population (pediatrics and adolescents) with type 1 diabetes mellitus. It is present in long form that consists of 52 item and short form that consists of 22 item (PROQOLID, 2011).

2.4 Diabetes mellitus and quality of life

The relationship between diabetes mellitus and quality of life has been a subject of study for many decades (Rubin & Peyrot, 1999). In addition to the burden of the disease itself, diabetes has some special characteristics in relation to quality of life. Its treatment requires self-managed regimens such as changes in lifestyles (diet and exercise), self-testing of blood sugar, and strict insulin therapies. Glycemic control puts extra burden to social, emotional, and physical aspects of daily life. Therefore, these factors may have a significant impact in the perception of quality of life in individuals with diabetes. A great number of studies published in the literature addressed this issue (Hanestad, 1993; Jacobson et al., 1994; Aalto et al., 1997; Rubin & Peyrot, 1999; Trief et al., 2003).
Although assessing QOL is methodologically complex, valid and reliable tools are available and could be used with diabetes patients and several studies differ regarding the purpose, design, target population, and especially the methodology to assess quality of life. Some studies included both type 1 and type 2 diabetes (Glasgow et al., 1997; Jacobson et al., 1997; Rubin & Peyrot, 1999).

Type of diabetes seemed to affect quality of life in some of these studies (Jacobson et al., 1994; Trief et al., 2003) but not in others (Aalto et al., 1996). It has been unclear if these differences result from the type of diabetes or factors associated with diabetes type such as disease duration and treatment regimen (Jacobson et al, 1994; Rubin & Peyrot, 1999). Sarac et al.(2007) and Jacobson et al. (1994) detected that individuals with type 2 diabetes who started treatment with insulin reported poorer quality of life than those with type 1 diabetes. Naughton et al. (2008) as well showed that HRQOL was significantly higher for youths with T1DM compared with T2DM. The same was reported by Glasgow et al. (1997) in a study of a large national sample of adults with diabetes in the United States.

Individuals with type 2 diabetes taking insulin reported lower quality of life scores than individuals with T2DM on diet or pills or those with type 1 diabetes. The authors reported that people with T2DM starting on insulin had probably failed previous treatment regimens such as diet and oral medication or developed complications of the disease increasing the amount of stress in their daily routine with a negative impact on their quality of life (Glasgow et al., 1997).

It has been shown that individuals with T1DM have poorer quality of life when compared to the general population (Wandell et al., 1998; Hahl et al., 2002) although some researchers did not find differences between these populations (Wikblad et al., 1996; Hart et al., 2003 a). These differences seemed to be dependent on some factors such as duration of diabetes and whether comparisons were made between populations with similar age distributions. In newly diagnosed individuals with type 1 diabetes, Huang et al found that people who are younger at diagnosis rate their health more highly than do people who are older at diagnosis (Huang et al., 2004). Hart et al. did not find any differences in the physical and mental component scores of quality of life compared to the general population (Hart et al., 2003b). The same research group also reported similar quality of life scores of type 1 diabetes individuals to the general population of comparable age (Hart et al., 2003a).

Results from meta-analyses have shown that depression increases the risk of disease progression in either type 1 or 2 diabetes (Saydah et al., 2002). Studies have also been consistent in showing that the prevalence of depression is higher among those with diabetes compared to the general population (Diabetes UK. 2007; Anderson et al., 2001). Anxiety has been estimated to occur in approximately 20% of those with diabetes (Li et al., 2008).

2.5 Socio-demographic factors and quality of life

Socio-demographic factors such as age, gender, and level of education were studied by several researches to investigate their associations with quality of life as possible determinants.

Older age has been associated with worse quality of life among people with type 1 diabetes. The greater impact of age has been observed on physical components of quality of life especially those related to daily functioning (Kalyva et al., 2011; Imayama 2011, Al-Akour et al., 2010; Sarac et al., 2007; Huang et al.,2004; Hart et al., 2003a; Trief et al., 2003; Hahl et al., 2002; Aalto et al., 1997). Ismail showed in her study that there were no differences in self-rating health among better or poorer group regarding to age and so age didn't affect quality of life (Ismail, 2011).

Among studies that reported differences in gender, men with type 1 diabetes have shown higher quality of life scores than women (Kalyva et al., 2011; Al-Akour et al., 2010; Tabaei et al., 2004; Huang et al.,2004, Aalto et al., 1997; Glasgow et al., 1997). These findings have been supported by other studies that showed that girls in older age groups had than boys the same groups as well, men reported higher satisfaction with their treatment and lower burden of diabetes on their physical and emotional functioning than women (Naughton et al., 2008; Peyrot & Rubin, 1997). Some studies found that being female was associated with depression in individuals with type 1 diabetes (Anderson et al., 2001; Li et al., 2008).

Some studies have found associations between socioeconomic status measured by level of education, marital status or income and quality of life. (Issa & Baiyewu, 2006; Huang et al.,2004; Egede & Zheng, 2003; Wikblad et al., 1996; Glasgow et al., 1997), while others didn't (Al-Akour et al., 2010). Issa & Baiyewu showed that low monthly income, elementary occupation such as trading was associated with poor score on overall QOL, health satisfaction, Physical and Psychological health as well as social relationship domains (Issa & Baiyewu, 2006). Huang et al found that people with higher maternal level of education and higher socioeconomic level reported better health (Huang et al., 2004). Egede & Zheng found that lower level of education and being unmarried were associated with depression in T1DM (Egede & Zheng, 2003). Wikblad et al showed that, although there were no differences regarding metabolic control among groups, those with less education and low income reported lower quality of life scores than those with higher education and income, respectively (Wikblad et al., 1996). In a clinic-based study in Finland, Aalto et al observed that lower education was associated with lower scores in health perception, mental health, social and role functioning. However, these associations were not statistically significant when controlled for diabetes-specific psychosocial factors such as social support and self-efficacy (Aalto et al., 1997).
Regarding place of residence Al-Akhuor et al reported that it wasn't associated with quality of life (Al-Akhour et al., 2010)

2.6 Lifestyle factors and quality of life

Lifestyle factors including physical activity, diet regimen and smoking status were investigated for their association with quality of life in several studies (Ismail 2011, Imayama, 2011; Sarac et al., 2007). Ismail in her study found that regular exercise was associated with better health (Ismail, 2011). Imayama reported the same findings regarding to physical activity levels, diet regimen as well as non smoking status which found to be positively associated to better health (Imayama 2011).

Similarly, Sarac et al in their study reported that reduced physical activity, not following diet regimen and being smokers reduced the levels of six domains of SF-36 that are role physical, physical functioning, role emotional, bodily pain, social functioning and general health among patients with T1DM (Sarac et al., 2007).

2.7 Diabetes-related factors and quality of life

Different studies were conducted to assess the association between quality of life and diabetes-related factors such as chronic diabetic complication, the presence of co-

morbidities, presence of hyperglycemic and hypoglycemic episodes,HbA_1c levels and BMI in patients with T1DM. Some researchers found associations between quality of life, diabetes-related distress and glycemic control (Kalyva et al., 2011; Wit et al., 2007; Weinger & Jacobson, 2001; Wikblad et al., 1996; Hanestad & Albrektsen, 1993). In a group of 117 children and adolescents with T1DM and 128 matched healthy children and adolescents Kalyva et al. found that HbA_1c as well as number of hyperglycemic episodes were significantly associated with poor quality of life (Kalyva et al., 2011). Another study by Wit et al. indicated that higher HbA1c values were associated with more depressive symptoms and lower psychosocial well-being and adolescents with good glycemic control ($\leq$7.5%) reported less family conflicts than the others (Wit et al., 2007). Weinger and Jacobson showed that improvement of glycemic control was related to improvement of diabetes-related emotional distress and depression in people with type 1 diabetes (Weinger & Jacobson, 2001).

In a group of 185 patients with T1DM, Wikblad et al found that individuals with poor glycemic control rated their quality of life scores significantly lower than those with good or acceptable metabolic control (Wikblad et al., 1996).

Other characteristics related to diabetes also had significant associations. Higher frequency of hypoglycemic reactions was significantly associated with lower scores for physical role and higher levels of glycosylated hemoglobin were also independently related to lower scores on the general health scale (Klein et al., 1998). In addition, individuals with hypoglycemic episodes rated their general health as being poorer than those without hypoglycemia (Lustman et al., 2000; Wikblad et al., 1996). Lustman et al published a meta-analysis for investigating the relationship between poor glycemic control and depression (Lustman et al., 2000). This study revealed a significant association of depression with hyperglycemia in patients with either type 1 or type 2diabetes. While Kalyva et al found that number of hypoglycemic episodes had no effect on quality of life (Kalyva et al., 2011).

The association between chronic diabetic complications; macro vascular (cardio- and cerebrovascular diseases) and micro vascular (neuropathy, nephropathy, and retinopathy) diseases; with poor quality of life has been consistent across studies (Tabaei et al., 2004; Hart et al., 2003a; Hahl et al., 2002; De Groot et al., 2001; Lustman et al., 2000; Aalto et al., 1997; Wikblad et al., 1996; Jacobson et al., 1994). Type1 diabetes has an early onset and, as a consequence, patients need to deal with the burdens of diabetes-related complications during a significant period of their lives. Hahl et al showed that the presence of macro vascular complications had the most pronounced negative influence on quality of life in a population with type 1 diabetes in the Netherlands. Micro vascular complications did not have significant impact on quality of life in their study. This finding could be explained by the fact that most of the individuals had micro vascular complications at their initial stages with minor symptoms (Hahl et al., 2002). Overall, the impact of these complications has been most commonly seen on quality of life domains related to physical role and functioning (Hahl et al., 2002; Wikblad et al., 1996).

In a meta-analysis, De Groot et al showed that the relationships between depressive symptoms and long-term complications of diabetes were statistically significant when studies were all combined irrespective of type of complications or when analyzed according to type (i.e. nephropathy, neuropathy, and retinopathy). In addition, no

differences were observed between types 1 and 2 and most of the studies were clinic based (De Groot et al., 2001).
Assessments of self-rated health using the MOS SF-36 have already been performed at the 14-year follow-up examination of the Wisconsin Epidemiologic Study of Diabetic Retinopathy (WESDR 4, 1995-96) (Klein et al., 1998). A cross-sectional analysis demonstrated that long-term complications including neuropathy were independently associated with poorer scores in general health, physical functioning, and physical role domains. Diabetic retinopathy was associated with poorer physical functioning and nephropathy was associated with lower scores of general health. The physical functioning scale includes questions about limitations of specific activities and the physical role scale concentrated more on whether physical problems cause limitations in daily activities.

The relationship between the number of complications and quality of life was studied by some researchers (Aalto et al., 1997; Jacobson et al., 1994). In a study in Finland, Aalto et al observed that those with higher number of complications reported poorer mental health, role functioning, and perceived health even after controlling for confounding factors (Aalto et al., 1997). Jacobson et al showed a cumulative effect of increasing number of complications in their study with greater number of complications associated with lower quality of life scores (Jacobson et al., 1994).

Few studies have shown longitudinal, long-term changes of these associations but most of them supported the findings from cross-sectional studies previously discussed (Hart et al., 2005a; Hart et al., 2005b; Huang et al., 2004; Wandell et al., 1999; The Diabetes Control and Complications Trial Research Group, 1996). Hart et al. (Hart et al., 2005a; Hart et al., 2005b) followed 234 adults with type 1 diabetes during 6 years in the Netherlands and used two generic instruments: the RAND-36 Health Survey and the EuroQol. In this study, yearly decreases in quality of life scores were found for the majority of scales from both instruments, especially the measurements of physical components (physical subscales and the physical component score). In addition, when compared to a population without diabetes, individuals with type 1 diabetes had poor quality of life scales, possibly due to a higher proportion of micro- and macro vascular complications among them.

The Wisconsin Diabetes Registry (Huang et al., 2004) investigated factors associated with self rated health in a population of T1DM. Males reported better health than females as did those with higher compared to lower socioeconomic status. The researchers also indicated that individuals who were young at the time of diagnosis and those with better glycemic control reported better health status. Wandell et al followed 48 patients with both types of diabetes in Sweden during a 3-year period. They observed that the overall health condition of this group worsened during this period and this change was associated with lower scores of physical functioning at the follow-up visit. (Wandell et al., 1999).

A longitudinal analysis of quality of life was also carried out in the DCCT study (The Diabetes Control and Complications Trial Research Group, 1996). This randomized controlled clinical trial in patients withT1DM indicated that quality of life for patients who were under strict treatment regimen to achieve glycemic control that also resulted in higher frequencies of hypoglycemic episodes was similar for those in the conventional treatment group.

Duration of diabetes was studied by several researchers (Ismail 2011; Al-Akhour et al., 2010; Naughton et al., 2008; Huang et al., 2004) to assess its association with quality of

life. Some researchers found that longer duration of diabetes was found to be associated with better health (Al-Akhour et al., 2010; Naughton et al., 2008), while others found that longer duration was associated with decreased self-rated health (Ismail 2011; Huang et al., 2004).

Number of insulin injections per day was also investigated (Al-Akhour et al., 2010; Naughton et al., 2008; Huang et al., 2004). Huang et al in their study found that there was an inverse association between number of insulin injections and self-rated health (Huang et al., 2004). Naughton et al in a study to examine the associations between demographic and diabetes management variables and the health-related quality of life (HRQOL) of youths with type 1 or type 2 diabetes mellitus found that youth with T2DM with at least three times insulin injections reported better health (Naughton et al., 2008). This association wasn't found in Al- Ahkour et al study (Al-Akhour et al., 2010).

Body mass index (BMI) was found to have an association in patients T1DM (Imayama, 2011; Naughton et al., 2008; Issa and Baiyewu, 2008). Imayama reported that higher BMI was associated negatively with quality of life (Imayama, 2011) and mainly with social functioning (Naughton et al., 2008) as well as with poor physical heath (Issa and Baiyewu, 2008); the last in the same study found that weight loss (low BMI) was associated with poor health satisfaction.

Naughton et al. as well as Imayama in their studies indicated that the presence of co-morbidities was found to be associated negatively with quality of life (Imayama, 2011; Naughton et al., 2008).

In Summary, many factors directly or indirectly related to diabetes have shown to be associated with quality of life among individuals withT1DM. Most studies were cross-sectional and those that investigated changes longitudinally used short follow up periods. In addition, many studies relied on clinic or convenience samples to describe their associations. There are several determinants of QOL in T1DM' patients among different countries throughout the world. The review of literature showed that QOL can be measured using various instruments, each of them had its own domains and scoring methods.

Despite the differences in these instruments and scoring methods, these instruments gave a view on possible determinants of QOL among T1DM'patints.
Although some studies revealed socio-demographic determinants such as age, gender, level of education, occupation and monthly income) were associated with better QOL, others didn't find this association, the same was found in respect to lifestyle determinants such as smoking and exercise, and diabetes-related determinants such as duration of diabetes, HbA_1c values, BMI, co-morbidities and diabetes complications.

CHAPTER THREE

Conceptual Framework

3.1 Introduction

Conceptual framework is consider a basic element in the scientific research, it represents the infrastructure of any study.

3.2 Quality of life and Diabetes Mellitus

Quality of life refers to how good or bad a person feels their life to be and this emphasizes to capture the individual's subjective evaluation of their QOL and not what others imagine it to be (Singh & Bradley,2006). Health related quality of life (HRQOL) refers to those aspects of quality of life which are related to a person's health status. It is primarily concerned with that aspect of quality of life which may be affected by health and disease (Polonsky, 2000). The issues of HRQOL related to the physical, mental, and social domains of person's health, become increasingly important in health care and clinical practice (Testa and Simonson,1996).

Diabetes mellitus is a long life disease that has a great burden on individuals. The demands of self-care can be burdensome; frustrating and the impact of long-term complications can be severe, leading to major changes in a patient's ability to function in daily life which makes the patient feel worried and depressed. Also the social relationships may be greatly affected (Polonsky, 2000).

In the case of T1DM, Polonsky defined HRQOL as *"The patient's perception of the way diabetes affects his/her physical, psychological, and social functioning"*. It reflects the perceived burden of living with T1DM (Polonsky, 2000).

Diabetes mellitus and physical functioning: Physical well-being of patients is negatively affected by the development of diabetic long-term complications (such as vision loss, kidney damage, peripheral neuropathy, and heart diseases) as well as short-term complication (such as hyperglycemia and hypoglycemia) in addition to lifestyle changes due to diabetes regimen which results in impaired functioning, increased fatigue and sleep problems, additional insulin injections, as well as the undesirable weight gain and limitation in daily activities which in turn leads to a significant drop in perceived QOL (Polonsky, 2000).

Diabetes mellitus and psychological functioning: Presence of short-term complication and long-term ones, and the demands of diabetic care make the patient chronically frustrated and discouraged, helpless and always in depressed mood due to persistent

fatigue, and the sense of mortality always confirmed and his disease isn't responding to treatment (Polonsky, 2000).

Diabetes mellitus and social functioning: Quantity and quality of diabetic patient's relationships are also affected by the disease. As diabetes started, lifestyle changes begin, friends and family members begin to share in self-care of the patient over his/her willing which makes patients feel different from other people, feel alone and unsupported (Polonsky 2000).

In the current study the RAND-36 was used to assesses HRQOL multidimensionality, containing subscales focusing primarily on physical, social, and emotional functioning and general health perceptions such as the subscales general health, vitality (Hays and Morales, 2001). The physical functioning domain measures the individual limitations in physical activities because of health; role limitations due to physical health problems measure the extent to which physical health interferes with doing work or other regular daily activities; role limitations due to emotional problems measure the extent to which emotional problems interfere with doing work or other regular daily activities; emotional well-being measures the general mood or effect including depression, anxiety and positive well-being; energy and fatigue measures energetic versus tired and worn out; social functioning measures the extent to health interferes with social activities with family, friends, neighbors or group; bodily pain measures pain frequency and the extent of role interference due to pain; while general health perception measures the individual's perceptions of health in general such as feeling well or ill (Hays,1998).

3.3 Factors that affect QOL

the association of several patient characteristics, life style factors and diabetes specific factors with physical, mental, and social domains of a person's health related quality of life (HRQOL) were investigated though different studies.

3.3.1. Socio-demographic determinants:

The socio-demographic factors included age, gender, place of residence, level of education, marital status, occupation, in addition to information about the participants' (family monthly income, presence of additional resources other than the patients' or his family work as well as parent's level of education). These factors were studied by (Ingersoll et al., 1991; Rubin &Peyrot, 1999; Faulkner, 2003; Huang et al., 2004; Issa & Beiyewu, 2006; Gonen et al., 2007; de Wit et al., 2007; and Imayama 2011).

3.3.2. Lifestyle determinants:

The lifestyle factors included smoking status, following special diet for diabetes, and physical activity such as playing sports, walking and running. These factors were studied by 9Gonen et al.,2007; and Imayama,2011).

3.3.3. Diabetes-related determinants:

These included the body mass index (BMI) which was calculated from the formula weight in kg/ height in merter^2, the duration of diabetes mellitus which was calculating subtracting age at diagnosis from the current age of the participant, the value of HbA_1C,

the number of insulin injections per day, presence of diseases other than diabetes, the presence of chronic diabetic complications (retinopathy, neuropathy, cardiovascular diseases, and nephropathy), the presence of acute diabetic complications (hypoglycemia and hyperglycemic episodes in the last four weeks), the need for hospitalization because of DM or its complications, and the compliance of regular visits to diabetic clinic. The effect of these factors on QOL was studied by (Eiser et al., 1992; Guttmann et al., 1998; Rubin & Peyrot, 1999; Huang et al., 2004; Issa & Beiyewu, 2006; de Wit 2007; Gonen et al., 2007; Naughton et al., 2008; Solli et al., 2010; and Imayama 2011).

3.4 Conceptual framework of the study

The following conceptual frame work was developed after reviewing the literature for QOL definition, measurements and the factors that may affect it and considered as possible determinants of QOL (Figure 3.1):

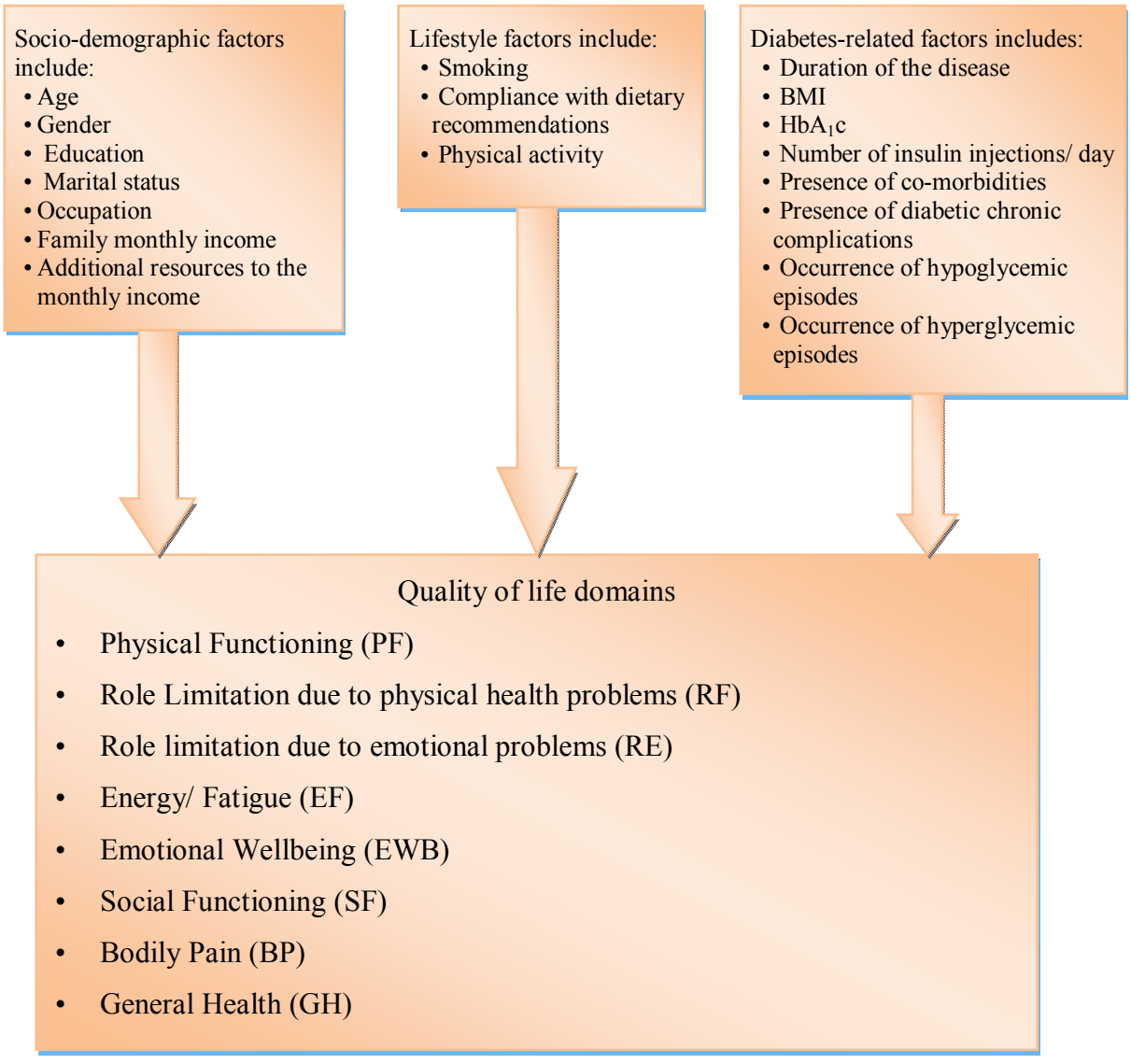

Figure (3.1): Factors affecting the QOL in patients with T1DM based on the literature review.

