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Al-Quds University

Evaluation of Type 2 Diabetes Mellitus Services Provided by the Ministry of Health in Gaza Strip: A Mixed-Methods Study

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Thesis submitted in partial fulfillment of the requirements for the degree of Master of Public Health

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Thesis Approval

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Dedication

I dedicate this dissertation to the memory of my late mother, father, and aunt their spirit inspired me throughout conducting this study with unlimited support, and encouragement.

To my brothers and sisters for giving me the faith and passion to complete this study.

And

To everyone who contributed to making this study a reality

Walaa K. Daloul

Declaration

I certify that this thesis submitted for the degree of master is the result of my research, except where otherwise acknowledged, and that this thesis or any of its parts has not been submitted for higher degree to any other university or institution.

Signed:

Walaa K. Daloul

Date: 11/5/2024

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Yours faithfully

Walaa Klay Daloul

Evaluation of Type 2 Diabetes Mellitus Services Provided by the Ministry of Health in Gaza Strip: A Mixed-Methods Study

By :Wala Daloul

Executive summary

Background: Diabetes Mellitus control and complications are affected by the structure of health services provided. **Aims:** This study aims to evaluate T2DM services provided in the Ministry of Health (MoH) primary health care clinics (PHC) in the Gaza Strip (GS) from providers' and patients' perspectives.

Methods: A cross-sectional study was done using a two-stage stratified random sample of PHC clinics from the four Gaza Strip regions, A convenient sample of 400 patients was selected from the 8 PHC clinic patients and were interviewed using a structured questionnaire. A purposing sample of 16 nurses and physicians treating T2DM patients was interviewed from each PHC clinic

Quantitative data analysis was done using descriptive and bivariate. Chi-square, correlations, t-tests, and one-way ANOVA testing were employed using SPSS as needed. Qualitative data was collected using individual interviews that were recorded, transcribed, and submitted open-ended. The study was ethically approved and each participant had to sign a consent form before participation.

Results: Participants had a mean age of 61 years (± 9.23), 59.8% were females and 66% had a family history of DM. The average diagnosis duration for T2DM was 9.5 years (SD ± 6.67) and 63.7% had co-morbidities. 61% had low diabetic awareness, 33.8% had low attitude, and over two-thirds had low practice.

Input services indicators: 41.8% thought DM services met expectations. The most common service need was drugs (85.5%), followed by blood sugar control (37%). There was good compliance with MoH non-communicable illness standards and protocols (PEN). In addition, 58.8% of participants didn't visit the health center for T2DM follow-up due to its appearance and facilities.

For process indicators, 79% exclusively used MoH PHC services and 84.8% said it was easy to access the health center. In interviews, doctors said early morning crowds disrupted work. Unfinished documentation was reported. Two-thirds got regular follow-ups, and 60.5% checked blood glucose entirely at the PHC. Medical staff need

periodic training and understanding of the latest scientific advances to follow up on T2DM patients and treat them. 78% of participants received T2DM self-care education in the health facility, however, the nurse (49.5%) was the main educator.

For output measures, over half of survey participants were satisfied with services. Also, 85% were satisfied with the cleanliness, but only 58.8% reported that medicines were available. 72.5% felt their health had improved while receiving MoH T2DM health care, and 43.3% reported that the cost of services was the most prevalent problem in the Ministry of Health healthcare clinics.

Unfortunately, medical records showed that only 35.5% of T2DM patients have controlled diabetes. 60.5% had yearly retina eye exams, 41.5% had their foot screening test, and 95% had their annual laboratory analysis. The Diabetes Complication Index (DCI) showed that 19.3% of study participants had no T2DM problems and 71.3% had diabetes complications, with neuropathy being the most common. Bivariate analysis revealed that those without diabetes complications (e.g., heart attack, CVD, PVD, neuropathy, diabetic foot, and eye difficulties) had better control of their diabetes ($p<0.05$). Females experienced greater diabetes complications (DCI index) among individuals with a long history of diabetes (10 years or more), a family history, and a comorbidity. Low knowledge, practice, attitude, and patient satisfaction were significantly associated with developing problems in DCI patients ($p<0.05$). Research indicates that those with low nutritional intake and inactivity are more likely to develop diabetic problems ($p<0.05$).

Conclusion: The present study concluded that the screening program for type 2 diabetes mellitus complications is relatively good at the MOH-PHC clinics. However, patients' knowledge, attitudes, and practices for type 2 diabetes mellitus glycemic control (HbA1c) is relatively poor. This could be explained by limited focus on diabetic self-care, insufficient health education, limited communication between health providers and patients, and very short contact time. More studies are needed to evaluate the determinants of controlling status. MoH needs to increase the contact time and improve the self-care management and complications knowledge.

تقييم الخدمات المقدمة لمرضى السكري في عيادات وزارة الصحة في قطاع غزة: دراسة بمنهجية مختلطة

اعداد: ولاء كلاي دلول

باشراف: د. نهى الشريف

الملخص التنفيذي

خلفية الدراسة: تتأثر متابعة ومضاعفات مرض السكري ببنية الخدمات الصحية المقدمة مثل عوامل الإمداد والعوامل المتصلة بتقديم الخدمات.

اهداف الدراسة: وتهدف هذه الدراسة إلى تقييم الخدمات التي تقدمها وزارة الصحة في عيادات الرعاية الصحية الأولية في قطاع غزة من منظور مقدمي الخدمات والمرضى.

طرق البحث: استُخدمت لأغراض التحليل الكمي دراسة استقصائية شاملة لعدة قطاعات شملت 400 من المرضى المراجعين من 8 عيادات للرعاية الأولية. حيث تم اختيار العينة من أربع مناطق في قطاع غزة. كما أجريت مقابلات شخصية مع عينة مقصودة لأغراض التحقيق النوعي حيث تم اختيار 16 ممرضة وطبيباً يعالجون مرضى السكري موزعين على العيادات المشاركة في الدراسة. وقد تم عرض بيانات الدراسة بصورة وصفية وتحليلية باستخدم اختبارات chi-square، ومعامل الارتباطات و t-test حسب انواع لبعوامل المدروسة بنسبة p-value <0.05 لاعتبار العلاقة بين العوامل احصائيا صحيحة. وقد وُقعت استمارة الدراسة من قبل المشاركين بعد اعتماد الدراسة أخلاقياً.

النتائج: كان متوسط عمر المشاركين 61 سنة (بانحراف معياري SD± 9.23 سنة)، حيث بلغت نسبة الإناث 59.8 %، و 66% كان لديهن تاريخ أسري من مرض السكري. اما متوسط مدة التشخيص بمرض السكري 9.5 سنة (SD 6.67±) وعانى 63.7 % من امراض مزمنة اخرى. كما اظهرت النتائج ان معرفة المشاركين (61%) وممارساتهم (66%) وتوجهاتهم (33.8%) نحو مرض السكري لم تكن بالمستوى الجيد.

مؤشرات بناء الخدمات: اظهرت النتائج ان نسبة 41.8 % من المرضى قد حصلوا على الخدمات المتوقعة من هذه المراكز ولكن أعرب 85.5% بان اهم مشكلة في هذه المراكز هو عدم توفر الادوية و37% أعربوا عن عدم توفر فحص مراقبة السكري. اما نسبة الالتزام بمعايير وبروتوكولات وزارة الصحة المتعلقة بالأمراض غير المعدية باستخدام الى PEN approach فقد كانت جيدة، وبالإضافة إلى ذلك، تجنب 58.8 % من المشاركين الذهاب للمراجعة لتلك المراكز بسبب المرافق المتوفرة والمظهر العام لها.

وبالنسبة لمؤشرات العمليات، فإن 79 % من المرض استخدموا الخدمات و84.8 % أعربوا انه من السهل الوصول إلى المركز الصحي. اما في خلال مقابلات مع الطواقم الصحية، فقد أعرب الاطباء ان حشود الصباح الباكر تعطل العمل على تقديم الخدمات الشاملة للمرضى. اما عن التوثيق والملفات فقد اغرب المشاركين عن عدم كفايتها وعدم اكتمالها، كما ان 66% اكدوا بوجود متابعة لمرضهم وان 60.5% قد تم اجراء فحص السكري لهم. وقد اكد 78% من المشاركين عن تلقيهم تدريب لإدارة مرضهم ذاتيا و49% اكدوا ان التدريب كان يتم من قبل الممرضين المرفق الصحي. . اما الطواقم الطبية، فقد أعرب المشاركون بالدراسة عن الحاجة للتدريب دوريا على الالية المتطورة في ادارة مرض السكري.

وفيما يتعلق بقياس نواتج الخدمات الصحية، فقد أعرب أكثر من نصف المشاركين في الدراسة الاستقصائية عن رضاهم عن الخدمات. وكانت نسبة 85 % راضية عن النظافة ولكن 58.8% أعربوا عن عدك توافر للأدوية المطلوبة. وشعرت نسبة 72.5 % من المشاركين بتحسن صحتهم حين تلقوا الرعاية الصحية في مراكز وزارة الصحة، في حين قال 43.3 % بان الكلفة العالية للخدمات الصحية هي احد المشاكل الاكثر انتشاراً فيما يتعلق بخدمات الرعاية الصحية الأولية.

ولسوء الحظ، أظهرت السجلات الطبية أن 35.5 % فقط من مرضى السكري النوع الثاني (T2DM) لديهم السيطرة على السكري، وخضع 60.5 % منهم لفحص شبكية العين سنويا، و41.5 % تم اجراء اختبار فحص القدمين، و95 % اجروا التحليل المخبري السنوي. اما عن المعامل القياسي لمضاعفات السكريات (DCI) فأظهرت النتائج ان فقط 19.3 % من المشاركين في الدراسة لم يكن لديهم اي مشاكل مع مرض السكري وبينما عانى 71.3 % من مضاعفات المرض، وكان الاعتلال العصبي هو الأكثر شيوعا. وكشفت التحليل المتفاوت أن الأشخاص **الذين لا يعانون** من مضاعفات السكري (مثلاً، النوبة القلبية، والإصابة بسرطان الدم، والإصابة بفيروس نقص المناعة البشرية، والاعتلال العصبي، والقدم المريضة، وصعوبات العين) لديهم قدرة أفضل على التحكم في مرض السكري($p < 0.05$) ، وقد شهدت النساء تعقيدات أكبر في مرض السكري بين الأفراد الذين لديهم تاريخ طويل من مرض السكري (10 سنوات أو أكثر)، والذين لديهم تاريخا عائليا من مرض السكري، أو اي امراض مزمنة اخرى. وترتبط قلة المعرفة والممارسة والمواقف ورضا المريض ارتباطاً كبيراً بالمشاكل الناشئة لدى المرضى المصابين بمضاعفات السكريات ($p < 0.05$). واشارت النتيجة ان المستوى الغذائي والنشاط البدني المنخفض يرتبط ارتباط مباشرا لدى المشاركين بحدوث مشاكل صحية نتيجة الاصابة بمرض السكري $p < 0.05$).

وخلصت هذه الدراسة إلى أن برنامج الفحص لمضاعفات السكري من النوع 2 جيد نسبياً في عيادات وزارة الصحة .ومع ذلك، فإن معرفة المرضى ومواقفهم وممارساتهم فيما يتعلق بضبط النوع 2 من السكري (HbA1c)يعتبر ضعيفا نسبياً. ويمكن تفسير ذلك بالتركيز المحدود على الرعاية الذاتية لمرضى السكر، وعدم كفاية التثقيف الصحي، ومحدودية الاتصال بين مقدمي الرعاية الصحية والمرضى، وقصر وقت الاتصال. وثمة حاجة إلى مزيد من الدراسات لتقييم محددات مركز السيطرة. وتحتاج وزارة الصحة إلى زيادة وقت الاتصال وتحسين إدارة الرعاية الذاتية والمعارف المتعلقة بالمضاعفات.

