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QUALITY OF LIFE FOR TYPE 2 DIABETES MELLITUS PATIENTS ATTENDING PRIMARY HEALTH CARE CENTERS IN KIRKUK CITY

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KIRKUK CITY**

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**The Institute of Health Sciences
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ETHICS STATEMENT

The thesis entitled “Quality of life for type 2 diabetes mellitus patients attending primary health care centers in kirkuk city” which was prepared and presented as a thesis, was written by myself and in accordance with the scientific, academic rules and ethical conduct. The idea/hypothesis of my thesis solely belongs to my supervisor and to me. The research pertaining to the thesis was conducted by myself and therefore, all of the used sentences and interpretations within the work belongs to me.

I declare the aforementioned issues to be correct.

Signature

22/8/ 2022

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ABSTRACT

QUALITY OF LIFE FOR TYPE 2 DIABETES MELLITUS PATIENTS ATTENDING PRIMARY HEALTH CARE CENTERS IN KIRKUK CITY

Ahmed Juneid Mohialdeen MOHIALDEEN

Master of Science in Nursing

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..... 2022

Introduction: Diabetes is one of the most common types in the world in general and in Iraq - and it accompanies the patient throughout his life. A relationship can be found between the quality of life of these patients with this disease.

Objective: The aim of this study is to assess the quality of life of diabetics living in Kirkuk and the factors affecting it.

Methodology: A descriptive cross-sectional study. This study was carried out in primary care centers in Kirkuk, Iraq, from September 2021 to March 2022. The study sample consisted of 150 participants who fulfilled the criteria for participation in the study. It was collected using the Sociodemographic and Clinical Characteristics Model and the WHO brief quality of life scale format. Chi-square test were used in the statistical analysis of the study.

Results: The majority of patients were 38.7% of age, with the highest mean distance psychological and social indicators 52.7 ± 13.8 the mean independence dimension score was 41.7 ± 11.8 the average physical indicator dimension was 38.1 ± 12.1 the average dimension was an environmental indicator 14.8 ± 3.8 the lowest mean spiritual dimension was 8.7 ± 6.2

A relationship was found between age and quality of life, $p=.001^*$, a relationship between marital status and quality of life, $p = 0.00$ *relationship between income and quality of life $p = 0.03^*$ relationship between educational level and quality of life $p = 0.00$ * in addition to a relationship between occupation, residence, type of family and smoking and quality of life where $p < 0.05$

Recommendations:Increasing family awareness and providing appropriate family support in cooperation with the family in the care and treatment of the patient in order to improve the quality of life for the patient, conducting weekly or monthly special programs for DM2 patients, which increases the quality of life provided through these programs, conducting a psychological diagnosis for DM2 patients, and then appointing a psychiatric nurse To speak with DM2 patient, which increases her QOL.

2022, 79 pages

Keywords: Quality of Life, Type 2 Diabetes, Primary Health Care Center, Iraq.

ÖZET

KERKÜK ŞEHRİNDE BİRİNCİ BASAMAK SAĞLIK MERKEZLERİNE DEVAM EDEN TIP 2 DIABETES MELLITUS HASTALARI İÇİN YAŞAM KALİTESİ

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Giriş: Diyabet, genel olarak dünyada ve Irak'ta en yaygın türlerden biridir - ve hastaya hayatı boyunca eşlik eder. Bu hastalığı olan bu hastaların yaşam kalitesi arasında bir ilişki bulunabilir.

Amaç: Bu çalışmanın amacı, Kerkük'te yaşayan şeker hastalarının yaşam kalitesini ve bunu etkileyen faktörleri değerlendirmektir.

Metodoloji: Betimleyici kesitsel bir çalışma. Bu çalışma, Eylül 2021'den Mart 2022'ye kadar Irak'ın Kerkük kentindeki birinci basamak bakım merkezlerinde gerçekleştirildi. Çalışma örneklemini çalışmaya katılma kriterlerini yerine getiren 150 adet katılımcı oluşturmuştur. Sosyodemografik ve klinik Özellikler Modeli ve DSÖ Kısa Yaşam Kalitesi Ölçeği formatı kullanılarak toplanmıştır. Çalışmanın istatistiksel analizinde ki-kare testi kullanıldı.

Bulgular: Hastaların çoğunluğu %38.7 yaş, en yüksek mesafe psikolojik ve sosyal göstergeleri ile 52.7 ± 13.8 ortalama bağımlılık boyutu puanı 41.7 ± 11.8 ortalama fiziksel gösterge boyutu 38.1 ± 12.1 ortalama boyut çevresel gösterge 14.8 ± 3.8 en düşük ortalama manevi boyut 8.7 ± 6.2 idi

Yaş ve yaşam kalitesi arasında bir ilişki bulundu, $p=.001^*$, medeni hal ile yaşam kalitesi arasında bir ilişki, $p = 0.00^*$ gelir ile yaşam kalitesi arasındaki ilişki $p = 0.03^*$ eğitim

düzeyi ile yaşam kalitesi arasındaki ilişki $p = 0.00$ * meslek, ikametgah, aile tipi ve sigara içme ve yaşam kalitesi arasındaki ilişkiye ek olarak $p < 0.05$

Öneriler: Hastanın yaşam kalitesini artırmak amacıyla aile bilincinin artırılması ve hastanın bakım ve tedavisinde aile ile işbirliği içinde uygun aile desteğinin sağlanması, DM2 hastalarına haftalık veya aylık özel programlar yapılması, bu programlar aracılığıyla sağlanan yaşam kalitesinin artırılması, DM2 hastalarına psikolojik tanı konulması,ve sonra bir psikiyatri hemşiresi atamak Bir meme kanseri hastasıyla konuşmak, bu da QOL'sini arttırır.

2022, 80 sayfa

Anahtar Kelimeler: Yaşam kalitesi, tip 2 diyabet, Birinci Basamak Sağlık Merkezlerine, Irak

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LIST OF ABBREVIATIONS

ADA	American Diabetes Association
AACE	American Association of Clinical Endocrinologists
CCM	Chronic Care Paradigm
CVD	Cardio Vascular Disease
DM	Diabetes mellitus
DM2	Diabetes Mellitus 2
DPP	Diabetes Prevention Program
ER	Estrogen Receptor
FFA	Free Fatty Acid
GDM	Gestational Diabetes Mellitus
HbA1c	Hemoglobin A1C Test
IDF	International Diabetes Federation
IR	Insulin Resistance
PR	Prolonged Released
QOL	Quality of Life
WHO	World Health Organization

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1 INTRODUCTION

Diabetes prevalence grew from 108 million in 1980 to 422 million in 2014. It has spread more rapidly in low- and middle-income nations than in high-income countries. Diabetes is a leading cause of blindness, renal failure, heart attack, stroke, and amputation of lower limbs (WHO, 2021).

Diabetes-related premature mortality increased by 5% between 2000 and 2016. Diabetes was the tenth biggest cause of mortality in 2019, accounting for an estimated 1.5 million fatalities. A nutritious diet, frequent physical exercise, keeping a normal body weight, and avoiding tobacco use are all approaches to prevent or postpone the onset of type diabetes. 2(DM2)., Diabetes can be controlled and its consequences prevented or postponed by diet, physical exercise, medication, frequent checkups, and treatment of complications (WHO, 2021).

Diabetes affected 8.5 percent of persons aged 18 and above in 2014, according to the WHO. Diabetes was the direct cause of death for 1.5 million persons in 2019, and 48 percent of all diabetes fatalities happened before the age of 70 (WHO, 2022).

Between 2000 and 2016, there was a 5% increase in premature mortality (that is, before age 70) due to diabetes. In high-income countries, premature mortality from diabetes decreased from 2000 to 2010 but then increased from 2010 to 2016. In lower middle-income countries, premature mortality from diabetes increased during the two periods. By contrast, the probability of dying from any of the four major noncommunicable diseases (cardiovascular disease, cancer, chronic respiratory disease or diabetes) between the ages of 30 and 70 decreased by 18% globally between 2000 and 2016 (WHO, 2022).

Epidemiological data also indicate patterns pointing to a grim future for DM2. According to the Centers for Disease Control and Prevention (CDC), the total number of persons living with DM2 is around 37.3 million (11.3 percent of the US

population).Pre-DM affects about 28.7 million individuals, 28.5 million of whom are adults, and 8.5 million undiagnosed instances (23.0 percent of adults are undiagnosed). That is, 96 million individuals are 18 or older. Do you have prediabetes? (CDC,2022). According WHO reports, more than 13.9 percent of people in Iraq have diabetes, and many are unaware of their condition (WHO, 2021)

The term "quality of life"(QOL). in health care may be traced back to the World Health Organization's (WHO) 1948 definition of health. In 1947, WHO defined health as "a condition of complete physical, mental, and social well-being, rather than only the absence of sickness and disability." The inclusion of the phrase "well-being" in this definition of health adds to the conceptual misunderstanding regarding what health is and what QOL is it. Regardless of whether the WHO definition describes optimal health or happiness, the majority of methodologists in health sciences and social sciences have adopted this definition and a policy of incorporating at least three dimensions into any scale or indicator purported to measure Health or QOL, namely physical function, mental state, and ability to engage in normative social interactions. Similarly, Karnofsky stated (Marcel, 2014).

A larger focus on QoL might have a significant influence on how health care practitioners engage with patients. QoL is an essential outcome for patients that is not always dependent on objective measurements (eg, weight, cholesterol, glucose, blood pressure). The inclusion of QoL as an outcome can give patients a voice in how their treatment is developing and allow them to take ownership of their care. The combination of traditional health outcomes with QoL allows health care practitioners to assist patients connect treatment steps with how they desire to feel each day in a natural way. Discussions like this are likely to enhance provider-patient relationships (Daundasekara et al, 2020).

Greater provider-patient rapport has been associated to better treatment adherence, retention, and health outcomes, including health-related quality of life(HRQoL) (Weeger and Farin, 2017; Samuel et al, 2019)

While using QoL as a therapeutic outcome has numerous potential benefits, including QoL conversations during care presents a number of practical problems. Addressing the whole QoL range may be unsettling for health care practitioners, many of whom may lack extensive training in psychological or social well-being. Furthermore, like with other initiatives for improving provider-patient interactions, QoL talks would need more time for each patient contact (Drossman and Ruddy, 2019).

It is critical for QOL research to consider the influence of adding QoL talks in lifestyle medicine on traditional patient outcomes. This data can assist practitioners in weighing the obstacles of introducing QoL talks into care against the possible advantages in adherence, provider-patient relationship, retention, and physical results (Daundasekara et al, 2020)

1.1 Purpose of the Study

- Detection of quality of life for DM2 in Kirkuk city
- Uncovering the relationship between selected demographic data and quality of life for patients with type 2 diabetes

1.2 Problem

Diabetes affects about 1.4 million Iraqis. 3 In Iraq, reported DM2 prevalence ranges from 8.5 percent (IDF—age-adjusted) to 13.9 percent. 3 A local survey of over 5400 persons in the southern Iraqi city of Basrah found a 19.7 percent age-adjusted prevalence of diabetes in respondents aged 19 to 94 years (Mansour et al, 2014; WHO, 2018) In light of these data, it is necessary to determine the QOL and hope for them and the relationship between them

1.3 Hypothesis

- H0: There is no relationship between QOL and hope for patients with type 2 diabetes entering primary school in Kirkuk

- H1: There is a relationship between QOL and hope among patients with type 2 diabetes entering the primary stage in Kirkuk.

1.4 Limitations

- The results are also limited by the duration of the sample, the place where results cannot be generalized beyond their limits and the fact that the data were based on self-reports from patients in the study.
- The researcher faced difficulty in obtaining approvals from the Iraqi Ministry of Health due to the spread of the COVID-19 epidemic

2. GENERAL INFORMATION

2.1 Diabetes

Diabetes mellitus (DM) is a chronic metabolic condition characterized by high levels of blood glucose (or blood sugar), which causes major damage to the heart, blood vessels, eyes, kidneys, and nerves over time. The most frequent is DM2, which mainly affects adults and arises when the body becomes insulin resistant or does not produce enough insulin. DM2 has been more common in countries of all income levels during the last three decades. Diabetes mellitus type 1 (DM1), also known as juvenile diabetes or insulin-dependent diabetes, is a chronic illness in which the pancreas generates little or no insulin on its own. Access to inexpensive medication, particularly insulin, is crucial for those living with diabetes. A global agreement has been reached to halt the growth in diabetes and obesity by 2025. Diabetes affects around 422 million people globally, with the majority residing in low- and middle-income countries, and diabetes is directly responsible for 1.5 million fatalities per year. Over the last few decades, both the number of cases and the prevalence of diabetes have significantly increased (WHO, 2022).

As the condition progresses, insulin production is inadequate to maintain glucose homeostasis, resulting in hyperglycemia. Patients with DM2 are often obese or have a greater body fat percentage, which is concentrated mostly in the abdominal area. Adipose tissue promotes insuline resistance (IR) in this scenario by a variety of inflammatory mechanisms, including increased free fatty acid (FFA) release and adipokine dysregulation. The global growth in obesity, sedentary lifestyles, high calorie diets, and population aging are the primary causes of the DM2 epidemic, which has doubled the incidence and prevalence of DM2 (Worldwide trends in diabetes since 1980, 2016; Chatterjee et al, 2017).