3. 5 Operational Definitions

Physical Functioning (PF) domain	Items that measures the individual limitations in physical activities because of health. It is measured by calculating the average of 10items (3,4,5,6,7,8,9,10,11, and12) of the RAND SF-36 (Hays, 1998).
Role Limitation physical (RF) domain	Items that measure the extent to which physical health interfere with doing work or other regular daily activities. It is measured by calculating the average of 4 items (13, 14, 15, and 16) of the RAND SF-36 (Hays, 1998).
Role Limitation emotional (RE) domain	Items that measure the extent to which emotional problems interfere with doing work or other regular daily activities. It is measured by calculating the average of 3 items (17, 18, and 19) of the RAND SF-36 (Hays, 1998).
Bodily Pain (BP) domain	Items that measure pain frequency and the extent of role interference due to pain. It is measured by calculating the average of 2 items (21, and 22) of the RAND SF-36 (Hays, 1998).
Social functioning (SF) domain	Items that measure pain frequency and the extent to which health interfere with social activities and family, friends, neighbors, or groups. It is measured by calculating the average of 2 items (20, and 32) of the RAND SF-36 (Hays, 1998).
Emotional well-being (EWB) domain	Items that measure general mood or affect, including depression, anxiety, and positive well-being. It is measured by calculating the average of 5 items (24, 25, 26, 28 and 30) of the RAND SF-36 (Hays, 1998).
Energy/ fatigue (E/F) domain	Items that measure feeling energetic versus tired and worn out. It is measured by calculating the average of 4 items (23, 24, 29, and 31) of the RAND SF-36 (Hays, 1998).
General Health (GH) domain	Items that measure the individual's perception of health in general, such as feeling well or ill. It is measured by calculating the average of 5 items (1, 33, 34, 35,and 36) of the RAND SF-36 (Hays, 1998).
Age	Age of the participants at the time of data collection.
Education	number of years of school completed at the time data collection.
Physical activity	Regular moderate intensity physical activity – such as walking, cycling, or participating in sports
Body-mass index (BMI)	Body-mass index was calculated as the weight in kilograms divided by the height in meters squared (weight(kg)/[height(m)]$_2$).

Chronic diabetic complications	Neuropathy, Retinopathy, Nephropathy, and Cardiovascular disease.
Other health problems than diabetes	Diseases such as musculoskeletal (arthritis, low back pain), and/or respiratory diseases

CHAPTER FOUR

Study Methodology

4.1 Introduction

This study focused on the quality of life and its determinants among type 1 diabetic patients attending at the diabetic clinics in the governmental primary health care centers of the northern districts of West Bank. In this chapter the methodology is presented. The study design, study setting, study population, sampling, study tool, as well as data analysis are discussed.

4.2 Study design

A descriptive cross sectional study design was used to conduct this study in its focus on the QOL including its different domains among T1DM in the study settings.

4.3 Study setting

This study was carried out through the governmental primary health care clinics (PHC) that provide care and follow up for T1DM in the northern districts of the WB which includes Jenin, Nablus, Tulkarm, Qalqelia, Salfit, and Tubas. In these districts a total of six clinics were identified, one for each district, and all were selected for the study purpose.

4.4 Study population

All patients diagnosed with T1DM and whose age 14 years and above and currently registered and receiving treatment at the governmental primary health care clinics in the northern districts of the West Bank. The number of those patients was 728 cases.

4.4.1 Inclusion criteria:

From the total number of T1DM patients who had files opened for receiving care and treatment at the clinics, people were selected for the sampling frame to compare the target population based on the following criteria:

1- The patients were Type 1 diabetic patients who aged 14 years and above.

2- T1DM patients with the disease since at least one year.

3- T1DM patients who had regular visits to the diabetic clinic for check up and treatment. Regular visits were considered according to the appointments given to the diabetic patients by the nurse according to the amount of insulin decided by the diabetic doctor.

4- Subjects can communicate verbally with the researcher.

4.4.2 Exclusion criteria:

At the beginning of the study, a total number of 911 patients from all ages were registered at the primary health care clinics in the six districts of the West Bank. After reviewing the medical files, 787 subjects aged 14 years and above were selected. 57 subjects were excluded from the study because:

1- They had history of other chronic diseases (thalacemia and sickle cell anemia)before being diagnosed as T1DM' patient.

2- They were diagnosed with T1DM for less than one year.

3- They weren't being able to response due to mental illness.

4- They didn't come to follow up and receiving treatment because they did so in the UNRWA clinics.

4.5 Study Sampling

The study sample was determined as follows:

4.5.1 Sample size determination:

The study population met inclusion criteria included 728 eligible type1 diabetic patients attending the governmental primary health care centers diabetic clinics in the northern districts of West Bank. From those eligible subjects a systematic random sample of 252 subjects was selected. The sample size was determined based on the formula described by the WHO :

$$Sample\ size\ (ss) = (Z^2 * (p) * (1-p)) / C^2$$

Where: Z = Z value (e.g. 1.96 for 95% confidence level), p = percentage picking a choice, expressed as decimal (.5 used for sample size needed), c = confidence interval, expressed as decimal (0.05).

The correction of the final calculation as follows:

$$New\ sample\ size\ (ss) = ss / 1+((ss-1) / population))$$

4.5.2 Sampling procedure:

For the sample to be representative to the districts, the proportion (34.5%) of eligible number of patients in the district diabetic clinics relative to the total eligible patients in the sample frame were calculated. Then the district was allocated the same proportion from

the total sample size. A total of 252 subjects distributed as follows, Jenin 95, Nablus 66, Tulkarm 54, Qalqilya 10, Salfit 13 and Tubas 13 were chosen.
By using the method of systematic random sampling, each subject of the sample frame was given a serial number and then the sample interval (fraction) was determined by dividing the total population size (N) on the sample size of the study (n) which yielded a sampling interval of 2.7 for this study, this was rounded to 2 as described by Trochim (2006). 9 subject refused to participate in the study, so they were excluded from the study (table 4.1).

Table (4.1): Distribution of the study sample in the area of study

District	Study Population (T1DM patients ≥ 14 years)	Study sample required	No. of remained subjects
Jenin	275	95	92
Nablus	191	66	68
Tulkarm	157	54	54
Qalqelia	29	10	8
Salfit	38	13	12
Tubas	38	13	11
Total	728	252	245

4.6 Ethical considerations

Formal approval was obtained from the concerned authorities at the Palestinian Ministry of Health (PMOH) to conduct the study. Subjects were asked to sign the consent form (Appendix A) after explaining the study details and procedures to them. The participants and their families were assured that their names and responses would be confidential. All participants have been informed that, their participation is entirely voluntary, and that even after the researcher-administrator questionnaire begins they can refuse to answer any specific question and that they have the right to terminate filling the questionnaire at any time. They have also been informed that, neither their participation nor their refusal to answer any question will have any effect on their right for receiving health care services from the MOH.

4.7 Study tools or instruments

Based on the study design used, the researcher used the medical files of T1DM patients attending the study settings, as well, mean of questionnaire was used as instruments to collect the required data for this study. Questionnaire were submitted to the patients and were filled in with the help of the researcher to collect the data from the participants themselves. This procedure of questionnaire filling helps the respondent to respond more easily as well as it helps the researcher to gather and summarize responses more efficiently (Trochim, 2006).

4.7.1. Medical files:

All sampled subjects' medical files were systematically reviewed to obtain basic identification information. These information include: HbA_1c values based on the criteria followed by the PMOH, number of injections per day, onset of the disease, duration of the disease, presence of diabetes co-morbidities (hypertension, high cholesterol levels, joints pain, and sleeping problems), as well as the presence of chronic diabetic complications (CVD_S , nephropathy, retinopathy and neuropathy) and the last visit the participant attended to the diabetic clinic was also noticed. The required information were fully recorded except the variable duration of the disease, so it was calculated by the researcher.

4.7.2. Patient information sheet:

Information on the possible socio-demographic determinants of QOL was obtained for each patient by mean of questionnaire that was developed by the researcher himself to collect personal data from the participants. This sheet was developed after extensive review of the available literature on T1DM and QOL. The sheet (Appendix B) has covered the following areas of interest:

1- Demographic data including, age, gender, marital status, level of education accomplished.

2- Socioeconomic status including, current occupation, monthly income, other resources of income.

3- Lifestyle status including, smoking, diet and physical activity.

4- Diabetes-related information including, height, weight, episodes of hyperglycemia and hypoglycemia.

4.7.3. Quality of life questionnaire:

A comprehensive measure of HRQOL would include items assessing physical, mental, and social domain of life (Hays and Morales, 2001).The HRQOL is measured either by Disease-targeted HRQOL measures that are applied to a particular disease such as diabetes or cancer, or by Generic HRQOL measures that are applied to anyone, the later had two basic forms: preference-based and profile based. In the preference-based measures such as the EQ-5D, Assessment of Quality of Life (AQOL), and Health Utility Index (HUI), a single summary score that cuts across the multiple domains of HRQOL is produced, while in profile measures multiple scores are produced on the multiple domains of HRQOL such as the RAND-36 (Hays and Morales, 2001) which was used in this study.

The RAND 36-Item Health Survey 1.0 (RAND-36) is comprised of 36 items selected from large number of items used in the RAND Medical Outcome Study (MOS) that assess eight domains of health; Physical Functioning (10 items) which considers limitation in performing daily activities as walking stairs, bathing, or dressing one's self, or carrying groceries as a result of a health problem, Role Limitation (physical problems; 4 items) that measures problems with work or other daily activities as a result of physical health during the last 4 weeks, Role Limitation (emotional problems; 3 items) which considers role limitation due to emotional problems, Energy / Fatigue (4 items) considers feelings of

energy and tiredness, Mental Health (5 items) that contains questions about feelings of depression and nervousness, Social Functioning (2 items) that considers limitations in social activities such as visiting friends or relatives, Pain (2 items) considers the amount of pain and limitations due to bodily pain , and the General Health Perceptions (5 items) which measures the subjective evaluation of their own general health status, and finally, an additional item, that isn't included in any of the eight domains, was added considering health change, referring to general health compared to 1 year ago. The eight domains are then summarized into three summary domains; physical, mental and global health summary scores (Hays, 1998). The RAND website and manual explains in details the questions measuring each dimension, scoring and calculating of QOL. Briefly, raw RAND-36 scores on the eight domains are linearly converted to 0– 100 scales with higher scores indicating better quality of life. Aggregate scores are compiled as a percentage of the total points possible, using the RAND scoring table. The scores from those questions that address each specific area of functional health status are then averaged together, for a final score within each of the eight domains measured such as pain, physical functioning (Hays, 1998).

A translated Arabic version of RAND-36 Health Survey is available for free use on the RAND Website. This Arabic form, which was used in this study (Appendix C),was validated by both Sabbah et al., (2003) and Alabdulmohsin et al., (1998) and found to be valid for use for Arabic speakers (Sabbah et al., 2003. Alabdulmohsin et al., 1998).

Rational for using the Rand-36 questionnaire: The RAND SF-36 is a brief questionnaire that has been well validated in the social science and medical literature, and is being used extensively around the world as a tool for assessing clinically relevant patient outcomes which is available for free use by the RAND website. This questionnaire is widely used in many countries and has been translated into many languages and proved to be valid and reliable.

Although the RAND-36 questionnaire consists of more items and takes longer to complete than other instruments, it is very sensitive to changes in HRQOL in a cohort of patients with T1DM and provides information about diabetes-specific associations with HRQOL. The RAND mental summary score (MCS) was associated with a change in a diabetes-specific characteristic and the onset of micro-vascular complications was associated with a decrease in MCS, while the PCS will be influenced negatively later. The generic and diabetes-specific instruments show low correlations and identify for the most part different patients with the lowest HRQOL (Hart et al., 2007).

4.8 Data collection

After the necessary permission was obtained from the concerned authorities to conduct the study, the researcher met with the physicians and the nurses in charge of the diabetic clinics in the six governmental primary health care centers in the northern districts of the West Bank, and the purpose of the study was explained to them and their assistance was requested in recruiting the subjects. The subjects who met the inclusion criteria were selected as potential participants for the sampling frame of the study. The selected subjects were informed via phone; by the their diabetic nurse; and the study objectives were discussed to them to attain their agreement. Subjects were willing to participate in the study, so they were asked to come to the diabetic clinic to fulfill the questionnaire.

4.9 Pilot testing

The data collection instruments; the demographic sheet and the QOL questionnaire; were both field tested on 25 subjects from the six diabetic clinics in the governmental primary health care centers in the northern districts of the West Bank, for any considerations or modifications needed before carrying out the study. All those who were pilot tested were excluded from the study. The goals of the pilot study were to assess the adequacy of the data collection plan, to identify any part of the instrument that might need revision and refinements or might be objectionable or culturally incongruent in order to minimize the problems which may be raised during data collection.

4.10 Data analysis

The collected data was coded then entered, cleaned and analyzed using the statistical package for social science (SPSS version 15.0). Descriptive statistics such as frequencies, percentages, means and standard deviations, summary scores for each participant were calculated then inferential tools within the program were used to make comparisons and inferences on association; t-test, and ANOVA were used to describe the variables of the study and their association with the QOL scores to find out if they could be considered as determinants for these scores. General Linear Model (univariate analysis) was used for confirmation of the results. These inferential methods were used based on the large sample size that fit the requirements of the central limit theorem (Witt & Witt, 1997) and the findings of Torrance et al., (2009).

CHAPTER FIVE

Study Results

5.1 Introduction

In this chapter the results of the data analysis are presented. The sample characteristics were first described followed by bivariate and univariate analysis testing for the variables associated with the QOL domains.

5.2 Response rate

The study sample composed of 252 subjects diagnosed with T1DM attending at the six governmental primary health care centers located in the northern districts of the West Bank, in which the data was collected. 245 subjects were studied (9 subjects refused to participate in the study). Therefore, the response rate was 97.2%.

5.3 Characteristics of the sample

The general characteristics of the sample and variables studied are presented in this section; they included socio-demographic variables; Lifestyle variables and diabetes-related variables.

5.3.1. Socio-demographic characteristics:

Socio-demographic variables included participant's age, gender, marital status, participants' level of education, current occupation, family monthly income, additional family resources rather than monthly income.

Age

At the time of data collection the age of the participants ranged between 14 and 58 years old with a mean of 25.2 years and standard deviation of 8.37. The results showed that 25.3% were at the age group (14 – 18), 45.7% were at the age group (19 – 29), 21.4% were at the age group (30 – 39), and 7.3% were above 40 years old (Table 5.1).

Gender

Both genders were represented in the sample, males were 119 (48.6%), while 126 (51.4%) were females (Table 5.1).

Participants' education

Participants who were illiterate composed 1.6% (n=4), while 6.5% had primary level of education composed 24.9% finished preparatory level of education, 35.9% of the participants finished secondary education, and 31% finished academic degree (first university degree and above) (Table 5.1).

Marital status

The main proportion (65.5%) of the participants were currently not married (single 62%, divorced 1.2%, widowed 1.2%) at the time of the study, while married participants composed only 35.5% (Table 5.1).

Current occupation

The distribution of participants by their current occupation showed that 9.8% were governmental employees, 2.9% worked in private sectors establishments, 10.2% were independent freelancers, 2.4% were farmers, 18.8% were housewives, 13.1% were unemployed, 34.4% of the participants were students, and 8.6% were unskilled workers (Table 5.1).

Family monthly income

Concerning family income, participants whose family monthly income was less than 1000 NIS represented 18%, participants whose family monthly income ranged from 1000 to 2000 NIS represented 44.5%, families with income of 2001-3000 NIS represented 21.6% and only 15.9% had a monthly income more than (3000NIS) (Table 5.1.b), in addition to that, a proportion of 11.4% of the participants reported to have additional resources of income other than their family monthly income, (Table 5.1).

5.3.2. Lifestyle characteristics:

The lifestyle variables studied in this study were smoking status, physical activity status, and compliance with dietary instructions of the participants.

Smoking status

The results on the current smoking status showed that 18.8% of the participants were smokes, while 81.2% non-smokers (Table 5.1).

Compliance with dietary instructions

Related to their diet, a proportion of 52.7% of the participants said that they currently followed a special diet for diabetes mellitus according to the medical instructions, while 47.3% said that they didn't follow the instructions (Table 5.1).

Physical activity

Participants who responded positively to the question about practicing walking, running and swimming accounted only for 61.2% of the sample (Table 5.1).

5.3.3. Diabetes-related characteristics:

Participants' diabetes-related variables that were studied and collected from the patients' files included duration of diabetes since diagnosis, body mass index (BMI) of the participant, the value of the last HbA_1c test, number of insulin injections per day, the presence of health problems other than diabetes(co-morbidities), the presence of one or more of the chronic diabetic complications (retinopathy, neuropathy, nephropathy, and cardiovascular disease), and occurrence of hyperglycemic and hypoglycemic episodes four weeks prior data collection that were self reported.

Duration of the disease

The results showed that 29% of the participants had been diagnosed for diabetes for less than 5 years, 28.2% had diabetes for 6 to 10 years, 17.6% had diabetes for 11 to 15 years, and 25.3% had diabetes for more than 15 years (Table 5.1).

Body mass index (BMI)

Following the Palestinian guidelines for diagnosis and management of diabetes mellitus (2003), a proportion of 5.7 % of the participants were diagnosed as very underweight with BMI less than 18, 10.6% were underweight with BMI ranged from 18.8 to 19.9, about 40.4% of the participants had healthy weight with BMI ranged from 20 to 25, 26.9% were overweight with BMI ranged from 25.1 to 29.9 %, while a proportion of 11% were diagnosed as obese with BMI ranged from 30 to 40, and the remained proportion 5.3% were very obese; their BMI was more than 40. Since the proportion of the participants who were very underweight was small, it was aggregated to those who were underweight to form a proportion of 16.3%, and those who were obese and very obese were aggregated to overweight participants to have a proportion of 43.2% (Table 5.1).

Metabolic control

With relation to metabolic control of diabetes measured by glycosylated hemoglobin (HbA_1c) level according to PMOH (2003), the files of the participants review of the last HbA_1c showed that 25.7% of the participants had an HbA_{1C} value of less than 8 (which is an acceptable control), while74.3% had a value of HbA_1c 8 or more (which is a poor control) (Table 5.1).

Number of insulin injections per day

The files of the participants review showed that a proportion of 8.6% of the participants inject themselves with insulin once daily to control their blood sugar level, 41.6% inject themselves twice daily, 37.6% inject themselves with insulin three times daily, while 12.2% inject themselves with insulin more than three times per day (Table 5.1).

Presence of health problems other than diabetes mellitus (co-morbidities)

The files of the participants review showed that presence of one or more of health problems other than DM (hypertension, high cholesterol levels, respiratory diseases or infections, joints pain and sleeping problems) were present in 26.5% of the participants, while the remaining proportion 72.5% had no co-morbidities (Table 5.1).

Chronic diabetic complications

Concerning chronic diabetic complications, the files of the participants review showed that a proportion of 20.4% of the study sample had one or more of the investigated diabetic complications; these were distributed as 9.4% with retinopathy, 11.4% with neuropathy, 1.6% with cardiovascular diseases (CVD's) and 6.5% with nephropathy. The remaining 79.6% of the participants didn't have any of these complications (Table 5.1).

Acute diabetic complications

Regarding the reporting of occurrence of acute diabetic complications a proportion of 43.7% of the study sample reported being exposed to hypoglycemic episodes during the four weeks prior to data collection (such as having symptoms of sweating, anxiety, hunger, and sleepiness), while hyperglycemic episodes during the four weeks prior to data collection (such as having symptoms of more urine output than usual, increased thirst, dry skin and mouth, fatigue, drowsiness, or no energy) was reported by 45.3% of the participants (Table 5.1).

Table 5.1: Distribution of the study sample according to the socio-demographic, lifestyle and diabetes-related characteristics of its subjects

Characteristics of the study sample			N (%)
Socio-demographic characteristics	Age group of the participants (years)	14 - 18	62 (25)
		19 - 29	112 (45.7)
		30 - 39	53 (21.6)
		≥ 40	18 (7.3)
	Gender	Male	119 (48.6)
		Female	126 (51.4)
	Level of education	Illiterate	4 (1.6)
		Primary	16 (6.5)
		Preparatory	61 (24.9)
		Secondary	88 (35.9)
		Academic	76 (31.0)
	Current occupation	Governmental Employee	24 (9.8)
		Private establishment Sector	7 (2.9)
		Self-employed	25 (10.2)
		Farmer	6 (2.4)
		Housewife	46 (18.8)
		Unemployed	32 (13.1)
		Student	84 (34.3)
		Unskilled worker	21 (8.6)
	Marital status	Married	87 (35.5)
		Not currently married	158 (64.5)

Continue…….