Contents

List of Abbreviations

CVD	Cardio-Vascular Disease
DM	Diabetes Mellitus
ESRD	End-Stage Renal Disease
FGDs	Focus Group Discussions
FPG	Fasting Plasma Glucose
GS	Gaza Strip
HbA1c	Hemoglobin A1c
IDF	International Diabetes Federation
KAP	Knowledge, Attuites, and Practices
MoH	Ministry of Health
NCDs	Non-Communicable Diseases
NGOs	Non-Governmental Organizations
OGTT	Oral Glucose Load
PCBS	Palestinian Center Bureau of Statistics
PEN	Package of Essential Noncommunicable-Diseases Intervention
PHCS	Primary Health care Centers
PS	Patient Satisfaction
QoL	Quality of Life
RPG	Random Plasma Glucose
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
USRDS	United States Renal Data System
WB	West Bank
WHO	World Health Organization

List of Tables

List of Figure

List of Annexes

Chapter one

Introduction

1.1 Background

Diabetes Mellitus (DM) is a global pandemic. Today, approximately 6% of the world population – over 420 million people – have Type 1 DM (T1DM) or Type 2 DM (T2DM) (WHO, 2021). Since 1980, this amount has quadrupled and it is expected to exceed half a billion. Deaths from other non-communicable diseases (NCDs) are decreasing, but deaths related to DM increased by 5% between 2000 and 2016 (WHO, 2021a). Recently, diabetes patients were shown to have an elevated risk of illness and death from COVID-19, and diabetes care has been seriously affected as a consequence of the pandemic (Ssentongo *et al.*, 2022)

DM services play an essential role in reducing the burden of mortality and morbidity of diabetes, preventing or delaying diabetic complications, and promoting the Quality of Life (QoL) and satisfaction of persons with diabetes

Being able to access DM services, quickly, and with appropriate support from family and service providers, is of paramount importance. People who have access to appropriate care can better manage their conditions and live happier and healthier lives (Konerding *et al.*, 2020). People with DM should have the full potential to adequately care for their disease without obstacles (Sainz, 2021).

Unfortunately, this does not always occur, and people may wait a long time before they start receiving health care. This delay in receiving timely care might lead to the development of complications. Several factors affect also the development of complications such as poverty, lack of knowledge about the severity of the disease, going undiagnosed, lack of medications, a lack of social support, and others (Hsu *et al.*, 2012).

DM control and complications are affected by the structure of health services provided such as provider factors (distributions, qualifications, numbers… etc.), adherence to DM guidelines, availability of drugs, access to services, and others (Hammad, 2019). Also, factors related to the provision of services such as waiting time, training on self-care,

training of healthcare providers, and others determine patients' diabetes control and complications (Messina *et al.*, 2017).

In the Gaza Strip (GS), according to the Ministry of Health (MoH) (2023), the number of new registered DM in the GS was 71016 cases with a prevalence rate of 3.2 per 100 population (2.8 per 100 in males, 3.7 % in females) (MOH, 2023). Also, DM complications are currently the second leading cause of death in Palestine (MoH, 2021b). According to the International Diabetes Federation (IDF), the estimated prevalence among adults in 2018 was 7% (IDF, 2021). The burden of DM, on the other hand, includes the consequences of DM, such as cardiovascular disease, strokes, and neuropathy (CDC, 2021).

Furthermore, DM is a major risk factor for the other two major causes of death in Palestine, specifically cardiovascular disease and stroke. Providing people with DM with the main health providers in Palestine have the mandate to provide preventive and curative services. The scope of services includes early detection of diabetic cases and effective management of patients with DM. Patients with DM, as well as early detection of diabetes long-term and short-term complications, according to DM services in MoH protocol (WHO, 2020a) .

Most DM services are provided through primary health care (PHC) by the two major health care providers, i.e. MoH and the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) (MoH, 2021a).

1.2 Problem statement

Access to diabetes services is important for people with DM patients to achieve well-being and Quality of Life (QoL) and reduce morbidity, mortality, and complications. In a fragmented health system like the GS, where resources are limited and health problems are complex, access to services might be even more complicated than anywhere (Sainz, 2021).

In the GS, the MoH is one of the key health providers for NCDs, including DM. In 2022, the total number of DM patients was 71,016 clients with DM and the incidence rate was 3 per 100100 of the population but the majority approximately 81.3% had received services from the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), not from the MoH (MoH, 2021a). No recent study has assessed the health services provided to DM clients at the MoH. Previously, a study was

conducted by Hammad in 2019 on services provided at the UNRWA clinics for people with DM but no study has targeted services provided at the MoH (Hammad, 2019). Thus, this study was carried out among the first to solely and comprehensively focus on assessing diabetes services provided by MoH, thus, the study fills important gaps in knowledge about how DM is managed.

1.3Justifications

Palestine is currently undergoing an epidemiological transition, which is being accompanied by a demographic transition. This refers to a shift in disease patterns from NCDs such as cancer, heart disease, stroke, injuries, diabetes, and arthritis. NCDs such as heart disease, cancer, hypertension, cardiovascular diseases, and diabetes mellitus have exceeded infectious diseases as the leading causes of death in both the West Bank (WB) and the GS (MOH, 2023) This emphasizes the significance of this research topic, which affects numerous people.

By reviewing the literature, a previous study (Hammad, 2019) was conducted to evaluate DM services in UNRWA PHC, and another study (Samara, 2010) evaluated services in the WB. Hammad's study, results show important gaps in the management of DM, however, it didn't study services provided at MoH.

DM services in the GS have not been thoroughly evaluated, and it is unclear how well the available services meet needs and of what quality they are. Evaluation can help us determine how services are contributing to the change in patients with DM habits and self-management of disease and how much it helps prevent complications and patient satisfaction. It may provide perspective on service modifications that have been made to improve efficiency.

This study provided a more comprehensive picture of the reality of DM services in the MoH from various angles and perspectives. The findings would provide insights for policymakers and service providers, forming the basis for better planning, implementation, and decision-making, resulting in more efficient, effective, and high-quality services, and thus improving the well-being of people with DM.

1.4 Aim of the Study

The study aims to evaluate DM services provided at PHC of the MoH in the GS from service providers' and patients' perspectives to suggest possible recommendations to

improve the control status, and patient satisfaction and reduce mortality, morbidity, and complications.

1.4.1 Objectives

- To appraise the DM management process and its effects on DM control and complications from patients' and providers' perspectives.
- To assess satisfaction among people with DM about the service provided to them.
- To ascertain the relationship between the provision of DM services and the development of complications and control status from patient and provider perspectives.
- To determine the role of patients' characteristics and lifestyle on DM control and complications.

1.5 Research Questions

1.5.1 Quantitative part

1. To what extent the inputs required (drugs and physical structure) for diabetes services are appropriately available?
2. What are the services provided to people with T2DM and how much these are appropriate?
3. What effect do socioeconomic factors, knowledge, attitude, and practices (KAP) of the patient have on diabetes control and complications?
4. Are T2DM healthcare services improving the health outcomes of patients at MoH healthcare facilities in the GS?
5. Are T2DM clients satisfied with the services they receive?
6. What are the strengths, weak areas, and challenges related to diabetes services?
7. What are the perceptions of diabetes services in MoH among clients?
8. What effects do these services have on the overall health of beneficiaries?

1.5.2 Qualitative part

1. What is the role of guidelines, appointment systems, documentation, and training on diabetes control and complications?
2. What are the perceptions of diabetes services in MoH among service providers and what is MoH's ability for diabetes services?
3. What gaps may prevent T2DM patients from receiving diabetes services at the MoH clinics?

1.6 Study Context

1.6.1 Demographic and Geographic Context

According to the Palestinian Central Bureau of Statistics (PCBS), About 14.5 million Palestinians in the world in mid-2023, and about 5.48 million in the State of Palestine; 2.78 million males and 2.70 million females. The estimated population of the Gaza Strip was 2.23 million in the same year (1.13 million males and 1.10 million females)(PCBS, 2023).

The GS is a narrow strip of land in the southwest of Palestine with a population of about 2.1 million people; it is divided into five governorates: North Gaza, Gaza, Middle Gaza, Khan Younis, and Rafah. Gaza governorate has the second-highest population in the Palestinian territories, accounting for 13.4% of the total population, trailing only Hebron, which accounts for 15.1% of population. Even though the fact that the GS is a small area of land, it has one of the greatest worldwide population densities (PCBS, 2023)..

1.6.2 Socioeconomic

The GS is still in a difficult economic situation the cumulative effects of years of blockade on Gaza's economy, which is currently operating at a portion of its abilities. Gaza's contribution to the Palestinian economy has been cut in half over the last three decades, and it now accounts for only 18% of the total. Gaza's economy has also been deindustrialized, and now it heavily relies on external transfers. Furthermore, as a result of the 11-day conflict and rapidly deteriorating COVID-19 conditions, the GS economic decline and causes a serious effect on living standards, with a rate of unemployment of 45% and poverty reaching 59%. Gazans are subjected to poor electricity and water-

sewerage availability, as well as conflict-related psychological trauma and restricted movement according to the Palestinian Economic Monitoring Report (World Bank, 2021). On the other hand, a total of 36.4% of Palestinians have a monthly income that is below the extreme poverty line, of whom 24.3% are in the WB and 55.9% are in the GS (PCBS, 2023). This increase in poverty may add further constraints on the provision of health services, including DM services.

1.6.3 Healthcare System

The Palestinian healthcare system is a mixture and primarily composed of four healthcare providers: the first is the MoH, which is the main healthcare provider and provides primary, secondary, and tertiary healthcare services; for primary healthcare, the MoH operates 475 primary health clinics (PHCs); 52 in the GS and 423 in WB; and for secondary health care, the MoH operates 475 PHCs (MOH, 2023) UNRWA is the second healthcare provider. It offers health programs focused on comprehensive, preventive, and primary healthcare, as well as services covering healthcare, family health, disease prevention and control, and health promotion. All of these services are provided to refugees at no cost. UNRWA operates 64 PHCs, 22 in GS and 65 in WB. The third type of provider is the non-Governmental Organizations (NGOs), which provide primary, secondary, and tertiary healthcare to the population. Finally, the private sector has hundreds of privacy settings operated mainly by private individuals, medical specialists, dentists, physicians, laboratory technicians, and x-ray technicians. Almost 78% of Palestinians in the WB and the GS are covered by some form of healthcare prepayment, and approximately 41.8% of health financing comes from out-of-pocket payments, with approximately 1% of the population experiencing catastrophic financial payments (WHO, 2021b)

1.6.4 Primary Health Care for the Ministry of Health

The MoH has been one of the key healthcare providers for Palestine, including PHCs, secondary, and tertiary care. PHCs: It is concerned with health in all of its physical, psychological, and social aspects, and its importance is the provision of care in its entirety and needs. PHC ensures a citizen's health for the rest of his life, and the duration of his life is not limited. People's access to universal coverage, including counseling and prevention as well as treatment. Currently, in MoH the 52 primary health facilities at the GS.

In the GS, the number of patients who visit PHCs is 388,310.1 visits to the MoH, including 921,446 A trips to a specialized clinic. The total number of DM patients was 84,039 in Palestine, which constituted 57% Female and 43% Male (MOH, 2023)

1.6.5 Diabetes Mellitus Services in PHC for MoH

According to MoH guidelines, the first step to receiving DM services the correctly diagnose: first Fasting plasma glucose (FPG) is the most practical test in MoH should be > 7 or equal mmol/L, second Random plasma glucose (RPG) but this is the least accurate of the diagnostic test. It was used to confirm the diagnosis of a person with symptoms. The RPG should be > 11.1 or equal mmol/L, third Plasma glucose 2 hours after a 75g oral glucose load (OGTT) can also be used to screen for DM. The OGTT should be > 11.1 or equal to mmol/L. Finally, use Hemoglobin A1c (HbA1c) but this is the most expensive and should be > 48 or equal mmol/L (WHO, 2020a).