2.2 Definition of DM

DM is a collection of metabolic illnesses defined by persistent hyperglycemia caused by insulin production, insulin action, or both. The relevance of insulin as an anabolic

hormone causes metabolic irregularities in carbohydrates, lipids, and proteins. These metabolic abnormalities are caused by low levels of insulin to achieve adequate response and/or IR of target tissues, primarily skeletal muscles, adipose tissue, and, to a lesser extent, liver, at the level of insulin receptors, signal transduction system, and/or effector enzymes or genes. The type and duration of diabetes influence the severity of symptoms. Some diabetes patients, particularly those with DM2 in the early stages of the disease, are asymptomatic; others with severe hyperglycemia, particularly in children with absolute insulin deficiency, may experience polyuria, polydipsia, polyphagia, weight loss, and blurred vision. Uncontrolled diabetes can cause stupor, coma, and death if not treated, owing to ketoacidosis or, in rare cases, nonketotic hyperosmolar syndrome (Galtier, 2010; American Diabetes Association, 2014).

2.3 Classification of DM

Although diabetes categorization is crucial and has consequences for treatment options, it is not a simple undertaking, and many individuals, particularly younger adults, do not neatly fall into a single class (Rosenbloom et al, 2009; Thunander et al, 2012; American Diabetes Association, 2014) and 10% of those first categorised may need to be revised (Cakan et al, 2012). The traditional categorization of diabetes, introduced by the American Diabetes Association (ADA) in 1997 as DM 1, DM 2, other forms, and gestational diabetes mellitus (GDM), is still the most widely recognized and used classification, and it is used by the ADA (ADA, 2014).

DM2 is a multifactorial and multilayer illness characterized by abnormal glucose, lipid, and protein metabolism. Hyperglycemia is the most prevalent hallmark of DM2, and patients are classified into groups based on the unique combination of insulin resistance (IR) and absolute or relative insulin insufficiency (Sladek, 2018). a combination that results in complicated clinical trajectories that underpin the development of early metabolic abnormalities and subsequent cardiovascular problems (Rawshani et al, 2017). DM2 and its consequences continue to be important sources of morbidity and death in the Western world (Twito et al, 2015).

While it is widely recognized that DM1 is caused by cell-mediated autoimmune pancreatic cell death, DM2 has long been regarded a metabolic illness, with metabolic determinants identified as important pathogenetic variables. A more recent line of study has begun to focus on low-grade inflammation (LGI) as a prevalent characteristic of DM2, accompanying the disease's development and progression, as well as the emergence of comorbidities (Prattichizzo et al, 2018).

Aging and obesity are both known to enhance tissue and systemic chronic inflammation, which are typically referred to as inflammaging and metaflammation, respectively. A lot of studies show that inflammation is more than just a bystander in the evolution of DM2 illness, such as IR, cell failure or inability to cope with increasing insulin demand, and atherosclerotic plaque growth and destabilization (Twito et al, 2015; Hotamisligil, 2017;Prattichizo et al, 2018; Franceschi et al, 2018).

To explain this findings, a variety of possible inflammatory sources and pathways have been proposed (Twito et al, 2015; Hotamisligil, 2017;Prattichizo et al, 2018; Franceschi et al, 2018; Prattichizzoet al, 2018). The majority of investigations and seminal findings have mostly focused on innate immune system cells Furthermore, more recent evidence point to the direct role of acquired immunity. Autoimmunity, a multifactorial process characterized by loss of self-tolerance and persistent excess reactivity of B and T cells, has emerged as an overlapping marker of both DM1 and DM2. Furthermore, metabolic dysregulation and autoimmune components can create a vicious cycle: increased cytokine production characterizing the chronic inflammatory state in DM2 collaborate to destroy pancreatic cells, and this inflammation-induced tissue damage leads to the release of "self" antigens that promote autoimmune activation. Autoimmunity, in turn, reduces insulin secretion in cells and increases hyperglycemia (Twito et al, 2015; Hotamisligil, 2017;Prattichizo et al, 2018; Franceschi et al, 2018; Prattichizzoet al, 2018).

Despite the inconsistency of clinical trials using antioxidants in diabetes treatment regimens (Johansen et al, 2005; Nebbioso et al, 2012), the implications of increased free radicals, oxidative stress, and many metabolic stressors in the development,

pathogenesis, and complications of diabetes mellitus (Robertson et al, 2003; Halban et al, 2014) are very strong and well documented. Since it has been convincingly proven that induced oxidative stress leads to β -cell death in ER- knockout mice, the female hormone 17- estradiol acting through the estrogen receptor- (ER-) is necessary for the formation and preservation of pancreatic cell function. The activation of the ER-receptor protects pancreatic islets from glucolipotoxicity and thereby avoids β -cell dysfunction (Kilic et al, 2014).

2.4 Pre-classification of diabetes

Different types of diabetes have different causes and different mechanisms of appearance that are dealt with and differ in some aspects of the new lifestyle that need to be learned. Common to these patients the disturbances are that there is always either a deficiency of insulin or tissue resistance to insulin. Glucose cannot be used properly or its levels in the blood increase. Reflect the causative species Defects, disorders, or processes that lead to diabetes (Ruiter et al, 2012).

2.5 Types of Diabetes Mellitus

Diabetes is generally divided into multiple categories where there are differences in individuals within the same category (Mansour et al., 2020). The classifications are as follows:

2.5.1 Type DM1

Type 1 diabetes was previously referred to as insulin-dependent diabetes DM in young adults. In this type of diabetes, the cells of the islet of Langerhans that produce insulin, which regulates glucose in the blood, are often damaged. As insulin production decreases, diabetes develops and insulin therapy becomes necessary to save life and prevent ketoacidosis, coma, and death. It is common in children, adolescents and adults under the age of 40, but the disease can also occur in old age. Usually, these people have a normal body weight. Checkout produces little or no insulin, so daily insulin is needed for life support injections. Failure to inject insulin may result in ketoacidosis and hyperglycemia. People with DM1 need treatment with insulin injections to survive or

with an insulin pump. Type 1 diabetes can be caused by autoimmune risks, genetics, or environmental factors. There are currently no known ways to prevent DM1(Mansour et al., 2020).

5-10% of cases of diabetes. DM2 accounts for 90-95% of diabetes cases: 80% of diabetes cases are in obese people and 20% in non-obese people. DM associated with other diseases or syndromes associated with known or suspected causative agents of diabetes: Diseases Pancreatic, hormonal imbalances, use of medications such as glucocorticoids. Diabetic Pregnancy, occurs in 2-5% of pregnancies, during pregnancy Pregnancy usually occurs in the second or third month. Glucose intolerance means a change in blood sugar during fasting, in 29% of cases diabetes develops. Finally, he also has diabetes, the individual has a previous history of hyperglycemia, but has a normal glucose metabolism (Mansour et al., 2020).

2.5.2 Type DM2

DM2 was previously referred to as non-insulin dependent DM or adult DM . Type 2 diabetes is the most common form of diabetes, affecting 80-95%. For all patients, DM: It usually begins with a disorder of IR when cells cannot do so. Proper use of insulin increases the need for insulin. Sometimes the cash register produces too much insulin, but it cannot be used properly. Most people with this type of diabetes are obese, and this increases IR. Risk factors for type 2 diabetes - old age, obesity, family people with diabetes, previous gestational diabetes, metabolic hypoglycemia, reduced physical activity (Mansour et al., 2020).

The World Health Organization (WHO) defines diabetes as a metabolic “disorder” of multiple etiologies, characterized by chronic hyperglycemia with alterations in carbohydrate, lipid and protein metabolism resulting from defects in the secretory and action of insulin "(WHO, 2019).

Diabetes is a group of multiple metabolic disorders characterized by elevated blood glucose levels, also called hyperglycemia, due to defects in insulin secretion, its effect, or in some cases both (Marengo, Comoglio, and Pizzini, 2008)

DM2 is a heterogeneous disease characterized by metabolic disorders, in which genetic alterations with acquired factors and deterioration of glucose homeostasis, amino acid and fatty acid metabolism determine (Chen, 2017).

2.6 Symptoms and signs of DM

- Thirst
- Polyurea
- Blurred vision
- Weight loss
- Frequent urination
- Drowsiness and tiredness
- Extreme thirst
- Excessive hunger
- Slow wound healing
- Urinary tract infections
- Periodontal disease (Mansour Et Al., 2020).

It's most severe manifestation may be ketoacidosis or a non-ketogenic hyperosmolar state, this leads to stupor, coma and death in the absence of effective treatment. Symptoms are often mild or absent and hyperglycemia is sufficient to cause pathological and functional changes. Long-term effects of progressive diabetes (Mansour et al., 2020).

2.7 DM2 complications

- Retinopathy with possible blindness
- Nephropathy that can lead to kidney failure
- neuropathy,
- Expression of a disorder of the autonomic nervous system
- impotence
- Diabetics suffer from enlarged heart, limbs and brain
- risk of vascular disease. Diabetes can cause serious complications and lead to premature birth

- Death, but diabetics who are able to control their disease reduce it The risk of complications (Chen, 2017).
- The body of a person with diabetes cannot eat properly. bit
- In the process of digesting food, it turns into glucose, which the body uses for energy. glucose
- The hormone insulin is necessary to use up all glucose for energy or put it aside (Rosen and Yosipovitch, 2018).

In the form of glycogen, thus maintaining normal blood sugar levels. Diabetic It occurs when the body is unable to use food properly due to the breakdown of the hormone insulin production or operation. As a result, glucose obtained from food accumulates in the blood and is not received by cells required power (Pittu et al, 2013).

2.8 Risk factors for diabetes

2.8.1 Signs of insulin deficiency or deficiency

Increases in blood glucose. The body cannot use glucose properly. Glucose remains in the blood, and is not used for energy or stored. To compensate for the lack of energy, the liver begins to produce more glucose and thus the level of glucose in the blood rises even on an empty stomach (Davies et al, 2018).

Glucose is excreted in the urine. Unused glucose accumulates in the blood. The kidneys filter about 160 liters of blood per day. A little of the slag and water is removed along with the urine and other filtered material, including most of the glucose, that is reabsorbed into the blood. If there is more glucose in the blood than the kidneys can handle it is reabsorbed and enters the urine (Davies et al, 2018).

2.8.2 Other signs such as profuse and frequent urination. Thus, excess glucose is excreted with urine

Urine volume. thirst; When the body loses a lot of fluid, dry mouth, thirst. It is also enhanced by drinking sugary drinks that are high in sugar; Genital itching. When there

is a lot of glucose in the urine, during sex, the mucous membrane of the organs is violated, itchy, itchy (Ruiter et al, 2012).

2.8.3 For the patient

Weight loss. Diabetes is one of the most common causes of weight loss. Especially weight loss is common in the onset of the disease and in poorly controlled diabetics; Fatigue and weakness occur. Fatigue often occurs without diabetes feeling under control. weakness. Unusual times of the day can include drowsiness, which disappears when blood glucose is controlled. Increased appetite. The body tries to compensate for the lack of energy (Ruiter et al, 2012).

2.8.4 Ketoacidosis. If the pancreas does not produce insulin, fat can be broken down very quickly

Substances called ketone bodies enter the bloodstream and are excreted in the urine. Ketones - are acids that, if too high, can cause diabetic ketoacidosis or Diabetic coma (Rosen and Yosipovitch, 2018).

2.9 Diabetes Complications

Complications of the arteries. Diabetes complications and comorbidities include peripheral artery disease. Patients with diabetic foot ulcers have roughly 50% concomitant PAD and may experience persistent ischemia discomfort (Brownrigg et al, 2015). Complications of Various Kinds It has been established that diabetic individuals who encounter bouts of extreme hypoglycemia are at a greater risk of developing cardiovascular disease (Goto et al, 2013).

Complications develop slowly and are usually not felt by the patient in imminent danger. The lens may be damaged - turbidity may develop. Retinal damage and diabetic retinopathy may also be present. Nerve tissue damage from superficial and deep sensations as figure 2.1 "Diabetic retinopathy - can lead to total blindness " (Pittu et al, 2013).

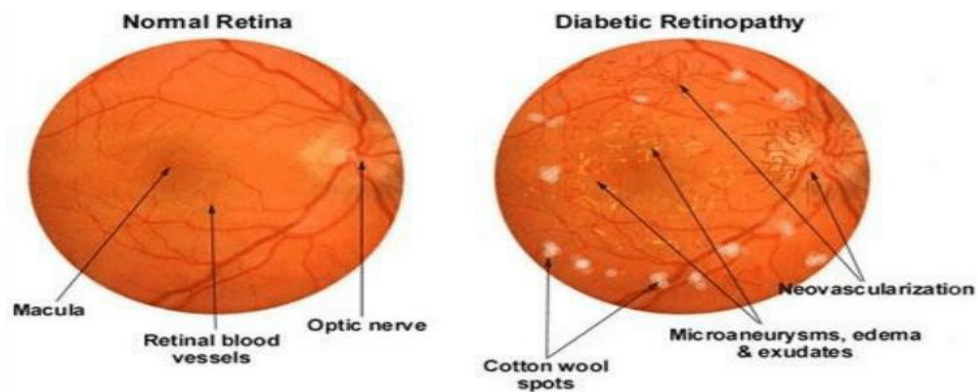


Figure 2.1 The difference between normal retina and diabetic retinopathy (Pittu et al, 2013).