	Family monthly income	< 1000	44 (18.0)
		1000 – 2000	109 (44.5)
		2001 – 3000	53 (21.6)
		> 3000	39 (15.9)
	Family additional resources of income	Yes	28 (11.4)
		No	217 (88.6)
Lifestyle characteristics	Smoking status	Yes	46 (18.8)
		No	199 (81.2)
	Compliance with dietary recommendations	Yes	129 (52.7)
		No	116 (47.3)
	Physical activity (walking ,running, swimming)	Yes	150 (61.2)
		No	95 (38.8)
Diabetes-related characteristics	Diabetes duration in years	< 5	71 (29.0)
		5 – 10	69 (28.2)
		11 – 15	43 (17.6)
		> 15	62 (25.3)
	BMI	< 19.9	40 (16.3)
		20 – 25	99 (40.4)
		> 25	106 (43.2)
	HbA_1 c	Acceptable control (< 8)	63 (25.7)
		Poor control (> 8)	182 (74.3)
	Number of insulin injections / day	Once	21 (8.6)
		Twice	102 (41.6)
		Three times	92 (37.6)
		> Three times	30 (12.2)
	Presence of health problems other than diabetes mellitus	Yes	65 (26.5)
		No	180 (73.5)
	Presence of one or more of chronic diabetic complications	Yes	50 (20.4)
		No	195 (79.6)
	Occurrence of hypoglycemic episodes within the four weeks prior	Yes	107 (43.7)
		No	138 (56.3)
	Occurrence of hypoglycemic episodes within the four weeks prior	Yes	111 (45.3)
		No	134 (54.7)
	Total		245 (100%)

5.4 Description of quality of life domain measures

The items that described and assessed the level of QOL for the participants over the past 4 weeks included 36 items (the RAND-36 version 0.1). The RAND-36 covers the following eight sub domains: The mean score and the median for the QOL domains were calculated and the results showed that the bodily pain domain (BP) had the highest mean of 75.64% and the GH domain had the lowest mean score (51.73%).

The physical functioning (PF) mean was 74.57%, social functioning (SF) mean was 71.88, role limitation due to physical health problems (RF) domain mean was 66.42%, role limitation due to emotional problems (RE) mean was 63.26%, emotional well-being (EWB) domain mean was 58.82%, energy/ fatigue (E/F) domain mean was 58.69%, and the additional item that assessed changes in perceived health had a mean score of 62.85%

(Table 5.2). Regarding the median, the PF domain had the highest median value (90), and the GH domain had the lowest value (55). the median for the bodily pain domain (BP) was 80, social functioning (SF) median was 75, role limitation due to physical health problems (RF) domain median was 75, role limitation due to emotional problems (RE) median was 66, emotional well-being (EWB) domain median was 56, energy/ fatigue (E/F) domain median was 60.

Table (5.2): Description of means, median and standard deviation of the RAND-36 QOL sub-domains

QOL domains	Mean score	Median	Std. Dev.
physical functioning (PF)	74.57	90	26.43
role limitation due to physical health problems (RF)	66.42	75	34.44
role limitation due to emotional problems (RE)	63.26	66	40.84
energy/ fatigue (E/F)	58.69	60	19.38
emotional well-being domain (EWB)	58.82	56	19.77
social functioning(SF)	71.88	75	22.77
Pain (BP)	75.64	80	24.65
general health (GH)	51.73	55	19.66
General Health change	62.85	75	24.75

5.5 Quality of life determinants

Possible determinants of health related quality of life were divided in the analysis into socio-demographic factors, lifestyle factors and diabetes-related factors. The sections 5.5.1 through 5.5.3.7 show the results for the analysis to detect possible relationship of the factors with QOL. Only factors associated with at least one of the eight domains are represented in this section. Factors none significantly associated with any of the domains are presented in Appendix (D). For the significant associations only mean, standard deviation, test statistic and p-value are presented in Appendix (E).

5.5.1. Socio-demographic factors and QOL:

The socio-demographic factors of the study sample were analyzed with regard to their potential relationship with the Quality of life eight domains.

While performing T-test or One-Way ANOVA to assess the relationship with age of the participants, gender, marital status, current occupation, family monthly income, and duration of diabetes mellitus, no significant association was found between these above mentioned variables and any of the eight domains of QOL. Tables and results of this analysis are shown in Appendix (D). The below description is only for the factors that were found significantly associated with at least one domain which are participants' level of education, presence of additional resources than family monthly income, smoking

status, compliance with special diet for diabetics according to medical instructions, physical activity and exercise, BMI of the participants, HbA_1c levels, number of insulin injections per day, presence of health problems other than DM, occurrence of hypoglycemic episodes, occurrence of hyperglycemic episodes, presence of one or more of diabetic complications. Table (5.3) showed the associated variables with each domain and its p- value.

5.5.1.2 Participants' level of education:

Participants' level of education was found to be significant associated with only the EWB domain (p 0.005) (table 5.3).One-Way ANOVA test detected a significant negative association was detected between the level of education and EWB domain(Appendix E). For the association of participants' level of education with EWB, LSD test was performed to test for the differences between participants' levels of education categories in relation to EWB of QOL domain(Appendix E). LSD test showed that participants who were illiterate had a higher mean score of EWB of QOL (84, p 0.013) than those who had primary, preparatory, secondary and university level of education. Participants with preparatory level of education had a high mean score on emotional well-being of QOL domain 62.09 than those with secondary level of education (p 0.012); and participants with academic level of education had a high mean score of 60.94 than those with secondary education (p 0.021)

5.5.1.3 Additional resources rather than monthly income:

Additional resources rather than monthly income had a significant relationship with the domain of role limitation due to physical health problems (RF) (p 0.007), role limitation due to emotional problems (RE) ($p < 0.0001$), and bodily pain domain (BP) (p 0.037) (table 5.3). The results of two independent samples T- test (Appendix E) showed that there was a significant negative association between the presence of additional resources rather than the monthly income and those three domains of QOL.

The mean sore of RF domain for those with additional resource was lower 37.88 than the mean score for those without these resources 33.48 (p 0.007) (Appendix E).

For role limitation due to emotional problems (RE), participants with additional resource had a slightly lower mean score 38.85 than those without these resources 39.93 (p 0.001) (Appendix E).

Similar trend of lower score for those without additional income was found in BP domain, since the mean score of this domain was lower for participants who had additional resources (66.60) than participants without the additional resources (76.80),
p 0.039 (Appendix E).

5.5.2 Lifestyle factors and QOL:

Quality of life eight domains were analyzed with regard to their potential relationship with the different socio-demographic factors of the study sample. This section shows the results of the significant associations.

5.5.2.1 Smoking status:

A significant association was found between smoking status of the participant and the role limitation due to physical health problems (p< 0.0001) and SF domains (p 0.005) (table 5.3). The results of the t-test analysis (Appendix E) showed that there was significant negative association between. The mean score of RF was as low as 49.4% among smokers compared to a mean of 70.3 for non smokers (p<0.0001). A significant positive association was detected between social functioning (SF) and smoking status , the SF mean score was 80.4 among smokers in comparison to 69.9 for non-smokers (p-value 0.005). No association was detected with the other domains(Appendix E).

5.5.2.2 Compliance with special diet for diabetics:

Following the diabetic diet requirements seems to have a positive impact on four of the domains of QOL, as well as the general health domain(table 5.3). T-test was used to assess significance of the association(Appendix E). Role limitation due to physical health problems (RF) was positively affected by following the dietary advices; mean score for the followers was 76.5 vs. 55.1 for non followers (p-value < 0.0001), following the special diet as well increased the score of role limitation due to emotional problems (RE) from 47.4 for non followers to 77.5 for the followers (p < 0.0001). Social functioning as well was affected positively by dietary requirement advices as following the diet requirements increased score from 64 for non followers to 78.9 for followers (p < 0.0001).

The same trend was observed for the mean scores of pain which increased from 68.9 to 81.6 (p < 0.0001), and for the general health domain, the mean score increased from 45.6 to 57.2 (p-value < 0.0001) (Appendix E).

5.5.2.3. Physical activity and exercise:

Physical activity and exercising seems to positively affect some QOL domains, a relationship was detected in T-test analysis between this variable and two QOL domains (table 5.3).

Participants who were physically active had a higher score in physical functioning domain (mean 77.2 for active vs. 70.3 for non active participants, p-value=0.045 and as well in energy/fatigue domain (mean of 63 for active vs. 51.8 for the non active, p < 0.0001) (Appendix E).

5.5.3. Diabetes-related factors:

Quality of life domains were analyzed with regard to their potential relationship with the diabetes-related factors of the study sample the significant results were as following:

5.5.3.1. Body mass index (BMI):

ANOVA test used to test for relationship between BMI of the participants and their QOL domains detected significant positive associations between this variable and five of the QOL domains. A significant positive association was detected with the role limitation due to physical health problems (p 0.009), role limitation due to emotional problems (p 0.001), EF domain (p 0.001), EWB domain (p 0.004), and BP domain (p 0.020) (table 5.3).

For the association of participants' BMI with the above mentioned QOL domains, LSD test was performed (Appendix E) to test for the differences between BMI categories in relation to these domains. LSD test showed that participants with healthy weight had a higher means score (73.73) on RF of QOL domain than the mean score for those who were very underweight or underweight (55), and the mean score for those who were overweight or obese (63.91). Participants with healthy weight had a higher mean score on RE of QOL 74.41 than the mean score for those who were very underweight or underweight (61.66) and those who were overweight or obese 53.45.

Participants with healthy weight had a higher means score (63.93) on EF of QOL domain than the mean score for those who were very underweight or underweight (51), and the mean score for those who were overweight or obese (56.59).

BMI was negatively associated emotional well-being, since overweight or obese participants achieved high mean score of (63.13) compared with those who were very under weight or underweight (51.90) and the participants with healthy weight (57.01). Bodily pain wasn't less important, that is BMI was positively associated with this domain, participants who were very under weight or underweight (BMI 25 or less) and participants who were with healthy weight achieved a mean score of 79.56, 79.44, respectively, in comparison to the mean score for those overweight or obese 70.61
(p 0.002) (Appendix E).

5.5.3.2. HbA_1c value:

The relationship of HbA_1c with the QOL domains was assessed by t- test. The results showed a significant positive relation with the pain domain and GH domain (table 5.3).

The mean score for the BP domain among those who had acceptable control (HbA_1c value >8) was 83.73 compared to 72.84 for those who had poor control (HbA_1c value ≥8) (p-value=0.001). Similar trend applied to the opposite with the general health domain as its mean score of 59.04 for participants with acceptable control compared to a lower mean score of 49.20 for those with poor control (p 0.001) (Appendix E).

5.5.3.3. Number of insulin injections per day:

ANOVA test showed the presence of significant association between number of insulin injections/day and role limitation due to physical health problems (RF) p <0.0001, role limitation due to emotional problems (p <0.0001), energy and fatigue of QOL domain (p <0.0001), emotional well-being (p <0.0001), SF (p 0.003), and GH domain of QOL (p 0.006) (table 5.3).

As shown in (Appendix E): for RF quality of life domain, The mean score for participants who inject themselves with insulin once daily was higher (75) compared to the mean score for those who inject themselves twice daily (57.82) and those who inject themselves more than 3 times daily (51.66) suggesting an inverse association. As for RF domain, and participants who inject 3 times daily had a high mean score (78.80) in comparison to the mean score for those who inject themselves less than twice (57.84) and more than three times per day (51.66).

Similar trends were observed for the domains RE, EF, EWB, SF and GH. The only domains that weren't associated with number of insulin injections per day were the PF and the BP domains. Details were as following; the mean score of RE quality of life domain for participants who inject themselves with insulin once daily was 90.47 compared to the mean score for those who inject themselves twice daily (51.96) and those who inject themselves more than 3 times daily (54.44), and participants who had 3 insulin injections daily had a high mean score of RE domain 72.46 in comparison to the mean score for those who inject themselves twice daily (51.96) and more than three times per day (54.44).

For EF quality of life domain, the mean score for participants who inject themselves with insulin once daily was 68.80 compared to the mean score of 56.27 for those who inject themselves twice daily and the mean score of 45.50 for those who inject themselves more than 3 times per day; as well, participants who had 3 insulin injections daily had a high mean score of EF domain (63.36) in comparison to the mean scores of 56.27% for those who inject themselves twice and 45.50 for those who inject themselves more than three times per day.

The mean score of EWB quality of life domain was higher for participants who inject themselves with insulin once daily (75.80) compared to the mean score for those who inject themselves twice daily 56.54, three times daily(64.34) and more than three times daily (37.73), and participants who injected themselves with insulin twice daily had a high mean score of EWB domain (56.54) in comparison to the mean score for those who inject themselves more than three times per day (37.73), in addition, participants with three insulin injections per day had a high mean score on EWB of QOL domain (64.34) than those who injected themselves twice daily (56.54) and more than three times daily (37.73).

Participants who injected themselves with insulin once daily reported a high mean score on SF of QOL domain (83.33) than the mean score for those who injected themselves with insulin twice daily (66.42); three times daily (75.81) and more than three times daily (70.41), also, participants who injected themselves with insulin three times daily reported a high mean score (75.81) compared to the mean score for those who inject themselves with insulin twice daily (66.42). For GH, participants who had one insulin injection daily reported a high mean score (65.23) than those who inject themselves with insulin twice daily (49.21), three times daily (50.76)and more than three times daily (53.83) (Appendix E).

5.5.3.4. Presence of health problems other than diabetes mellitus:

A T- test was used to assess whether there were significant relationships between chronic diabetic complications and QOL domains. The results showed that there was significant negative associations between presence of health problems other than diabetes mellitus (co-morbidities) and the energy/fatigue (EF) domain ($p < 0.0001$), bodily pain (BP) domain ($p < 0.0001$) and the general health domain(GH) ($p < 0.0001$) (table 5.3).

For EF, participants with co-morbidities had mean score of 48.46 in comparison to the higher mean score of 60.38 for those without co-morbidities. The same was found for BP, that is, the mean score for this domain was lower for participants with co-morbidities (65.34) compared to the mean score for those without co-morbidities (79.36). Regarding the mean score of GH for participants with co-morbidities, it was lower than for those without co-morbidities 39 vs.56.33(Appendix E).

5.5.3.5. Presence of chronic diabetic complications:

A T- test was used to assess whether there were significant relationships between chronic diabetic complications and QOL domains. The results showed that there was significant negative association between presence of chronic complications and QOL domains except for the domain physical functioning which wasn't significant (table 5.3).

Participants who had chronic diabetic complications had low mean score of RF than those without chronic diabetic complications 31.50 vs. 74.17 ($p< 0.0001$).

The mean score of RE for participants who had chronic diabetic complications was lower than the mean score for those who didn't have chronic diabetic complications 28 vs.72.30 ($p < 0.0001$). For EF, the mean score for this domain decreased for participants with chronic diabetic complications to 42, while it was 62.97 for participants without chronic diabetic complications ($p < 0.000$). Regarding EWB, the same was detected, as the mean score of this domain was low for participants with chronic diabetic complications 49.44 compared to those without chronic diabetic complications 61.23
(p 0.001), SF domain wasn't less important, since participants who had chronic diabetic complications had a mean score of 49, while those participants who didn't have these complications had a mean score of 77.65 ($p < 0.0001$). The mean score of bodily pain (BP) was low for participants who had chronic diabetic complications 58.55, while those participants who didn't have these complications had a mean score of had a mean score of 80.02 ($p < 0.0001$).

The same trend was detected for the mean score of GH, such that, participants with chronic diabetic complications had a mean score of 33.20, and participants without these complications had a mean score of 56.48 ($p < 0.0001$) (Appendix E).

5.5.3.6. Hypoglycemic episodes:

A T- test was used to detect whether there were significant relationships between presence of hypoglycemic episodes during the four weeks prior to data collection and the QOL domains. The results showed that there were significant negative associations between presence of hypoglycemic episodes during the four weeks and the physical functioning domain (PF) (p 0.036) as well as the general health domain (GH) (p 0.012) (table 5.3).

Participants who were exposed to such episodes during the four weeks prior to data collection had mean score of 70.56 on PF of QOL domain in comparison to mean score of 77.86 for those who weren't exposed to such episodes. For the GH, the mean score for participants who were exposed to hypoglycemic episodes was lower than that for those who weren't exposed to hypoglycemic episodes 48.17 vs.54.49 consecutively(Appendix E).

5.5.3.7. Hyperglycemic episodes:

A significant negative association was detected between presence of hyperglycemic episodes during the four weeks prior to data collection and all QOL domains except for the PF domain (table 5.3). These results were as following: Participants who were exposed to hyperglycemic episodes during the above mentioned period had low mean score of RF

compared to those who weren't exposed 56.98 vs.74.25 ($p< 0.0001$). The mean score of RE for participants exposed to hyperglycemic episodes was lower than the mean score for those who weren't exposed 49.54% vs.74.62 ($p < 0.0001$). For EF, the mean score for this domain decreased for participants exposed to hyperglycemic episodes from 63.88 for not exposed to 52.43 for exposed ($p < 0.000$). Regarding EWB, the same was detected, as the mean score of this domain was low for participants who were exposed to hyperglycemic episodes (54.30) compared to those who weren't exposed to these episodes (62.56), p 0.001.

Social functioning (SF) domain was also affected, since participants who were exposed to hyperglycemic episodes had a mean score of 66.42, while those participants who weren't exposed had a mean score of 76.49 ($p < 0.0001$). The mean score of bodily pain (BP) was low for participants who were exposed to hyperglycemic episodes 66.86, while those participants who weren't exposed had a mean score of 82.91 ($p < 0.0001$). The same trend was detected for the mean score of GH, such that, participants who were exposed to hyperglycemic episodes had a mean score of 44.36, and participants who weren't exposed had a mean score of 57.83 ($p < 0.0001$) (Appendix E).

Table 5.3: Associations with QOL domains in the Bivariate Analysis

Independent variables / QOL domains		**PF (P value)**	**RF (P value)**	**RE (P value)**	**E / F (P value)**	**EWB (P value)**	**SF (P value)**	**BP (P value)**	**GH (P value)**
Socio-demographic variables	Level of education	NS	NS	NS	NS	0.005	NS	NS	NS
	Additional resources	NS	0.007	< 0.0001	NS	NS	NS	0.037	NS
Lifestyle variables	Smoking	NS	< 0.0001	NS	NS	NS	0.005	NS	NS
	Diet	NS	< 0.0001	< 0.0001	NS	NS	< 0.0001	< 0.0001	< 0.0001
	Physical activity	0.045	NS	NS	< 0.0001	NS	NS	NS	NS
Diabetes- related variables	BMI	NS	0.009	0.001	0.001	0.004	NS	0.020	
	HbA1C	NS	NS	NS	NS	NS	NS	0.001	0.001
	No. of insulin injections/day	NS	< 0.0001	0.021	< 0.0001	< 0.0001	NS	NS	NS
	Co-morbidities	NS	NS	NS	< 0.0001	NS	NS	< 0.0001	< 0.0001
	Chronic complications	NS	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
	Hypoglycemia	0.036	NS	NS	NS	NS	NS	NS	0.012
	hyperglycemia	NS	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

NS: Not significant at ∞ 0.05

5.6 Univariate analysis for determinant of QOL

A univariate analysis (GLM) was used to assess for the associations detected in bivariate analysis between QOL domains and the variables of socio-demographic factors, lifestyle factors and diabetes-related factors. The model includes only variables associated with the domain in the bivariate analysis, the results were as follows:

5.6.1. Physical functioning domain (PF):

In the bivariate analysis the variables physical activity and occurrence of hypoglycemic episodes during the four weeks prior to data collection were found associated with PF domain, however, the results in table (5.4) showed that those associations lost their significance and became marginal when entered in the univariate analysis (GLM), and so none of the studied variables appeared as a determinant of the PF domain (Appendix F).

5.6.2. Role limitation due to physical health problem (RF):

Univariate analysis in table (5.4) showed that both BMI and hyperglycemic episodes lost the significant association with the role limitation due to physical health domain they presented in the bivariate analysis, while the presence of additional resources smoking status, following special diet for diabetics, being physically active, presence of hyperglycemic episodes, presence of chronic complications and number of insulin injections per day remained significantly associated with this particular domain.

Presence of resources additional to the monthly income remained negatively associated with RF(Appendix F). Participants who had additional resources to the monthly income had low mean score for RF domain of 36.39 (F 4.45 and P value 0.036), while those who didn't had additional resources had a higher mean score of 47.60. This variable could have explained about 2% of the variability in this domain score as it partial eta square showed.

Smoking remained negatively associated with the mean score of role limitation due to physical health (F28.83, P<0.0001) (Appendix F). The mean score for RF was (28.61) for smokers versus 55.37 for nonsmokers. This variable appeared as the second strongest predictor and could have explained about 11% of the variability in the domain.

The mean score of RF remained positively associated with following special diet for diabetics, since the followers had a mean score of (50.33) while the non follower had a mean score of 33.66 (F 19.96, P< 0.0001) (Appendix F). This variable could have explained about 8% of the variability in the domain.

Number of insulin injections per day remained negatively associated with RF of QOL (F7.52; P <0.0001) (Appendix F), this is because participants who inject themselves with insulin once daily had a mean score more of (58.80) which is higher than the mean score for those who injected themselves twice daily (43.56), three times daily (44.53) or more than three times daily (21.08). This variable could have explained 9% of the variability in this domain.

Another negative association was confirmed, that is the relation of presence of chronic complications with role limitation due to physical health domain (F 60.44, P<0.0001) (Appendix F), participants with one or more of diabetic chronic complications had a very

low mean score (24) of RF versus (59.99) for those who didn't have chronic complications. This variable appeared as the strongest predictor of RF score among all associated variable as it could have explained about 21% of the variability in the domain. In total, the model could have explained about 43% of the variability in the score.