The DM health services at MoH include antidiabetics' drug provision for example metformin, systemic follow-up, DM complication screening such as Foot complications, diabetic retinopathy, kidney disease and neuropathy, and self-care education. The prevalence of DM among the served population ≥ 40 years of age, in 2020 at the GS according to the MoH annual health report 2020 was 63627 DM clients and the incidence rate was 3.1 per100 of the population (MOH, 2023).

1.7 Operational Definitions

Type 2 DM (T2DM)

Persons with Type 2 DM (T2DM) who have a record of NCD services in PHC at MoH clinics and have visited the Department of NCDs for the past three months to monitor glycemic control.

Glycemic control

Operationally control is defined according to PEN NCD technical instruction as having a glycated hemoglobin level HbA1c equal to or below 7% (≤ 7%).

Chapter Two

Literature Review

2.1 Definition of Diabetes Mellitus

Diabetes mellitus (DM) is classified as a chronic condition by the World Health Organization (WHO) and is caused by insufficient insulin production by the pancreas or ineffective insulin utilization by the body. Therefore, DM can cause serious damage to many of the body's systems, particularly the nerves and blood vessels, over time (WHO, 2021a).

Diabetes occurs in several types. The first type is Type 1 DM (T1DM) is believed to be due to an autoimmune reaction (the body mistakenly attacks itself) that prevents your body from producing insulin CDC (2021b). The second type is diabetes type 2 (T2DM) which is characterized by a malfunction in the way the body regulates and utilizes sugar (glucose) as a fuel. This long-term chronic condition causes excess sugar to circulate in the bloodstream. Therefore, these high blood sugar levels may eventually cause circulatory, nervous, and immune system problems. Another type of diabetes is gestational DM which is defined as hyperglycemia, or blood glucose levels that are higher than normal but lower than those required to diagnose diabetes. Gestational diabetes is a type of diabetes that develops during pregnancy (WHO,2021). This study only assessed patients with T2DM.

2.2 Global burden

DM is a worldwide pandemic. Today, 537 million adults (20-79 years old) have DM, accounting for one in every ten. This figure is expected to increase to 643 million by 2030, and 783 million by 2045. Over three-quarters of adults with DM live in low- and middle-income countries (IDF, 2021). Deaths from other non-communicable diseases (NCDs) are decreasing, but deaths related to DM increased by 5 % between 2000 and 2016 (WHO,2021), and according to IDF, DM is responsible for 6.7 million deaths in 2021, one every 5 seconds (IDF, 2021). Recently, patients with DM were shown to have an elevated risk of illness and death from COVID-19, and DM care has been seriously affected as a consequence of the pandemic (WHO, 2021). DM is the Number 1 cause of kidney failure, lower-limb amputations, and adult blindness according to the Centers for Disease Control and Prevention (CDC) (CDC,2021).

2.3 Local Burden

According to the MoH, the estimated prevalence of T2DM among all NCD patients in Palestine in 2020 was 36.9% (MoH,2020b). DM complications were the leading cause of death in Palestine in 2020, accounting for 14.6% of all deaths (MoH, 2020b).

In the GS, according to the MoH, the number of new registered DM in the GS was 110.2 per 100,000 cases, distributed among males with an incidence rate of 2.6 per 100 populations, it constituted 43% of the total patients and among females with an incidence rate of 3.5 per 100 populations, it constituted 57% of the total patients (MoH, 2020a).

2.4 DM complications

DM, if not managed properly, can lead to many complications that affect nearly all organs in the body DM complications include the following: Microvascular, macrovascular, and neuropathic conditions. The most common cause of microvascular and metabolic complications is high blood glucose. Hyperglycemia has less of an impact on macrovascular disease (Harding *et al.*, 2019).

The most common and serious complications that DM can cause are:

2.4.1 Macrovascular complications

T2DM causes a variety of macrovascular complications through different pathogenetic pathways that include hyperglycaemia and insulin resistance. The association between T2DM and cardiovascular disease is clear (Viigimaa *et al.*, 2020) . As the incidence of the disease DM rises, so does the number of people diagnosed with CVD (IDF, 2016). People with DM continue to have a two- to fourfold higher risk of hospitalization for major CVD events and CVD-associated clinical procedures compared with those without DM (IDF, 2021).

2.4.2 Microvascular complications

Microvascular complications affected approximately one-fifth (18.8%) of people with T2DM worldwide (Kosiborod *et al.*, 2018). The most common T2DM microvascular complications at the time of DM diagnosis are retinopathy, neuropathy, and nephropathy (Dweib & El Sharif, 2023) Retinopathy affects roughly one-third of adults with T2DM and is the leading cause of blindness in this population (Liew *et al.*, 2017). DM is the

first leading cause of kidney failure, lower-limb amputations, and adult blindness, according to the CDC (CDC, 2021). Diabetic neuropathy is the primary cause of diabetic foot ulcers and amputation (Seid *et al.*, 2021).

2.4.3 End-stage renal disease (ESRD)

The 2023 United States Renal Data System (USRDS) Annual Data Report (ADR) demonstrates the detrimental effects of the COVID-19 pandemic on chronic kidney disease (CKD) and end-stage renal disease (ESRD) and documents racial, ethnic, and socioeconomic treatment and outcome disparities. The mortality rate was higher in 2021 than in 2020 for patients with ESRD. According to the United States Renal Data System (USRDS), an estimated 91% of new cases of diabetes-related end-stage renal disease (ESRD) are caused by T2DM (NIH-NIDDK, 2023).

2.4.4 Diabetes Complications Index (DCI)

A cross-sectional study done by Ghandour and colleagues says a significant proportion of T2DM patients had macro- and microvascular complications when using DCI, as well as poor metabolic control. These findings are critical for policy development and healthcare planning (Ghandour et al., 2018).

The DCSI score performed a retrospective cohort analysis of T2DM patients from primary care2012. This DCSI can be used to forecast direct healthcare costs. To reduce overall healthcare costs, the DCSI can be used to triage high-risk patients for more focused secondary prevention interventions at the primary care level (Chang *et al.*, 2012).

A study done by Graeme Fincke and colleagues in 2005 says we investigated the relationship between the Diabetes Complications Index (DCI) and the use of diabetes-related medical resources, outpatient doctor visits, HRQOL, diabetes duration, and the degree to which patients perceived their health to be harmed by diabetes. The DCI was significantly correlated with patient's perceptions of their health being harmed by DM ($r = 0.35$, $P = 0.0001$), utilization of diabetes-related resources (model $R^2 = 0.15$, $P = 0.0001$), outpatient doctor visits (model $R^2 = .08$, $P = 0.001$), and diabetes duration ($r = 0.11$, $P = 0.04$). When controlling for age and comorbid conditions, it correlated well with aspects of HRQOL that reflect physical function (model $R^2 = 0.23$, $P = 0.0001$). The DCI appears to be a promising method for assessing the effects of T2DM (Fincke,

et al., 2005). A study done by Glasheen and colleagues (2017) showed that poor DM management and the resulting end-organ damage increase hospital admissions, which account for more than 40% of DM-related costs (Glasheen *et al.*, 2017).

Young and colleagues (2008) created the Diabetes Complications and Severity Index This index assists healthcare organizations in better allocating resources for population health improvement and disease management (DCSI)(Young *et al.*, 2008). In the validation procedure, the DCSI performed slightly better than the complications count and appears to be a useful tool for predicting mortality and hospitalization risk .

2.5 Management of T2DM

According to the WHO Package of Essential Noncommunicable (PEN) Disease Interventions (2020), T2DM management is the following (WHO, 2020a):

Treatment options

- A healthy diet to achieve or maintain normal body weight and regular physical activity are the mainstays of diabetes management.
- All patients should be advised on avoidance of tobacco use.
- Management of risk factors.
- Oral hypoglycemic agent for T2BM.
- Metformin can be used as the first-line medicine.
- Other classes of antihyperglycemic agents, are added to metformin if glycemic targets are not met.
- Group education is effective and less costly than individual programs.

Diet and exercise are often insufficient to achieve this goal, and one or more medications may be required. Metformin is a tried-and-true medication that has been used for decades to treat T2DM and is recommended as first-line therapy by the majority of experts. It is inexpensive, safe, effective, and well-tolerated by the majority of people. When metformin fails to control blood sugar adequately, another medication must be added (Samar Hafida, 2020).

2.5.1 Prevention of complications

A. Foot complications

Regular (3-6 months) visual inspection and examination of patient's feet by trained personnel for detecting risk factors for ulceration (assessment of foot sensation, palpation of foot pulses, inspection for any foot deformity, an inspection of footwear).

According to a study by Deborah in 2021, patients with T2DM frequently experience foot problems. In general, you can reduce your risk of diabetes-related complications by maintaining a healthy blood sugar level and visiting your doctor for regular checkups. You can also reduce your chances of developing foot problems by regularly inspecting your feet (Deborah 2021).

A study done by Nather and colleagues in 2018 shows the lifetime risk of developing a foot ulcer is 15%, while the incidence of developing an ulcer in patients with DM may be as high as 25%. Once an ulcer develops, there is a high risk that it leads to amputation below the knee. The most expensive and feared consequence of foot ulcers is limb amputation. Foot ulcers are the cause of 84 % of non-traumatic limb amputations in patients with DM (Nather *et al.*, 2018).

B. Prevention of onset and progression of chronic kidney disease

- Optimal glycemic control.
- Angiotensin-converting enzyme inhibitor for persistent albuminuria.

According to the CDC in 2021, to prevent kidney disease, the patients should maintain blood sugar levels as close to the target range as possible, get HgA1c testing at least twice a year and even more frequently if their medication changes or if they have other health issues, and check blood pressure regularly and keep it under 140/90 mm/Hg (or the target your doctor sets) (CDC, 2021a).

C. Prevention of onset and progression of diabetic retinopathy

- Screening for diabetic retinopathy and referral for laser treatment if indicated.
- Optimal glycemic control and blood pressure control.

According to NIH in 2022, maintaining healthy blood sugar, blood pressure, and cholesterol levels can help reduce your risk of developing diabetic retinopathy or slow its progression. This is often accomplished through healthy lifestyle choices, though some people may require medication (NIH, 2022).

D. Prevention of onset and progression of neuropathy

- Optimal glycemic control.

E. Screening for chronic complications

- Measure blood pressure at every scheduled visit.
- Refer for the dilated-pupil retinal exam upon diagnosis and every 2 years thereafter, or as per ophthalmologist recommendation.
- Examine feet for ulcers at every visit. Refer to higher-level care if an ulcer is present.
- Assess the risk of lower limb amputation annually.
- Test for proteinuria annually.

2.5.2 Management of Acute Complications

A. Severe hypoglycemic or signs (plasma glucose <50 mg/dl or 2.8 mmol/L**)**.

- If conscious, give a sugar-sweetened drink.
- If unconscious give 20-50 ml of 50% glucose (dextrose) IV over 1-3 minutes.
- Sever hyperglycemic or signs and symptoms (plasma glucose >18 mmol/L and urine ketone 2+).
- Set up intravenous drip 0.9% NaCl 1 liter in 2 hours: continue at 1 liter every 4 hours.
- Refer to hospital.

According to WHO, if the patient can swallow, hypoglycemia is treated with carbohydrates or with intravenous administration of hypertonic glucose (WHO, 2020b). DM management is an excellent way to reduce fatigue, bladder problems, and other DM symptoms. Furthermore, controlling DM can lower the chances of developing vision problems, dementia, and other serious medical problems.(Viigimaa *et al.*, 2020; Xue *et al.*, 2019) .Tight control of blood sugars reduces the long-term risks of heart disease and strokes. However, overly tight control can lead to hypoglycemia, memory loss, and dementia (Xue *et al.*, 2019)

2.6 Equipment and supplies

According to Medical News Today, DM supplies are equipment that can help people who have DM. They can use these to plan and maintain their blood glucose levels, and they can also share the results with their doctor or clinic. Such as glucose monitors, Two types of glucose monitors can be used to monitor a person's blood sugar levels: Blood glucose meters and continuous glucose monitors (Fletcher, 2021). Blood glucose meters (BGMs) involve a finger prick test to collect a blood sample to measure a person’s blood

glucose levels. According to WebMD, if other medications and self-care strategies fail to control T2DM, insulin may be required. Insulin injectors: Syringes are the most common types of injectors that people use; pens, which are similar to syringes but allow an individual to inject a specific amount of insulin; and insulin pumps, which provide insulin 24 hours a day via a catheter (Michael Dansinger, 2021).