The skin of the leg develops dryness, risk of skin damage, risk of amputation as figure 2.2.



Figure 2.2 Diabetic Dermopathy (Rosen and Yosipovitch, 2018).

Renal insufficiency can also be observed initially, but later arterial blood pressure increases, development of renal insufficiency. Severe complications are also possible: ketoacidosis coma with ketone buildup, increased blood sugar, acetone smell in the mouth, tissue loss, Coma develops and even sudden death. When injecting insulin, the patient needs to know the risks of not taking it on time leads to high blood sugar, so patients must be trained to recognize the above symptoms and eliminate them when they occur (Davies et al, 2018).

The biggest problem that complicates the fight against this severe disease comes early in diagnosing diabetes, accompanied by potentially serious complications, is treated as it comes complex and frequent in human life. It is not diabetes in itself, but rather its cause. Complications have become a huge burden not only on the patient and his relatives, and the prevention and control measures and the QOL for this disease are certainly not (Rosen and Yosipovitch, 2018).

A tragedy compared to what can lead to an undiagnosed and uncontrolled disease in time. The time for diabetes that is properly diagnosed, controlled and treated will make the person feel healthy and reduce the complications of diabetes (Ruiter et al, 2012).

2.10 Diabetes Control

A person with diabetes rarely visits the doctor while on glucose Blood levels vary at different times of the day depending on many factors: diet, physical activity, medication, stress, etc. Therefore, you need to push to successfully control your diabetes by reconciling these factors (Ruiter et al, 2012).

Diabetes is well controlled when:

1. The daily blood glucose level is close to that of a healthy person.
2. There is no glucose in the urine.
3. The absence of ketones in the urine.
4. Reach and maintain a normal weight.
5. The content of normal glycosylated hemoglobin.
6. There is no severe hypoglycemia (Gerstein et al, 2008).

2.11 Tools for the successful control of diabetes

1. Nutrition planning.

2. Physical activity.
3. Medications (insulin and blood sugar lowering tablets).
4. Blood and/or urine glucose tests.
5. Knowing about diabetes.

In order to make better use of all the mentioned measures, a control diary is needed, Which is very important for both the diabetic and the doctor to reach faster and give good results. After the observations, you can note the regularity, according to which in a few days it is possible to change the diet, physical activity or dosage of the drug. The diary will help you to understand faster what is going on in the patient's body (Gerstein et al, 2008).

The diary says:

- The date and time of the blood and urine test.
- the result of a blood or urine glucose test;
- type of insulin, time and dose of injection;
- Urine ketone test result.
- Additional information:
 - Hypoglycemia (when, why, symptoms, treatment)
 - Diet (normal, eaten more or less than usual, late or late)
 - Eating food);
 - physical activity (normal, higher, lower);
 - Other events that may affect test results (infection, disease)
 - mood, menstruation, etc.) (Doyle, 2020).

2.12 Treatments of Diabetes

2.12.1 Nonpharmacological Treatment (Diet and Exercise)

Diet and exercise alone reduced the risk of DM development by 58 percent after three years in the Diabetes Prevention Program (DPP) study. Obesity has long been linked to an increased risk of acquiring type 2 diabetes. In one research, women and men with a

BMI more than 35 kg/m² had a 20-fold increased risk of type 2 diabetes compared to those with a BMI of 18.5 to 24.9 kg/m². (Field et al, 2001). Metformin, acarbose (Precose, Bayer), and rosiglitazone (Avandia, GlaxoSmithKline) have all been shown to reduce the progression of prediabetes to diabetes, although not as much as diet and exercise (Field et al, 2001) as figure 2.3.

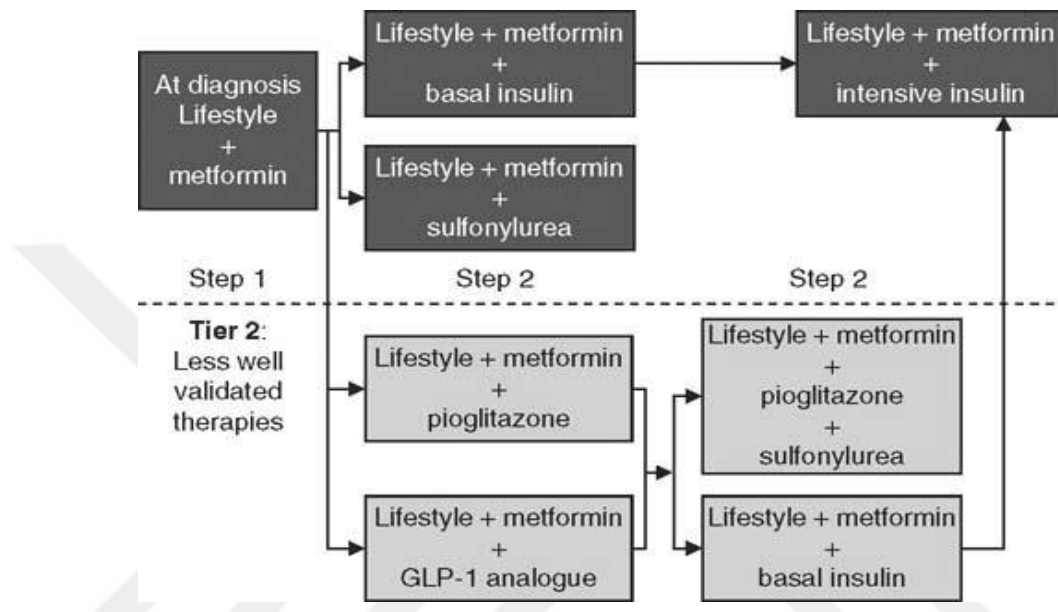


Figure 2.3. Type 2 Diabetes Treatment (Gallwitz, 2010).

2.12.2 Pharmacotherapy

2.12.3 Metformin

Although both the ADA and AACE guidelines include treatment suggestions, the ADA guidelines are more generic and are not grouped by HbA1c levels. AACE grades its recommendations based on a patient's baseline HbA1c level and advises combination treatment if HbA1c is higher than 7.5 percent. The algorithms developed by ADA and AACE are depicted in Figures 1 and 22, respectively. biguanides (metformin) (Gerstein et al, 2008).

Unless the patient has significant renal disease or is unable to tolerate side effects, metformin (Glucophage) is the first-line therapy for type 2 diabetes. Metformin

improves insulin sensitivity by boosting peripheral glucose absorption and utilization by decreasing hepatic glucose synthesis and intestinal glucose uptake (Knowler et al, 2002).

Metformin, which was authorized by the Food and Drug Administration in 1994 and was first commercialized in 1995, continues to provide doctors with an outstanding therapeutic choice with a favorable risk-benefit ratio. To avoid gastrointestinal (GI) side effects, start with a modest dose (e.g., 500 mg orally twice day) and gradually increase (Gaede et al, 2008).

Doses less than 1500 mg per day are unlikely to generate a meaningful therapeutic response. Metformin, in addition to lowering HbA1c by roughly 1% to 2%, may also lower significant vascular problems. In the original UK Diabetes Study (UKPDS), overweight individuals with newly diagnosed type 2 diabetes who administered metformin had a 39% ($P = 0.010$) lower risk of myocardial infarction (MI) and a 36% ($P = 0.011$) lower risk of overall mortality after a median follow-up of 10 years (Gaede et al, 2008).

The decrease was not seen in patients who were randomly allocated to either a sulfonylurea or insulin treatment. Metformin treatment is connected with weight reduction (or weight neutrality), has minimal adverse medication responses, seldom causes hypoglycemia when used alone, and is affordable. Metformin has also been linked to lower LDL-C and triglyceride levels (Gaede et al, 2008).

Metformin should be avoided in individuals suffering from shock, heart failure needing medication, severe liver disease, severe hypoxia, or diminished tissue blood flow (Gaede et al, 2008).

2.12.4 Sulfonylureas (Glimepiride, Glipizide, Glyburide)

Sulfonylureas of the first and second generations bind to the sulfonylurea receptor on the pancreatic beta-cell membrane, resulting in an increase in insulin output.

Sulfonylureas induce potassium channels to close and the cell membrane to depolarize. Calcium channel opening causes an inflow of calcium and an increase in pancreatic insulin production (Ruiter et al, 2012).

Acetohexamide (Dymelor, Eli Lilly), chlorpropamide (e.g., Diabinese, Pfizer), tolazamide (Tolinase, Pfizer), and tolbutamide are examples of lower-potency, first-generation sulfonylureas (various). Glimepiride (Amaryl, Sanofi), glipizide (Glucotrol, Pfizer), and glyburide (e.g., DiaBeta, Sanofi; Micronase, Pfizer) permeate cell membranes more easily than first-generation sulfonylureas (Gerstein et al, 2008).

Weight gain, hypoglycemia, and water retention are all common side effects of sulfonylureas. First-generation sulfonylureas cause more adverse effects, ionically bind to plasma proteins, and cause more drug–drug interactions (Gerstein et al, 2008).

Sulfonylureas raise fasting and late postprandial insulin levels, resulting in lower blood glucose and HbA1c levels. These substances are broken down in the liver. With sulfonylureas that have active metabolites or are eliminated renally, dose changes must be undertaken for renally challenged individuals (Ruiter et al, 2012).

2.12.5 Thiazolidinediones (Rosiglitazone and Pioglitazone)

The two presently authorized thiazolidinediones (TZDs) in the treatment of type 2 diabetes are rosiglitazone (Avandia) and pioglitazone (Actos, Takeda/Eli Lilly). TZDs increase insulin sensitivity by antagonizing the peroxisome proliferator-activated receptor-gamma (PPAR-gamma) (PPAR). Adipose tissue, skeletal muscle, and the liver all have PPAR receptors. PPAR receptor activation causes the transcription of genes that react to insulin and are involved in the transport, use, and control of glucose synthesis, as well as the regulation of fatty acid metabolism (Inzucchi et al, 2002).

2.12.6 Inhibitors of Alpha-Glucosidase (Acarbose, Miglitol)

Acarbose (Precose) and miglitol are two alpha-glucosidase inhibitors (AGIs) that are now accessible in the United States (Glyset, Pfizer). AGIs act by blocking small

intestine enzymes such as sucrase and maltase. As a result, there is a delay in the breakdown of sucrose and complex carbohydrates. In type 2 diabetes, AGIs produce a drop in postprandial blood glucose (40–50 mg/dL) and may also cause a modest fall in FPG levels (about a 10 percent reduction). The effect on HbA1c is minor, ranging from 0.3 to 1%. Patients with high postprandial glucose levels may benefit from AGI treatment (Herman et al, 2007).

2.12.7 Meglitinides are a kind of medication (Nateglinide, Repaglinide)

Nateglinide (Starlix, Novartis) and repaglinide (Prandin, Novo Nordisk) are insulin secretagogues that enhance pancreatic beta cell insulin secretion. Glucose is necessary for both medications to induce insulin secretion. Both drugs are rapidly absorbed, have short half-lives, and are strongly protein-bound (Gerrald et al, 2012).

Nateglinide is predominantly metabolized by CYP2C9 and CYP3A4. It is eliminated by the kidneys, and no renal dose modifications are required. Repaglinide is metabolized mostly by oxidative metabolism and glucuronidation, therefore no dose modifications are required in individuals with renal insufficiency; however, extended exposure to the medicine may occur in people with hepatic impairment. Before each meal, nateglinide and repaglinide are consumed (Gerrald et al, 2012).

2.12.8 Incretins (Exenatide, Liraglutide)

Incretins are peptide hormones that are released in reaction to glucose consumption. The most important incretins that influence blood glucose levels are glucagon-like peptide-1 (GLP-1) and glucose-dependent insulintropic polypeptide (GIP) (GIP). Incretins exert their effects primarily through glucose-dependent stimulation of insulin synthesis and secretion (GLP-1 and GIP), inhibition of glucagon release (GLP-1), and delaying stomach emptying and promoting satiety (GLP-1) (Brunetti et al, 2010).

2.12.9 Inhibitors of DPP-4 (The Gliptins)

Several DPP-4 inhibitors, including sitagliptin (Januvia, Merck), saxagliptin (Onglyza, Bristol-Myers Squibb/AstraZeneca), and linagliptin, have been licensed (Tadajenta,

Boehringer Ingelheim). Several randomized controlled studies have demonstrated the efficacy of these medicines. These medicines are well tolerated, have a low risk of hypoglycemia, and have no effect on weight (Via et al, 2010).

Several published research suggest that DPP-4 inhibitors may have a cardiovascular beneficial effect. Improved cardiac function and coronary perfusion are suggested pathways, as are lower blood pressure and positive effects on the lipid profile. More research is needed to evaluate whether inhibiting DPP-4 improves cardiovascular outcomes in type 2 diabetes. HbA1c reductions with DPP-4 inhibitors are expected to vary from 0.5 to 0.8 percent (Via et al, 2010).