5.6.3. Role limitation due to emotional problems (RE):

The associations detected in the bivariate analysis between the presence of additional resources other than monthly income, following special diet for diabetics, BMI of the participants, number of insulin injections per day, occurrence of hyperglycemic episodes, and presence of diabetic complication with RE domain were investigated using GLM (univariate). As shown in table (5.4) all tested variables remained significantly associated with the role limitation due to emotional problems except for occurrence of hyperglycemic episodes.

There was a significant negative association between RE domain and the presence of additional resources other than monthly income (F 13.43, P <0.0001). Participants who had additional resources had lower mean score of RE domain versus those who didn't have additional resources (34.32 vs. 58.26). This variable could have explained 5% of the variability in this domain(Appendix F).

Participant who follow special diet for diabetics had significant positive association with the RE domain (F 28.03, P <0.0001). The mean score of RE domain for the followers was (58.49 vs. 34) for the non followers. This variable could have explained 11% of the variability in this domain(Appendix F).

The results of this analysis also showed that BMI remained to be associated with the RE domain (F 7.64, P 0.001). Participants who were underweight or very underweight and those who had healthy weight had higher mean score of 55.55; 49.28 respectively for RE domain compared to the mean score for those who were overweight or obese 34. This variable could have explained about 6% of the variability in this domain(Appendix F).

Number of insulin injections per day persisted negatively associated with RE (F 7.82; P <0.0001), since the mean score of 68.52 for RE for participants who inject themselves once daily was higher than the mean score for those who inject themselves twice daily (47), three times daily (48.69) or more than three times daily (20.8).This variable could have explained 9% of the variability in this domain(Appendix F).

Presence of diabetes chronic complications also had a significant negative association with RE domain (F30.10, P<0.0001). This association was the strongest among the associated variables as it had partial squared eta of 0.119. Participants with chronic diabetic complication had mean score of 23.18 vs. 55.40 mean score of those without chronic complication(Appendix F).

In total, the model could have explained 38% of the variability in domain score (adjusted R^2 0.381).

5.6.4. Energy / Fatigue Domain:

Univariate analysis was used to confirm for the relationships between the Energy Fatigue domain and physical activity, presence of co-morbidities, hyperglycemia, presence of chronic diabetic complications and BMI. The results in table (5.4) showed that BMI of the participants and occurrence of hyperglycemic episodes lost the significance of their association with EF of QOL domain, while the significant positive association detected in the univariate analysis between EF domain and physical activity remained consistent (F 18.26, P <0.0001). Appendix (F) showed that being physically active raised the mean score of EF to 56.66 compared with non- physically active who had a mean score of 45.68. This variable could have explained about 7% of the variability in this domain.

The negative significant association between number of insulin injections per day and EF domain was also confirmed (F 7.27, P <0.0001) (Appendix F). The mean score of (59.88) for participants who inject themselves once daily was higher than the mean score for those who had been injected with insulin twice (46.5) or more than three times daily (43.76), in addition, those who inject themselves with insulin three times daily had a higher mean score of (54.53) on RF of QOL domain compared to the mean score for those who had been injected with insulin twice or more than three times daily but not for those injecting once daily. This variable is the strongest predictor in the model, since it could have explained 9% of the variability in this domain.

Another negative relationship found between EF domain and presence of health problems rather than DM (co-morbidities) was confirmed (F 20.44, P < 0.0001) (Appendix F); such that the participant who had co-morbidities had a low score of EF domain 45.27 in comparison to the mean score for those without co-morbidities (57). This variable could have explained about 8% of the variability in this domain.

The negative association was also confirmed between chronic diabetic complications and EF (F 2021, P < 0.0001). Participants who suffered from chronic diabetic complications marked a low mean score of EF domain 44.83; while absence of chronic diabetic complications resulted in a higher mean score of 57.5. This variable could have explained about 8% of the variability in this domain. The model, with all associated variables, could have explained 37% of the variability in the domain score (adjusted $R^2 = 0.373$) (Appendix F).

5.6.5. Emotional well–being domain (EWB):

Univariate analysis tested for the relationships between EWB domain and participant level of education, presence of hyperglycemic episodes, presence of chronic diabetic complications and BMI of the participants. The results table (5.4). showed that no significant associations persisted between EWB domain and BMI as well as the occurrence of hyperglycemic episodes. However, the significant positive association between participants' level of education and EWB (F 2.53, P 0.041) detected in the bivariate analysis remained,such that participants who were illiterate had a higher mean score on EWB of QOL 73.93 than the mean score for those with secondary and university levels of educations (51.7%, 55.47) respectively.

In addition, participants with preparatory education had a higher mean score of 58.31 than the mean score for those with secondary education 51.7. This variable could have explained about 4% of the variability in this domain(Appendix F).

The negative significant association between number of insulin injections per day and EWB domain of QOL was confirmed (F 15.73, P <0.0001) (Appendix F), since participants who inject themselves once daily had a higher mean score (71.69) than those who inject themselves with insulin twice daily (59.95) or more than three times daily (40), as well, participants who inject three times daily reported a mean score of 64.32. This variable was the strongest predictor for the domain score among all as its partial eta squared showed.

.A significant negative relationship between EWB domain and diabetic complications was detected (F 8.85, P 0.003). Participants who suffered from chronic diabetic complications had a low mean score of EF domain (54.53); while those who didn't had chronic diabetic complications had a higher mean score (63.48). This variable could have explained about 4% of the variability in this domain (Appendix F). This model was able to account for about 28% of variability in the mean score (adjusted $R^2 = 0.280$).

5.6.6. Social Functioning Domain (SF):

The relationships between the social functioning domain and smoking status, following special diet for diabetics, number of insulin injections per day, occurrence of hyperglycemic episodes and presence of chronic diabetic complications detected in the bivariate analysis were tested by using the univariate analysis. The result shown in table (5.4) revealed that the number of insulin injections per day, and presence of hyperglycemic episodes lost the significance of their association with SF of QOL domain. The results also revealed that there was a significant positive association between smoking status and SF domain (F 8.11, P 0.005), such that the mean score of SF for smokers was (68.53) versus nonsmokers (58.83). This variable could have explained about 3% of the variability in this domain(Appendix F).

Participants who followed special diet for diabetics had a mean score of 70.18 for the SF domain, while the followers had a mean score of 57.17, this association was significantly positive (F 25.11, P < 0.001). This variable could have explained about 10% of the variability in this domain(Appendix F).

A significant negative association was found between Presence of chronic diabetic complications and SF domain (F 53.42, P < 0.001), since the participants who had one or more of the chronic diabetic complications had a low mean score (51.65), while those who had no chronic diabetic complications had a higher mean score of 75.70. This variable was the strongest predictor for the domain score among all (explained 19%) as its partial eta squared showed (Appendix F).

This model was able to account for about 35% of variability in the mean score (adjusted $R^2 = 0.352$).

5.6.7. Bodily Pain Domain (BP):

The univariate analysis test was used to assess the associations between bodily pain and the presence of additional resources other than monthly income, diet regimen, presence of co-morbidities, presence of hyperglycemic episodes, presence of one or more of chronic diabetic complications, HbA_1c and BMI of the participants. As shown in table (5.4), the significant association has been lost between BP and presence of additional resources. The association between following special diet for diabetics and BP in QOL domains remained significantly positive (F 12.96, P < 0.001). Participants who followed special diet for diabetics had a mean score of 75.55 for the BP domain, while the non followers had a mean score of 63.08. This variable could have explained about 5% of the variability in this domain(Appendix F).

The significant negative association consisted between BMI of the participants and BP of QOL domain (F 3.46, P 0.033), since participants who were very underweight or underweight (BMI less than 19.9) achieved high mean score of 75.28 in comparison to those who were overweight or obese who achieved a mean score for BP of 65.32. This variable could have explained about 3% of the variability in this domain (Appendix F).

Another significant negative association was found between HbA_1c and BP (F 8.38, P 0.004), such that participants with acceptable control (HbA_1c levels less than 8%) had higher mean scores of BP 74.94 than those with Poor control (HbA_1c levels 8% or more) the mean score was 65.69. This variable could have explained about 4% of the variability in this domain(Appendix F).

A significant negative association was found between health problems other than DM (co-morbidities) and BP (F 8.95, P 0.003), such that participants had co-morbidities had a low mean scores of BP 65.36 than those without co-morbidities; the mean score was 75.27. This variable could have explained about 4% of the variability in this domain(Appendix F).

The same trend of negative association remained between occurrence of hyperglycemic episodes and BP (F 4.41, P 0.037). Such that, participants who were exposed to hyperglycemic episodes had a low mean score of 67.05 for BP while those who weren't exposed to such episodes had high mean score of 73.58. This variable could have explained only about 2% of the variability in this domain(Appendix F).

As well, another significant negative association was found between chronic diabetic complications and BP (F 6.69, P 0.010), such that participants had one or more of diabetic complications had a low mean scores of BP 65.43 than those without any of those complications the mean score was 75.20. This variable could have explained about 3% of the variability in this domain (Appendix F).

This model was able to account for about 28% of variability in the mean score (adjusted $R^2 = 0.282$).

5.6.8 General Health Perceptions (GH):

The relationship between diet regimen, number of insulin injections per day, presence of co-morbidities, occurrence of hypoglycemic episodes; occurrence of hyperglycemic

episodes, presence of chronic diabetic complication and HbA_1c level detected in the bivariate analysis were tested by using univariate analysis in GLM to confirm if these variables remained significantly associated with the general health perceptions (GH). As in table (5.4), the results showed that number of insulin injections per day, occurrence of hypoglycemic and occurrence of hyperglycemic episodes lost the significance of their association with GH of QOL domain, while the other variables remained significantly associated with this domain.

Following diet regimen had a significant positive association with GH (F 26.83 $P < 0.001$). Participants who follow diet regimen had high mean score on GH (52.95) than non followers (41.51). This variable could have explained about 10% of the variability in this domain(Appendix F).

A significant negative association was found between presence of health problems other than DM (co-morbidities) and GH (F 25.47, $P < 0.0001$) since participants with health problems other than DM had a mean score of GH (40.61) than those without co-morbidities (53.84). This variable could have explained about 10% of the variability in this domain. The same trend detected between chronic diabetic complication and GH (F 27.17, $P < 0.0001$) such that, participants with one or more chronic diabetic complications had a mean score (39.79) on GH while those without chronic diabetic complications had a mean score of 54.67. This variable could have explained about 10% of the variability in this domain(Appendix F).

Another significant negative association was found between HbA_1c levels and the GH (F 13.58, $P <0.0001$). Participants with acceptable control of HbA_1c had higher mean score of GH (51.84) than the mean score for those with poor control of HbA_1c (42.61). This variable could have explained about 6% of the variability in this domain (Appendix F). This model was able to account for about 41% of variability in the mean score (adjusted $R^2 = 0.406$).

Table 5.4: Associations with QOL domains in the Univariate analysis

Independent variables / QOL domains		PF (P, ETA)	RF (P, ETA)	RE (P, ETA)	F /F (P, ETA)	EWB (P, ETA)	SF (P, ETA)	BP (P, ETA)	GH (P, ETA)
Socio-demographic variables	Level of education	NS	NS	NS	NS	0.005 (4%)	NS	NS	NS
	Additional resources	NS	0.024 (2%)	<0.0001 (5%)	NS	NS	NS	NS	NS
Lifestyle variables	Smoking	NS	<0.0001 (11%)	NS	NS	NS	0.002 (3%)	NS	NS
	Diet	NS	<0.0001 (8%)	<0.0001 (11%)	NS	NS	<0.0001 (10%)	<0.0001 (5%)	<0.0001 (11%)
	Physical activity	NS	NS	NS	0.001 (7%)	NS	NS	NS	NS
Diabetes-related variables	BMI	NS	NS	0.002 (6%)	NS	NS	NS	0.033 (3%)	NS
	HbA1C	NS	NS	NS	NS	NS	NS	0.004 (4%)	0.001 (6%)
	No. of insulin injections/day	NS	<0.0001 (9%)	<0.0001 (9%)	0.005 (9%)	<0.0001 (17%)	NS	NS	NS
	Co-morbidities	NS	NS	NS	<0.0001 (8%)	NS	NS	0.003 (4%)	<0.0001 (10%)
	Chronic complications	NS	<0.0001 (21%)	<0.0001 (11%)	<0.0001 (8%)	0.002 (4%)	<0.0001 (19%)	0.010 (3%)	<0.0001 (11%)
	Hypoglycemia	NS	NS	NS	NS	NS	NS	NS	NS
	hyperglycemia	NS	NS	NS	NS	NS	0.037 (2%)	NS	NS
Adjusted R^2		0.023	0.433	0.381	0.373	0.280	0.352	0.282	0.406

NS: Not significant at ∞ 0.05

5.7 Summary of the results

In summary: The bivariate analysis results using T-test and ANOVA (see table 6.1) revealed that level of education, presence of additional resources to the monthly income, smoking status, compliance to dietary recommendations, physical activity, BMI, HbA_1c levels, presence of other health problems in addition to DM (co-morbidities), presence of acute and chronic diabetic complications, occurrence of hypoglycemic episodes and occurrence of hyperglycemic episodes were associated with at least one of the QOL domain.

In the final univariate analysis, all the above variables remained significantly associated with at least one domain of QOL except for the occurrence of hypoglycemic episodes that didn't show association with any of the QOL domains (see table 5.5).

Table (5.5): Summary of the associations of independent variables with QOL domains

Independent variables	QOL domains							
	PF	**RF**	**RE**	**EF**	**EWB**	**SF**	**BP**	**GH**
	Bivariate Univariate	Bivariate Univariate	Bivariate Univariate	Bivariate Univariate	Bivariate Univariate	Bivariate Univariate	Bivariate Univariate	Bivariate Univariate
Socio-demographic variables								
Participants' level of education	**NS**	**NS**	**NS**	**NS**	**0.005**** **0.005*****	**NS**	**NS**	**NS**
Additional resources of monthly income	**NS**	**0.007**** **0.024*****	**<0.0001**** **<0.0001*****	**NS**	**NS**	**NS**	**0.039**** **NS**	**NS**
Lifestyle variables								
Smoking	**NS**	**<0.0001**** **<0.0001*****	**NS**	**NS**	**NS**	**0.005**** **0.002*****	**NS**	**NS**
Compliance with dietary recommendations	**NS**	**<0.0001**** **<0.0001*****	**<0.0001**** **<0.0001*****	**NS**	**NS**	**<0.0001**** **<0.0001*****	**<0.0001**** **<0.0001*****	**<0.0001**** **<0.0001*****
Physical activity	**0.045**** **NS**	**NS**	**NS**	**<0.0001**** **0.001*****	**NS**	**NS**	**NS**	**NS**
Diabetes-related variables								
BMI	**NS**	**0.009**** **NS**	**0.001**** **0.002*****	**0.001**** **NS**	**0.004**** **NS**	**NS**	**0.020**** **0.033*****	**NS**
HbA_1C	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**0.001**** **0.004*****	**0.001**** **0.001*****
Number of insulin injections/day	**NS**	**<0.0001**** **<0.0001*****	**0.021**** **<0.0001*****	**<0.0001**** **0.005*****	**<0.0001**** **<0.0001*****	**NS**	**NS**	**NS**
Health problems other than DM	**NS**	**NS**	**NS**	**<0.0001**** **<0.0001*****	**NS**	**NS**	**<0.0001**** **0.003*****	**<0.0001**** **<0.0001*****
Chronic diabetic complications	**NS**	**<0.0001**** **<0.0001*****	**<0.0001**** **<0.0001*****	**<0.0001**** **<0.0001*****	**<0.0001**** **0.002*****	**<0.0001**** **<0.0001*****	**<0.0001**** **0.010*****	**<0.0001**** **<0.0001*****
Hypoglycemia	**0.036**** **NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**0.012**** **NS**
Hyperglycemia	**NS**	**<0.0001**** **NS**	**<0.0001**** **NS**	**<0.0001**** **NS**	**0.001**** **NS**	**<0.0001**** **0.037*****	**<0.0001**** **NS**	**<0.0001**** **NS**
Adjusted R^2 (GLM)	**0.023**	**0.433**	**0.381**	**0.373**	**0.280**	**0.352**	**0.282**	**0.406**

* **NS:** not significant ** level of significance of ($p \leq 0.05$) in bivariate analysis
*** level of significance of ($p \leq 0.05$) in univariate analysis

CHAPTER SIX

Discussion and Recommendations

Diabetes mellitus is a chronic metabolic disease that requires careful dietary and physical activity habits, frequent monitoring of blood glucose and compliance with prescribed medications to reduce the risk of acute and chronic complications. Persons with diabetes often feel exhausted by the burden the disease places on them and their families. The demands of diabetes care can affect health-related quality of life (QOL) of patients at any age but may present a special challenge in the adolescent and young adult stage (de Beaufort, 2006 cited in Tulloch-Reid and Walker, 2009). Type 1 diabetes, the most common form of diabetes at this age, does not result from poor lifestyle choices and may be perceived as an unfair diagnosis by many youth (Sawyer et al., 2007 cited in Tulloch-Reid and Walker, 2009). As the prevalence and incidence of youth onset diabetes continues to increase due to improved survival, there is a need to assess not only the acute and chronic complications of the disease but also the impact it has on QOL (Daneman, 2007; Dabelea, 2007 cited in Tulloch-Reid and Walker, 2009).

Several studies were conducted to identify the factors that affect the QOL of patients with T1DM in the world using different approaches. This study represents the first study aimed to assess the QOL and its determinants in patients with T1DM in Palestine. Patients' QOL was assessed using the RAND-36 questionnaire. The target subjects for this study were participants diagnosed with T1DM and treated at the Palestinian Ministry of Health (PMOH) primary health care clinics in the northern districts of the West Bank between April and December, 2011.

The present study examined the socio-demographic factors, lifestyle factors and diabetes-related factors as determinants of QOL for patients with T1DM in the northern districts of WB in Palestine.

Quality of life was assessed using the RAND SF-36 which evaluated the different dimensions and domains that composed it. The mean score for the eight QOL composing domains ranged from 51.73% to 75.64%, with the highest for bodily pain domain and the lowest for general health and the median of the domains mean score; which was calculated in addition to the mean scores due to the lack of reference population in Palestine; range from 55 for general health perceptions domain to 90 for the physical functioning. These calculated values indicate that the QOL for those patients can be considered to be moderate to high, but lower than QOL measured among T1DM subjects in other different populations, that is, Mostafa and Almkhtar, (2012) using WHOQOL-BREF reported that 47% of patients with T2DM in Al-Mousel have fair overall quality of life and 41% have a good overall quality of life. In a Turkish SF-36 study conducted by Sarac et al., (2007) among T1DM and T2DM, the mean scores were considerably higher for the domains of RE , EWB, EF, and GH in diabetic patients as compared to our sample, but only slightly

higher for the domains of PF, RF, BP and SF. In a Dutch study; using the RAND-36 conducted by Hart et al., (2003) among subjects with T1DM, the mean score for all domains was higher compared to our sample QOL domains mean score. Such lower values recorded in the current study could be due to differences in economic status, health care provided for these patients, health care access in these countries or due to differences in targeted population and QOL measurement tool used such as the case in Mostafa and Almkhtar study.

It appears in the our study that the RF domain of the RAND SF-36 is the most significantly influenced by the associated studied socio-demographic, lifestyle, and diabetes-related factors. This is shown through the high percentage of variability in the domain explained by General Linear Model used (R^2 0.433) for RF, followed by GH (R^2 0.406). For the other domains, the models used explained percentage of variability ranging from $R^2 = 0.381$ to such a low $R^2 = 0.023$; the R^2=0.023 was for the PF domain with which the associated factors in the bivariate analysis lost their associations in the univariate (GLM) analysis suggesting that the domain is independently affected by diabetes and that, to confirm, needs further research and a standard comparison population which is beyond the current research scope.

Socio-demographic factors and QOL: The univariate analysis for QOL domains showed that the level of education, and the presence of additional resources to the family monthly income affected one or more of QOL domains.

The level of education completed by the participants at the time of data collection was negatively associated with low score of EWB domain(p 0.005), and this could explained only 4% of the variability in the domain which is consistent with the related studies conducted by Egede & Zheng, (2003); Wikblad et al., (1996); Aalto et al., (1997); Glasgow et al., (1997); Jacobson et al., (1994). A possible explanation for such association is that high level of education could be an opportunity for employment, marriage and social relationships. In case of being a diabetic patient, although having high level of education, these opportunities decreased due to the presence of one or more of the acute which may have an obvious effect on health status and affect the emotional wellbeing of patients as well as their quality of life. So, it may be effective to take into account the level of education of the patient while education programs and interventions about diabetes is performed.

The Presence of additional resources to family monthly income was negatively associated with RF and RE domains (p 0.007, $p < 0.0001$) respectively and this effect could have explained only 2% and 5% of the variability in the domains, respectively. A possible explanation is that the presence of additional resources to the family monthly income indicates higher income to the family, but also earning such additional income could put a demand on them in securing these additional resources; participants who had additional resources to the family monthly income either have to work more if they are independent income generators and so they would have to suffer more due to work demands and have less time for themselves and their emotional well-being; or if they are dependent on their family in their income, then the family income generators might have less time to spend with them and looking for their needs. This variable wasn't studied previously, so further investigation may be needed at this level.

Lifestyle factors and QOL: The univariate analysis for QOL domains showed that a number of lifestyle factors affect one or more of the QOL domains. **Smoking** is one of the lifestyle variable that had a pronounced effect on QOL. In the current study, smoking was associated negatively with RF; it explained 11% of the variability in the domain. This is consistent with the findings of Vogl et al., (2012) study who reported that a heavy-smoker is associated with 86% more likelihood of reporting some/severe problems in anxiety/depression compared with 42% in usual activity. The negative association between smoking and poor QOL was also reported by Imayama, (2011) and Sarac et al., (2007). Smoking was also associated, but positively, with SF, and could explain 10% of the variability in the domain, A possible explanation for this association is that smoking among some of the T1DM is a way of social engagement in and interaction with external world and so feeling of better self that could reflect positively on this domain of QOL. Lynes and Lynes, (2012) explained that smoking comprises physical developments associated with puberty as well as psychological development including that of an adult identity. Snow and Bruce found that some adolescents used cigarette smoking as a way of achieving status among their peers (Snow and Bruce as cited in Lynes and Lynes,2012).