According to the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), DM should be tested for anyone who exhibits symptoms. Some people may have no symptoms but may have DM risk factors and should be tested. Testing enables healthcare professionals to detect DM earlier and collaborate with their patients to manage DM and prevent complications. To diagnose diabetes, doctors typically use the fasting plasma glucose (FPG) test or the HbA1c test. Doctors may use a random plasma glucose (RPG) test in some cases. As a result, DM patients rely heavily on the availability of these tests and supplies in clinics (NDEI, 2015)

2.7 Services providers

A country's ability to meet its health goals is heavily reliant on the knowledge, skills, motivation, and deployment of those in charge of organizing and delivering health services. Anand and Barnighausen (2007) have found a direct and positive relationship between the number of health workers and population health outcomes. Many countries, however, lack the human resources required to deliver essential health interventions due to a variety of factors such as limited production capacity, migration of health workers within and across countries, a poor skill mix, and demographic imbalances (Anand & Bärnighausen, 2012)

WHO is collaborating with countries and partners to expand the global evidence base on the health workforce, including reaching an agreement on a core set of indicators and a minimum data set for tracking the stock, distribution, and production of health workers (WHO, 2010).

2.8 Drugs

In 2022, Hakim and others showed that it is critical not to overlook the significance of DM medication. Fortunately, the cost of your medications does not have to be an impediment (Hakim *et al.*, 2022). In 2019, Kosonde and Colleagues used the World Health Organization/Health Action International (WHO/HAI) survey methodology to

investigate the availability, price, and affordability of 61 medicines in Bangladeshi health facilities (Kasonde *et al.*, 2019).

Biswas and Colleagues found that only 0.4% of diabetes care facilities had all four service readiness factors (guidelines, trained staff, equipment, and medicine) and the study found that infectious disease medicines and non-essential medicines were more readily available than NCD and essential medicines, and it also mentioned the poor availability of medicines in the public sector (Biswas *et al.*, 2018)

2.9 Physical structure

The first point of contact in the provision of health care is access to health services. It has long been recognized that the elderly, in particular, represent a segment of the population that faces barriers to accessing health units due to a lack of accessibility devices that take into account diagnosed physical and mobility challenges, as well as the inadequacy of physical structures of health units to allow offering a quality service directed to these users' needs. Some results show the majority of the apartments were only one floor high. In terms of physical structures, most health units were either partially or completely inadequate. Similar findings were made regarding signage. In general, the units were primarily inadequate (52.6%) (Neves, 2017).

2.10 Waiting time

Patient satisfaction is important and has been identified as the primary indicator of care quality. It is influenced by the characteristics of patients, health professionals, and clinical practices, including patient waiting for time management (Shalihin SE *et al.*, 2020)

In 2018, a study done by Loh show even with advancements in technological developments in medical care such as organizational empowerment and facility development driven by health organizations and government agencies, patients continue to experience unacceptable levels of waiting time in clinics (Ashok Matcha, 2023)

2.11 Appointment system

A systemic review conducted by Nuti and colleagues (2015) on the effect of improving appointment systems on DM outcomes revealed that minor actions such as phone or letter reminders of DM appointments could improve DM outcomes (Nuti *et al.*, 2015a)

According to Hammad (2019), the focus group interviews revealed that there is a wide variation in the effectiveness of an appointment system between nurses and doctors. For example, a 32-year-old nurse participant stated, "It's very good, approximately 80 % effective," but a 36-year-old doctor participant stated, "It's not good, all patients come on peak time from 9 to 11 am, to do FPG early morning and then they rash to doctors."(Hammad, 2019). Other causes of ineffective appointment systems mentioned by different interviewees include staff rotation and a heavy workload.

2.12 Documentation

Annersten and Colleagues (2011) reported that accurate documentation ensures that Federal health care programs pay the right amount to the diagnosed people—not too much or too little. Also, they reported that good documentation is essential for protecting your patients and it promotes patient safety and care quality (Annersten Gershater *et al.*, 2011). An essential point of documentation is the use of clinical judgment at critical decision points (Gutheil, 2004)

2.13 User-provider interaction

According to Patel and Colleagues (2018), effective communication between pediatric people who have DM and their providers has helped improve patient satisfaction and health outcomes, as well as DM-related self-management (Patel *et al.*, 2018). Also, according to Du Pon and Colleagues (2019), patients with T2DM who receive primary care see their practice nurses regularly (PNs). Patients can better manage their disease by actively participating in medical consultations, improving clinical outcomes and quality of life (Du Pon *et al.*, 2019).

Patients and providers frequently agree on the importance of medication adherence for symptom improvement, the value of a collaborative and responsive relationship between patient and provider, and the importance of effective information communication. The incorporation of patients' perspectives in the clinical relationship, based on a mutual and trusting relationship, broadens the scope of the explanatory model of illness by addressing various 'dysfunctional' states and possible intervention areas to improve adherence (Brundisini *et al.*, 2015a).

2.14 Training

A systemic study demonstrated that training primary care physicians is an effective way to improve standardized DM management by improving primary care physicians' ability

to manage DM in a standardized manner, allowing patients in primary care hospitals to receive a more complete and accurate diagnosis and treatment services (Liu *et al.*, 2022). Also, another study found that DM knowledge significantly improved among primary care doctors after training (Murugesan *et al.*, 2009). Moreover, Vaidya and colleagues (2012) investigated the effect of training on DM management using a computer-based training program. They found that comfort and knowledge are improved, particularly in insulin administration practices (Vaidya *et al.*, 2012). Finally, Van Zyl and Rheeder (2008) found that 80.9% of healthcare providers agreed on the importance of DM management training in their study of DM knowledge and attitudes (van Zyl & Rheeder, 2008) .

2.15 Accessibility

According to Konerding and Colleagues (2020), visits to the DM primary care providers are essential in DM management. As a result, patients should see their DM primary care providers whenever a visit is required. Accessibility (in terms of travel distance, cost, and time to the practice) and service quality (for example, in-practice waiting time and the quality of the provider's communication with the patient) are factors that may influence whether this condition is met (Konerding *et al.*, 2020).

Brundisini and colleagues (2015) investigated chronic disease patients' experiences of accessing medical care in rural and remote areas and found that geographic distance from health services causes access barriers, which are exacerbated by moving issues or climate conditions (Brundisini *et al.*, 2015b)

2.16 Patients satisfaction

Patient satisfaction is an important and widely used indicator of healthcare quality. Clinical outcomes, patient retention, and medical malpractice claims are all influenced by patient satisfaction. It has an impact on the timely, efficient, and patient-centered provision of high-quality health care(Prakash, 2010).

A cross-sectional study in the Gaza Strip by Hammad (2019) showed that participants perceived that UNRWA T2DM services were of good quality (87.43%) and they felt satisfied with its services (84.07 %). The vast majority of participants (99.3%) recommended the UNRWA T2DM services to their friends and relatives, and they continued to receive the T2DM services from UNRWA.

Nicolucci and colleagues (2009) found an inverse relationship between female gender and treatment satisfaction, insulin treatment, perceived frequency of hyperglycemic episodes, and DM complications. Self-monitoring of blood glucose levels, as well as self-management of insulin doses and use of the pen for insulin injections in insulin-treated patients, were associated with higher levels of satisfaction. Finally, higher levels of satisfaction were linked to a more positive perception of physical and psychological well-being (Nicolucci *et al.*, 2009).

Saatci and colleagues (2010) found a statistically significant relationship between treatment satisfaction and scholar level, glycemic control, and compliance to diet and physical exercise in a study to assess psychological well-being and treatment satisfaction in patients with T2DM in primary care (Saatci *et al.*, 2010) .

Patient satisfaction refers to how satisfied patients are with their healthcare both inside and outside of the provider's office. Patient satisfaction, as a measure of care quality, provides providers with information about various aspects of medicine, such as the effectiveness of their care and their level of empathy (Sharma *et al.*, 2023)

2.17 Control status

Plasma glucose control in DM patients can be assessed by measuring glycated hemoglobin (HbA1c), fasting plasma glucose (FPG), and postprandial plasma glucose (PPG). However, HbA1c measurement remains the gold standard for assessing glycemic control at follow-up (Ketema & Kibret, 2015).

HbA1c levels in people without DM should be between 4% and 5.9%. People with DM who have poor glucose control have HbA1c levels above 7%; lowering HbA1c levels by 1% may reduce the risk of microvascular complications (such as diabetic eye, nerve, or kidney disease) by 10% (Davis, 2018)

According to the CDC, it is critical to keep your blood sugar levels as close to normal as possible to help prevent or delay long-term, serious health problems such as heart disease, vision loss, and kidney disease. Maintaining your target range can also help you feel more energized and happier (CDC, 2021b)

Ketema and Kibret (2015), showed that glycemic control in DM is critical to lowering morbidity and mortality. Achieving glycemic control or lowering hyperglycemia

reduces the microvascular and macrovascular complications of diabetes significantly (Ketema & Kibret, 2015).

2.18 Self-management

DM self-management can lower blood sugar levels, mortality risk, healthcare costs, and weight in obese people (Jessica Caporuscio, 2019). According to Sukartini and Colleagues, seven major elements of self-care behaviors predict positive outcomes: healthy eating, physical activity, monitoring, medication adherence, good problem-solving, healthy coping, and risk-reducing behaviors (Sukartini *et al.*, 2023) .

A Quasi-experimental study by Prabawati and Natalia shows the self-care model is an effective program for changing self-care behavior and controlling glycemic control. There are significant differences in DSM Behavior and blood sugar levels in patients with DM after the self-care model intervention (Prabawati & Natalia, 2020).

A study done by Schmitt and collogues in 2013, this study provides preliminary evidence that the DSMQ is a reliable and valid instrument for assessing self-care behaviors related to glycemic control. The questionnaire should be useful for scientific research as well as clinical use in patients with T1DM and T2DM (Schmitt *et al.*, 2013). Aslo, in 2022, another study findings support the DSMQ's good clinometric properties. The tool may be useful for research and clinical practice, as well as for identifying individuals with improvable self-management practices (Schmitt *et al.*, 2022).

DSMQ translated into numerous languages and used in numerous studies, demonstrating its potential value for research and practice. A recent systematic review done by Wee and colleagues identified the DSMQ as one of only three diabetes self-management scales that met the COSMIN (Consensus-based Standards for the Selection of Health Measurement Instruments) guidelines for measurement tools that can be recommended for use and whose results can be trusted (Wee *et al.*, 2021) .

2.19 Patient health-related variable

2.19.1 Lifestyle

A. Nutrition and physical activity

According to a study done by Linda in 2021, many factors influence how well a person's diabetes is managed. You can lower your risk of complications by following your doctor's recommendations for diet, exercise, blood sugar monitoring, and medication

regimens. Dietary changes are usually centered on eating nutritious foods and achieving (and maintaining) a healthy weight. If you use insulin, you may need to be more consistent about what you eat and when you eat it (Delahanty , 2021).

Dietary compound types and quality may be linked to the risk of T2DM, disease progression, and secondary disease. Some studies conducted in Western societies found that a Western dietary structure that included more red meat, processed meat, and refined grains was significantly associated with an increased risk of T2DM (Mambiya *et al.*, 2019).