2.13 Quality of Life(QOL)

The WHO QOL as "an individual's view of their place in life in the context of the culture and value systems in which they live, and in connection to their goals, expectations, standards, and worries." (WHO, 2020) Wealth, employment, the environment, physical and mental health, education, recreation and leisure time, social connection, religious views, safety, security, and freedom are all standard markers of QOL (Martha and Amartya, 1993; Gregory et al, 2009; Barcaccia, 2013) QOL may be found in a variety of situations, including international development, healthcare, politics, and employment. Health-related QOL (HRQOL) is an assessment of QOL in connection to health (Bottomley, 2002).

2.14 Importance (QOL)

Discussion and use of QOL as a measurable outcome in health has increased in recent decades as health care has shifted from a disease-focused biomedical model to a more holistic socio-psychosocial model focused on well-being. QOL has also become more important with improvements in medical treatments and disease management resulting in longer lives for people in general and especially those living with chronic diseases (Centers for Disease Control and Prevention, 2018).

Whereas, QOL means different things to different individuals, groups, and cultures. This is the challenge of defining and measuring QOL (Carr et al, 1996). The individual's perspective is inherent to QOL but it is difficult to define for each person and therefore meaningfully measure in clinical practice. The term QOL is not always used consistently or singly. In literature and practice, it is common to hear the terms 'health', 'perceived health' and 'state of health' (Aaronson, 1988)

Four common areas of QOL in health have been defined as: physical health, mental health, social health, and functional health (Aaronson, 1988)

One common definition used is that of the (WHO). The WHO defined QOL as:

“ an individual’s perception of his place in life in the context of the culture and value systems in which he lives and in relation to his goals, expectations, standards and interests. It is a broad concept that is influenced in a complex way by a person’s physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment.” (WHO, 2020).

This definition has an advantage in that it acknowledges the multidimensional aspect of QOL, including the four areas mentioned above, and recognizes the specificity of QOL to individuals. The WHO definition also fits with the World Health Organization's International Classification of Functions and Health (ICF), which provides a framework and definitions that are comprehensive and specific to the individual and focus on well-being rather than disease and disability (WHO, 2020).

2.15 DM2 treatment and QOL

The use of insulin injections allows greater freedom and flexibility, which improves living with the disease. Diabetes mellitus, is a group of metabolic diseases characterized by the appearance of secondary hyperglycemia and defects in insulin secretion or action. It is one of the most prevalent chronic diseases in the world and is among the top ten causes of death. It also represents one of the most important and biggest challenges

facing health systems in industrialized countries, due to its chronic nature and its tendency to cause short and long-term complications in addition to disabilities (Nursetime, 2018).

Diabetes treatment includes, on the one hand, lifestyle changes that significantly improve the quality of life, and on the other hand, the use of hypoglycemic therapy. To replicate the trend of physiological insulin secretion, multiple injections can be used during the day, multiple daily injections, which are practiced with syringes, insulin pens or by continuous infusion, also called continuous subcutaneous infusion of insulin, using an insulin pump. In addition to mimicking the physiological insulin profile, the goals of good insulin therapy are to improve glycemic control and prevent complications, while attempting to reduce the risk of hypoglycemia (Nursetime, 2018).

2.16 Life with DM2 and QOL

First of all living with diabetes, which includes changes and difficulties that have occurred from the moment of diagnosis. Indeed, diabetes can have a powerful impact on lifestyle, with a strong psychological component involved, linked to both chronic disease and insulin dependence and the complexity of therapeutic management. The biggest problems related to work and sports activities, frequent blood sugar checks and discomfort that can arise from having to give injections in public (Nursetime, 2018).

Another issue is nutrition, which is one of the most influential aspects of daily life, and is considered the biggest sacrifice. Diet changes and food sacrifices are particularly challenging, along with the need to weigh all foods and count carbohydrates before meals (Nursetime, 2018).

2.17 Nursing role

The nurse works in the same perspective to achieve healthy outcomes for diabetic patients undertakes to satisfy the acceptance of care and plays the role of active and ongoing education, counseling and support. The nurse may also develop group

educational interventions, which would allow patients to compare themselves, improve knowledge and skills, and receive assistance in managing potential complications, in order to improve self-management of overall quality of life (Nursetime, 2018).



3. MATERIALS AND METHODS

This chapter deals with a design, administration arrangements, sample and setting, instrument, pilot, data collection, and data analysis.

3.1 Study type

This is a descriptive cross-sectional study.

3.2 Study Design

The research will be conducted in the Tisein Health Center, Hajjaj Health Center, Al-Wasiti Health Center, Rezkari Health Center, and the Altaakhi Health Center from 09.09.2021 to 30.3.2022. Quantitative research was used in the study design. The Facilitate the task of working according to approval No.36 on 17/10/2021 in Appendix 2.

3.3 Sample and Setting

The total number of patients in these centers is 244 patients the sample size was determined as 150 according to a 95% confidence interval and 50% response.

3.4 Instrument

Instrument were four parts, the data was be collected using a questionnaire determine the socio-demographic characteristics of individuals and WHOQOL-BREF

3.4.1 Socio-demographic form

The first part were included 10 questions to determine (Age, Gender, Marital status, Level of education, Occupation, Economic status, Residence, Type of family, Smoking, BMI), relationship with the person with DM2 (Appendix 1).

3.4.2 The second part, the medical history of patients

Consists of 6 questions (the duration of diabetes, other diseases, if the answer is yes; mention the disease, type of treatment for diabetes, Date of the last cumulative glucose test, the last cumulative glucose test).

3.4.3 The third part, COVID- 19 infected information

Consists of 4 questions (COVID 19 infection, COVID 19 vaccine, Infection after vaccination, the type of vaccine taken) Answers consist, 2 = Yes, No = 1

3.4.4 WHOQOL-BREF Schedule

The fourth part was used measure WHOQOL-BREF This scale was developed by the World Health Organization in 1997, its validity and reliability study was conducted by (Ohaeri and Awadalla, 2009)., and it was adapted to the Arab community and determined to be appropriate. It was developed to adapt it to the Iraqi society by 8 experts at the University of Kirkuk and University of Baghdad as per Table 3.1. The Arabic version of WHOQOL-BREF is a 26-item scale. Response options range from 1 (Very Dissatisfied/Very Bad) to 5 (Very Satisfied/Very Good). The scale consists of four sub-dimensions: a physical indicator consisting of 4 elements (sleep, nutrition, completion of duties, pain and discomfort) the answers range always = 3, sometimes = 2, never = 1

The second dimension, the psychological and social aspects, consists of 6 elements (sexual activities, relationship with family and friends, mood, focus, memory and learning, concentration, self, fear and anxiety). The third dimension of independence consists of 4 elements (daily life activities, movement, medicines, health care) The fourth dimension consists of 8 sub-elements, Fifth Dimension Beliefs Two components (spiritual beliefs, hope and the future) are formed. the answers range from always = 3, sometimes = 2, never = 1

In the study that was adapted to the Arabic language, it was found that Cronbach's alpha coefficient of the scale is 0.93. The scale explains 58.3% of the total variance (Ohiri and Awadallah, 2009). (Appendix 1).

3.5 Data collection method

Data was collected by using the questionnaire and interview technique. The average data collection time was 15 - 25 minutes.

3.6 Research variables

Dependent variable was QOL and independent variables were age, gender, and marital status, Educational status, occupational status, economic status, family h/o DM, relationship with the person with diabetes, duration of DM, duration of insulin, device used, media

3.7 Data Analysis

Analysis of the data in the study was obtained in SPSS (26) and to determine whether the objectives of the study were achieved, the normal distribution was tested using Kolmogorov-Smirnov and for comparisons between groups. Descriptive analysis (frequencies, percentages, mean), Chi-Square were used to evaluate the data, and the results were considered highly significant. The level of significance to be determined in assessing the data was $P < 0.05$.

3.8 The ethical dimension

On 02.09.2021 Ethical approval was obtained from Iraq with a date from the Ministry of Health, Kirkuk Health Directorate, where the researcher provided a detailed description that includes the purpose and methodology of the study, and to obtain official permission, it was submitted to the Kirkuk Health Directorate whose approval facilitated the matter (Appendix 2). For hospitalization, participants were orally informed of the aims of the study and asked to participate voluntarily, and assured of

non-disclosure. To ensure the confidentiality of the participants, no names were written during data collection and reporting. They were also informed that they could refuse to answer a specific question or withdraw from the study at any time without any penalty.



4. RESULTS

4.1 Information on the sociodemographic characteristics of patients

The findings obtained from the research are presented below.

Table 4.1. Sociodemographic Characteristics of Patients (n = 150)

Variables		F	%
Age	20-29	8	5.3
	30-39	4	2.7
	40-49	29	19.3
	50-59	51	34.0
	<59	58	38.7
Gender	Female	45	30
	Male	105	70
Marital status	Single	13	8.7
	Married	137	91.3
Level of education	Illiteracy	21	14.0
	read and does not write	14	9.3
	elementary graduate	19	12.7
	Intermediate graduate	21	14.0
	middle school graduate	59	39.3
	college or Bachelor graduate	9	6.0
	Master's/PhD	7	4.7
Occupation	Government employee	52	34.7
	Unemployed	17	11.3
	Retired	34	22.7
	House wife	27	18.0

	Free business	13	8.7
	Other	7	4.7
Economic status	Enough	49	32.7
	Enough to some extent	87	58.0
	Not enough	14	9.3
Residence	Town	143	95.3
	Village	7	4.7
Type of family	Single family	54	36.0
	Extended family	96	64.0
Smoking	Yes	113	75.3
	No	37	24.7
BMI	BMI < 25.00	00	00
	BMI 25.00-27.49	57	38.1
	BMI 27.50-29.99	88	54.7
	BMI 30.00-39.99	5	3.3
Total		150	100

Sociodemographic characteristics of DM patients are presented in Table 4.1 and accordingly, they were 58 (38.7%) in the age group <59 years, 51 (34.0%) in the age group 50-59 and 29 (19.3%) in the 40-49 age group, 8 (5.3%) in the 20-29 age group and 4 (2.7%) in the 20-29 age group

The study indicated that the majority of the study sample (70%) are males, and the rest are females, and most of them are married and represent (91.3%) and the rest were single and constituted (8.7%) of the total sample. As for the educational level, the largest number of them obtained middle school graduate, where they constituted (39.3%) of the sample, 14.0% obtained Intermediate graduate, 14% were illiteracy and 12% obtained elementary graduate, in addition to 9.3 % were read and does not write, 6% were college or Bachelor graduate, and 4.7% had a Master's/PhD

As for Occupation of the sample, the largest number of them were government employees, who constituted (34.7%), followed by retirees, who constituted (22.7%), followed by a housewife (18%), and the unemployed constituted (11.3%). In addition, 8.7% worked in private businesses, and others constituted 4.7%.

As for the economic situation, the largest number of them was Enough to some extent (58%), followed by Enough (32.7%) of the sample, and finally Not enough (9.3%).

Also, 95.3 of the sample members lived in the city and 4.7% lived in the village, and 64% of them lived in an extended family and 36% in a single family, and 75.3% of them smoked and 24.7% were non-smokers. As for BMI, all sample members were above normal weight

4.2 Patients' diabetes history

Table 4.2. Patients' diabetes history (n = 150)

Variables		F	%
The duration of diabetes	1-3 years	27	18.0
	4-6 years	55	36.7
	7-9 years	33	22.0
	>10	35	23.3
Other diseases	Yes	65	43.3
	No	85	56.7
If the answer is yes ; mention the disease	blood pressure and kidney disease	5	3.3
	leg amputation	2	1.3
	permanent sensitivity	7	4.7
	Apoplexy	4	2.7
	Hypertension	43	28.7
	kidney disease	4	2.7
Type of treatment for	diet only	18	12

diabetes	Oral anti-diabetic drugs (pills)	84	56.0
	Oral anti-diabetic drugs (pills) + insulin	32	21.3
	Insulin only	16	10.7
Last cumulative glucose test	1 year	90	60
	< 1	60	40
The last cumulative glucose test	6-8.9	113	75.3
	9-12	37	24.7

In Table 4.2, the date of occurrence of diabetes for the sample members showed that the largest number of them developed diabetes from 4-6 years, where they constituted (36.7%) and then >10 formed (23.3%) and the number of sample members They were infected with it in the period between 4-6 years and constituted (22%) and the least number of them were infected in the period between 1-3 years, where they constituted (18%) of the sample members

Also, (56.7%) of the sample members did not develop other diseases and (43.3%) developed other diseases, which is Hypertension where they formed (28.7%) and then permanent sensitivity where they formed (4.7%) of the sample, followed by blood pressure and kidney disease where they constituted (3.3%), followed by Apoplexy and kidney disease in equal proportions, where they constituted (2.7%) for each of them, and finally leg amputation where they constituted (1.3%) of the sample

As for the type of treatment used, the largest number of the sample used Oral anti-diabetic drugs (pills) (56%), then Oral anti-diabetic drugs (pills) + insulin, which made up (21.3%) and the lowest number used The diet accounted for (12%), and finally insulin treatment, which accounted for (10.7%)

Also, the last cumulative glucose test for the sample members was the largest number of them during the first year, where they constituted (60%), and the rest was less than a

year, and the last result of the cumulative glucose test was 6-8.9, where they constituted (75.3%) of the sample and the rest was 9-12, where they constituted (24.7%)

4.3 Infected with COVID-19 for the sample

Table 4.3. Infection with COVID-19 for the sample (n = 150)

Variables		N	%
COVID 19 infection	Yes	65	43.3
	No	85	56.7
COVID 19 vaccine	Yes	97	64.7
	No	53	35.3
Infection after vaccination	Yes	7	4.7
	No	90	60
The type of vaccine taken	Pfizer (USA)	88	58.6
	AstraZeneca (British)	9	4.5
	Chinese Sinopharm	0	0

In Table 4.3, it was found that the majority of the sample members were not infected with Covid 19, as they constituted (56.7%) and the rest were infected with it, and that (64.7%) took the vaccine and the rest did not take it, in addition to that (60%) of the sample They were not infected after receiving the vaccine, and (4.7%) were infected with it after receiving the vaccine, and the majority of the sample that received the vaccine was from the type of Pfizer (USA), where they constituted (58.7%) and the rest took AstraZeneca (British), where they constituted (4.5%) of the sample members

4.4 Distribution of the scores of the research group on “quality of life for type 2 diabetes patients who attend primary health care centers in Kirkuk city” and its sub-dimensions

Table 4.4 Distribution of the scores of the research group on “quality of life for type 2 diabetes patients who attend primary health care centers in Kirkuk city” and its sub-dimensions (n = 150).