The compliance with dietary recommendations according to medical advice had the most pronounced effect on QOL, such that, it was positively associated with five domains of QOL (RE, GH, RF, BP and SF). It could explain 11%, 10, 8%, 5% and 3% of the variability in these domains respectively. Good compliance with dietary recommendations was associated with a higher QOL which is in agreement with the findings of Imayama, (2011); Chaveepojnkamjorn et al., (2008); and Gönen et al., (2007). A possible explanation is that compliance with dietary recommendations reduce bodyweight and HbA_1c (Asplund et al., 2010) of the patients and so reduce the chances of complications occurrences, which in turn could reflect positively on his quality of life.

Physical activity in the univariate analysis was found to be associated positively only with EF domain. It could explain only 7% of the variability in the domain. The positive effect of physical activity on QOL was reported by Ismail, (2011); Imayama, (2011), Sarac et al., (2007); and Gönen et al., (2007). Fatigue in patients with diabetes may be associated with physiological phenomena, such as hypoglycemia and /or hyperglycemia, psychological factors, such as depression or emotional distress related to the diagnosis or to the intensity of diabetes self-management regimens (Fritschi and Quinn, 2012). Physical activity, which is an important part of diabetes management plan makes the muscles use glucose for energy, improves the body's response to insulin which leads to lower blood sugar level which may increase participants feelings of energy and decreased feeling of fatigue.

Diabetes-related factors and QOL: The univariate analysis for QOL domains showed that the following diabetes-related factors affect one or more of QOL domains:

Body mass index (BMI) was negatively associated with QOL which is in agreement with the findings of Imayama, (2011) and Naughton et al., (2008). The negative associations in the current study were found mainly in the domains RE and BP; and it could explained 6% and 3% of the variability in these domains respectively. The negative association between BMI and RE domain that was reported in this study may be a result of other factors such as fear of hypoglycemia. Russell-Jones and Khan in their review article (2007) reported that weight gain has to be viewed as an undesirable side effect of insulin therapy such that patients increase their carbohydrate intake and so, total calorie intake in response to the perceived threat or experience of hypoglycemia which may result from their more frequent

injection regimen (Russell-Jones and Khan, 2007). Fear of hypoglycemia may result in increased anxiety about diabetes management, obsessive self-monitoring, deliberately keeping blood glucose levels too high, dependence on others, feelings of guilt and frustration, a sense of loss of control, embarrassment, relationship stress and avoidant behavior (Frier, 2007 as cited in Gonder-Frederick et al., 2011). The negative association between BMI and BP domain may be due to the mechanical consequences of carrying excess weight (Burns et al., 2001) and associated symptoms such as symptoms of chronic low back pain and respiratory symptoms (Han et al., 1999 as cited in Burns et al., 2001) that may be associated problems in functioning and daily activities.

Patients with high **HbA_1c levels** (poor control); reported low scores on QOL scales, specifically, BP and GH domains which could explain only 4% and 6% of the variability in the domains respectively. The association between HbA_1c and QOL is consistent with the findings of Kalyva et al., (2011); Wit et al., (2007); Huang et al., (2004); Weinger & Jacobson, (2001). Wikblad et al. in their study reported that patients with poor control rated their HRQOL to be lower than those with good or acceptable control which they explained that, if the treatment is non-adequate, the patient's quality of life is affected by physical symptoms and by the presence of late complications that follow the poor control. On the other hand, if the treatment regime is too tight, the patient's quality of life might also deteriorate. Patients with a tight control and who had experienced hypoglycemic episodes that they could not manage on their own rated their general health as being poorer than those without severe hypoglycemia (Wikblad et al., 1996). Sinnott et al., (2005) in their study found that patients who had elevated HbA1c levels reported more bodily pain, poor physical functioning, and poor self-assessment of their overall health. Krein et al., (2005) reported that chronic pain limited the ability of patients with diabetes to self-manage their disease.

Our data showed that increased **number of insulin injections per day** negatively affect QOL. Such an association was confirmed by Huang et al., (2004) who reported an inverse association between number of insulin injection per day and quality of life. The effect of number of insulin injections per day was found mainly on the RF, RE, EWB and EF domains since it could explain 9%, 6%, 9% and 16% of the variability in these domains respectively. Increased number of insulin injections per day interfere with performing regular daily activities either due to fear of injection-related pain (Rubin et al., 2009) which makes patients unhappy, anxious and depressed or due to increased number of episodes of hypoglycemia due to greater amount of insulin used which could negatively affect the quality of life in people with diabetes (Rubin & Peyrot, 1999). Such interference is associated either in the time, amount, effort, and degree of carefulness needed in performing their work and activities or the type of work performed.

In relation to the **Presence of health problems other than DM**, a proportion of 26.5% of this study population reported having other health problems in addition to DM such as hypertension, high cholesterol levels, respiratory diseases or infections, joints pain and sleeping problems. The presence of health problems other than DM was negatively associated with QOL. Such association was noted by Imayama, (2011) and Naughton et al., (2008). The presence of health problems other than DM associated negatively with the EF, BP and GH domains and could have explained 8%, 4% and 10% of the variability of these domains respectively. A possible explanation could be that due to the presence of health problems other than DM may intense need for recurrent visits to diabetic clinic or the need for recurrent hospitalization or extra health care and management according to

the type of this health problem. Struijs et al., (2006) found that non diabetes-related co-morbidity increases the health care demand as much as diabetes-related co-morbidity do.

A proportion of 20.4% of the study subjects was found to suffer from one or more **chronic diabetic complications**; including neuropathy, retinopathy and nephropathy complications (11.4%, 9.4%, and 6.5% respectively), while the frequency of CVD_s was relatively low (1.6%). Chronic diabetic complications had the most pronounced negative effect on quality of life; it affected the domains of RF,RE, EF, EWB, SF, BP, and GH, and could explain 21%, 11%, 8%, 4%, 19%, 3% and 10% of the variability in these domains, respectively. Coyne et al., (2004); De los Ríos et al., (2005); and Lewko et al., (2007) reported that patients with diabetic retinopathy, neuropathy and diabetic nephropathy could have an impaired QOL due to their physical, psychosocial and leisure activities that were reduced as a result of these complications. Visual impairment due to diabetic retinopathy resulted in deterioration in daily activities such as reading, hobbies, diabetes care activities, cooking, housekeeping and getting dressed, as well, it interferes with exercise, diet, insulin injections and blood testing. In addition to the financial burden of these complications that lead to emotional distress, anxiety, depression, fears as well as lose of one's independence, self-concept and some of social integration. Patients with diabetic peripheral neuropathy may consider themselves to be greater burden on their families and friends and make them always anxious as a result of their illness.

In the current study, limitations due to physical and emotional health as well as social functioning were higher in the group with diabetic complications who also rated their general health as worse than the patients without complications. Wikblad et al., (1996) reported that, regarding the emotional factor, patients without complications scored higher on positive feelings than patients with diabetic complications. Such association was also found by Huang et al., (2004); Hahl et al., (2002) and De Groot et al., (2001) study who indicated a significant positive relationships between depressive symptoms and long-term complications of diabetes. Moreover, Wandell et al., (1999) and Klein et al., (1998) studies demonstrated that long-term complications including neuropathy, retinopathy and nephropathy were associated with poorer scores in general health, physical functioning, and physical role domains.

Occurrence of hyperglycemic episodes was associated negatively only with BP domain and could explain 2% of the variability in this domain. A proportion of 45.3% of the study subjects reported that they experienced episodes of hyperglycemia and this was negatively associated with their QOL, mainly the BP domain, and that could have explained only 2% of the variability in the BP domain. This result could be due to either an early or prolonged signs that patients suffer when they have elevated blood sugar levels (hyperglycemia) such as tiredness, loss of weight, blurred vision, infections e.g. thrush (International Diabetes Institute, 2003); or due to the presence of other illness such as cold or flu that may raise blood sugar levels (International Diabetes Institute, 2004) which may increase bodily pain and interfere with their daily activities.

Strengths and limitations of the study

The main strength of this study its fairly large sample size, relative to the targeted population, that was recruited for the purpose of this study and of its being; not only; the first of its kind of T1DM patients in the West Bank, but also its ability to detect many of

the variables that are associated with QOL and so could establish for improvements in care and future researches. Another strength of this study is the high response rate.
The limitations of this study are as follows: (i) in some diabetic clinics, the files didn't have the exact data of the onset and severity of complications which made it difficult to study the effect of such information on QOL of patients with T1DM; (ii) the study was carried out in the northern districts of the West Bank, so the findings might not be easily generalized to patients with T1DM who live in other places in the other districts of the West Bank or Gaza strip; (iii) the lack of age-matched healthy subjects as a control group to compare our results on the determinants of quality of life in T1DM; (iv) the lack of normative data for the Palestinian population that measures QOL using the RAND SF-36 to help us to have a cut off value in order to compare our results with on the determinants of quality of life in T1DM.

In conclusion, the results of the present study support the following findings:

1. The quality of life assessment provides valuable information regarding how the effect of diabetes mellitus on the living standards of patients' life.

2. Diabetes mostly puts limitations on Palestinians T1DM patients in performing their daily activities. This is evident from the result that role limitation due to physical health is the main domain significantly affected by socio-demographic, lifestyle and diabetes-related factors since it has a high portion of variability in the score explained by GLM (R^2 0.433).

3. Palestinian T1DM patients with chronic complications and co-morbidities perceive their general health negatively. This is evident from the second high portion of variability explained by GLM (R^2 0.406).

4. Although Palestinians with T1DM with poor glycemic control represents a proportion of 74.3%, it negatively affects only BP and GH domains of quality of life.

5. Prevention and adequate treatment of complications and control of DM appears to be an important strategy in improving life quality in diabetic patients.

6. More attention must be paid for factors that increases the risk of developing chronic diabetic complications such as smoking, low activity, and diet in order to improve QOL of Palestinians with T1DM.

7. Although participants who have one or more chronic diabetic complications represents only 20% of the study sample, the presence of these complications is the most pronounced determinant of their quality of life among all variables studied.

8. Although a small proportion of the study subjects have other health problems in addition to DM (26.5%), these health problem are determinants of quality of life.

9. Years of diabetes duration, and occurrence on hypoglycemic episodes aren't determinants of quality of life among Palestinians with T1DM.

The results of our study provided strong support that quality of life assessment is a very important outcome that should be considered when dealing with patients with T1DM. The followings are some recommendations that evidently enhance the quality of life among those patients:

1. Intensive educational programs for diabetics are encouraged to be held at the individual and community levels about the importance of smoking cessation and its relation with reducing the co-morbid conditions and complications associated with diabetes mellitus or the quality of life.

2. Educational programs for diabetics are encouraged to be held at the individual and community levels on the importance of healthy lifestyle behaviors and its relation with reducing the co-morbid conditions and complications associated with diabetes mellitus and as well as on the quality of life.

3. Group discussions and regular meetings among T1DM should be encouraged to be held in order to allow them to share ideas and express their feelings, anxiety about their future as people with long-life disease to ensure better QOL outcome.

4. Interventions targeting psychosocial adjustment should be considered as an important part of diabetes management and should be offered along with interventions designed to improve QOL.

5. Mental-health screening should be part of routine care for young people with diabetes in order to detect mental health problems such as diabetes-related depression and anxiety and solve these problems to attain better mental health and better quality of life.

6. Health care providers, strategic planners and policy makers should focus on prevention rather than treatment in order to reduce diabetic complications in patients with T1DM as well as on social and financial burden in both patient, family and the financial burden on the health authorities.

Recommendations for future research studies: The results of our study provide a significant incentive for future investigations in the subject that include:

1. Community based studies are recommended for measuring quality of life in diabetes mellitus and setting norms for the Palestinians.

2. Study the quality of life and its determinants among T1DM patients attending the governmental primary health care clinics in the southern districts of the West Bank to have a comprehensive picture, especially that people have different lifestyle and community structure in these districts.

3. Investigate the quality of life and its determinants among T1DM patients attending the UNRWA and private sector diabetic clinics. Since the health services and care provided for those patients in both sectors may differ from those provided in governmental primary health care clinics.

4. Study on the impact of the various diabetic complications such as nephropathy and cardiovascular diseases and their severity in relation with the quality of life among T1DM patients in Palestine.

References

1. Aalto, AM., Uutela, A., Aro, AR.(1997):Health related quality of life among insulin-dependent diabetics: disease-related and psychosocial correlates. Patient Educ Courts, 30:(3),215-225.

2. Aalto, AM., Uutela, A., Kangas, T.(1996):Health behavior, social integration, perceived health and dysfunction. A comparison between patients with type I and II diabetes and controls. Scand J Soc Med,24:(4),272-281.

3. Al Abdulmohsin, S., Coons, S., et al.(1998):Translation of the RAND 36-ITEM Health Survey 1.0 (aka SF-36) into Arabic. The RAND Corporation.

4. Al-Akour, N., Khader, Y., Shatnawi, N. (2010):Quality of life and associated factors among Jordanian adolescents with type 1 diabetes mellitus. J Diabetes Complications,24:(1),43-7.doi: 10.1016/j.jdiacomp.2008.12.011.

5. American Diabetes Association, (2012):Diagnosis and Classification of Diabetes Mellitus. Position Statement. Diabetes Care,35:(1),S64

6. American Diabetes Association(Jan,2011):Diabetes Basics. Diabetes Statistics. Data from the 2011 National Diabetes Fact Sheet,26.

7. Anderson, R., et al. (2001):The prevalence of co morbid depression in adults with diabetes: A meta-analysis. Diabetes Care,24:(6),1069-1078.

8. Asplund, K., et al.(2010): Summary and Conclusions of the SBU Report: Dietary Treatment of Diabetes; A Systematic Review.

9. Ausili, E., et al.(2007): Multidimensional study on quality of life in children with type 1 diabetes. European Review for Medical and Pharmacological Sciences,11:(4),249-255.

10. Bloomberg, Z. (2003):Diabetes: An International Epidemiologic Focus. Medscape, 20/10/2003.

11. Bowling, A.(1999): Health-Related Quality of Life: A Discussion of The Concept, Its Use and Measurement Background: The Quality of Life'. info.worldbank.org/e tools/docs/.../m2s5bowling.pdf .

12. Burns, C., Tijhuis, M., Seidell, J.(2001): The relationship between quality of life and perceived body weight and dieting history in Dutch men and women. International Journal of Obesity,25,1386-1392.

13. Center for Arab Genomic Studies. A division of Sheikh Hamdan Award for Medical sciences(n.d):The Catalogue for Transmission Genetics in Arabs. CTGA Database, Diabetes Mellitus, Insulin-Dependent.

14. Centers for Disease Control and Prevention, (2000): Measuring Healthy Days. Population assessment of health-related quality of life. Centers for Disease Control and Prevention, Atlanta, Georgia.

15. Centers for Disease Control and Prevention (2008):National diabetes fact sheet: general information and national estimates on diabetes in the United States, 2007. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

16. Chaveepojnkamjorn, W., et al. (2008):Quality of Life and Compliance Among Type 2 Diabetic Patients. Southeast Asian J Trop. Med Public Health,39:(2).

17. Couch, R., et al.(2008):Diabetes Education for Children With Type 1 Diabetes Mellitus and Their Families. Evidence Reports/Technology Assessments,166, Rockville (MD): Agency for Healthcare Research and Quality (US).

18. Coyne, KS., et al. (August,2004): The impact of diabetic retinopathy: perspectives from patient focus groups; Family Practice,21:(4). Doi: 10.1093 /fampra/cmh417.

19. Delamater, AM. (2000): Quality of life in youths with diabetes. Diabetes Spectrum,13,42–46.

20. De Groot, M., et al. (2001):Association of depression and diabetes complications: A meta-analysis. Psychosom Med, 63(4):619-630.

21. De los Ríos, JL., et al.(2005): Quality of life in patients with diabetic nephropathy. Invest Educ Enferm,23(1): 30-43.

22. de Wit, M., et al.(2007):Monitoring health related quality of life in adolescents with diabetes: A review of measures. Arch Dis.Child,92: 434–9.

23. Diabetes Control and Complications Research Group (1994): Diabetes Control and Complications Trial (DCCT): update. Diabetes Care,13:427-33.

24. Diabetes UK (2007): Prioritizing Emotional Well being. Position Statement.

25. Efstathiou, E., Skordis, N.(2011): Altering Trends in the Epidemiology of Type 1 Diabetes Mellitus in Children and Adolescents. In: Chih-Pin Liu (Ed.).Type 1 Diabetes - Complications, Pathogenesis, and Alternative Treatments(pp.323-336).InTech. ISBN: 978-953-307-756-7, , DOI: 10.5772/22036. Available from:http://www.intechopen.com/books/type-1-diabetes-complications-pathogenesis-and-alternative-treatments/altering-trends-in-the-epidemiology-of-type-1-diabetes-mellitus-in-children-and-adolescents

26. Egede, L., & Zheng, D.(2003):Independent factors associated with major depressive disorder in a national sample of individuals with diabetes. Diabetes Care,26(1):104-111.

27. Eiser, C., & Morse, R.(2001): A review of measures of quality of life for children with chronic illness. Archives of Disease in Childhood, 84(3):205-211.

28. Fal Andrzej, M., Jankowska, B., et al.(2011): Type 2 diabetes quality of life patients treated with insulin and oral hypoglycemic medication. Acta Diabetol,48:237–242. DOI 10.1007/s00592-010-0244-y

29. Faro, B.(May-June1999):The Effect of Diabetes on Adolescents' Quality of Life. Pediatric Nursing, 25(3):247-53, 286.

30. Faulkner, MS.(Sep-Oct2003):Quality of Life for Adolescents With Type I Diabetes: Parental and Youth Perspectives. Pediatr Nurs,29(5):362-8.

31. Fitzpatrick, R., and Gibbons, E.et al.(Nov2006): A Structured Review of Patient-Reported Outcome Measures For People with Diabetes. A structured review of patient-reported measures in relation to selected chronic conditions, perceptions of quality of care and care impact. Department of Public Health. University of Oxford.

32. Franciosi, M., Maione, A., et al.(Jan2010): Correlates of quality of life in adults with type 1 diabetes treated with continuous subcutaneous insulin injection. Nutrition, Metabolism, & Cardiovascular Diseases,20(1):7-14. doi:10.1016/j.numecd.2009.02.012.Epub 2009 Sep 11.

33. Fritschi, C. & Quinn, L.(July 2010): Fatigue in Patients with Diabetes: A Review J Psychosom Res,69(1): 33–41. doi:10.1016/j.jpsychores.2010.01.021

34. Gage, H., Hampson, S., et al., (Jun2004): Educational and psychosocial programmes for adolescents with diabetes: approaches, outcomes and cost-effectiveness. Patient Educ Couns,53(3):333-46.

35. Gill, .T, Feinstein, A. (Aug1994):A critical appraisal of the quality of quality-of-life measurements.JAMA,24-31;272(8):619-26.

36. Glasgow, R., Ruggiero, et al. (April1997): Quality of life and associated characteristics in a large national sample of adults with diabetes. Diabetes Care,20(4):562-567.

37. Glastras, S., Mohsin, F., Donaghue, K.(Dec 2005):Complications of diabetes mellitus in childhood. Pediatr Clin North Am,52(6):1735-53.

38. Goldstein, D. et al.,(Nov-Dec 1981): A prospective study of symptomatic hypoglycemia in young diabetic patients. Diabetes Care, 4(6):601-5.

39. Gonder-Frederick, L. et al.,(2011): Assessing fear of hypoglycemia in children with Type 1 diabetes and their parents, Diabetes Manag (Lond),1(6): 627–639.doi: 10.2217/DMT.11.60.

40. Gönen, S. et al.,(2007): Comprehensive Analysis of Health Related Quality of Life in Patients with Diabetes: A Study From Konya Turkey. Turk Jem,11: 81-8.

41. Guttmann-Bauman, I. et al., (Jun1998):Metabolic Control and Quality-of-Life Self-Assessment in Adolescents with IDDM. Diabetes Care, 21(6):915-8.

42. Hahl, J. et al., (Aug 2002): Health-related quality of life in type 1 diabetes without or with symptoms of long-term complications. Qual Life Res., 11(5):427-36.

43. Hanestad, BR.(Feb 1993): Self-reported quality of life and the effect of different clinical and demographic characteristics in people with type 1 diabetes. Diabetes Res Clin. Pract, 19(2):139-149.

44. Hanestad, BR., Albrektsen, G.,(Feb 1993): The effects of participation in a support group on self assessed quality of life in people with insulin-dependent diabetes mellitus. Diabetes Res Clin Pract., 19(2):163-173.

45. Hart, H. et al.,(Dec 2003a): Quality of life of patients with type I diabetes mellitus. Qual Life Res, 12(8):1089-1097.

46. Hart, H. et al.(April2003b):Health-related quality of life in patients with newly diagnosed type 1 diabetes. Diabetes Care. 26(4):1319-1320. doi: 10.2337/diacare.26.4.1319

47. Hart, H., et al.(Nov 2005a):Factors that predicted change in health-related quality of life were identified in a cohort of diabetes mellitus type1 patients. patients. J Clin Epidemiol,58(11):1158-64.

48. Hart, H., et al.(Feb 2005b):Change in perceived health and functioning over time in patients with type I diabetes mellitus. Qual Life Res.,14(1):1-10.

49. Hart, H., et al.,(Mar 2007): Health related quality of life in patients with type I diabetes mellitus: generic & disease-specific measurement. Indian J Med Res,125(3):203-16.

50. Hays, R.(1998):R 36. H.S.I.; RAND-36 Health Status Inventory. The Psychological Corporation.

51. Hays, R., Morales, L.(2001): The RAND-36 Measures of Health-Related Quality of Life. Ann. Med,33:350-357.

52. Health Act CHQ Inc.(2008): CHQ. Child Health Questionnaire. http://www.healthactchq.com/chq.html.

53. Huang, GH., et al.,(Feb 2004): Self-rated Health among Young People with Type 1 Diabetes in Relation to Risk Factors in a Longitudinal Study. Am J Epidemiol, 15,159(4):364-372.