In different literature, a variety of factors have been linked to microvascular DM complications. These factors can be classified as socio-demographic (age, gender, and marital status), behavioral (obesity, diet), and clinical (glycemic control, diabetes duration, comorbidities (hypertension), and medication) (Seid *et al.*, 2021).

According to the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), when you have diabetes, nutrition and physical activity are critical components of a healthy lifestyle. Following a healthy meal plan and staying active can help you keep your blood glucose level, also known as blood sugar, within your target range, among other benefits (NIH, 2018).

According to the American Diabetes Association (ADA), the development of T2DM is also influenced by lifestyle factors. Obesity often runs in families, and families eating and exercise habits are often similar (ADA, 2022).

According to the CDC, Physical activity also aids in blood sugar control and reduces your risk of heart disease and nerve damage (CDC, 2020).

B. Smoking

In a cross-sectional study done by Hammad and Abu Hamad (2019), the study revealed a statistically significant difference between smokers (26.6%) and nonsmokers (13%) (Hammad O, 2019). Another retrospective cohort study found that HbA1c increased by 0.21% in the first year after quitting smoking and then began to decrease as smoking cessation continued (Lycett et al., 2015). In addition, the CDC reported that people who smoke cigarettes are 30-40% more likely to develop T2DM than those who do not Smokers with diabetes are more likely than nonsmokers to have difficulty with insulin dosing and managing their condition (Smoking and Diabetes, 2022).

2.19.2 Medical history

A study done by Seid and Colleagues shows moreover, that clients with DM with co-morbid hypertension were 3.52 times (AOR = 3.52; 95% CI 2.09–5.95) more likely to acquire microvascular complications than non-hypertensive D and says participants with DM for more than 5 years were four times (AOR = 4.09; 95% CI 2.40–6.96) more likely to have microvascular complications than those with DM for less than 5 years. Furthermore, patients with DM with co-morbid hypertension were 3.52 times more likely (AOR = 3.52; 95% CI 2.09) (Seid *et al.*, 2021).

2.19.3 Genetic factors

T2DM develops as a result of a complex interplay of genetic, environmental, and lifestyle risk factors, according to Piko and Collogues 2021. T2DM develops earlier in people with a higher genetic risk than in people with the same lifestyle and environmental characteristics but a lower genetic risk (Piko *et al.*, 2021).

T2DM is more closely linked to family history and lineage than T1DM, and twin studies have revealed that genetics play a significant role in the development of T2DM. However, environmental factors play a role. If you have a family history of T2DM, it may be difficult to determine whether your diabetes is due to genetics or lifestyle factors according to ADA 2022 (ADA, 2020).

A study done by Mambiya and colleagues shows that T2DM is caused by both environmental and genetic factors (Mambiya *et al.*, 2019).

2.19.4 knowledge, attitude, and practice (KAP)

In across sectional study done by Shawahna and colleagues in 2021, for the first time, the knowledge, attitude, and practice of patients with T2DM regarding their disease were assessed in a cross-sectional study among Palestinian patients. Patients for this study were recruited from various primary healthcare facilities in Palestine's West Bank. In this study, more than half (52.2%) had good knowledge and 58.7% had a positive attitude toward their disease. Only 36.4%, on the other hand, had good practice. The findings of this study revealed gaps in T2DM knowledge, attitude, and practice among patients. According to the findings of this study, 58.7% of the patients had a positive attitude toward their disease. The ability to keep a normal fasting plasma glucose level below 140 mg/dL, postprandial plasma glucose level below 200 mg/dL, HbA1c below

7%, and BMI below 25 kg/m2 were all positively associated with attitude scores. (Shawahna *et al.*, 2021).

A cross-sectional study done by Herath and Collogues says patients who have a good understanding of diabetes and its complications seek proper treatment and care and take control of their health. There is strong evidence that individuals who are educated and diligent in their diabetes self-care achieve better and longer-lasting diabetic control (Herath *et al.*, 2017).

Previous studies on diabetes knowledge, attitude, and practice (KAP) have supported the need for greater awareness of diabetes prevention, diagnosis, and risk factor control (Islam *et al.*, 2015).

2.20 Clients' characteristics and demographic factors

2.20.1 Socioeconomic factors

According to WHO in 2020, Low socioeconomic status is associated with an increased risk of developing cardiovascular disease and diabetes in developed countries. It is expected that the disease gradually spread to the more disadvantaged segments of society.

Many studies have found a link between health and income, with the poorest segments of society being the most vulnerable. Poor people face a greater social disadvantage in terms of chronic disease occurrence and treatment access. They also have lower rates of acceptance of health-promoting behaviors than other segments of society (Benjelloun, 2002).

2.20.2 Demographic factors

According to Hammad's study in the GS, the female study participants were more controlled according to HbA1c level (27.4%), than male study participants (17.4%). A chi-squared test was conducted to examine whether there was a significant difference between study participants' male participants and female participants regarding their controlling status

Piko and Collogue's study shows the age and gender differences between the Case and Hungarian T2DM subpopulations are due to the age category (20–64 years) used in the Hungarian general population sample collection and the subpopulation with normal glucose levels, gender was found to be significantly related to age (Piko *et al.*, 2021).

A study done by Hammad (2019) shows the more controlled study participants according to HbA1c were the participants with less than 12 years of schooling (24.4%), and the less controlled study participants according to HbA1c were the participants with 12 years and above of schooling (22.9%)

Chapter Three

Conceptual Framework

3.1 Conceptual Framework

This study's conceptual framework was based on the Donabedian Model quality of care framework. It links the structure, the process, and the output/outcomes through program evaluation theory and the six WHO building blocks framework (Donabedian, 1988).

The study framework's main domains are structure, process, and outcomes, which demonstrate linear and interlocking relationships. Aside from the main domains, many other factors have an impact (Donabedian, 1988). Therefore, this study framework is presented in Figure (3.1). In the following sections, this model will be explained.

3.2 Inputs/structure

Input/structure for T2DM management includes the primary demands for the proper delivery of T2DM services. These factors influence how physicians and patients behave in a healthcare system and are indicators of the overall quality of care in a facility or system. The structure is frequently easy to observe and measure, and it may be the source of problems found in the process Equipment and Supplies, providers' factors, guidelines and standards, drugs, and physical structure are all examples of input/structure. Therefore, a proper structure in T2DM services decides if follow-up patients to control T2DM complications are properly done or not (Minesh Khatri, 2022).

3.2.1 Equipment and Supplies

Examining the availability of ready-to-use/off-the-shelf devices is an important factor for diabetes management. To follow patients with T2DM, blood glucose levels are monitored and controlled using diabetic equipment and supplies such as glucometers, Insulin, Pumps, Blood Sugar Meters, Blood Lances, T2DM test Strips, Glucose Tablets, and Glucagon. In addition, the availability of laboratory testing such as HbA1C is necessary too. Also, the availability of ophthalmologist services, foot examination, etc. must be available to follow- up on any potential complications the patient may have (Dansinger, 2021).

3.2.2 Services Providers'

Several factors play an important role in T2DM providers: numbers, distributions, qualifications, skills, and whether or not they are well-paid, as well as whether or not the profession is regulated by the state and aligned with health professionals (Hammad, 2019).

3.2.3 Guidelines and Standards

Diabetes guidelines (follow-up and treatment) are used by MOH healthcare workers to follow up with patients with T2DM WHO (2020a)These guidelines are important to ensure that treatment decisions are made on time, align T2DM management approaches with the Chronic Care Model, and assess DM healthcare maintenance using reliable and relevant data metrics to improve care processes and health outcomes while keeping care costs in mind (Of & Carediabetes, 2022). Thus, the researcher examined if these guidelines are used at the PHC. Also, to determine if the healthcare professional received any training, or at least knows about it. Therefore, assessing participant's knowledge use and training on this guideline affects the quality of services provided for these patients with T2DM.

3.2.4 Drugs

The availability of appropriate and high-quality T2DM medicine, as well as whether the amount of medicine available covers all patients without a shortage during the specified period is shown to affect T2DM management (Biswas *et al.*, 2018) .

3.1.5 Physical structure

This is important for any patient, it involves a comfortable shape clinic for patients as well as the presence of good facilities within them, as well as a design that ensures the comfort of patients in quickly reaching the service, particularly elderly patients and those with disability (Neves, 2017).

3.3 Process

The process refers to the conversion actions that comprise healthcare, how care is delivered, or interpersonal processes, all of which encompass how care is delivered. Donabedian Model claims that measuring the process is fairly comparable to measuring the quality of care because the process encompasses all acts of healthcare delivery. Access, waiting time, guidelines/protocols, the appointment system,

records/documentation, follow-up, and user-provider interaction are all processes.

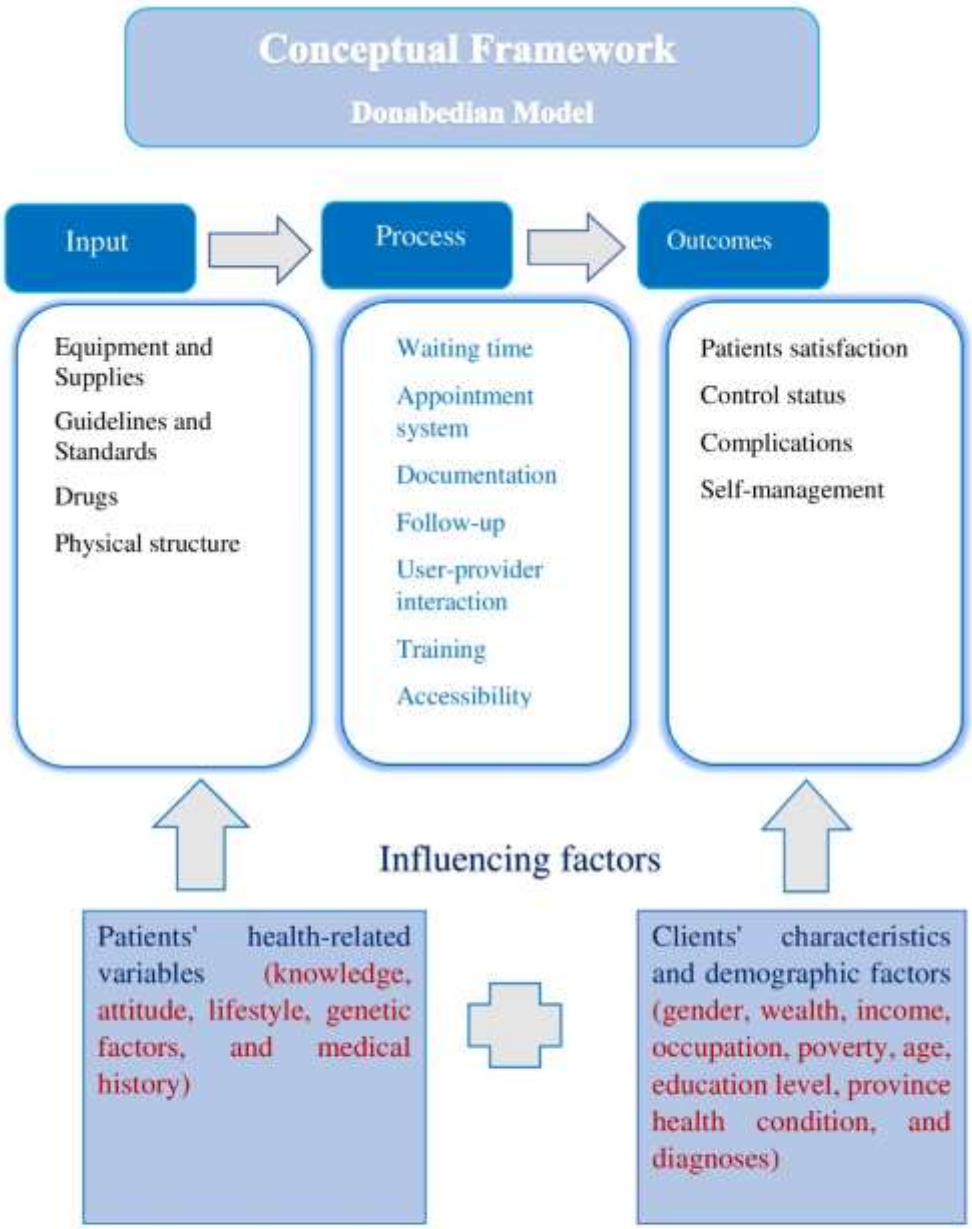

Figure (2.1): Conceptual Framework

3.3.1 Waiting time

It is essential to provide the T2DM service on time to ensure that the instructions are followed, that there are no complications, and that diabetes control and long-term holistic care and treatment. Given the number of services they receive from registration to assessment at each visit, in addition, there is a waiting period during visits and sessions at the facility. The waiting time is closely related to patient satisfaction and thus the quality of services provided (Shalihin et al., 2020).