Multidimensional scale of QOL	Min.	Max.	Mean (SD)
Physical indicator	19	57	38.1 ± 12.1
Psychological and social indicators	27	69	52.7 ± 13.8
Independence	22	60	41.7 ± 11.8
Environmental indicator	6	18	14.8 ± 3.8
Spiritual indicator	4	31	8.7 ± 6.2

Table 4.4 shows the distribution of the research group's scores on "quality of life for type 2 diabetes patients who attend primary health care centers in the city of Kirkuk" and its sub-dimensions, as it showed that the majority of the sample was the sub-dimension in quality of life psychosocial indicators 52.7 ± 13.8 is the highest and then Then came the Independence sub-dimension with mean and standard deviation 41.7 ± 11.8 , then Physical indicator with mean and standard deviation 38.1 ± 12.1 , followed by Environmental indicator with mean and standard deviation 14.8 ± 3.8 and the lowest score was for the Spiritual indicator sub-dimension with mean and standard deviation 8.7 ± 6.2

4.5 The distribution of QOL for diabetic patients and the degrees of sub-dimensions according to some characteristics

Table 4.5 The distribution of QOL for diabetic patients and the degrees of sub-dimensions according to some characteristics (n=150)

Variables	QOL total score X ± SD	X ²	df	P
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Age	20-29 years	27± 5.4	0.00	84	0.01*
	30-39 years	41± 5.3			
	40-49 years	30± 9.2			
	50-59 years	32.6± 8.8			
	>59 years	54.6± 10.9			
Gender	Female	41.7± 12.9	0.87	21	0.3
	Male	39.5± 10.6			
Marital status	Single	31.0± 8.7	0.00	21	0.00*
	Married	36.3± 11.2			
Income	lower than expenditures	48.17± 3.57	2.93	1	0.03*
	equal expenditures	51.95± 8.91			
	higher than expenditures	54.33± 7.80			
Level of education	Illiteracy	43.1± 9.3	0.00	126	0.00*
	read and does not write	30.1± 9.1			
	elementary graduate	38.0± 10.3			
	Intermediate graduate	39.7± 6.4			
	middle school graduate	48.0± 6.50			
	college or Bachelor graduate	51.3± 7.31			
	Master's/PhD	1.9± .13			
Occupation	Government employee	43.1± 9.3	0.00	105	0.00*
	Unemployed	30.1± 9.1			
	Retired	38± 10.3			

	House wife	39.7± 6.4			
	Free business	48.0± 6.50			
	Other	15.3± 3.31			
Economic status	Enough	27.0± 6.5	0.00	42	0.45
	Enough to some extent	35.4± 10.2			
	Not enough	28.0± 5.12			
Residence	Town	53.0± 7.60	0.00	21	0.00*
	Village	34.3± 5.80			
Type of family	Single family	38.0± 5.12	0.00	21	0.00*
	Extended family	58.1± 12.1			
Smoking	Yes	55.3± 14.0	0.04	19	0.00*
	No	34.7± 13.5			

Chi-Square $P < 0.05$

Table 4.5 shows the following: The distribution of QoL scores according to some sociodemographic characteristics of DM patients is shown. When age was examined, the mean QOL score was 54.6 ± 10.9 for the age group >59 years, Then 34.6 ± 12 for the age group > 59 , followed by 41 ± 5.3 for the age group 30-39 years, then 32.6 ± 8.8 for the age group 50-59 years and younger, 27 ± 5.4 for the age group 20-29 years, and the difference between the mean scores was Statistical significance ($X^2 = 0.00$ $p = .001$ *)

When gender was examined, the mean QoL score was found to be 41.7 ± 12.9 for females and 39.5 ± 10.6 for males, and the difference between the mean scores was not statistically significant ($X^2 = 0.87$ $p = 0.3$).

The mean QoL score was 36.3 ± 11.2 in married people and 31.0 ± 8.7 in singles, and the difference between the mean scores was statistically significant ($X^2 = 0.00$ $p = 0.00$ *).

The mean QoL score for patients was 54.33 ± 7.80 for higher than expenditures the difference between the mean score was statistically significant ($X^2 = 2.93 p = 0.03^*$)

When patients' educational level in QOL were examined, the highest mean score was 51.3 ± 7.31 for college graduates or undergraduates, the difference between mean scores was statistically significant ($X^2 = 0.00 p = 0.00^*$).

The average QOL score was an occupational variable. The mean score was 48.0 ± 6.50 for the self-employed, 43.1 ± 9.3 for the civil servant, 39.7 ± 6.4 for the housewife, 38 ± 10.3 for the retired, 30.1 ± 9.1 for the unemployed and the lowest average score was 15.3 ± 3.31 for the other and the difference between the mean score was Statistically significant ($X^2 = 0.00 p = .00^*$)

When the economic situation is analyzed in QL, the mean score for adequate is 35.4 ± 10.2 , the mean score for poor is 28.0 ± 5.12 , and the lowest mean score is 27.0 ± 6.5 for adequate. The difference between mean scores was not statistically significant ($X^2 = 0.00 p = 0.45$)

Additionally, when examining residence in QOL, mean QOL scores were 53.0 ± 7.60 for village residents and 34.3 ± 5.80 for residents. The difference between mean scores was not YK village scores and mean score are statistically significant. ($t = 2.6 p = .009^*$)

When the family type variable was analyzed, the mean score was 58.1 ± 12.1 and the mean score for the extended family was 38.0 ± 5.12 The difference between the mean Single-family scores and mean scores are statistically significant ($X^2 = 0.00 p = 0.00^*$).

Finally, when examining the smoking variable in QOL of the study sample individuals, the mean score was 55.3 ± 14.0 for smokers and 34.7 ± 13.5 for non-smokers, and the difference between the mean scores was statistically significant ($X^2 = 0.04 p = .000^*$).

5. DISCUSSION

In table 4.1 the study indicates that the study sample (30%) are males and the rest are females. This result is consistent with previous studies in Iran (Birjand et al., 2020) the majority of the study sample was male (59.3%) in Bangladesh (Barua et al., 2020) the majority of the study was male (61.8%) and the rest were female.

This corresponds to a study in Dubai that stated that the majority of type 2 diabetes patients were female (Puspasari and Farera, 2020). As for the age groups, most of them are <59 (38.7%), and this is consistent with a study in Dubai, which reported that the majority of the study sample was ≥ 45 years old (76.7%). Similar to a study in Birjand (Abedini et al., 2020), which reported that the majority of the study sample was > 60 (41.6%).

As for the educational level, most of the study sample obtained an education from a middle school (39.3%), and this corresponds to a study in Saudi Arabia (AbuAlhommos et al., 2022) who showed the majority of the study sample at an elementary school level (64.5%), and this is consistent with a study conducted in Dubai (Puspasari and Farera, 2020). Which stated that the majority of the study sample were Senior high school (52.1%).

Most of the sample members of this study were government employees (34.7%), and this is similar to a study conducted in Sweden, which showed that the incidence of type 2 diabetes was higher for employees (Carlsson et al., 2019). This is also similar to a study conducted in Brazil, which showed that most of their study were of employees (40.5 percent) (Almeida et al, 2011).

At the level of economic status, most of them (58.0%) had a fairly sufficient economic level. This result is consistent with a study in Korea (Hwang and Shon, 2014) that showed the prevalence of type 2 diabetes among low-income people. , This result is consistent with a study conducted in America (Adler et al., 1994), which stated that the

economic situation is linked to health in general, as the incidence of diabetes is type 2 (Angeles et al, 2020).

The results of this study showed that most of the study sample reside in the city (95.3%), and this is similar to a study in Canada (Angeles et al., 2020) which found that the majority of type 2 diabetic patients live in social housing and in cities, and this is consistent with a study in Poland (Dudzińska). et al., 2013) who found that 71.9% of patients live in cities

As for smoking, the results of this study showed that (75.3%) had type 2 diabetes. This result is in agreement with a study in China that reported that smoking is a factor in type 2 diabetes (Chang, 2012). This is consistent with a study conducted in Britain that showed that smoking increased the risk of developing type 2 diabetes almost double (Wannamethee et al, 2001). This is consistent with a study conducted in Britain that showed that smoking increased the risk of developing type 2 diabetes almost double, and this is with a study (Śliwińska-Mossoń, M., and Milnerowicz, 2017).

The majority of the study sample had a BMI of 27.50-29.99 (54.7%) and this is consistent with the study (Gray et al., 2015) who found that the majority of the study sample were overweight

The results showed in table 4.4 the distribution of the research group's scores on "quality of life for type 2 diabetes patients who attend primary health care centers in Kirkuk city" and its sub-dimensions, as it showed that the majority of the sample was sub-sample. The dimension in the quality of psychosocial indicators is 52.7 ± 13.8 is the highest. These results are similar to some studies, (Pobutsky et al., 2010; Inouye et al., 2013; Pobutsky et al., 2010, Daniele et al., 2013) Which showed that psychological and social influence was positively and significantly associated with DM patients

Then the independence sub-dimension came with a mean and standard deviation of 41.7 ± 11.8 , and this is consistent with a number of study by (Trikkalinou et al., 2017; Selim

et al., 2009; Centers for Disease Control and Prevention, 2000) Who found that the independence variable was one of the dimensions that significantly affected QOL

Then the physical indicator with the mean and standard deviation 38.1 ± 12.1 , which comes in agreement with the study of (Yi, 2012; Hamasaki et al., 2013; Zhang et al., 2020) Who reported that the physical indicator dimension affects the QOL of DM2 patients

Followed by the environmental index with mean and standard deviation. The deviation was 14.8 ± 3.8 and the lowest score for the spiritual index sub-dimension was with mean and standard deviation of 8.7 ± 6.2 , this result is similar to other studies (Brownson et al. , 2005; Graff-Iversen et al. 2007) Which showed the environmental index and the spiritual index to have a low impact on the level of QOL

The result was according to the table 4.5 and it was found that the QOL given to patients was the age variable that made a difference in QOL and it was higher at age > 59 years ($p < 0.05$) which is consistent with the study (Sharma et al., 2021) that found in their study that there is a relationship between age and QOL ($p < 0.05$)

There was found that the QOL given to patients was gender as the variable that made a difference in QOL, and it was higher in females ($p < 0.05$). It shows that females have more QOL than males In the literature, there are similar findings to our research on this topic (Zurita et al., 2018) found in their study that patients have a relationship between gender and QOL ($p < 0.05$) which is The following is consistent with the second research hypothesis which states that there is a relationship between demographic data and QOL

This study found that the marital status variable is a variable that makes a difference in the QOL that married patients feel higher than those who are single ($p < 0.05$). This means that there is a significant difference between patient scores according to sociodemographic characteristics, and this is consistent with the hypothesis of the

second study in the literature, there are similar results to our research findings on this topic. (Saleh et al., 2021) found that married DM2 patients had higher QOL than single patients ($P < 0.05$). It is also in agreement with the study by (Wubben et al., 2005; Alhayek et al., 2014; Speight et al., 2020) who showed a relationship between it and QOL where it is higher for married couples ($P < 0.05$)

This study found that the income variable is a variable that makes a difference in the QOL felt by patients with higher than expenditures ($p < 0.05$). There are similar results to our research on this topic. (Saleh et al., 2021) found that DM2 patients with high income had higher QOL than singles ($P < 0.05$). It is also in agreement with the study by Wubben et al., 2005 and Alhayek et al., 2014 (Speight et al., 2020) who showed a relationship between it and QOL being higher for married couples ($P < 0.05$).

This study found that Level of education was a variable that makes a difference in QOL, where there was a significant difference with college or Bachelor graduate scores being higher than others and a variable in QOL ($p < 0.05$). In the literature, there are different outcomes regarding our research findings on this. the topic. (Baghianimoghdam et al., 2009) and a study (Mokhtari et al., 2019) who showed a relationship between it and QOL, which is higher for those with a higher level of education ($P < 0.05$)

This study found that the variable Occupation It is a variable that makes a difference in the QOL felt by patients as the scores were higher for Free business (p < 0.05). There are similar results to our research on this topic. (Saleh et al., 2021) found that the employed DM2 patients had higher QOL scores than the control group ($P < 0.05$). It also agrees with the study of Wubben et al., 2005, Alhayek et al., 2014 (Speight et al., 2020) who showed a relationship between QOL and work as they got higher scores than non-employees ($P < 0.05$).