54. Imayama, I., et al. (2011): Determinants of quality of life in adults with type 1 and type 2 diabetes. Health and Quality of Life Outcomes, 9:115. doi:10.1186/1477-7525-9-115.

55. Ingersoll, G., Marrero, D.(April 1991): A modified quality-of-life measure for youths: psychometric properties. The Diabetes Educator,17(2):114-8.

56. International Diabetes Federation(2003):Diabetes Atlas, Second Edition. Brussels.

57. International Diabetes Institute (2004). High Blood Glucose Levels (Hyperglycemia). Diabetes Fact Sheet

58. International Diabetes Institute (2003). High Blood Glucose Levels (Hyperglycemia). Diabetes Fact Sheet.

59. Ismail, H. (2011): Self-rated health and factors influencing responses among young Egyptian type 1 diabetes patients. BMC Public Health,11:216. doi:10.1186/1471-2458-11-216.

60. Issa, BA., Baiyewu, O.(2006):Quality of Life of Patients with Diabetes Mellitus in a Nigerian Teaching Hospital. Hong Kong J Psychiatry,16:27-33.

61. Jacobson, A., et al.(Oct 1988): Reliability and Validity of a Diabetes Quality-of-Life Measure for the Diabetes Control and Complications Trial (DCCT). The DCCT Research Group. Diabetes Care,11(9):725-32.

62. Jacobson, A., de Groot, M., Samson, J.(April 1994):The evaluation of two measures of quality of life in patients with type I and type II diabetes. Diabetes Care,17(4):267-274.

63. Jacobson, A., de Groot, M., Samson, J. (Jan 1997): The effects of psychiatric disorders and symptoms on quality of life in patients with type I and type II diabetes mellitus. Qual Life Res, 6(1):11-20.

64. Kalyva, E., et al. (Feb 2011): Health-related quality of life (HRQOL) of children with type 1 diabetes mellitus (T1DM): self and parental perceptions. Pediatric Diabetes; 12(1):34-40. doi: 10.1111/j.1399-5448.2010.00653.x.

65. Khatib, O., Guindy, M. (eds).(2005):Clinical Guidelines for the Management of Hypertension. EMRO Technical Publication Series No. 29, WHO Regional Office for Eastern Mediterranean, Cairo.

66. Kindi, D., Booske, B., Remington, P. (2010):Mobilizing Action Toward Community Health (MATCH): metrics, incentives, and partnerships for population health. Prev Chronic Dis,7(4):A68. http://www.cdc.gov/pcd/issues/2010/jul/10_0019.htm

67. Klein, B., Klein, R., Moss, S. (Feb 1998): Self-rated health and diabetes of long duration. The Wisconsin Epidemiologic Study of Diabetic Retinopathy. Diabetes Care; 21(2):236-240.

68. Kovcs, M., et al.(May 1985): Initial coping responses and psychosocial characteristics of children with insulin-dependent diabetes mellitus. J Pediatr, 106(5):827-34.

69. Krein, S., et al.(Jan 2005):The effect of chronic pain on diabetes patients' self-management. Diabetes Care,28:65–70.

70. Laffel, L., et al. (Nov2003): General Quality of Life in Youth With Type 1 diabetes: relationship to patient management and diabetes-specific family conflict. Diabetes Care,26(11):3067-73.

71. Lewko, J., et al. (2007):Quality of life and its relationship to the degree of illness acceptance in patients with diabetes and peripheral diabetic neuropathy; Advances in Medical Sciences,52(1):144-6.

72. Li, C., et al. (Jan 2008):Prevalence of depression among U.S. adults with diabetes: findings from the 2006 behavioral risk factor surveillance system. Diabetes Care,31(1):105-107.

73. Wee, HL., et al. (Jan 2005):The impact of diabetes mellitus and other chronic medical conditions on health-related Quality of Life: is the whole greater than the sum of its parts?. Health and quality of life outcomes,3:2.

74. Lustman, P., et al. (Jul 2000):Depression and poor glycemic control: a meta-analytic review of the literature. Diabetes Care,23(7):934-942.

75. Lynes, D., Lynes, A. (2012):Strategies to help adolescents stop smoking. Nursing Practice, Discussion, Teenage Smoking. Nursing Times,108(26):12-14.

76. McHorney, C. (1999):Health status assessment methods for adults: past accomplishments and future challenges. Annual Rev Public Health, 20:309-35.

77. Mostafa, W., Almkhtar, M. (2012): Quality of life of patients with type 2 diabetes mellitus in Mosul. Annals of Collage of Medicine,Mosul,38(1):20-26.

78. Naughton, M., et al. (Jul 2008): Health-Related Quality of Life of Children and Adolescents With Type 1 or Type 2 Diabetes Mellitus: SEARCH for Diabetes in Youth Study. Arch Pediatr Adolesc Med.162(7):649-657. doi:10.1001/archpedi.162.7.649.

79. NIH.(1993): Quality of life assessment: Practice, problems, and promise-proceedings of a workshop. Bethesda, Maryland.

80. Palestinian Central Bureau of Statistics, 2007. Palestinian Family Health Survey, 2006: Final Report.

81. Palestinian Guidelines for Diagnosis and Management of Diabetes Mellitus (2003): Web site: http://www.moh.gov.ps/main/pdf/health_projects/diabetes_m.pdf

82. Palestinian Ministry of Health- PHIC; Annual report (2010).

83. Papadopoulos, A., et al. (Jul 2007): Predictors of health related quality of life in type II diabetic patients in Greece. BMC Public Health,7:186.

84. Peyrot, M., Rubin, R. (1997): Levels and risks of depression and anxiety symptomatology among diabetic adults. Diabetes Care; 20(4):585-590.

85. Polonsky, W. (2000):Understanding and assessing diabetes-specific quality of life. Diabetes Spectrum,13(2000):36

86. PROQOLID, (2011): Patient-Reported Outcome and Quality of Life Instruments Database. Diabetes Quality of Life for Youth Scale (DQOLY).

87. Raha, O., et al. (April 2009): Approaches in type 1 diabetes research: A status report. Int. J Diabetes Dev Ctries, 29(2):85-101. doi: 10.4103/0937-3930.53126.

88. Reuben, D., et al.(Jan 1995): Measuring physical functioning in community dwelling older persons: A comparison of self-administered, interviewer-administered, and performance- based measures. Journal of the American Geriatrics Society 43 (1):17-23.

89. Roze, S., et al. (Sep 2005): Health-economic comparison of continuous subcutaneous insulin infusion with multiple daily injections for the treatment of type 1 diabetes in the UK. Diabet Med,22(9): 1239-1245.

90. Rubin, R., Peyrot, M. (1999): Quality of Life and Diabetes. Diabetes Metab Res Rev, 15 (3): 205-218.

91. Rubin, R., et al.(2009): Barriers to Insulin Injection Therapy. Patient and Health Care Provider Perspectives. Diabetes Educator, 35(6):1014-22. doi: 10.1177/0145721709345773.

92. Russell-Jones, D., Khan, R. (Nov 2007): Insulin-associated weight gain in diabetes – causes, effects and coping strategies. Diabetes Obesity and Metabolism,9(6):799-812.

93. Sabbah, I., et al. (2003). Quality of Life in rural and urban populations in Lebanon using SF-36 Health Survey. Health and Quality of Life Outcomes, 1:30-43.

94. Sarac, Z., et al. (2007): Quality of Life in Turkish Diabetic Patients. Turk Jem,11: 48-53.

95. Saydah, SH., et al. (2002): Age and the burden of death attributable to diabetes in the United States. Am J Epidemiol, 156(8):714-719. doi: 10.1093/aje/kwf111

96. Schoenle, E., et al. (Jan 2002):Impaired intellectual development in children with Type I diabetes: association with HbA_1c,age at diagnosis and sex. Diabetologia,45(1):108-14.

97. Singh, H., Bradley, C. (March 2006): Quality of life in diabetes; Review Article. Int J Diab Dev Ctries,26(1):7-10

98. Sinnott, C., et al. (June 2005): Bodily Pain, Poor Physical Functioning, and Poor Glycemic Control in Adults With Diabetes. Diabetic Care,28(6):1534.

99. Snoek, F.(2000). Quality of life: a closer look at measuring patients' well-being. From Research to Practice? Diabetes and Quality of Life. Diabetes Spectrum, 13:24-28.

100 Solli, O., et al. (2010): Health-related quality of life in diabetes: The associations of complications with EQ-5D scores. Health and Quality of Life Outcomes, 8:18. doi:10.1186/1477-7525-8-18.

101 Spieth, L., Harris, C. (1996): Assessment of Health-Related Quality of Life in Children and Adolescents: An Integrative Review. Journal of Pediatric Psychology,21(2):175-193. doi: 10.1093/jpepsy/21.2.175.

102 Struijs, J., et al. (2006):Co morbidity in patients with diabetes mellitus: impact on medical health care utilization. BMC Health Services Research, 6:84. Doi:10.1186/1472-6963-6-84.

103 Tabaei, B., et al. (2004): Glycemia and the quality of well-being in patients with diabetes. Qual Life Res,`13(6): 1153-1161.

104 Testa, M., Simonson, D. (March 1996):Assessment of Quality of Life Outcomes. Review Articles. The New England Journal of Medicine,334(13):835-840.

105 The Diabetes Control and Complications Trial Research Group,(1996): Influence of intensive diabetes treatment on quality-of-life outcomes in the Diabetes Control and Complications Trial. Diabetes Care,19(3):195-203.

106 Torrance, N., et al. (April 2009): Analyzing the SF-36 in population-based research. A comparison of methods of statistical approaches using chronic pain as an example. J Eval Clin Pract, 15(2):328-34.

107 Trief, P., et al. (2003): A comparison of health-related quality of life of elderly and younger insulin-treated adults with diabetes. Age and Ageing; 32(6):613-618.

108 Trochim, W. (2006): The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL: <http://www.socialresearchmethods.net/kb/>.

109 Tulloch-Reid, M., Walker, S. (June 2009): Quality of Life in Caribbean Youth with Diabetes. West Indian Med J, 58 (3): 250-256.

110 Varni, J.(1998): The PedsQL™ Measurement Model for the Pediatric Quality of Life Inventory™. PedsMetric™, Quantifying the QualitativeSM.

111 Veenhoven, R. (2000): The Four Qualities of Life. Ordering Concepts and Measuring of the Good Life. Journal of Happiness Studies,1(1):1-39.

112 Votey, S., Pester, A. (Oct. 8 2009): Diabetes Mellitus, Type 1- A Review. E-medicine Medscape: E-medicine. Medscape/com/article/766036-overveiw.

113 Wagner, J., James, A. (Sep 2006):A pilot study of school counselor's preparedness to serve students with diabetes: relationship to self-reported diabetes training. J.Sch Health, 76(7):387-92.

114 Wandell, P., Brorsson, B., Aberg, H. (Dec 1998): Quality of life among diabetic patients in Swedish primary health care and in the general population: comparison between 1992 and 1995. Qual Life Res,7(8):751-760.

115 Wandell, P., Brorsson, B., Aberg, H. (Nov 1999): Quality of life in relation to co-morbidity among diabetic patients followed for three years in Swedish primary health care. Diabetes Metab, 25(5):424-428.

116 Ware, J. (1997): SF-36 Health Survey. Manual and Interpretation Guide. The Health Institute, New England Medical Centre. Boston, MA. Nimrod Press. Second Edition.

117 Ware, J., Kosinski, M., Keller, S. (1994): SF-36 Physical and Mental Health Summary Scales: A User's Manual. Boston, MA: The Health Institute, New England Medical Centre.

118 Ware, J., Sherbourne, C. (1992): The MOS 36-Item Short-Form Health Survey (SF-36). I. Conceptual framework and item selection. Medical Care,30(6): 473-483.

119 Weinger, K., Jacobson, AM. (2001): Psychosocial and quality of life correlates of glycemic control during intensive treatment of type 1 diabetes. Patient Educ Couns.;42(2):123-131.

120 Wikblad, K., et al. (Feb.1996): Health-related quality of life in relation to metabolic control and late complications in patients with insulin dependent diabetes mellitus, Quality of Life Research, 5(1): 123-130.

121 Wild, S., et al.(May 2004): Global Prevalence of Diabetes: Estimates for The Year 2000 and Projection for 2030. Diabetes Care, 27(5):1047-1053

122 Witt, R., and Witt, S. (1997): Statistics, Fifth edition, Harcourt Brace College Publisher

123 Wolever, TM., et al.(1999): Day-to-day consistency in amount and source of carbohydrate associated with improved blood glucose control in type 1 diabetes. J Am Coll Nutr,18(3):242-7.

124 World Health Organization, Division of Mental Health (1993): WHOQOL Study Protocol to development of the World Health Organization quality of life instrument. Quality of Life Research

125 World Health Organization (1996): WHOQOL-BREF: Introduction, Administration, scoring and generic version of the assessment. Field Trial Version. Programme on Mental Health, WHO, Geneva, Switzerland. Web site: http://www.who.int/mental_health/media/en/76.pdf.

126 World Health Organization, Division of Mental Health and Prevention of Substance Abuse (1997): WHOQOL Measuring Quality of Life. The World Health Organization Quality of Life Instrument (THE WHOQOL-100 AND THE WHOQOL-BREF). WHO/MSA/MNH/PSF/97.4. www.who.int/mental_health/media/68.pdf.

Appendix A

Consent Form

جامعة القدس

كلية الصحة العامة

السادة المحترمين

تحية طيبة وبعد:

أقوم أنا الطالبة في كلية الصحة العامة _ جامعة القدس رشا عبد الرحمن الكرمي بعمل بحث لاستكمال رسالة الماجستير يهدف إلى معرفة جودة الحياة ومحدداتها عند مرضى السكري (النوع الأول) في محافظات شمال الضفة الغربية راجية من حضرتكم الموافقة على تعبئة الاستبيان المرفق والإجابة على أسئلته وذلك لما له أهمية في التوصل إلى نتائج علمية قد تساعد في التعامل مع المشكلة، حيث أن إجاباتكم والمعلومات المسجلة والتي سوف تصرحون بها هي لأغراض البحث العلمي فقط ولن يتم ذكر ما يدل على اسمك على نموذج الاستبيان وسوف يتم التعامل معها بسرية تامة . علما بان اشتراكك في تعبئة الاستبيان اختياري ويحق لك الانسحاب في أي وقت تشاء.
للاستفسار عن أي معلومة تتعلق بالبحث يمكنك الرجوع إلى الباحثة.

توقيعك على الاستبيان يعتبر بمثابة الموافقة على الاشتراك.

شاكرين لكم حسن تعاونكم

التوقيع رقم الهوية الباحثة

رشا عبد الرحمن الكرمي

Appendix B

Patient Information Sheet

بسم الله الرحمن الرحيم

اسم العيادة:..... **رقم الملف في العيادة .....**

القسم الأول : العوامل الديموغرافية والاجتماعية:

1. كم عمرك بالسنوات؟.....
2. الجنس 1-ذكر 2- أنثى
3. المرحلة التعليمية التي أنهيتها؟

1-غير متعلم 2- ابتدائي 3- إعدادي 4- ثانوي 5- جامعي

4. الحالة الاجتماعية: 1- أعزب 2- متزوج 3-أرمل 4- مطلق
5. ما هي مهنتك الحالية؟.....
6. كم يبلغ مصدر دخل أسرتك الشهري بالشيكل؟.....
7. هل هناك مصادر دخل إضافية للأسرة (غير عملك أنت أو احد أفراد أسرتك) ؟

1- نعم 2- لا

القسم الثاني: معلومات عن نمط الحياة

8. هل أنت مدخن حاليا؟ 1- نعم 2- لا
9. هل تتبع نظام غذائي خاص لمرضى السكري؟

1- نعم 2-لا

10. هل تمارس أي نشاطات جسدية أو رياضية غير العمل كالمشي،الجري أو السباحة؟

1- نعم 2- لا

القسم الثالث: معلومات متعلقة بمرض السكري:

11. ما هو طولك بالمتر؟.....

12. ما هو وزنك بالكيلوغرام؟.....

13. كم كان عمرك عندما تم تشخيصك بمرض السكري؟.....

14. ما هي آخر نتيجة لفحص السكر التراكمي؟.....

15. كم مرة تحقن نفسك بالأنسولين يوميا؟

1- مرة واحدة يوميا 2- مرتين يوميا

3- ثلاث مرات يوميا 4- أكثر من ثلاث مرات يوميا

16. هل تعاني من أي مشاكل صحية أخرى غير السكري مثل ارتفاع ضغط الدم، أمراض الجهاز التنفسي، الآم في المفاصل ، أو مشاكل في النوم ؟

1- نعم 2-لا

17 . هل تعاني من اعتلال شبكية العين كأحد مضاعفات السكري؟

1- نعم 2- لا

18. هل تعاني من اعتلال الأعصاب كأحد مضاعفات السكري؟

1- نعم 2- لا

19. هل تعاني من مشاكل في شرايين القلب كأحد مضاعفات السكري؟

1- نعم 2- لا

20. هل تعاني من مشاكل في عمل الكلى كأحد مضاعفات السكري؟

1- نعم 2- لا

21 . هل تعرضت خلال الأسابيع الأربعة الماضية إلى نوبات انخفاض في نسبة السكر في الدم ؟

1- نعم 2- لا

22. هل تعرضت خلال الأسابيع الأربعة الماضية إلى نوبات ارتفاع في نسبة السكر في الدم ؟

1- نعم 2- لا

Appendix C

The RAND SF-36 (0.1)

Quality of Life Questionnaire

استبيان صحي

من فضلك اجب عن كل الأسئلة الموجودة في هذا الاستبيان. في حال عدم وضوح أي سؤال، أرجـــو اختيـــار اقرب إجابة لمفهومك للسؤال.

1- بصورة عامة، كيف ترى حالتك الصحية؟

(اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)

- **ممتازة**
- **جيد جدا**
- **جيدة**
- **لا بأس بها**
- **سيئة**

2- مقارنة بعام مضي، كيف تقيم حالتك الصحية الآن بصورة عامة

(اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)

- **أفضل بكثير مما كانت عليه قبل عام**
- **أفضل نوعا ما من العام الماضي**
- **تقريبا على ما هي عليه**
- **أسوء نوعا ما من العام الماضي**
- **أسوء بكثير مما كانت عليه العام الماضي**

تتعلق البنود التالية بأنشطة يمكن أن تقوم بها خلال يومك العادي.
في الوقت الحالي، إلى أي مدى تقيدك حالتك الصحية:
(اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)

		نعم تقيدني كثيرا	نعم تقيدني قليلا	لا تقيدني إطلاقا
3-	من ممارسة الأنشطة الشاقة مثل:الجري،حمل الأشياء الثقيلة أو مزاولة النشطة الرياضية المجهدة جدا	○	○	○
4-	من ممارسة الأنشطة متوسطة الجهد، كتحريك الطاولة أو التنظيف باستخدام المكنسة الكهربائية أو تنظيف حديقة المنزل والعناية بها؟	○	○	○
5-	من حمل المشتريات من البقالة أو السوق المركزي (السوبر ماركت)؟	○	○	○
6-	من صعود الدرج لعدة أدوار؟	○	○	○
7-	من صعود الدرج لدور واحد فقط؟	○	○	○
8-	من الانحناء أو الركوع أو السجود؟	○	○	○
9-	من المشي لأكثر من كيلو ونصف متر؟	○	○	○
10-	من المشي لمسافة نصف كيلو؟	○	○	○
11-	من المشي لمسافة مئة متر؟	○	○	○
12-	من الاستحمام أو ارتداء الملابس بنفسك؟	○	○	○

الصحة الجسمية

تتعلق البنود التالية (أ،ب،ج،د) بالمشاكل التي يمكن أن تواجهك خلال تأديتك لعملك أو للأنشطة اليومية المعتادة نتيجة لحالتك الصحية الجسمية.