3.3.2 Follow-up services

Follow-up is required at agreed-upon intervals to review outcomes, and it includes various types of tests and processes to monitor the T2DM patient's general situation, such as fasting blood glucose, which provides a real but temporary picture of the level of glucose, whereas HbA1c provides a picture of the blood sugar in the previous three months. Follow-up improves outcomes and is a critical component of service delivery (Hammad, 2019).

3.3.3 Appointment system

To ensure that the patient isn't left behind, the appointment system ensures attendance and compliance with the scheduled appointment. An appointment to evaluate and receive each service on the date and time specified (Nuti *et al.*, 2015b).

3.3.4 Records/documentation

System for documentation to monitor patient progress and follow-up, written and documented in-patient files, and check to see if all appointments are recorded. Also, whether clinical records are kept secure was evaluated. The researcher determines whether or not a communication system exists between the user and the diabetes provider (Health, 2016).

3.3.5 User-provider interaction

It refers to how patients and providers communicate with one another. If the provider respects the patients and introduces himself to them. If everyone agrees on the goals and everyone commits to the treatments. If patients' dignity, confidentiality, and privacy are respected, as well as communication style and staff awareness of their roles. If staff

provide accurate information about the management process, such as instructions, advice, plans, and a path (Johnson, 2019).

3.3.6 Training

Indicates whether healthcare providers in T2DM care services receive regular training on how to deal with patients and provide effective support and care. It also includes patient training and regular self-care training on the management of T2DM from PHCs (Liu *et al.*, 2022).

3.3.7 Accessibility

Accessibility to healthcare services refers to the ability to visit a healthcare facility and obtain the necessary services and information. Access to information, financial access and affordability of service, physical access, availability of skilled health providers, and finally access to medication (availability of drugs, proper drug dispensing, and accurate labeling) are all factors (Neves, 2017).

3.4 Outcomes

Inputs and processes influence output and outcomes. The effects of T2DM service on the patient's satisfaction, self-management, DM complications severity, and control status are indicated as outcomes.

3.4.1 Patients satisfaction

The researcher investigates patient satisfaction with services, as well as patient experience with the services provided, including appointment, waiting, management pathway, staff interaction, responsiveness of the service, and patient involvement Al Anazi et al., 2019; Saatci et al., 2010).

3.4.2 Control status

Measured by HbA1c, it is considered the most reliable, and sensitive indicator related to control status, complications, and mortality caused by T2DM. For people with T2DM, the target HbA1c value is 7%. If the HbA1c level is equal to or below, he is on the right track in managing diabetes. If the level of HbA1c is higher than that, there is control (Davis, 2018).

3.4.3 Self-management

Patients need to be offered a full package of knowledge and awareness about DM, which includes the early signs of hypo and hyperglycemia, treatment options, diet, exercise,

follow-up, and others. After this, they are taught and trained on how to deal with the disease on their own while they are at home. Through DM self-management education and programs in clinics. These programs provide both education and ongoing support to control and manage DM (Alaofè *et al.*, 2022). We used the self-management diabetes mellitus questionnaire (SMDQ) to measure T2DM self-management.

Response analysis resulted in the identification of 16 items that comprised the final scale for full psychometric assessment. In terms of what is considered effective self-care, seven of these items are phrased positively and nine are phrased negatively. The questionnaire allows you to calculate a 'Sum Scale' score as well as estimate four subscale scores. The subscales were labeled 'Glucose Management' (items 1, 4, 6, 10, 12), 'Dietary Control' (items 2, 5, 9, 13), 'Physical Activity' (items 8, 11, 15), and 'Health-Care Use' (items 3, 7, 14) based on their contents. One item (16) requests an overall rating of self-care and is to be included in the ‘Sum Scale’ only.

3.4.4 Complications

The utilization rate of complications screening reflects directly the prevention measures for T2DM complications, which have an immense benefit on the client's future well-being. HbA1c was used because it was thought to be the most reliable and sensitive indicator of complications such as retinopathy, neuropathy, kidney disease, heart disease, and mortality caused by T2DM.

3.4.4.1 Complications Index

The diabetes complications severity index (DCSI) was used because it was thought to be the most reliable and sensitive indicator of complications severity such as retinopathy, neuropathy, nephropathy, peripheral vascular disease (PVD), cerebrovascular, cardiovascular, and metabolic caused by T2DM. The DCI and patients' perceptions of how much diabetes had affected their health were substantially correlated ($r = 0.35$, $P = .0001$) (Fincke, Clark, Linzer, Iii, *et al.*, 2005).

3.5 Influencing factors

3.5.1 Patient health-related variable

The medical history, genetic factors, and lifestyle of T2DM patients such as nutrition and diet, physical activity, and tobacco use affect the nature of services needed.

Knowledge, attitudes, and practices (KAP) refer to T2DM patients' understanding of DM management and self-care guidelines and recommendations (ADA, 2022).

3.5.2 Clients' characteristics and demographic factors

Socioeconomic status can affect opportunities for individuals to improve their health. This include wealth, income, occupation, and poverty. Other factors that might influence the service such as demographic characteristics of T2DM users: such as age, sex, education level, diagnosis, medical and health condition, and any associated illness (Seid *et al.*, 2021).

Chapter Four

Methodology

4.1 Study design

The design of this study has been was a descriptive cross-sectional design evaluative mixed method, combining both, quantitative and qualitative methods. Triangulation, which combines quantitative and qualitative methods, is preferred because the results of one method can be compared to the results of the other method, increasing the validity (Kajamaa *et al.*, 2020)It has been to assess T2DM services at PHC of the MoH in the GS and describe the practice and its relationship to other variables.

The qualitative part was a Phenomenological research design. A phenomenological study investigates what people experience and focuses on their encounter with

4.2 Study population

T2DM patients

The study population consisted of T2DM clients who are registered at PHC for MoH centers in the GS and their files. At the end of the year 2020, the total number of T2DM with diabetes registered among PHCs for MoH in GS is 10154 according to annual reports for PHCs in the GS (PHIC-MoH 2020-2021). They are all receiving NCD healthcare services in 52 clinics located all across the GS.

Health care providers

The study consisted of healthcare providers for T2DM care (nurses and physicians) who are registered at PHCs for MoH in the GS. At the end year of 2022, the total number of nurses in PHCS for MoH in the GS is 434, and the number of physicians is 252 according to annual reports for PHCs in the GS (MoHb, 2023).

4.3 Sample Size

For Quantitative data: The number of patients with T2DM registered in PHCs for MoH in the GS field is 10154 in the year 2021. Using the EPI tools program, the sample calculation formula yielded 370 using the following parameters: confidence interval 95% and precision level 95%, estimated %age level of the dependent variable 50%, and study population of 10,154. Hence, the researcher is going to select 380 participants and it was increased to 400 clients to compensate non-respondents, as in Annex (1).

In the qualitative study, 16 individuals were interviewed and discussions were held in total. A non-probability purposive sample of physicians and nurses working with T2DM patients from the 8 health centers be invited to participate in individual interview discussions. Participants range in age, come from various clinics, and females and males mixed.

4.4 Study setting

The services are provided at PHCS at different levels. Table (4.1).

Table (4.1): Distribution of PHC Levels for MoH

Location	Number of centers	Number of level four center	Number of level three center	Number of level two center
North area	9	1	5	3
Gaza city	14	5	4	5
Middle area	15	1	2	12
South area	14	3	4	7
Total	52	10	15	27

4.5 Sampling Method

According to Table 3.1, we selected from each region (North area, Gaza City, Middle area, and South area) 8 PHC from different levels. Therefore, 8 PHCs have been included in the study. In each area, a random sample of PHC clinic levels had been selected. It is important to note that the eight centers vary in size, ranging from relatively small to significantly large. According to the total number of active NCD files in the selected HC, a proportionate sample size had been collected from large PHCs and small to medium PHCs. Such diversity in terms of health center location and size ensures a high diversity of sample size and more representations of the study sample.

Similarly, in the second stage, the researcher has selected patients with DM receiving care in these health centers via convenient sampling from daily assigned patients, with every patient invited to participate in the study (Based on each health center's daily target of the number of participants and average PHC daily NCD appointments).

For qualitative data, we used a non-probability purposing sampling technique. Because we need to understand and know the current practices, and suggestions for improving DM services provided at MoH centers from the perspective of healthcare providers.

4.5.1 Eligibility Criteria--quantitative part

4.5.1.1 Inclusion

- T2DM clients, who have been utilizing T2DM health care services for at least 1 year.

4.5.1.2 Exclusion

- T1DM, visiting the health centers to receive other health care services.
- T2DM, who have been utilizing diabetes health care services for less than 1 year.

4.5.2 Eligibility Criteria—Qualitative part

4.5.2.1 Inclusion

- The T2DM health care providers include physicians, and nurses, working in study locations.

4.5.2.2 Exclusion

- Other healthcare providers who are not working directly with T2DM clients like midwives, senior staff nurses, and senior medical officers.

4.6 Study Period

The study consumed around 1 year or more; it started in July 2022 and was completed September in 2023. Annex (2) describes the activities of the research and the expected duration for each activity.

4.7 Study Instruments

4.7.1 Quantitative Component

1-Questionnaire: The quantitative data was collected using a well-interviewed questionnaire, with the majority of questions being closed-ended. The questionnaire was designed with the concepts mentioned in the conceptual framework in mind and parts of the questionnaire were adapted from ready-made and pre-arbitrated questionnaires. The questionnaire include the following items:

1. **Patient's health-related variable:** medical history, lifestyle, and KAP (KAP part was taken from pre-arbitrated questionnaires).

The knowledge questionnaire was adapted from Le and Collagenous' study in 2021 (Le et al., 2021) Practices and Attitude questionnaires were adapted from Ghannadi and Collagenous in 2016

2. **Client's characteristics and demographic factors:** Socioeconomic status include education level, wealth, income, occupation, and poverty. Demographic characteristics of DM patients: such as age, sex, education level, diagnosis, medical and health condition, and any associated illness.
3. **Client's satisfaction with the provided services.**
4. **Self-management for DM and training and education for this:** Testing blood sugar, engaging in regular exercise, taking medications as prescribed, and monitoring other signs or symptoms caused by DM and self-management for T2DM patients**.**

The self-management for patients measured by the Self-Management Diabetes Questionnaire (SMDQ) is adapted from Schmitt and Collagenous (2013) (Schmitt et al., 2013).

5. **Control status and DM complications for patients with T2DM.**

In this section, the Diabetes Complication Index (DCI) was measured. The DCI questionnaire was adapted from Ghandour and Collagenous (2018) (Ghandour et al., 2018).

6. **Availability of drugs, all tests and equipment inside the clinics, and Follow-up activities done for patients with T2DM.**
7. **Accessibility to go to clinics and physical structure for these clinics.**

In addition, the contact time for nursing and physician stations for each client was observed by the data collectors and measured, as the waiting time for all health center stations (nursing, physician, laboratory, pharmacy). Finally, the total time spent by patients with T2DM2 in the health center was observed and calculated.