This study found that the Residence variable It is a variable that makes a difference in the QOL that patients feel, with scores higher for Town ($p < 0.05$). There are similar results to our research on this topic. It was found (Quah et al., 2011) that DM2 patients who live in the city had higher QOL scores than those who did not ($P < 0.05$). It is also

in agreement with the study Bradley et al., 2018 Knowles et al., 2020 Those who showed a relationship between it and QOL and the place of residence where they got higher scores than those who live in the village ($P < 0.05$)

This study found that the variable Type of family it is a variable that makes a difference in the QOL felt by patients as the extended family scores were higher ($p < 0.05$). There are similar results to our research on this topic. It was found (Thommasen and Zhang, 2006) that DM2 patients who live in a small and isolated group have lower QOL scores than those who live in a family than others ($P < 0.05$).

This study found that the smoking variable is a variable that makes a difference in the QOL felt by patients as the scores were higher for smokers ($p < 0.05$). There are similar results to our research on this topic. (Kiadaliri et al., 2013) found that DM2 smokers had higher QOL scores than non-smokers ($P < 0.05$).

6. CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The study was conducted on 150 DM2 patients receiving treatment in primary health care centers in Kirkuk city in order to determine the relationship between QOL levels.

- In this study, the variables affecting the QOL dimensions of DM2 patients were identified as Age, Marital status, Income, Level of education, Occupation, Residence, Type of family, and Smoking ($P < 0.05$)
- In this study, factors such as age, economic status and those variables that did not affect the sub-dimensions ($p > 0.05$) were determined.

6.2 Recommendations

- In this study, the results of the study showed that the QOL provided to DM2 patients from Psychological and social indicators, followed by Independence, Physical indicator, Environmental indicator, and finally Spiritual indicator

In line with the results obtained from the research;

- Family awareness must be increased and appropriate family support should be provided in cooperation with the family in the care and treatment of the patient in order to increase the quality of life for the patient
- Conducting weekly or monthly special programs for DM2 patients, which increases the QOL provided through these programs
- Making a psychological diagnosis for DM2 patients, and then assigning a psychiatric nurse to talk to a breast DM2 patient, which increases the QOL provided to her.

REFERENCES

- Aaronson, N. 1988. Quantitative issues in health related quality of life assessment. *Health Policy*. vol. 10; 3, pp.217–230.
- Abedini, M., Bijari, B., Miri, Z., Emampour, F. and Abbasi, A. (2020). The quality of life of the patients with diabetes type 2 using EQ-5D-5 L in Birjand, *Health and Quality of Life Outcomes* volume 18, Article number: 18
- AbuAlhommos AK, Alturaifi AH, Al-Bin Hamdhah AM, Al-Ramadhan HH, Al Ali ZA, Al Nasser HJ. 2022. The Health-Related Quality of Life of Patients with Type 2 Diabetes in Saudi Arabia, Dovepress, Volume 2022:16 Pages 1233—1245, DOI <https://doi.org/10.2147/PPA.S353525>
- Abusaib, M., Ahmed, M., Nwayyir, H., Alidrisi, H., Al-Abbood, M., Al-Bayati, A., Al-Ibrahimi, S., Al-Kharasani, A., Al-Rubaye, H., Mahwi, T., Ashor, A., Howlett, H., Shakir, M., Al-Naqshbandi, M. and Mansour, A. (2020). Iraqi Experts Consensus on the Management of Type 2 Diabetes/Prediabetes in Adults. *Clin Med Insights Endocrinol Diabetes*; 13: 1179551420942232. doi: 10.1177/1179551420942232
- Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R. L., and Syme, S. L. 1994. Socioeconomic status and health: The challenge of the gradient. *American Psychologist*, 49(1), 15–24. <https://doi.org/10.1037/0003-066X.49.1.15>
- Alhayek AA, Robert AA, Al Saeed A, Alzaid AA, Al Sabaan FS. 2014. Factors associated with health-related quality of life among Saudi patients with type 2 diabetes mellitus: A cross-sectional survey *Diabetes Metab J*. 2014;38:220–9
- Almeida, V., Zanetti, M., Almeida, P., Damasceno, M. (2011). Occupation and Risk Factors for Type 2 Diabetes: a Study With Health Workers, May 2011 *Revista Latino-Americana de enfermagem* 19(3):476-484, DOI: [10.1590/S0104-11692011000300005](https://doi.org/10.1590/S0104-11692011000300005)
- American Diabetes Association. 2014. Diagnosis and classification of diabetes mellitus. *Diabetes Care*. 2014;37 Suppl 1:S81–S90.
- American Diabetes Association. 2017. Promoting Health and Reducing Disparities in Populations. *Diabetes Care*. 2017;40(Supplement 1):S6–S10
- Angeles, R., Zhu, Y., Pirrie, M., Marzanek, F., Agarwal, G. 2021. Type 2 Diabetes Risk in Older Adults Living in Social Housing: A Cross-Sectional Study, *CJD*, DOI: <https://doi.org/10.1016/j.jcjd.2020.10.005>
- Baghianimoghadam, M., Afkhami, H., Ardekani, M., Baghianimoghadam, B. 2009. Effect of Education on Improvement of Quality of Life by SF-20 in Type 2 Diabetic Patients, *Acta Med Indones-Indones J Intern Med*, Vol 41, pp.4-6
- Barcaccia, B. 2013. Quality Of Life: Everyone Wants It, But What Is It?. *Forbes/ Education*. <https://www.forbes.com/sites/iese/2013/09/04/quality-of-life-everyone-wants-it-but-what-is-it/?sh=2df42963635d>
- Barua, L., Faruque, M., Chowdhury, H. A., Banik, P. C., and Ali, L. (2020). Health-related quality of life and its predictors among type 2 diabetic population of Bangladesh: A

- nation-wide cross-sectional study. *Journal of Diabetes Investigation*. doi:10.1111/jdi.13331
- Bo A, Pouwer F, Juul L, Nicolaisen SK, Maindal HT. 2019. Prevalence and correlates of diabetes distress, perceived stress and depressive symptoms among adults with early-onset type 2 diabetes: cross-sectional survey results from the Danish DD2 study. *Diabet Med*. 2019. <https://doi.org/10.1111/dme.14087>
- Bottomley, A. 2002. "The Cancer Patient and Quality of Life". *The Oncologist*. 7 (2): 120–125. doi:10.1634/theoncologist.7-2-120.
- Bradley C, Eschwège E, de Pablos-Velasco P, Parhofer KG, Simon D, Vandenberghe H, et al 2018. Predictors of quality of life and other patient-reported outcomes in the PANORAMA multinational study of people with type 2 diabetes *Diabetes Care*. 2018;41:267–76
- Brownrigg J. R. W., Schaper N. C., Hinchliffe R. J. 2015. Diagnosis and assessment of peripheral arterial disease in the diabetic foot. *Diabetic Medicine*. 2015;32(6):738–747. doi: 10.1111/dme.12749
- Brownson, R. C., Boehmer, T. K., and Luke, D. A. 2005. Declining rates of physical activity in the United States: what are the contributors? *Annu. Rev. Public Health* 26, 421–443. doi: 10.1146/annurev.publhealth.26.021304.144437
- Brunetti L, Hermes-Desantis ER. 2010. The role of colesevelam hydrochloride in hypercholesterolemia and type 2 diabetes mellitus. *Ann Pharmacother*. 2010;44:1196–1206
- Cakan N, Kizilbash S, Kamat D. 2012. Changing spectrum of diabetes mellitus in children: challenges with initial classification. *Clin Pediatr (Phila)* ;51:939–944
- Canivell S, Gomis R. 2014. Diagnosis and classification of autoimmune diabetes mellitus. *Autoimmun Rev*. ;13:403–407.
- Carlsson, S., Andersson, T., Talbäck, M., and Feychting, M. 2019. Incidence and prevalence of type 2 diabetes by occupation: results from all Swedish employees. *Diabetologia*. doi:10.1007/s00125-019-04997-5
- Carr, A. Thompson, P. Kirwan, J. 1996. Quality of life measures. *Br J Rheumatol*. 35; 3:275-81.
- Catford J. 2014. Turn, turn, turn: time to reorient health services. *Health Promot Int*. 2014;29(1):1–4. <https://doi.org/10.1093/heapro/dat097>.
- Centers for Disease Control and Prevention. 2022. National Diabetes Statistics Report website. <https://www.cdc.gov/diabetes/data/statistics-report/index.html>.
- Centers for Disease Control and Prevention. 2000. Measuring healthy days: Population assessment of health-related quality of life. Atlanta, Georgia: Centers for Disease Control and Prevention; 2000
- Chang, S. A. 2012. Smoking and Type 2 Diabetes Mellitus. *Diabetes and Metabolism Journal*, 36(6), 399. doi:10.4093/dmj.2012.36.6.399

- Chatterjee S., Khunti K., Davies M.J. 2017.Type 2 diabetes. *Lancet*. 2017;389:2239–2251. doi: 10.1016/S0140-6736(17)30058-2.
- Daniele, T. de Bruin, V. de Oliveira, D.Pompeu,C. and Forti, A.2013. “Associations among physical activity, comorbidities, depressive symptoms and health-related quality of life in type 2 diabetes,” *Arquivos Brasileiros de Endocrinologia and Metabologia*, vol. 57, no. 1, pp. 44–50, 2013.
- Daundasekara, S. Arlinghaus, K.and Johnston, C.(2020). Quality of Life: The Primary Goal of Lifestyle Intervention, *Am J Lifestyle Med.* vo.14(3):pp. 267–270.doi: 10.1177/1559827620907309
- Doyle, A. 2020. The Best Diabetes Apps of 2020, healthline, pp.2-10.
- Drossman DA, and Ruddy J. 2019). Improving patient-provider relationships to improve health care, *Clin Gastroenterol Hepatol*. doi:10.1016/j.cgh.2019.12.007
- Field AE, Coakley EH, Must A, and et al.2001. Impact of overweight on the risk of developing common chronic diseases during a 10-year period. *Arch Intern Med*. 2001;161:1581–1586
- Franceschi C, Garagnani P, Parini P, Giuliani C, and Santoro A. 2018.Inflammaging: a new immune-metabolic viewpoint for age-related diseases. *Nat Rev Endocrinol*. 14:576–90. doi: 10.1038/s41574-018-0059-4
- Gaede P., Vedel P., Larsen N., Jensen G.V., Parving H.H., and Pedersen O. 2003.Multifactorial intervention and cardiovascular disease in patients with type 2 diabetes. *N. Engl. J. Med*. 2003;348:383–393. doi: 10.1056/NEJMoa021778
- Gallwitz, B. 2010. Benefit-Risk Assessment of Exenatide in the Therapy of Type 2 Diabetes Mellitus, *Drug Safety* 33(2):87-100, DOI:10.2165/11319130-000000000-00000
- Galtier F. (2010).Definition, epidemiology, risk factors. *Diabetes Metab*. 2010;36:628–651.
- Gerrald KR, Van Scoyoc E, Wines RC, et al. (2012).Saxagliptin and sitagliptin in adult patients with type 2 diabetes: A systematic review and meta-analysis. *Diabetes Obes Metab*. 2012;14(6):1481–1492.
- Gerstein HC, Miller ME, Byington RP, et al. (2008).Effects of intensive glucose lowering in type 2 diabetes. *N Engl J Med*. 2008;358:2545–2559.
- Goto A., Arah O. A., Goto M., Terauchi Y., Noda M. (2013).Severe hypoglycaemia and cardiovascular disease: systematic review and meta-analysis with bias analysis. *BMJ*. ;347, doi: 10.1136/bmj.f4533
- Graff-Iversen, S., Anderssen, S. A., Holme, I. M., Jenum, A. K., and Raastad, T. (2007). An adapted version of the long international physical activity questionnaire (IPAQ-L): construct validity in a low-income, multiethnic population study from Oslo, Norway. *Int. J. Behav. Nutr. Phys. Act*. 4, 1–7.
- Gray, N., Picone, G., Sloan, F., and Yashkin, A. (2015). Relation between BMI and Diabetes Mellitus and Its Complications among US Older Adults. *Southern Medical Journal*, 108(1), 29–36. doi:10.14423/smj.0000000000000002