خلال الأسابيع الأربعة الماضية،هل تسببت حالتك الصحية الجسمية في:

(اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)

		نعم	لا
13-	أ- التقليل من الوقت الذي تقضيه في العمل أو أي أنشطة أخرى؟	○	○
14-	ب- التقليل مما تود انجازه من العمل أو أي أنشطة أخرى؟	○	○
15-	ج- تقييدك في أداء نوع معين من الأعمال أو أي أنشطة أخرى؟	○	○
16-	أن تجد صعوبة في تأدية العمل أو أي أنشطة أخرى؟ (على سبيل المثال، احتجت إلى جهد إضافي لتأديتها)	○	○

الصحة النفسية

تتعلق البنود التالية (أ،ب،ج،د) بالمشاكل التي يمكن أن تواجهك خلال تأديتك لعملك أو للأنشطة اليومية المعتادة نتيجة لحالتك الصحية النفسية.(مثلا العور بالاكتئاب أو القلق)

خلال الأسابيع الأربعة الماضية،هل تسببت حالتك الصحية الجسمية في:

(اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)

		نعم	لا
17-	أ- التقليل من الوقت الذي تقضيه في العمل أو أي أنشطة أخرى؟	○	○
18-	ب- التقليل مما تود انجازه من العمل أو أي أنشطة أخرى؟	○	○
19-	عدم انجاز العمل أو أي أنشطة أخرى؟	○	○

الصحة الجسمية والنفسية

20- **خلال الأسابيع الأربعة الماضية، إلى أي مدى تعارضت صحتك الجسمية أو النفسية مع تأديتك لنشاطاتك الاجتماعية المعتادة مع عائلتك أو أصدقاؤك أو جيرانك أو أي من المناسبات الاجتماعية الأخرى؟**

- **لم يكن هناك أي تعارض إطلاقا**
- **كان هناك تعارض قليل**
- **كان هناك تعارض متوسط**
- **كان هناك تعارض كبير**
- **كان هناك تعارض كبير جدا**

شدة الألم

21- **ما شدة الألم الجسمي الذي عانيت منه خلال الأسابيع الأربعة الماضية؟**
(اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)

- **لم يكن هناك أي ألم**
- **كان هناك ألم خفيف جدا**
- **كان هناك ألم خفيف**
- **كان هناك ألم متوسط**
- **كان هناك ألم شديد**
- **كان هناك ألم شديد جدا**

22- **خلال الأسابيع الأربعة الماضية، إلى أي مدى أدى الألم الجسدي إلى التعارض مع تأديتك لأعمالك المعتادة (سواء داخل المنزل أو خارجه) :**
(اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)

- **لم يكن هناك أي تعارض إطلاقا**
- **كان هناك تعارض قليل**
- **كان هناك تعارض متوسط**
- **كان هناك تعارض كبير**
- **كان هناك تعارض كبير جدا**

الأسئلة التالية تتعلق بكيفية شعورك وطبيعة سير الأمور معك خلال الأسابيع الأربعة الماضية،
الرجاء إعطاء واحدة لكل سؤال بحيث تكون هذه الإجابة هي الأقرب إلى الحالة التي كنت تشعر بها.
خلال الأسابيع الأربعة الماضية، كم من الوقت:

(اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)

		في كل الأوقات	في معظم الأوقات	في كثير من الأوقات	في بعض الأوقات	في قليل من الأوقات	لم تشعر في أي وقت
23-	شعرت بأنك ملئ بالحيوية والنشاط؟	○	○	○	○	○	○
24-	كنت شخصا عصبيا جدا؟	○	○	○	○	○	○
25-	شعرت بأنك في حالة اكتئاب إلى درجة لـــم يمكن معها إدخال السرور إليك	○	○	○	○	○	○
26-	شعرت بالهدوء والطمأنينة؟	○	○	○	○	○	○
27-	كانت لديك طاقة كبيرة جدا؟	○	○	○	○	○	○
28-	شعرت بالإحباط واليأس؟	○	○	○	○	○	○
29-	شعرت بأنك منهك (استنفذت قواك)؟	○	○	○	○	○	○
30-	شعرت بأنك شخص سعيد؟	○	○	○	○	○	○
31-	شعرت بأنك تعبان؟	○	○	○	○	○	○

32- خلال الأسابيع الأربعة الماضية، ما مقدار الوقت الذي تعارضت فيه صحتك الجسمية أو مشاكلك النفسية مع نشاطاتك الاجتماعية (مثل زيارة الأصدقاء والأقارب وغير ذلك)؟

اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)

- ○ **كان التعارض في كل الأوقات**
- ○ **كان التعارض في معظم الأوقات**
- ○ **كان التعارض في بعض الأوقات**
- ○ **كان التعارض في قليل من الأوقات**
- ○ **لم يكن هناك تعارض في أي وقت من الأوقات**

ما مدى صحة أو خطأ كل من العبارات التالية (أ، ب، ج، د) بالنسبة إلى حالتك الصحية؟ اختر إجابة وضع علامة (√) أمام الإجابة المناسبة)						
		صحيحة بلا شك	صحيحة غالبا	لا أعلم	خطأ غالبا	خطأ بلا شك
33-	أ- يبدو أنني أصاب بالمرض أسهل من الآخرين	○	○	○	○	○
34-	ب- حالتي الصحية مساوية لأي شخص أعرفه	○	○	○	○	○
35-	ج- أتوقع أن تسوء حالتي الصحية	○	○	○	○	○
36-	د- حالتي الصحية ممتازة	○	○	○	○	○

.....شكرا لتعاونكم.....

This Arabic version is a translation of the original Rand 36-Item Health Survey 1.0
Developed by the RAND Corporation as part of the Medical Outcome Study.

Scoring the RAND SF-36-item Health Survey 1.0

NOTE: This information is derived from the article:
Goertz, C.M. (1994): Measuring *Functional Health Status in the Chiropractic Office Using Self-Report Questionnaires*. Top in Clin Chiro, 1 (1): 51-59.

Scoring the RAND involves 3 steps

STEP 1: Scoring questions:

Item numbers	Original response	Recorded value
1, 2, 20, 22, 34, 36	1	100
	2	75
	3	50
	4	25
	5	0
3, 4, 5, 6, 7, 8, 9, 10, 11, 12	1	0
	2	50
	3	100
13, 14, 15, 16, 17, 18, 19	1	0
	2	100
21, 23, 26, 27, 30	1	100
	2	80
	3	60
	4	40
	5	20
	6	0
24, 25, 28, 29, 31	1	0
	2	20
	3	40
	4	60
	5	80
	6	100
32, 33, 35	1	0
	2	25
	3	50
	4	75
	5	100

STEP 2: Averaging items to form 8 scales:

Scale	Number of items	After recording scores per Table (1), Average the following items
Physical functioning	10	3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Role limitations due to physical health	4	13, 14, 15, 16
Role limitations due to emotional problems	3	17, 18, 19
Energy/ fatigue	4	23, 27, 29, 31
Emotional well being	5	24, 25, 26, 28, 30
Social functioning	2	20, 32
Pain	2	21, 22
General health	5	1, 33, 34, 35, 36

STEP 3: Figuring scores:

RAND recommends the following straightforward approach to scoring the RAND 36-Item Health Survey.

All questions are scored on a scale from 0 to 100, with 100 representing the highest level of functioning possible. Aggregate scores are compiled as a percentage of the total points possible, using the RAND scoring table (STEP I chart).

The scores from those questions that address each specific area of functional health status (STEP II chart) are then averaged together, for a final score within each of the 8 dimensions measured. (e.g. pain, physical functioning etc.)

For example, to measure the patient's energy/fatigue level, add the scores from questions 23, 27, 29, and 31. If a patient circled 4 on 23, 3 on 27, 3 on 29 and left 31 blank, use table 1 to score them.

An answer of 4 to Q23 is scored as 40, 3 to Q27 is scored as 60, and 3 to Q29 is scored as 40. Q31 is omitted. The score for this block is 40+60+40 =140. Now we divide by the 3 answered questions to get a total of 46.7. Since a score of 100 represents high energy with no fatigue, the lower score of 46.7% suggests the patient is experiencing a loss of energy and is experiencing some fatigue.

All 8 categories are scored in the same way.

Appendix D

Variables with no significant Associations with QOL domains In the bivariate analysis

Age:
One-Way ANOVA comparing the effect of age of the participant on QOL

QOL Domain	age of the participant	Sum of Squares	df	Mean Square	F	P value
PF	Between Groups	3323.193	3	1107.731	1.597	.191
	Within Groups	167206.807	241	693.804		
	Total	170530.000	244			
RF	Between Groups	3767.145	3	1255.715	1.059	.367
	Within Groups	285732.855	241	1185.614		
	Total	289500.000	244			
RE	Between Groups	1929.871	3	643.290	.383	.766
	Within Groups	405235.662	241	1681.476		
	Total	407165.533	244			
EF	Between Groups	1104.381	3	368.127	.979	.403
	Within Groups	90627.660	241	376.048		
	Total	91732.041	244			
EWB	Between Groups	413.784	3	137.928	.350	.789
	Within Groups	94991.669	241	394.156		
	Total	95405.453	244			
SF	Between Groups	1009.551	3	336.517	.646	.586
	Within Groups	125523.613	241	520.845		
	Total	126533.163	244			
PAIN	Between Groups	3009.101	3	1003.034	1.664	.175
	Within Groups	145258.399	241	602.732		
	Total	148267.500	244			
GH	Between Groups	2708.288	3	902.763	2.374	.071
	Within Groups	91629.467	241	380.205		
	Total	94337.755	244			

Gender:

Independent T-test comparing relation between gender and QOL

QOL Domain	Gender	N	Mean	Std. Deviation	t	P value
PF	male	119	75.4202	26.05063	.488	.626
	female	126	73.7698	26.87517		
RF	male	119	68.2773	34.55183	.816	.415
	female	126	64.6825	34.39038		
RE	male	119	64.1457	41.20585	.327	.744
	female	126	62.4339	40.65773		
EF	male	119	58.3613	20.24332	-.260	.795
	female	126	59.0079	18.62278		
EWB	male	119	59.3950	20.47331	.438	.662
	female	126	58.2857	19.15614		
SF	male	119	72.1639	23.32509	.184	.854
	female	126	71.6270	22.32782		
PAIN	male	119	75.1891	24.94307	-.279	.780
	female	126	76.0714	24.46309		
GH	male	119	50.7563	21.06928	-.756	.450
	female	126	52.6587	18.27224		

Current occupation:

One-Way ANOVA comparing relation between current occupation and QOL

QOL Domain	current occupation	Sum of Squares	df	Mean Square	F	P value
PF	Between Groups	3952.305	7	564.615	.803	.585
	Within Groups	166577.695	237	702.859		
	Total	170530.000	244			
RF	Between Groups	4339.989	7	619.998	.515	.823
	Within Groups	285160.011	237	1203.207		
	Total	289500.000	244			
RE	Between Groups	13373.596	7	1910.514	1.150	.333
	Within Groups	393791.937	237	1661.569		
	Total	407165.533	244			
EF	Between Groups	736.092	7	105.156	.274	.964
	Within Groups	90995.949	237	383.949		
	Total	91732.041	244			
EWB	Between Groups	1503.695	7	214.814	.542	.802
	Within Groups	93901.758	237	396.210		
	Total	95405.453	244			
SF	Between Groups	2799.289	7	399.898	.766	.616
	Within Groups	123733.874	237	522.084		
	Total	126533.163	244			
PAIN	Between Groups	2222.865	7	317.552	.515	.823
	Within Groups	146044.635	237	616.222		
	Total	148267.500	244			
GH	Between Groups	1108.781	7	158.397	.403	.900
	Within Groups	93228.974	237	393.371		
	Total	94337.755	244			

Monthly income:
One-Way ANOVA comparing relation between family monthly income and QOL

QOL Domain	Family monthly income	Sum of Squares	df	Mean Square	F	Sig.
PF	Between Groups	2722.708	3	907.569	1.303	.274
	Within Groups	167807.292	241	696.296		
	Total	170530.000	244			
RF	Between Groups	4458.046	3	1486.015	1.256	.290
	Within Groups	285041.954	241	1182.747		
	Total	289500.000	244			
RE	Between Groups	2654.745	3	884.915	.527	.664
	Within Groups	404510.788	241	1678.468		
	Total	407165.533	244			
EF	Between Groups	574.053	3	191.351	.506	.679
	Within Groups	91157.988	241	378.249		
	Total	91732.041	244			
EWB	Between Groups	1046.092	3	348.697	.891	.447
	Within Groups	94359.361	241	391.533		
	Total	95405.453	244			
SF	Between Groups	1121.095	3	373.698	.718	.542
	Within Groups	125412.069	241	520.382		
	Total	126533.163	244			
PAIN	Between Groups	960.638	3	320.213	.524	.666
	Within Groups	147306.862	241	611.232		
	Total	148267.500	244			
GH	Between Groups	930.136	3	310.045	.800	.495
	Within Groups	93407.619	241	387.583		
	Total	94337.755	244			

Duration of diabetes:
One-Way ANOVA comparing relation between duration of diabetes mellitus and QOL

QOL Domain	duration of diabetes mellitus	Sum of Squares	df	Mean Square	F	P value
PF	Between Groups	1885.374	3	628.458	.898	.443
	Within Groups	168644.626	241	699.770		
	Total	170530.000	244			
RF	Between Groups	2475.097	3	825.032	.693	.557
	Within Groups	287024.903	241	1190.975		
	Total	289500.000	244			
RE	Between Groups	4725.537	3	1575.179	.943	.420
	Within Groups	402439.996	241	1669.876		
	Total	407165.533	244			
EF	Between Groups	267.191	3	89.064	.235	.872
	Within Groups	91464.850	241	379.522		
	Total	91732.041	244			
EWB	Between Groups	371.366	3	123.789	.314	.815
	Within Groups	95034.087	241	394.332		
	Total	95405.453	244			
SF	Between Groups	1123.840	3	374.613	.720	.541
	Within Groups	125409.323	241	520.371		
	Total	126533.163	244			
PAIN	Between Groups	1891.869	3	630.623	1.038	.376
	Within Groups	146375.631	241	607.368		
	Total	148267.500	244			
GH	Between Groups	1926.369	3	642.123	1.675	.173
	Within Groups	92411.386	241	383.450		
	Total	94337.755	244			

Appendix E

Tables and results of the variables with significant Associations with QOL domains In the bivariate analysis

Level of education

The averages and One-Way ANOVA for the effect of level of education on the participants' QOL

QOL domains	Participants' level of education	N	Mean	Std. Deviation	F	P value
PF	illiterate	4	90.00	16.83	.594	.667
	Primary	16	75.93	24.16		
	Preparatory	61	76.39	26.44		
	Secondary	88	74.54	25.99		
	University	76	72.03	27.93		
	Total	245	74.57	26.43		
RF	illiterate	4	93.75	12.50	1.280	.278
	Primary	16	57.81	36.19		
	Preparatory	61	70.49	31.46		
	Secondary	88	63.35	36.14		
	University	76	67.10	34.69		
	Total	245	66.42	34.44		
RE	illiterate	4	100.00	.00	2.060	.087
	Primary	16	52.08	40.31		
	Preparatory	61	71.58	38.41		
	Secondary	88	58.71	42.28		
	University	76	62.28	40.85		
	Total	245	63.26	40.84		
EF	illiterate	4	76.25	17.01	.974	.422
	Primary	16	57.18	17.88		
	Preparatory	61	59.91	19.56		
	Secondary	88	57.67	20.15		
	University	76	58.28	18.71		
	Total	245	58.69	19.38		
EWB	illiterate	4	84.00	16.32	3.820	.005
	Primary	16	57.00	17.06		
	Preparatory	61	62.09	20.43		
	Secondary	88	53.90	19.23		
	University	76	60.94	19.07		
	Total	245	58.82	19.77		
SF	illiterate	4	87.50	25.00	1.307	.268
	Primary	16	62.50	23.71		
	Preparatory	61	73.15	23.80		
	Secondary	88	73.01	22.49		
	University	76	70.72	21.75		
	Total	245	71.88	22.77		

PAIN	illiterate	4	92.50	9.57	.502	.735
	Primary	16	73.43	23.95		
	Preparatory	61	75.77	24.39		
	Secondary	88	75.25	24.43		
	University	76	75.55	25.94		
	Total	245	75.64	24.65		
GH	illiterate	4	67.50	11.90	2.180	.072
	Primary	16	47.50	20.81		
	Preparatory	61	56.63	19.70		
	Secondary	88	50.34	20.40		
	University	76	49.47	18.10		
	Total	245	51.73	19.66		

LSD test for the differences of EWB of QOL by participants' level of education

Dependent Variable	(I) Level of education you have completed	(J) Level of education you have completed	Mean Difference (I-J)	P value
EWB	illiterate	Primary	27.00000(*)	.013
		Preparatory	21.90164(*)	.029
		Secondary	30.09091(*)	.003
		University	23.05263(*)	.021
	Primary	illiterate	-27.00000(*)	.013
		Preparatory	-5.09836	.349
		Secondary	3.09091	.557
		University	-3.94737	.459
	Preparatory	illiterate	-21.90164(*)	.029
		Primary	5.09836	.349
		Secondary	8.18927(*)	.012
		University	1.15099	.729
	Secondary	illiterate	-30.09091(*)	.003
		Primary	-3.09091	.557
		Preparatory	-8.18927(*)	.012
		University	-7.03828(*)	.021
	University	illiterate	-23.05263(*)	.021
		Primary	3.94737	.459
		Preparatory	-1.15099	.729
		Secondary	7.03828(*)	.021

* The mean difference is significant at the .05 level.

Additional resources rather than monthly income

Independent T-test testing relation between additional resources rather than monthly income and QOL

QOL Domain	Presence of additional sources of income	N	Mean score	Std. Deviation	t	P value
PF	yes	28	77.14	22.70	.546	.585
	no	217	74.23	26.90		
RF	yes	28	50.00	37.88	-2.716	.007
	no	217	68.54	33.48		
RE	yes	28	36.90	38.85	-3.723	.000
	no	217	66.66	39.93		
EF	yes	28	56.07	20.42	-.760	.448
	no	217	59.03	19.27		
EWB	yes	28	54.28	16.16	-1.292	.197
	no	217	59.41	20.14		
SF	yes	28	65.62	22.47	-1.551	.122
	no	217	72.69	22.73		
PAIN	yes	28	66.60	25.25	-2.075	.039
	no	217	76.80	24.38		
GH	yes	28	47.85	20.29	-1.109	.268
	no	217	52.23	19.57		

Smoking status

Independent T-test for relation between smoking status and QOL domains

QOL Domain	Smoking status	N	Mean score	Std. Deviation	t	P value
PF	yes	46	69.4565	26.25152	-1.459	.146
	no	199	75.7538	26.40372		
RF	yes	46	49.4565	37.07692	-3.809	.000
	no	199	70.3518	32.66956		
RE	yes	46	57.2464	38.27325	-1.109	.268
	no	199	64.6566	41.38975		
EF	yes	46	58.9130	16.01780	.085	.932
	no	199	58.6432	20.12382		
EWB	yes	46	57.4783	20.95258	-.512	.609
	no	199	59.1357	19.53336		
SF	yes	46	80.4348	22.68356	2.866	.005
	no	199	69.9121	21.35223		
PAIN	yes	46	75.7609	29.95770	.036	.971
	no	199	75.6156	23.34208		
GH	yes	46	50.0000	20.84333	-.663	.508
	no	199	52.1357	19.41276		

Following special diet for diabetics

Independent T-test comparing measures scores of QOL domains between followers of special diet for diabetics and non followers

QOL Domain	following special diet for diabetics	N	Mean score	Std. Deviation	t	P value
PF	yes	129	72.7132	28.00675	-1.161	.247
	no	116	76.6379	24.52839		
RF	yes	129	76.5504	29.10648	5.092	.000
	no	116	55.1724	36.49259		
RE	yes	129	77.5194	33.63478	6.184	.000
	no	116	47.4138	42.42660		
EF	yes	129	60.8527	21.02941	1.847	.066
	no	116	56.2931	17.15810		
EWB	yes	129	59.6279	20.38039	.670	.504
	no	116	57.9310	19.12509		
SF	yes	129	78.9729	20.06973	5.427	.000
	no	116	64.0086	23.08745		
PAIN	yes	129	81.6473	22.71489	4.152	.000
	no	116	68.9655	25.09129		
GH	yes	129	57.2481	14.55004	4.836	.000
	no	116	45.6034	22.64235		

Physical activity

Independent T-test comparing average scores of QOL domains by physical activity and exercise:

QOL Domain	Physical activities (walking, running swimming)	N	Mean score	Std. Deviation	t	P value
PF	yes	150	77.2667	27.52416	2.018	.045
	no	95	70.3158	24.15388		
RF	yes	150	69.3333	34.77476	1.665	.097
	no	95	61.8421	33.58898		
RE	yes	150	66.0000	40.59035	1.319	.189
	no	95	58.9474	41.09973		
EF	yes	150	63.0000	16.21996	4.540	.000
	no	95	51.8947	21.96684		
EWB	yes	150	60.6400	17.26590	1.814	.071
	no	95	55.9579	22.99672		
SF	yes	150	72.6667	24.20665	.672	.502
	no	95	70.6579	20.36636		
PAIN	yes	150	77.5000	24.07692	1.485	.139
	no	95	72.7105	25.38183		
GH	yes	150	51.7333	21.56609	-.001	.999
	no	95	51.7368	16.32073		

BMI of the participants

ANOVA test comparing averages of QOL domains by BMI

QOL domain	BMI of the participants	N	Mean	Std. Deviation	F	P value
PF	<19.9(very under weight, under weight)	40	73.75	24.35	.804	.449
	20 -25 (healthy weight)	99	77.12	27.62		
	>25 (overweight, obese, very obese)	106	72.50	26.08		
	Total	245	74.57	26.43		
RF	<19.9(very under weight, under weight)	40	55.00	40.50	4.862	.009
	20 -25 (healthy weight)	99	73.73	29.31		
	>25 (overweight, obese, very obese)	106	63.91	35.20		
	Total	245	66.42	34.44		
RE	<19.9(very under weight, under weight)	40	61.66	34.21	7.109	.001
	20 -25 (healthy weight)	99	74.41	33.61		
	>25 (overweight, obese, very obese)	106	53.45	46.61		
	Total	245	63.26	40.84		
EF	<19.9(very under weight, under weight)	40	51.00	24.81	7.739	.001
	20 -25 (healthy weight)	99	63.93	16.86		
	>25 (overweight, obese, very obese)	106	56.69	18.08		
	Total	245	58.69	19.38		
EWB	<19.9(very under weight, under weight)	40	51.90	25.20	5.587	.004
	20 -25 (healthy weight)	99	57.01	17.68		
	>25 (overweight, obese, very obese)	106	63.13	18.45		
	Total	245	58.82	19.77		

SF	<19.9(very under weight, under weight)	40	70.62	19.92	2.706	.069
	20 -25 (healthy weight)	99	75.88	19.50		
	>25 (overweight, obese, very obese)	106	68.63	26.00		
	Total	245	71.88	22.77		
PAIN	<19.9(very under weight, under weight)	40	79.56	21.40	3.985	.020
	20 -25 (healthy weight)	99	79.44	24.52		
	>25 (overweight, obese, very obese)	106	70.61	25.20		
	Total	245	75.64	24.65		
GH	<19.9(very under weight, under weight)	40	46.37	21.21	1.896	.152
	20 -25 (healthy weight)	99	53.43	17.98		
	>25 (overweight, obese, very obese)	106	52.16	20.38		
	Total	245	51.73	19.66		

LSD test for the differences of RF, RE, EF, EWB and BP of QOL by BMI

QOL domains	**(I) BMI of the participant**	**(J) BMI of the participant**	**Mean Difference (I-J)**	**P valve**
RF	<19.9(very under weight, under weight)	20 -25 (healthy weight)	-18.73737(*)	.003
		>25 (overweight, obese, very obese)	-8.91509	.158
	20 -25 (healthy weight)	<19.9(very under weight, under weight)	18.73737(*)	.003
		>25 (overweight, obese, very obese)	9.82228(*)	.039
	>25 (overweight, obese, very obese)	<19.9(very under weight, under weight)	8.91509	.158
		20 -25 (healthy weight)	-9.82228(*)	.039
RE	<19.9(very under weight, under weight)	20 -25 (healthy weight)	-12.74411	.089
		>25 (overweight, obese, very obese)	8.20755	.268
	20 -25 (healthy weight)	<19.9(very under weight, under weight)	12.74411	.089
		>25 (overweight, obese, very obese)	20.95165(*)	.000
	>25 (overweight, obese, very obese)	<19.9(very under weight, under weight)	-8.20755	.268
		20 -25 (healthy weight)	-20.95165(*)	.000

EF	<19.9(very under weight, under weight)	20 -25 (healthy weight)	-12.93939(*)	.000
		>25 (overweight, obese, very obese)	-5.69811	.105
	20 -25 (healthy weight)	<19.9(very under weight, under weight)	12.93939(*)	.000
		>25 (overweight, obese, very obese)	7.24128(*)	.007
	>25 (overweight, obese, very obese)	<19.9(very under weight, under weight)	5.69811	.105
		20 -25 (healthy weight)	-7.24128(*)	.007
EWB	<19.9(very under weight, under weight)	20 -25 (healthy weight)	-5.11010	.161
		>25 (overweight, obese, very obese)	-11.23208(*)	.002
	20 -25 (healthy weight)	<19.9(very under weight, under weight)	5.11010	.161
		>25 (overweight, obese, very obese)	-6.12197(*)	.025
	>25 (overweight, obese, very obese)	<19.9(very under weight, under weight)	11.23208(*)	.002
		20 -25 (healthy weight)	6.12197(*)	.025
PAIN	<19.9(very under weight, under weight)	20 -25 (healthy weight)	.11806	.979
		>25 (overweight, obese, very obese)	8.94929(*)	.049
	20 -25 (healthy weight)	<19.9(very under weight, under weight)	-.11806	.979
		>25 (overweight, obese, very obese)	8.83124(*)	.010
	>25 (overweight, obese, very obese)	<19.9(very under weight, under weight)	-8.94929(*)	.049
		20 -25 (healthy weight)	-8.83124(*)	.010

* The mean difference is significant at the .05 level.