3.7.2 Qualitative Component

We conducted individual interviews with nurses and physicians with T2DM from the randomly selected PHCs for MoH. The qualitative method was used to collect, review, and comprehend the data. There were guiding questions. The guiding questions covered various issues such as provider training, barriers to utilization of T2DM services, and ways to improve T2DM services at PHCs for MoH. This included individual discussions with DM care providers to discuss their perspectives on the quality of DM services and, finally, methods used to reduce complications, mortality, and morbidity in T2DM patients.

4.8 Ethical Considerations:

1. The School of Public Health at Al-Quds University academic approval of the study proposal was obtained first.
2. An ethical approval was obtained from the Helsinki Committee. Annex (2).
3. An administrative approval of MOH was obtained before fieldwork.
4. Before filling out the questionnaire, participants provided written informed consent, they were informed about all data extracted for this study and its objectives, and the stud did was not pose any physical, social, psychological, or financial risks to them.
5. The questionnaires were confidential. The identity and extracted data of participants were as kept confidential and private.
6. The importance of voluntary participation was emphasized, and they were able to withdraw at any time without penalty.
7. Participants in focus group discussions were asked to consent to the recording of focus group interviews.

4.9 Pilot Study

A pilot study was conducted before the actual data collection. This stage aims to investigate the suitability of the study tools. One health facility provided 25 participants. The pilot participants were excluded from the study sample. Accordingly, following the piloting, any necessary changes were made to the questionnaire.

4.10 Data Collection

The researcher and her two assistants collected the data, which took nearly three months to complete. Records of patients were revised to complete data collection. Simultaneously, the assistant was trained on how to choose the sample and ask the questions. All individual discussions were led by the researcher.

4.11 Reliability

Two assistants were hired to assist the researcher in data collection. The researcher was training the assistants to ensure reliable data collection, and the assistant was trained on how to select participants, ask questions, and finally, fill out questionnaires. The researcher was used to check and review each questionnaire completed by the assistant daily.

5% of the collected data was re-entered by the researcher. To demonstrate appropriate item clustering, data were checked for internal consistency of its domains. Cronbach's alpha, the standard statistical technique for assessing the coherency of each item within each domain, was used to assess each domain individually (Table 3.2).

Table (4.2): Cronbach alpha coefficient for perceived attitude, self-management, and satisfaction domains

Scale	Cronbach's Alpha
Attitude	0.708
Self-Management	0.871
Satisfaction	0.921

4.12 Validity

4.12.1 Face and Content validity

The researcher organized the questionnaire so that readers can easily read it. The design and structure of the questionnaire would be appealing, and the format was as successful as possible. The questionnaire and checklist was evaluated by 5 experts (Annex 3) to determine its relevance, and their feedback be considered.

4.13.2 For qualitative part

The following steps were taken to ensure the reliability of the qualitative portion of this study. First, we distributed the interview protocol to five experts to ensure that it covered all the necessary dimensions. Following that, a member check was be performed to

ensure the accuracy and transparency of the transcripts used during the interviews. Prolonged engagement occurred as the researcher attempted to probe for answers and properly cover all interview dimensions. Furthermore, recording the interviews would aid in fact-checking and re-checking the accuracy of the texts.

4.13 Data Entry and Analysis

4.14.1 For Quantitative Data

For data entry and analysis, the researcher used the Statistical Package for Social Science (SPSS) program. SPSS version 26 was used to enter and analyze data. The quantitative data was described using mean, standard deviation, and range. And the qualitative data was described using frequency, and percentage. Data was presented using frequency tables and bar charts. Cross-tabulation was used for the main finding, and bi-variate statistical tests such as the Chi-square test, correlation and t-tests or one-way ANOVA to investigate the relationships between the different variables and their differences. When fulfillment conditions such as gender, availability of drugs, and lifestyle with control status are met, the Chi-square test was used to compare two or more percentages. An independent t-test was used to compare the averages of two independent samples, such as the average duration of T2DM between the controlled and uncontrolled groups of participants. The one-way ANOVA was used to compare the means of three or more groups based on a single independent variable, such as comparing the mean Gaza governorate according to HgA1c of different demographic groups. For all significant tests, a probability of 0.05 was used as a cut-off point.

3.14.2 For Qualitative Data

To achieve the objectives through qualitative research methodology, individual interviews were recorded, transcribed, and entered into open-ended manner. The data was analyzed based on the content of the participants' perspectives, opinions, and experiences. The data was examined in an open-ended manner so that the respondents' voices could be heard. The categorizing process in thematic analysis was used to conduct the analysis.

3.14 Limitations of the study

1. The researcher is not employed by the Ministry of Health, but the research has been conducted at MoH PHCs, which may present some challenges.

2. Because of the differences in protocols and operational definitions of NCD programs, as well as the lack of standardization of collected data and health information systems, comparing the results of this study with the previous study conducted at UNRWA in 2019 consequently,
3. Limited literature resources, such as books and journals.
4. Difficulties in data collection due to a variety of factors, including a low response rate to the questionnaire and reluctance to participate in the individual interview discussion.

Chapter Five

Results and Discussion

5.1 Introduction

This chapter illustrates the main findings of the quantitative and qualitative data. The results of the statistical data analysis involve a descriptive analysis that presents the socio-demographic characteristics of the study sample and answers to the study's questions. This chapter discusses the qualitative and quantitative findings in light of previous research studies. The findings and discussion are presented in the following order: inputs, processes, outputs, and patients' health-related variables.

5.2 Descriptive analysis

5.2.1 Participants' demographic and health characteristics

Table (5.1): Distribution of the study participants according to their demographic characteristics

Items	Number	%
Gender		
▪ Male	161	40.3
▪ Female	239	59.8
Total	**400**	**100.0**
Age		
▪ 55 years and less	93	23.3
▪ 56 to 60 years	95	23.8
▪ 61 to 69 years	138	24.5
▪ 70 and above	74	18.5
Total	400	100.0
Mean = 60.91, Median = 61.00, SD ± 9.23		
Education		
▪ Primary	77	19.3
▪ Preparatory	104	26.0
▪ Secondary	119	29.8
▪ University and above	55	13.8
▪ Illiteracy	45	11.3
Total	**400**	**100.0**
Marital Status		
▪ Married	314	78.5
▪ Not Married	86	21.5
Total	**400**	**100.0**
Work		
▪ Yes	57	14.2
▪ No	304	76.0

▪ Retired	39	9.8
Total	**400**	**100.0**
If working, Type of Work		
▪ Employee	44	77.2
▪ Worker	8	14.0
▪ Skilled worker	4	7.0
▪ Other	1	1.8
Total	**57**	**100.0**
Income		
▪ 500 NIC and Less	143	35.8
▪ From 501 to 999 NIC	64	16.0
▪ 1000 NIC	80	20.0
▪ Above 1000	113	28.2
Total	**400**	**100.0**
Mean:1019.92, Median:900.0, SD ± 1162.21		

According to Table 5.1, 40% were from the Gaza governorate, and the South Gaza governorates (Rafah and Khan Younes) accounted for 35% of the study participants.

Table 5.1 shows that the mean age of the study participants was 60.91 years (SD ± 9.23). This finding was consistent with the annual health report for MoH (2022), which showed that DM had the highest prevalence among people aged 60 and up (MoH, 2023). Also, more than half of the study participants were females (59.8%). This is consistent with the findings of an annual health report (2023), in which male clients constitute 43% of all DM patients utilizing health services and female clients constitute 57% (MoH, 2023).

Table (5.1) shows that more than two-thirds of study participants (78.5%) were married at the time of data collection. This finding is consistent with the findings of Hammad's study in 2019 in UNRWA PHC in the GS, which found that More than two-thirds of the study participants were married at the time of data collection (84.1%) (Hammad,2019), 86.2% of the study participants were high school graduates or less, and more than two-thirds of the study participants (79%) were unemployed at the time of data collection. Also, the average median monthly income was 900 New Israeli Shekels (NIS) (SD ± 1162 NIS). The study's findings are consistent with Gaza's economy generally declining. The high rates of poverty may put clients' ability to pay for essential medical care and necessities at risk.

When employment status was stratified by gender, 10.3% of men were employed at the time of data collection, compared to 4% of females. In contrast, nearly one-third of the male study participants (28%) were unemployed, compared to 72.1% of unemployed

women. That is consistent with the findings of the PCBS as the current unemployment rate is about 78% among Females in the GS (PCBS, 2017). This also reflects that the low participation rate of women in the labor market (19%) in Palestine, as reported by the PCBS (PCBS, 2018).

5.2.2 Family history, lifestyle factors, and health-related variables

Table (5.2): Distribution of the study participants according to their patient health-related variable

Family history of diabetes in the family?		
▪ Yes	264	66.0
▪ No	136	34.0
Total	**400**	**100.0**
If Yes what is the relative (n = 264)		
▪ First Degree	256	97.0
▪ Second Degree	9	3.4
Smoking		
▪ Yes	35	8.8
▪ No	330	82.5
▪ Quite smoking	35	8.8
Total	**400**	**100.0**
Number of cigarettes		
▪ Less than 5	19	54.3
▪ 5 and more	16	45.7
Total	**35**	**100.0**
Mean = 4.74, Median = 4.00, SD ± 2.704		
If leaving smoking since when		
▪ 3 years and less	54.3	54.3
▪ 4 to 5 Years	28.6	28.6
▪ Above 5 Years	6	17.1
Total	**35**	**100.0**
Mean = 5.34, Median = 3.00, SD ± 5.92		
Exercise for T2DM?		
▪ Yes	219	54.8
▪ No	181	45.2
Total	**400**	**100.0**
If yes, How many times a week		
▪ 3 and less	91	41.6
▪ From 4 to 6	64	29.2
▪ 7 times	64	29.2
Total	**219**	**100.0**
Mean = 4.52, Median = 4.00, SD ± 1.91		
Specific program to control your diet? '		
▪ Yes	232	58.0

▪ No	168	42.0
Total	**400**	**100.0**
Years of diagnosis with T2DM		
▪ 5 years and less	131	32.8
▪ 6 to 10 Years	145	36.3
▪ Above 10 Years	124	31.0
Total	**400**	**100.0**
Co-morbidities		
▪ Yes	255	63.7
▪ No	145	36.3
Total	**400.0**	**100.0**
Specification of other chronic diseases (n = 255)		
▪ Hypertension	229	89.8
▪ Kidney problem	24	9.4
▪ Heart disease	54	21.2
▪ Asthma	6	2.3
▪ Dyslipidemia	9	3.4
▪ Other (Nerve, Thyroid, Hearing)	11	4.3

As shown in Table 5.2, nearly two-thirds of the study participants (66%) had a family history of DM in the family, and 97% of them had first-degree a family history. These findings are also consistent with Scott and colleagues (2013) say individuals with a first-degree family member's history of diabetes were more likely to develop T2DM and a 2.5-fold increase in the risk of developing T2DM was linked to having even one family member with the disease (Scott *et al.*, 2013).

Another study in China, patients with early-onset T2DM typically have a more pronounced family history of the disease, according to Hao and colleagues in 2022 (Hao *et al.*, 2022).

Moreover, 54.8% of the study participants have been regularly exercising for a week, 41.6% regularly exercise 3 or fewer times per week, and 45.2% did not exercise and do not intend to do so in the coming weeks. 42% of participants did not do anything in particular to control their weight and healthy diet, and 58% of study participants tried to lose weight and control their healthy diet, but only 8.8% (8.3% males, 0.5% females) of study participants smoked at the time of data collection.