- Gregory, D. Johnston, R. Pratt, G. Watts, M. 2009. "Quality of Life". Dictionary of Human Geography (5th ed.). Oxford: Wiley-Blackwell. ISBN 978-1-4051-3287-9.
- Halban PA, Polonsky KS, Bowden DW, Hawkins MA, Ling C, Mather KJ, Powers AC, Rhodes CJ, Sussel L, Weir GC. (2014). β -cell failure in type 2 diabetes: postulated mechanisms and prospects for prevention and treatment. *Diabetes Care.* ;37:1751–1758.
- Hamasaki, H., Yanai, H., Mishima, S., Mineyama, T., Yamamoto-Honda, R., Kakei, M., et al. (2013). Correlations of non-exercise activity thermogenesis to metabolic parameters in Japanese patients with type 2 diabetes. *Diabetol. Metab. Syndr.* 5:26. doi: 10.1186/1758-5996-5-26
- Herman GA, Stein PP, Thornberry NA, Wagner JA. 2007. Dipeptidyl peptidase-4 inhibitors for the treatment of type 2 diabetes: Focus on sitagliptin. *Clin Pharmacol Ther.* 2007;81:761–767
- Hotamisligil GS. 2017. Inflammation, metaflammation and immunometabolic disorders. *Nature.* 542:177–85. doi: 10.1038/nature21363
- Huang ES, Basu A, O'Grady M, Capretta JC. (2009) Projecting the future diabetes population size and related costs for the U.S. *Diabetes Care.*;32:2225–2229
- Hwang, J., and Shon, C. (2014). Relationship between socioeconomic status and type 2 diabetes: results from Korea National Health and Nutrition Examination Survey (KNHANES) 2010-2012. *BMJ Open*, 4(8), e005710–e005710. doi:10.1136/bmjopen-2014-005710
- Inouye, J. Davis, J. and Arakaki, R. 2013. Associations between Psychosocial and Physiological Factors and Diabetes Health Indicators in Asian and Pacific Islander Adults with Type 2 Diabetes, *Nursing Research and Practice*, vol. 2013, pp.7, <https://doi.org/10.1155/2013/703520>
- International Diabetes Federation. 2017, IDF diabetes atlas. 8th ed. Brussels: International Diabetes Federation; 2017.
- Internet: Centers for Disease Control and Prevention, 2018. HRQOL Concepts. Available from: <https://www.cdc.gov/hrqol/concept.htm>
- Internet: Nursetime, 2018. Diabetes mellitus: therapy and quality of life, <https://nursetimes.org/diabete-mellito-terapia-e-qualita-della-vita/48858>
- Inzucchi SE, Bergenstal RM, Buse JB, et al. 2012. Management of hyperglycemia in type 2 diabetes: A patient-centered approach: Position Statement of the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD) *Diabetes Care.*;35:1364–1379.
- Inzucchi SE. (2002). Oral antihyperglycemic therapy for type 2 diabetes: Scientific review. *JAMA.* 2002;287:360–372
- Johansen JS, Harris AK, Rychly DJ, Ergul A. 2005. Oxidative stress and the use of antioxidants in diabetes: linking basic science to clinical practice. *Cardiovasc Diabetol.* ;4:5.

- Kiadaliri AA, Najafi B, Mirmalek-Sani M. 2013. Quality of life in people with diabetes: a systematic review of studies in Iran. *J Diabetes Metab Disord.* 2013;12:54.
- Kilic G, Alvarez-Mercado AI, Zarrouki B, Opland D, Liew CW, Alonso LC, Myers MG, Jonas JC, Poitout V, Kulkarni RN, et al. 2014. The islet estrogen receptor- α is induced by hyperglycemia and protects against oxidative stress-induced insulin-deficient diabetes. *PLoS One.* 2014;9:e87941
- Knowler WC, Barrett-Connor E, Fowler SE, et al. 2002. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med.* 2002;346:393–403
- Knowles SR, Apputhurai P, O'Brien CL, Ski CF, Thompson DR, Castle DJ. 2020. Exploring the relationships between illness perceptions, self-efficacy, coping strategies, psychological distress and quality of life in a cohort of adults with diabetes mellitus *Psychol Health Med.* 2020;25:214–28
- Lamb MM, Yin X, Zerbe GO, Klingensmith GJ, Dabelea D, Fingerlin TE, Rewers M, Norris JM. 2009. Height growth velocity, islet autoimmunity and type 1 diabetes development: the Diabetes Autoimmunity Study in the Young. *Diabetologia.* ;52:2064–2071
- Lloyd-Jones D, Adams RJ, Brown TM, et al. 2010. Heart disease and stroke statistics—2010 update: A report from the American Heart Association. *Circulation.*;121:e46–e215
- Mansour AA, Alibrahim NTY, Alidrisi HA, et al. 2020. Prevalence and correlation of glycemic control achievement in patients with type 2 diabetes in Iraq: a retrospective analysis of a tertiary care database over a 9-year period. *Diabetes Metab Syndr.* 2020;14:265-272
- Mansour AA, Al-Maliky AA, Kasem B, Jabar A, Mosbeh KA. (2014). Prevalence of diagnosed and undiagnosed diabetes mellitus in adults aged 19 years and older in Basrah, Iraq. *Diabetes Metab Syndr Obes.* 2014;7:139-144
- Marcel W.M. (2014). Definitions of Quality of Life: What Has Happened and How to Move On, *Top Spinal Cord Inj Rehabil.* 2014 Summer; 20(3): pp.167–180. doi: 10.1310/sci2003-167
- Marta Dudzińska, M., Tarach, J., Zwolak, A., Kurowska, M., Malicka, M. Smoleń, A., Nowakowski, A. (2013). Type 2 diabetes mellitus in relation to place of residence: evaluation of selected aspects of socio-demographic status, course of diabetes and quality of life – a cross-sectional study, *Annals of Agricultural and Environmental Medicine* 2013, Vol 20, No 4, 869–874
- Martha, N. and Amartya, S. 1993. *The Quality of Life*, Oxford: Clarendon Press., DOI: 10.1093 / 0198287976.001.0001
- McAllister M, Dunn G, Payne K, Davies L, Todd C. 2012. Patient empowerment: the need to consider it as a measurable patient-reported outcome for chronic conditions. *BMC Health Serv Res.* 2012;12(1):157. <https://doi.org/10.1186/1472-6963-12-157>
- Mokhtari, Z. Gheslagh, R. Kurdi, A. 2019. Health-related quality of life in Iranian patients with type 2 diabetes: An updated meta-analysis, *Diabetes Metab Syndr*, 13(1):402-407. doi: 10.1016/j.dsx.2018.10.007.

- Nebbioso M, Federici M, Rusciano D, Evangelista M, Pescosolido N. 2012.Oxidative stress in preretinopathic diabetes subjects and antioxidants. *Diabetes Technol Ther.* 2012;14:257–263
- Ohaeri, J. U., and Awadalla, A. W. (2009). The reliability and validity of the short version of the WHO Quality of Life Instrument in an Arab general population. *Annals of Saudi Medicine*, 29(2), 98–104. <https://doi.org/10.4103/0256-4947.51790>
- Pittu, V. Avanapu, S. and Sharma, J. (2013). Diabetic Retinopathy - Can Lead to Complete Blindness, *International Journal of Science Inventions today*, ISSN 2319-5436.
- Pobutsky, A. Balabis, J. Nguyen, D. and Tottori, C. 2010. Hawai'i Diabetes Report 2010," Hawai'i State Department of Health, Chronic Disease Management and Control Branch, Diabetes Prevention and Control Program, Honolulu, Hawaii, USA, 2010.
- Prattichizzo F, De Nigris V, Mancuso E, Spiga R, Giuliani A, Matacchione G, et al. 2018. Short-term sustained hyperglycaemia fosters an archetypal senescence-associated secretory phenotype in endothelial cells and macrophages. *Redox Biol.* 15:170–81. doi: 10.1016/j.redox.2017.12.001
- Prattichizzo F, De Nigris V, Micheloni S, La Sala L, Ceriello A. 2018. Increases in circulating levels of ketone bodies and cardiovascular protection with SGLT2 inhibitors: is low-grade inflammation the neglected component? *Diabetes Obes Metab.* 20:2515–22. doi: 10.1111/dom.13488
- Prattichizzo F, De Nigris V, Spiga R, Mancuso E, La Sala L, Antonicelli R, et al. 2018. Inflammageing and metaflammation: the yin and yang of type 2 diabetes. *Ageing Res Rev.* 41:1–17. doi: 10.1016/j.arr.2017.10.003
- Puspasari, S. and Farera, D. 2020. Quality of Life Among Patients with Type 2 Diabetic Mellitus in Outpatient Department, General Public Hospital, West Java" in The 4th International Virtual Conference on Nursing, KnE Life Sciences, pages 897–906. DOI 10.18502/kls.v6i1.8767 , pp. 897
- Quah JH, Luo N, Ng WY, How CH, and Tay EG. 2011. Health-related quality of life is associated with diabetic complications, but not with short-term diabetic control in primary care *Ann Acad Med Singap.* 2011;40:276–86
- Rawshani A, Rawshani A, Franzen S, Eliasson B, Svensson AM, Miftaraj M, and et al. 2017. Mortality and cardiovascular disease in type 1 and type 2 diabetes. *N Engl J Med.* (2017) 376:1407–18. doi: 10.1056/NEJMoa1608664
- Robertson RP, Harmon J, Tran PO, Tanaka Y, Takahashi H. 2003. Glucose toxicity in beta-cells: type 2 diabetes, good radicals gone bad, and the glutathione connection. *Diabetes.* ;52:581–587.
- Robertson RP, Harmon J, Tran PO, Tanaka Y, and Takahashi H. 2003. Glucose toxicity in beta-cells: type 2 diabetes, good radicals gone bad, and the glutathione connection. *Diabetes.* 2003;52:581–587.
- Rodbard HW, Jellinger PS, Davidson JA, and et al. 2009. Statement by an American Association of Clinical Endocrinologists/American College of Endocrinology consensus panel on type 2 diabetes mellitus: An algorithm for glycemic control. *Endocr Pract.*;15:540–559

- Rosen, J. and Yosipovitch, G. 2018. Skin Manifestations of Diabetes Mellitus, Feingold KR, Anawalt B, Boyce A, et al., editors. South Dartmouth (MA): MDText.com, Inc.; 2000
- Rosenbloom AL, Silverstein JH, Amemiya S, Zeitler P, and Klingensmith GJ. 2009. Type 2 diabetes in children and adolescents. *Pediatr Diabetes*. ;10 Suppl 12:17–32
- Ruiter R, Visser LE, van Herk-Sukel MP, and et al. 2012. Lower risk of cancer in patients on metformin in comparison with those on sulfonylurea derivatives: Results from a large population-based follow-up study. *Diabetes Care*. 2012;35:119–124
- Saleh, A. Mohammed, A. Shahad, A. Naif, A. Razan, A. and Abdullah, A. 2021. Quality of life among type II diabetic patients attending the primary health centers of King Saud Medical City in Riyadh, Saudi Arabia, *Journal of Family Medicine and Primary Care*: [August 27, 2021 - Volume 10 - Issue 8 - p 3040-3046](#), doi: 10.4103/jfmmpc.jfmmpc_175_21
- Samuel CA, Mbah O, Schaal J, and et al. 2019. The role of patient-physician relationship on health-related quality of life and pain in cancer patients. *Support Care Cancer*. doi:10.1007/s00520-
- Selim AJ, Rogers W, Fleishman JA, Qian SX, Fincke BG, Rothendler JA, and Kazis LE. 2009. Updated U.S. population standard for the Veterans RAND 12-item Health Survey (VR-12) *Qual Life Res*. 2009;18:43–52
- Shaheen F, Basit KA, Riaz M, Fawwa A, Hakeem R, and Basit A. 2014. Assessing health related quality of life in diabetic subjects by SF 36 questionnaire in a tertiary care diabetes unit of Karachi, Pakistan. *Int J Adv Res*. 2014;2:13–7
- Sharma, S. Mohan, U. Singh, S. Deori, T. and Misra, A. 2021. Quality of life of type 2 diabetes mellitus patients attending a tertiary care hospital of Northern India: A cross sectional study, *J Family Med Prim Care*, 10(5): 1938–1944. doi: 10.4103/jfmmpc.jfmmpc_1743_20
- Sharma, S. Mohan, U. Singh, S. Deori, T. and Misra, A. 2021. Quality of life of type 2 diabetes mellitus patients attending a tertiary care hospital of Northern India: A cross sectional study, *J Family Med Prim Care*, 10(5): 1938–1944. doi: 10.4103/jfmmpc.jfmmpc_1743_20
- Sladek R. 2018. The many faces of diabetes: addressing heterogeneity of a complex disease. *Lancet Diabetes Endocrinol*. 6:348–9. doi: 10.1016/S2213-8587(18)30070-6
- Śliwińska-Mossoń, M., and Milnerowicz, H. 2017. The impact of smoking on the development of diabetes and its complications. *Diabetes and Vascular Disease Research*, 14(4), 265–276. doi:10.1177/1479164117701876
- Speight J, Holmes-Truscott E, Hendrieckx C, Skovlund S, and Cooke DJ. 2020. Assessing the impact of diabetes on quality of life: What have the past 25 years taught us? *Diabet Med*. 2020;37:483–92
- Stumvoll M., Goldstein B.J., and van Haeften T.W. 2005. Type 2 diabetes: Principles of pathogenesis and therapy. *Lancet*. 2005;365:1333–1346. doi: 10.1016/S0140-6736(05)61032-X.
- Thommasen HV, and Zhang W. 2006. Health-related quality of life and type 2 diabetes: A study of people living in the Bella Coola Valley. *BCM J*. 2006;48:272–278