HbA_1c level

Comparison of the averages of QOL domains by HbA_1c level

QOL domains	HbA1c levels	N	Mean score	Std. Deviation	t	p
PF	<8%(acceptable control)	63	75.7937	31.54881	.425	.671
	≥ 8%(poor control)	182	74.1484	24.50538		
RF	<8%(acceptable control	63	70.2381	32.33430	1.019	.309
	≥ 8%(poor control)	182	65.1099	35.13571		
RE	<8%(acceptable control	63	64.0212	36.56466	.170	.865
	≥ 8%(poor control)	182	63.0037	42.32371		
EF	<8%(acceptable control	63	59.7619	16.15022	.506	.613
	≥ 8%(poor control)	182	58.3242	20.41880		
EWB	<8%(acceptable control	63	59.0476	21.06475	.104	.917
	≥ 8%(poor control)	182	58.7473	19.36711		
SF	<8%(acceptable control	63	75.3968	21.76305	1.422	.156
	≥ 8%(poor control)	182	70.6731	23.04497		
PAIN	<8%(acceptable control	63	83.7302	20.69787	3.39	.001
	≥ 8%(poor control)	182	72.8434	25.33312		
GH	<8%(acceptable control	63	59.0476	17.41007	3.73	.001
	≥ 8%(poor control)	182	49.2033	19.80701		

Presence of other health problems than diabetes mellitus

Independent T-test comparing relation between presence of other health problems than diabetes mellitus and QOL

QOL Domain	Presence of health problems other than diabetes	N	Mean score	Std. Deviation	t	P value
PF	yes	65	70.92	25.90	-1.300	.195
	no	180	75.88	26.57		
RF	yes	65	61.92	41.71	-1.232	.219
	no	180	68.05	31.38		
RE	yes	65	57.94	39.20	-1.225	.222
	no	180	65.18	41.36		.
EF	yes	65	48.46	22.16	-5.224	.000
	no	180	62.38	16.88		
EWB	yes	65	56.06	18.28	-1.316	.189
	no	180	59.82	20.24		
SF	yes	65	72.50	20.15	.252	.801
	no	180	71.66	23.69		
PAIN	yes	65	65.34	24.89	-4.051	.000
	no	180	79.36	23.54		
GH	yes	65	39.00	18.89	-6.602	.000
	no	180	56.33	17.86		

Presence of chronic diabetic complications

Independent T-test for differences in means of QOL domains by chronic diabetic complications

QOL Domain	presence of one or more of chronic diabetic complications	N	Mean score	Std. Deviation	t	P value
PF	yes	50	72.2000	21.66913	-.710	.478
	no	195	75.1795	27.54272		
RF	yes	50	31.5000	29.79950	-9.306	.000
	no	195	75.3846	29.54519		
RE	yes	50	28.0000	37.10621	-7.549	.000
	no	195	72.3077	36.71938		
EF	yes	50	42.0000	21.18914	-6.516	.000
	no	195	62.9744	16.40733		
EWB	yes	50	49.4400	16.90811	-4.243	.000
	no	195	61.2308	19.77510		
SF	yes	50	49.0000	19.37150	-9.333	.000
	no	195	77.7564	19.69316		
PAIN	yes	50	58.5500	21.12940	-6.256	.000
	no	195	80.0256	23.59859		
GH	yes	50	33.2000	21.70677	-7.107	.000
	no	195	56.4872	16.00076		

Presence of hypoglycemic episodes

Independent T-test testing for the effect of presence of hypoglycemic episodes during four weeks prior data collection on QOL domains

QOL Domain	Hypoglycemic episodes	N	Mean score	Std. Deviation	t	P
PF	yes	107	70.5607	29.13313	-2.106	.036
	no	138	77.6812	23.78553		
RF	yes	107	63.3178	37.66751	-1.246	.214
	no	138	68.8406	31.65329		
RE	yes	107	58.2555	39.94059	-1.697	.091
	no	138	67.1498	41.26655		
EF	yes	107	56.7290	22.43547	-1.399	.163
	no	138	60.2174	16.57619		
EWB	yes	107	58.5794	21.03906	-.170	.865
	no	138	59.0145	18.81023		
SF	yes	107	73.2477	20.63615	.823	.412
	no	138	70.8333	24.32170		
PAIN	yes	107	74.3692	23.00813	-.711	.477
	no	138	76.6304	25.89220		
GH	yes	107	48.1776	20.62002	-2.521	.012
	no	138	54.4928	18.49531		

Presence of hyperglycemic episodes

Independent T-test for differences in means of QOL domains by hyperglycemic episodes during the four weeks prior to data collection

QOL Domain	Hyperglycemic episodes	N	Mean score	Std. Deviation	t	P value
PF	yes	111	74.9550	26.76918	.206	.837
	no	134	74.2537	26.25430		
RF	yes	111	56.9820	40.47603	-4.027	.000
	no	134	74.2537	26.18261		
RE	yes	111	49.5495	45.36382	-5.014	.000
	no	134	74.6269	32.74649		
EF	yes	111	52.4324	20.13438	-4.804	.000
	no	134	63.8806	17.16398		
EWB	yes	111	54.3063	17.09481	-3.321	.001
	no	134	62.5672	21.08288		
SF	yes	111	66.3288	25.32700	-3.560	.000
	no	134	76.4925	19.33120		
PAIN	yes	111	66.8694	25.52732	-5.350	.000
	no	134	82.9104	21.40988		
GH	yes	111	44.3694	19.96721	-5.666	.000
	no	134	57.8358	17.22745		

Appendix F

QOL domains in the univariate analysis

Physical functioning

Physical functioning domain univariate analysis (GLM)

Source	Type III Sum of Squares	df	Mean Square	F	P value	Partial Eta Squared	N	Estimated marginal mean
Corrected Model	5366.865(b)	2	2683.432	3.932	.021	.031		
Intercept	1241642.765	1	1241642.765	1819.277	.000	.883		
Physical activity	2311.191	1	2311.191	3.386	.067	.014	Yes 150 No	76.613 70.281
hypoglycemia	2556.724	1	2556.724	3.746	.054	.015	Yes 107 No	70.176 76.718
Error	165163.135	242	682.492					
Total	1532950.000	245						
Corrected Total	170530.000	244						

a Computed using alpha = .05 b R Squared = .031 (Adjusted R Squared = .023)

RF domain

Associations with RF domain in the Univariate analysis (GLM)

Source	Type III Sum of Squares	df	Mean Square	F	P value	Partial Eta Squared	N	Estimated Marginal mean
Corrected Model	132007.365	10	13200.736	19.613	.000	.456		
Intercept	103219.437	1	103219.437	153.362	.000	.396		
Additional sources of income	2999.808	1	2999.808	4.457	.036	.019	Yes 28 No 217	36.39 47.60
Smoking	19405.433	1	19405.433	28.832	.000	.110	Yes 46 No 199	28.61 55.37
Diet	13435.561	1	13435.561	19.962	.000	.079	Yes 29 No 116	50.33 33.66
BMI	2466.214	2	1233.107	1.832	.162	.015	<19.9 40 20-25 99 >25 106	41.50 45.98 38.50
Number of insulin injections/day	15198.738	3	5066.246	7.527	.000	.088	Once 21 Twice102 3 times 92 >3 times30	58.80 43.56 44.53 21.08
hyperglycemia	509.286	1	509.286	.757	.385	.003	Yes 11 No 134	40.33 43.65
Diabetic complications	40684.829	1	40684.829	60.449	.000	.205	Yes 50 No 195	24.00 59.9
Error	157492.635	234	673.045					
Total	1370625.000	245					245	
Corrected Total	289500.000	244						

R Squared = .456 (Adjusted R Squared = .433)

RE domain

Associations with the RE domain in univariate analysis (GLM).

Source	Type III Sum of Squares	df	Mean Square	F	P value	Partial Eta Square	N	Estimated marginal mean
Corrected Model	164418.328	9	18268.703	17.686	.000	.404		
Intercept	132665.098	1	132665.098	128.431	.000	.353		
Additional sources of income	13874.525	1	13874.525	13.432	.000	.054	Yes 28 No 217	34.329 58.263
Diet	28955.745	1	28955.745	28.032	.000	.107	Yes 129 No 116	58.494 34.098
BMI	15799.431	2	7899.715	7.648	.001	.061	<19.9 40 20-25 99 >25 106	55.552 49.288 34.048
Number of insulin injections/day	24256.168	3	8085.389	7.827	.000	.091	Once 21 Twice 102 3 times 92 >3 times30	68.525 47.060 48.799 20.800
Hyperglycemia	2136.494	1	2136.494	2.068	.152	.009	Yes 111 No 134	42.918 49.674
Diabetic complications	31097.906	1	31097.906	30.105	.000	.114	Yes 50 No 195	30.564 62.028
Error	242747.205	235	1032.967					
Total	1387777.778	245					245	
Corrected Total	407165.533	244						

R Squared = .404 (Adjusted R Squared = .381)

EF domain

Associations with EF domain of QOL in univariate analysis (GLM).

Source	Type III Sum of Squares	df	Mean Square	F	P value	Partial Eta Squared	N	Estimated marginal means
Corrected Model	36338.455	9	4037.606	17.129	.000	.396		
Intercept	249668.868	1	249668.868	1059.187	.000	.818		
Physical activity	4305.290	1	4305.290	18.265	.000	.072	Yes150 No 95	56.66 45.68
BMI	823.498	2	411.749	1.747	.177	.015	<19.9 40 20 -25 99 >25 106	48.89 53.94 50.67
Number of insulin injections/day	5142.230	3	1714.077	7.272	.000	.085	Once 21 Twice 102 3 times 92 >3 time30	59.88 46.50 54.53 43.76
Health problems rather than diabetes	4819.735	1	4819.735	20.447	.000	.080	Yes 65 No 180	45.27 57.06
Hyperglycemia	130.835	1	130.835	.555	.457	.002	Yes 111 No 134	50.30 52.04
Diabetic complications	4764.570	1	4764.570	20.213	.000	.079	Yes 50 No 195	44.83 57.50
Error	55393.586	235	235.717					
Total	935750.000	245						
Corrected Total	91732.041	244						

R Squared = .396 (Adjusted R Squared = .373)

EWB domain

Associations with EWB of QOL in univariate analysis (GLM)

Source	Type III Sum of Squares	df	Mean Square	F	P value	Partial Eta Squared	N	Estimated marginal mean
Corrected Model	29784.299	11	2707.664	9.614	.000	.312		
Intercept	191786.593	1	191786.593	680.974	.000	.745		
Participants' level of education	2858.251	4	714.563	2.537	.041	.042	Illiterat4 Prima16 Prep. 61 Secon88 Acad. 76	73.93 55.60 58.31 51.70 55.47
BMI	1315.856	2	657.928	2.336	.099	.020	<19.9 40 20 -25 99 >25 106	60.30 55.83 60.88
Number of insulin injections/day	13290.101	3	4430.034	15.730	.000	.168	Once 21 Twice 102 3 times 92 >3 times 30	71.69 59.95 64.32 40.06
hyperglycemia	403.871	1	403.871	1.434	.232	.006	Yes 111 No 134	57.54 60.46
Diabetic complications	2492.728	1	2492.728	8.851	.003	.037	Yes 50 No 195	54.53 63.48
Error	65621.155	233	281.636					
Total	943184.000	245						
Corrected Total	95405.453	244					245	

R Squared = .312 (Adjusted R Squared = .280)

SF domain

Associations with the SF domain of QOL in the univariate analysis (GLM).

Source	Type III Sum of Squares	df	Mean Square	F	P value	Partial Eta Squared	N	Estimated marginal mean
Corrected Model	48627.371	12	4052.281	12.06	.000	.384		
Intercept	240506.535	1	240506.535	716.2	.000	.755		
Smoking	2724.633	1	2724.633	8.114	.005	.034	Yes 46 No 199	68.53 58.82
Diet	8433.883	1	8433.883	25.116	.000	.098	Yes 129 No 116	70.18 57.17
Number of insulin injections/day	1720.548	3	573.516	1.708	.166	.022	Once 21 Twice 102 3 times 92 >3 time30	66.53 64.80 66.12 57.25
Hyperglycemia	151.290	1	151.290	.451	.503	.002	Yes 111 No 134	64.57 62.78
Diabetic complications	17938.348	1	17938.348	53.420	.000	.187	Yes 50 No 195	51.65 75.70
Error	77905.792	232	335.801					
Total	1392656.250	245					245	
Corrected	126533.163	244						

R Squared = .384 (Adjusted R Squared = .352)

BP domain

Associations with BP of QOL domain in univariate analysis (GLM)

Source	Type III Sum of Squares	df	Mean Square	F	P value	Partial Eta Squared	N	Estimated marginal mean
Corrected	47419.100(a)	13	3647.623	8.355	.000	.320		
Intercept	244752.654	1	244752.654	560.622	.000	.708		
Additional sources of income	786.816	1	786.816	1.802	.181	.008	Yes 28 No 217	67.36 73.27
Diet	5658.301	1	5658.301	12.961	.000	.053	Yes 129 No 116	75.55 65.08
BMI	3027.145	2	1513.573	3.467	.033	.029	<19.9 40 20 -25 99 >25 106	75.28 70.35 65.32
HbA1c	3658.459	1	3658.459	8.380	.004	.035	<8 63 >8 182	74.94 65.69
Health problems rather than diabetes	3909.629	1	3909.629	8.955	.003	.037	Yes 65 No 180	65.36 75.27
Hyperglycemia	1926.759	1	1926.759	4.413	.037	.019	Yes 111 No 134	67.05 73.58
Diabetic complications	2924.623	1	2924.623	6.699	.010	.028	Yes 50 No 195	65.43 75.202
Error	100848.400	231	436.573					
Total	1550118.750	245						
Corrected	148267.500	244						

a R Squared = .320 (Adjusted R Squared = .282)

GH domain

Associations with GH domain in univariate analysis (GLM)

Source	Type III Sum of Squares	df	Mean Square	F	P value	Partial Eta Squared	N	Estimate marginal mean
Corrected Model	40380.993	9	4486.777	19.541	.000	.428		
Intercept	173114.179	1	173114.1	753.971	.000	.762		
Diet	6162.112	1	6162.112	26.838	.000	.102	Yes 129 No 116	52.95 41.51
Number of insulin injections/day	1212.722	3	404.241	1.761	.155	.022	Once 21 Twice102 3 times 92 >3times30	53.88 45.11 45.89 44.02
Health problems rather than diabetes	5848.816	1	5848.816	25.474	.000	.098	Yes 65 No 180	40.61 53.84
Hypoglycemia	198.778	1	198.778	.866	.353	.004	Yes 107 No 138	46.23 48.22
Hyperglycemia	1.399	1	1.399	.006	.938	.000	Yes 111 No 134	47.13 47.32
Diabetic complications	6238.739	1	6238.739	27.172	.000	.104	Yes 50 No 195	39.79 54.67
HbA1c	3120.135	1	3120.135	13.589	.000	.055	<8 63 >8 172	51.84 42.61
Error	53956.762	235	229.603					
Total	750075.000	245					245	
Corrected Total	94337.755	244						

R Squared = .428 (Adjusted R Squared = .406)

"جودة الحياة ومحدداتها لدى مرضى السكري من النوع الأول الذين يتلقون الرعاية في عيادات السكري التابعة لمراكز الرعاية الصحية الأولية الحكومية في المحافظات الشمالية من الضفة الغربية"

إعداد: رشا عبد الرحمن الكرمي

إشراف: الدكتور خلدون بدر
مشرف مساعد: الدكتور هشام درويش

الملخص

يعتبر مرض السكري من النوع الأول ثالث الأمراض المزمنة الأكثر شيوعا في الأطفال والمراهقين حيث أنه يسبب الكثير من الاضطرابات النفسية والاجتماعية في حياة المرضى وكذلك عائلاتهم. ومن هنا برزت أهمية دراسة جودة الحياة والعوامل التي تؤثر عليها عند هذا النوع من المرضى.

وهدفت هذه الدراسة إلى تقييم جودة الحياة لدى الفلسطينيين المصابين بمرض السكري من النوع الأول واستكشاف العوامل الاقتصادية والاجتماعية الديموغرافية ونمط الحياة وكذلك المتغيرات المرضية التي تؤثر عليها.

إجراءات الدراسة

وقد أجريت هذه الدراسة في الفترة الواقعة بين نيسان وكانون أول 2011 على عينة عشوائية طبقية بواقع 252 مريض، (ما يوازي 34.5.% من المجتمع المستهدف) ممثلة مرضى السكري من النوع الأول من الذين أعمارهم أكثر أو تساوي أو14 سنة (728 مريض) والذين يتلقون العلاج في عيادات السكري التابعة لمراكز الرعاية الصحية في وزارة الصحة في المحافظات الشمالية من الضفة الغربية. ولتحقيق أهدافها تم استخدام استبيان يجمع معلومات عن المبحوث كالعمر،الجنس والعوامل المرضية وكذلك مراجعة الملفات الطبية للمرضى كما تم استخدام النسخة العربية الموجزة لمقياس جودة الحياة وقد تم تحليل البيانات باستخدام رزمة البرامج الإحصائية للعلوم الاجتماعية.

نتائج الدراسة

وتلخصت نتائج الدراسة، بأن أعمار المبحوثين تراوحت بين عمر 14 و 58 سنة بمعدل 25.2 سنة منهم 48.6 % ذكور و 51.4% إناث، وأن (45.7 %) كانوا من الفئة العمرية (19 – 29)، وأن (35.9%) قد انهوا المرحلة الثانوية بينما (31 %) قد انهوا التعليم الجامعي، كما أن (29%) من المبحوثين قد تم تشخيص المرض لديهم منذ أقل من خمس سنوات. علامات المتوسطات لمجالات جودة الحياة الثمانية تراوحت بين 51.73 للمجال الذي يقيم الحالة الصحية و 75.64 للمجال الذي يقيس شدة الألم. وقد كان أكثر المجالات تأثرا هو ذلك المجال الذي يقيس المدى الذي تتعارض فيه الناحية الصحية مع أداء الأعمال والأنشطة اليومية، حيث أن 43% من المبحوثين قد تأثروا في هذا المجال بواحد أو أكثر من العوامل الديموغرافية والاجتماعية، نمط الحياة، والعوامل المتعلقة بالسكري ، يليه المجال الذي يقيم من خلاله المبحوث حالته الصحية، حيث أن حوالي 41% من المبحوثين فد تأثروا في هذا المجال بواحد أو أكثر من العوامل المدروسة، بينما لم يتأثر المجال الذي يقييم النشاط الجسدي بأي من هذه العوامل. إن التزام المبحوثين بنظام الحمية الخاص لمرضى السكري وكذلك وجود واحد أو أكثر من مضاعفات السكري كان لهما الأثر الأكبر على مجالات جودة الحياة،حيث أن أربع مجالات على الأقل قد تأثرت بهذين العاملين. بينما كان لوجود مصادر دخل إضافية غير دخل الأسرة الشهري ، المستوى التعليمي الذي أنهاه المبحوث، ممارسة الرياضة والتمارين الجسدية،عدد المرات اليومية للحقن بالأنسولين ، وجود أمراض أخرى غير مرض السكري ، معدل السكر، زيادة وزن المبحوث وكذلك تعرض المبحوث لنوبات متكررة من ارتفاع نسبة السكر في الدم أثر على واحد أو أكثر من مجالات جودة الحياة. أما بالنسبة للعمر والجنس، الحالة الاجتماعية، المهنة الحالية، دخل الأسرة الشهري طول فترة المرض وكذلك وجود لنوبات متكررة من انخفاض نسبة السكر في الدم لم يكن لها أي تأثير على أي من مجالات جودة الحياة.

الاستنتاجات والتوصيات

ومن هذه الدراسة نستنتج أن مرضى السكري من النوع الأول لديهم جودة حياة متوسطة إلى مرتفعة نسبيا وأن هناك بعض العوامل التي تؤثر عليها بحيث خفضت من معدل جودة الحياة مثل وجود مضاعفات السكري.

توصي الدراسة مقدمي الخدمات الصحية وصانعي القرار بأخذ تلك النتائج بعين الاعتبار من اجل المساهمة في تطوير الخدمات الصحية المقدمة لمرضى السكري من النوع الأول من أجل تخفيف معاناتهم والحيلولة دون حدوث مضاعفات مستقبلية مما قد يرتقي بهم إلى جودة حياة أفضل.