- Thunander M, Törn C, Petersson C, Ossiansson B, Fornander J, and Landin-Olsson M. 2012. Levels of C-peptide, body mass index and age, and their usefulness in classification of diabetes in relation to autoimmunity, in adults with newly diagnosed diabetes in Kronoberg, Sweden. *Eur J Endocrinol.* 2012;166:1021–1029.
- Trikkalinou, A. Papazafiropoulou, A. and Melidonis, A. 2017. Type 2 diabetes and quality of life, *World J Diabetes.* 15; 8(4): 120–129. doi: 10.4239/wjd.v8.i4.120
- Twito O, Frankel M, and Nabriski D. 2015. Impact of glucose level on morbidity and mortality in elderly with diabetes and pre-diabetes. *World J Diabetes.* (2015) 6:345–51. doi: 10.4239/wjd.v6.i2.345
- Vehik K, Hamman RF, Lezotte D, Norris JM, Klingensmith GJ, and Dabelea D. 2009. Childhood growth and age at diagnosis with Type 1 diabetes in Colorado young people. *Diabet Med.* ;26:961–967.
- Via MA, Chandra H, Araki TP, and et al. 2010. Bromocriptine approved as the first medication to target dopamine activity to improve glycemic control in patients with type 2 diabetes. *Diabetes Metab Syndr Obes.* 2010;3:43–48.
- Wagner EH, Austin BT, Davis C, Hindmarsh M, Schaefer J, and Bonomi A. 2001. Improving chronic illness care: translating evidence into action. *Health Aff.* 2001;20(6):64–78. <https://doi.org/10.1377/hlthaff.20.6.64>
- Wagner EH. 2000. The role of patient care teams in chronic disease management. *BMJ.* 2000;320(7234):569–72. <https://doi.org/10.1136/bmj.320.7234.569>
- Wannamethee, S. G., Shaper, A. G., and Perry, I. J. 2001. Smoking as a Modifiable Risk Factor for Type 2 Diabetes in Middle-Aged Men. *Diabetes Care,* 24(9), 1590–1595. doi:10.2337/diacare.24.9.1590
- Weeger S, and Farin E. 2017. The effect of the patient-physician relationship on health-related quality of life after cardiac rehabilitation. *Disabil Rehabil.* vol.39:pp.468-476. doi:10.3109/09638288.2016.1146360
- Weyer C., Bogardus C., Mott D.M., and Pratley R.E. 1999. The natural history of insulin secretory dysfunction and insulin resistance in the pathogenesis of type 2 diabetes mellitus. *J. Clin. Investig.* 1999;104:787–794. doi: 10.1172/JCI7231.
- WHO, 2018.. *Diabetes.* Geneva, Switzerland: World Health Organization; 2018. <https://www.who.int/news-room/fact-sheets/detail/diabetes>. Updated October 30, 2018. Accessed March, 2019
- WHO, 2019. CLASSIFICATION OF DIABETES MELLITUS 2019, ISBN 978-92-4-151570-2
- WHO, 2020. WHOQOL: Measuring Quality of Life, <https://www.who.int/toolkits/whoqol>
- WHO, 2020. WHOQOL: Measuring Quality of Life. Available from: <https://www.who.int/healthinfo/survey/whoqol-qualityoflife/en/>
- WHO, 2021. Diabetes, <https://www.who.int/news-room/fact-sheets/detail/diabetes>

- WHO, 2021. World Diabetes Day 2020, <http://www.emro.who.int/ar/2020-arabic/world-diabetes-day-2020.html>
- WHO, 2022. Diabetes, https://www.who.int/health-topics/diabetes#tab=tab_1
- WHO,2021, Diabetes, <https://www.who.int/news-room/fact-sheets/detail/diabetes>
- WHO,2022. Diabetes, <https://www.who.int/news-room/fact-sheets/detail/diabetes>
- Wilkin TJ. 2009.The accelerator hypothesis: a review of the evidence for insulin resistance as the basis for type I as well as type II diabetes. *Int J Obes (Lond)* ;33:716–726.
- Worldwide trends in diabetes since 1980, 2016. a pooled analysis of 751 population-based studies with 4·4 million participants. *The Lancet*, 387(10027), 1513–1530. doi: 10.1016/S0140-6736(16)00618-8.
- Wubben DP, and Porterfield D. 2005.Health-related quality of life among North Carolina adults with diabetes mellitus *N C Med J*. 2005;66:179–85
- Yi, L. 2012. Effect of Health Qigong · Baduan jin on depression symptoms and life quality in patients with Type 2 Diabetes and depression in community. *Chinese J. Sports Med.* 31, 212–217.
- Young-Hyman D, de Groot M, Hill-Briggs F, Gonzalez JS, Hood K, and Peyrot M.2016. Psychosocial Care for People with Diabetes: a position statement of the American Diabetes Association. *Diabetes Care*. 2016;39(12):2126–40. <https://doi.org/10.2337/dc16-2053>
- Zhang, F.Huang, L.1,2 and Peng, L.2020. The Degree of Influence of Daily Physical Activity on Quality of Life in Type 2 Diabetics, *Frontiers in Psychology*, doi: 10.3389/fpsyg.2020.01292
- Zheng Y, Ley SH, and Hu FB. 2018.Global aetiology and epidemiology of type 2 diabetes mellitus and its complications. *Nat Rev Endocrinol.* ;14(2):88–98. <https://doi.org/10.1038/nrendo.2017.151>.
- Zurita-Cruz JN, Manuel-Apolinar L, Arellano-Flores ML, Gutierrez-Gonzalez A, Najera-Ahumada AG, and Cisneros-González N. 2018.Health and quality of life outcomes impairment of quality of life in type 2 diabetes mellitus: A cross-sectional study. *Health Qual Life Outcomes*. 2018;16:94

APPENDICES

APPENDIX 1. Questionnaire

ASSESSMENT OF QUALITY OF LIFE FOR PATIENTS WITH TYPE 2 DIABETES IN KIRKUK CITY, we welcome you presented by Basim Hameed Ahmed , We invite you to the **research** entitled “Assessment of quality of life for patients with type 2 diabetes in Kirkuk city” conducted by the lecturer FATİH KARAYÜREK. Before deciding whether or not to participate in this research, you need to know why and how to conduct the research. It is very important to read and understand this form. If there are things that you do not understand and are not clear to you, or if you want more information, ask us. Participation in this study is completely **voluntary**. You have the right not to participate in the study or to withdraw at any time after joining. Your response to the study will be interpreted as giving your consent to participate in the study. Do not submit to any pressure or suggestion from anyone while answering the questions on the forms provided to you. Personal information obtained from these forms will remain completely confidential and will only be used. For research purposes.

First Part: Sociodemographic and Clinical Characteristics Form:

1. Age: years.

2. Gender:

A) female	
B) male	

3. Social status:

a) married	
b) single	

4. Educational status:

a) illiteracy	
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b) learner	
c) Elementary graduate	
d) high school graduate	
e) Institute graduate	
f) a university graduate	

5. Job:

a) employee	
b) unemployed	
c) retired	
d) House wife	
e) free business	
f) employee	

6. Economic Status:

a) Income is less than expenses	
b) Income and expenses are equal	
c) Income is more than expense	

7. Health status

a) Good	
b) Center	
c) bad	

8. Living place

a) City	
b) spend	
c) the village	

9. The people who live with you

a) husband/wife	
b) children	
c) Single	
d) husband and children	

10. Social support

a) Yes	
b) No	

11. Duration of illness (years)

a) 5th	
b) 6 - 10	
c) 11 and up	

12. Additional Diseases

a) Yes	
b) No	

If the answer is yes, please mention the disease

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13. Do you or do you have complications

a) Yes	
b) No	

If the answer is yes, please indicate the type of complications.

14. Type of treatment

a) food system	
b) Oral antidiabetic drugs/pills	
c) Oral antidiabetic drugs + insulin	
Insulin	

15. Regular use of medicines

a) Yes	
b) No	

16. Do you do a regular check up

a) Yes	
b) No	

17. Smoking

a) Yes	
b) No	

18. Drinking liquor

a) Yes	
b) No	

19. Weight: kg.

20. Height:

21. Have you had COVID-19?

a) Yes	
b) No	
c) I don't know	

22. Have you taken the vaccine?

a) Yes	
b) No	

If yes, what kind of vaccine did you take?

a) Pfizer (US)	
b) AstraZeneca (British)	
c) Sino Pharm (Chinese)	

23. Did you get infected after taking the vaccine?

a) Leave blank if the vaccine has not been taken	
b) Yes	
c) No	
d) I don't know	



24. When was the last HbA1C test // 20

25. What was the last percentage of the HbA1C test:

Second Part: WHOQOL-BREF Scale

Items	Always	Sometimes	Never
First: the physical aspect a. sleep 1- Do you find it difficult to sleep? 2- Do you have changes in the nature of sleep after illness? 3- Do you need medication to help you sleep? 4- Are you satisfied with your sleep? B. Nutrition 1- Do you have loss of appetite? 2- Do you follow a special diet after illness? 3- Do you stick to eating times? 4- Do you have difficulty in digestion? c. Accomplishment of duties 1- Do you find it difficult to complete your daily work? 2- Do you feel that the disease has affected your ability to perform daily tasks? 3- Do you have the strength and energy to do daily chores? 4- Do you feel tired without doing any work? D.Pain and discomfort 1- Do you have paresthesia in the hands and feet? 2- Do you feel tingling and burning in the extremities?			

3- Do you suffer from severe pain and cramps?			
4- Do you suffer from joint pain?			

Second, the psychological and social aspects

Items	Always	Sometimes	Never
sexual activities 1- Do you face difficulty in your sexual life? 2- Have you lost your sexual desire as a result of illness? 3- Do you feel pain during sexual intercourse? 4- Has the disease affected your sex life? Second, the psychological and social aspects a. Relationship with family and friends 1- Are you satisfied with the support and help from family and friends? 2- Do your family members and friends treat you as a sick or disabled person? 3- Is your relationship good with your wife and family members? 4- Do you get support from others? 5- Do you participate in making decisions at home? 6- Do your friends understand your health condition? 7- Does the disease affect your attendance at special occasions and visiting friends? B. the mood 1- Are you bothered by your review of the Diabetes Center?			

2- Are you happy in your life? 3- Are you bothered by the noise? 4- Do you prefer not to mix with people? C focus, memory and learning 1- Now, are you able to focus? 2- Are you able to remember things that happened in the past? 3- Do you feel that your memory has been affected by the disease? 4- Do you feel that your educational level has been affected by the disease? D. Self 1- Are you satisfied with yourself? 2- Are you satisfied with your role in life? 3- Are you satisfied with what you have achieved in your life? 4- Do you feel that you have achieved yourself? e. Fear and anxiety 1- Do you feel anxious and afraid as a result of your illness? 2- Do you feel sad and depressed as a result of your illness? 3- Do you have fears and worries about your life?			
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health?			
4- Do you think that your visit to health centers is beneficial to your health?			
5- Do you follow the doctor's instructions?			
6- Do you always take good care of your health?			
7- Do you need the help of your family members when visiting diabetes treatment centers?			

Fourth: the environment and physical safety

Items	Always	Sometimes	Never
d Environment and physical safety			
1- Are you satisfied with your environment?			
2- Do you feel that your environment is safe?			
3- Is the place where you live healthy?			
4- Do you feel that the people around you are trying to keep your environment healthy?			
5- Is your home exposed to sunlight?			
6- Is your place of work close to your place of residence?			
7- Do you have enough money to meet your daily needs?			
8- Are you satisfied with your workplace?			

Fifthly: Beliefs

Items	Always	Sometimes	Never
A spiritual beliefs			
1- Are you able to go to places of worship and religious events?			
2- Does your illness affect your prayers?			
3- Do you think that religious beliefs have an effect on your health?			
4- Do you use spiritual beliefs in treatment?			
b hope and future			
1- Do you feel that your health will improve?			
2- Do you have hope of recovery from the disease?			
3- Do you feel that the disease will lead to death?			
4- Do you feel that your health will improve in the future?			
5- Do you feel afraid of the future?			

APPENDIX (2): Adminstrative approval from Iraq



APPENDIX (3): A committee of experts to adapt the questionnaire to the Iraqi culture

No.	Expert name	The scientific title	Certificate	Experience / Years	Workplace
1	Dr.Hala Saadi Abdel Wahed	Professor	PhD Community Health Nursing	28	University of Baghdad \ College of Nursing
2	Dr.Salah Mohammed Saleh Hassan	Assistant Professor	PhD in adult nursing	30	Kirkuk University \ College of Nursing
3	Dr. Shatha Saadi Mohammed	Assistant Professor	PhD Community Health Nursing	20	Kirkuk University \ College of Nursing
4	Dr.Mohamed Fadel Khalifa	Assistant Professor	PhD Community Health Nursing	20	Kirkuk University \ College of Nursing
5	Dr.Hewa Sittar Saleh	Assistant Professor	PhD Community Health Nursing	21	Kirkuk University \ College of Nursing
6	Dr. Nazar Ahmed Mahmood	Assistant Professor	PhD Community Health Nursing	16	Kirkuk University \ College of Nursing
7	Dr.Abid Salih Kumait	Assistant Professor	PhD in adult nursing	15	Kirkuk University \ College of Nursing
8	Dr. Abbas Lateef MuheAldeen	Assistant Professor	PhD in psychiatric and mental health nursing	16	Kirkuk University \ College of Nursing

APPENDIX (4) : EDITING CERTIFICATE .



CURRICULUM VITAE

Personal Information

Full name: - Ahmad Junaid Mohiuddin

Gender:- Male

Place and Date of Birth