In addition, the mean duration of being diagnosed with T2DM was 9.5 years (SD ± 6.67), and 36.3% had diabetes for 6 to 10 years. These results were almost the same as Hammad's (2019) study results which revealed that the mean DM duration was 8.88 years (Hammad, 2019), and results with AL-Qedra's (2018) study results which revealed

that the mean DM duration was 8.45 years (Al-Qedra E, 2018) Of the study participants, 63.7% have co-morbidities in addition to T2DM (high blood pressure, 89.8%, 21.2% heart disease, 9.4% kidney disease) (Table 5.2). About 75% of adults with diabetes mellitus also have hypertension, and patients who only have hypertension frequently exhibit signs of insulin resistance (Long & Dagogo-Jack, 2011) . Accordingly, there are many underlying risk factors and complications that are similar to hypertension and diabetes mellitus (DM) such as ethnicity, familial history, dyslipidemia, and lifestyle factors (Long & Dagogo-Jack, 2011). Type 2 diabetes mellitus (T2DM) has been linked to an increased risk of hypertension and vice versa, according to observational studies conducted in 2019 by Sun and colleagues (Sun *et al.*, 2019)

5.2.3 Knowledge, Attitude, and Practices (KAP) of Participants

Table (5.3): Distribution of the study participants according to KAP score-how you got this score

			Total	Low		Moderate to high			
Items	**Mean**	**SD**	**Median**	**Num.**	**%**	**Num.**		**%**	
Knowledge	58.74	8.25	59.09	247	61.8	153		38.3	
Practices	52.03	15.98	50.00	317	79.3	83		20.8	
				Low		**moderate**		**High**	
Attitudes	25.05	7.4	27.0	134	33.5	139	34.8	127	31.8

All patients completed the KAP questionnaire, and the average score was low (47.08, SD ± 12.81). In knowledge, the mean of correct answers was only 58.74 (SD ± 8.25). However, it is worth noting that some questions reveal a significant gap in DM knowledge. Despite this, some of the knowledge questions, such as "How many types of T2DM are there (72.3%)?" and What exactly is T2DM are there 64.5%? had a high patient rate. KAP tool Annex (4).

The knowledge score was low, as shown by Le et. Al. indicating that the KAP questionnaire was completed by all patients and the average score was low (50.057, SD ± 10.644). Their knowledge score was particularly low (30.04, SD ± 12.8), in comparison to the number of studies that have reported that patients with T2DM generally have good knowledge about the disease. One such study conducted in 2023 by Almousa and colleagues found that patients with T2DM demonstrated positive

behavior, a high degree of knowledge, and good practice adherence (Almousa *et al.*, 2023) . This finding may indicate that study participants had low knowledge about DM. And Hammad's study in 2019 shows, the mean of correct answers in knowledge was 76.87 % with (SD 12.6). This may reflect a good level of knowledge about DM by study participants (Hammad,2019), which was 61.8%, and those who obtained a moderate to high knowledge score was 38.3%(N. K. Le *et al.*, 2021) In contrast, their attitude score was moderate (25.05, SD ±7.40), and the study participants were classified with a low attitude score was 33.8%, in contrast, the study participants who obtained a high attitude score were 31.8% (Table 5.3). These results reflect an attitude gap when compared to the Le and colleagues' study in 2021, showing the diabetics' attitude toward their score was classified as moderate (61.544 ± 29.99) (N. K. Le *et al.*, 2021) Furthermore, as shown in Table (5.3), the practice score was low at 52.03 (SD 15.98), with more than two-thirds of the study participants obtaining a low level of practice score (79.3%), while 20.8% obtained a moderate to a high level of practice score. This illustrates the relationship between knowledge and practice. Lack of understanding of the value of exercise, a lack of suitable exercise facilities, the inability to pay for gymnastics, and possibly cultural restrictions are some of the reasons for this low.

A cross sectional study done by Shawahna and colleagues in 2021 shows the median scores for knowledge, attitude, and practice were 6.0/13.0 (4.5/13.0, 7.5/13.0), 3.0/4.0 (2.0/4.0, 4.0/4.0), and 3.0 (1.0/5.0, 4.0/5.0). Higher knowledge scores were substantially correlated with a university education (p-value = 0.001). Furthermore, a moderate correlation was found between attending a diabetes education program and higher practice scores (p-value = 0.026). (Shawahna *et al.*, 2021)

Le and colleagues divide KAP scores into three categories (tertiles) : low (less than 60% of total points), moderate (60-79% of total points), and high (80% of total points)Biswas et al. (2018; NghiepKe Le *et al.*, 2021a). In our study, we used this cutoff point in the knowledge and practice scores. However, because the number of study participants who received a high score was so small, they were combined with those who received a moderate score. The attitude score was divided into tertiles. The three tertiles were: low (equal or less than 22.8% of total points), moderate (22.9-28% of total points), and high (more than 28% of total points).

5.3 Inputs/structure

5.3.1 Equipment and Supplies

DM health services are always available and meet patients' needs at PHCS for MoH, according to the vast majority of study participants (82.8%). On the contrary, only 17.3% reported that health services were available and met needs only occasionally or not at all. Furthermore, 41.8% of study participants believe that DM services met their expectations, these findings are bad in comparison to those of Hammad's study in 2019 for UNRWA centers, 95.8% of research participants said that the diabetic services they received were satisfactory and met their expectation (Hammad,2019). 56% believe that DM services met their expectations to some extent, and only 2.3% believe that services did not meet their expectations.

The DM services and patients' needs include the following: for patients with DM, blood glucose levels are monitored and controlled using DM equipment and supplies such as glucometers, insulin, insulin pumps, blood sugar meters, blood lancets, DM test strips, glucose tablets, and glucagon.

Providing medication, as reported by 85.5% of study participants, was the most frequent need and challenge to receiving DM health services in MoH health centers, followed by blood sugar regulation, as reported by 37% of study participants, and providing the necessary analyses, as reported by 29.8% of study participants, as shown in Figure (5.1).

According to individual interviews, there is widespread agreement that there is a general lack of equipment and supplies for follow-up care for DM patients. A 52-year-old doctor stated that only *10% of DM patients are served by the available medical equipment.* "When asked why patients did not adhere to follow-up, one of the main reasons given was a lack of all the care requirements for them, including supplies and medicines.

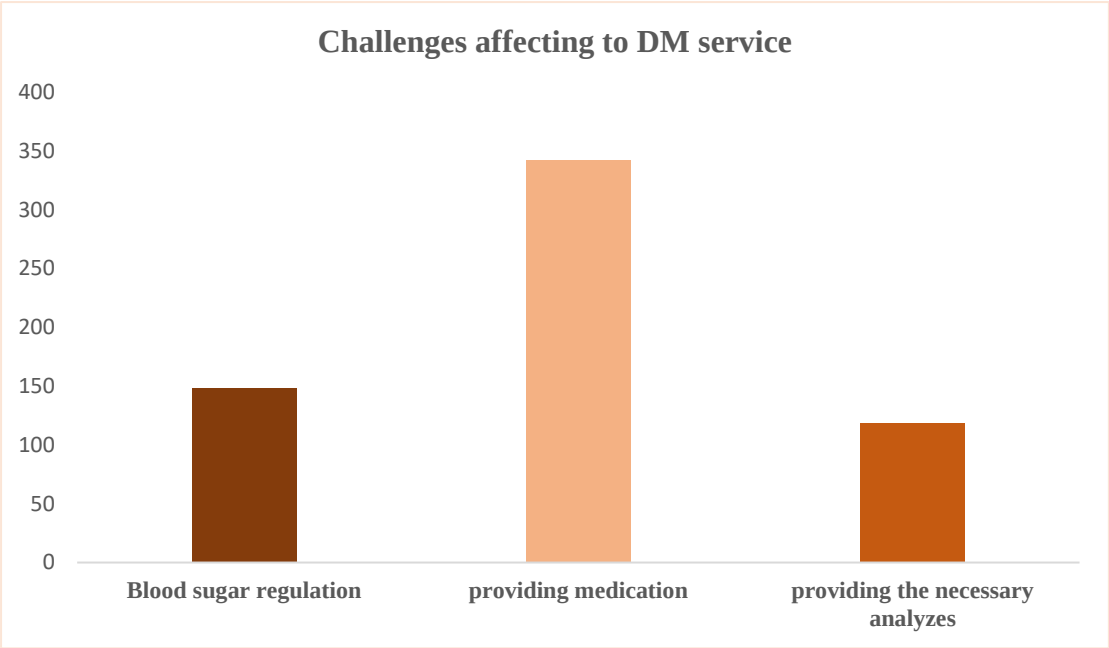

Figure (5.1): Challenges affecting DM health service equipment

5.3.2 Services Providers

According to individual interviews, nearly all participants stated that they have the necessary knowledge and skills to serve DM patients, but a 56-year-old physician stated that "*nurses need to learn how to manage and follow up DM clients, as well as how to deal with DM complications, and train for the true measurement of hypertension*." Another 32-year-old nurse stated, "*The overload prevents us from applying our knowledge and skills*," which reflects the effect of overload on DM patient management.

According to the findings of individual interviews, the number of medical staff present in clinics to follow up on T2DM patients is adequate and proportionate to the number of patients being followed, as well as their distribution within departments.

72.3% of study participants are pleased with how medical staff responds to their inquiries and questions, and 9.3% are extremely pleased with medical staff knowledge. 80.3% of study participants are satisfied with how to teach and explain the disease to medical staff, and 80.5% are satisfied with the medical staff's efficiency in providing health care. These results are constants with the Anazi and colleagues' study in 2019 say, the diabetic centers in Arar, Saudi Arabia, received positive feedback from two-

thirds of their patients regarding their level of satisfaction and the offered service Anazi et al., 2019).

5.3.3 Drugs

The most frequent barrier to receiving DM health services in PHCS for MoH was the unavailability of medicines, as indicated by 97.2% of the study participants, according to Table (5.7), This is among the main causes of patients with T2DM missing follow-up appointments at primary healthcare centers in MoH. Biswas and colleagues (2018), reported that the availability of appropriate and high-quality DM medicine, as well as whether the amount of medicine available covers all patients without a shortage during the specified period is shown to affect T2DM management Biswas et al. (2018) .

According to individual interviews, when asked by the health providers why patients did not adhere to follow-up, one of the main reasons given was a lack of all care requirements for them, medicine, in particular, is not always readily available. A 46-year-old doctor stated, " *One of the main factors that motivates patients to attend follow-up appointments and also drives them out of the service center is medication."*

Another 50-year-old doctor stated, " *One of the main things preventing patients from receiving regular follow-up care at the center is a shortage of medications."*

5.3.4 Guidelines and Standards

According to individual interviews, there is high compliance with MoH guidelines and protocols (PEN) for NCD. A 55-year-old doctor stated, "*Approximately 70% of the time, we follow the PEN*," and when asked about the reasons for noncompliance, the main causes were work overload, especially during periods when drug orders are available. Another 32-year-old nurse stated, "*Booklets are always distributed to remind us of the guidelines to be followed when dealing with diabetic patients, such as explaining how to deal with fasting periods, Eid, and others."* The standards and guidelines are always available, and we follow them, as well as any modifications and instructions.

These guidelines are important to ensure that treatment decisions are made on time, align T2DM management approaches with the Chronic Care Model, and assess DM healthcare maintenance using reliable and relevant data metrics to improve care processes and health outcomes while keeping care costs in mind (“Introduction: *Standards of Medical Care in Diabetes—2019*,” 2019) .

Evidence-based clinical guidelines can be useful in enhancing the procedure and organization of care, according to a systemic review conducted by Lugtenberg and Colleagues (2009) to assess the effects of evidence-based clinical practice guidelines on quality of care (Lugtenberg *et al.*, 2009) .

5.3.5 Physical structure

According to the findings, 58.8% of participants do not come to the health center for T2DM follow-up because they dislike the clinic's overall appearance and internal facilities, as illustrated in Table (5.4).

Nevse study in 2017 shows, that this is important for any patient, it involves a comfortable shape clinic for patients as well as the presence of good facilities within them, as well as a design that ensures the comfort of patients in quickly reaching the service, particularly elderly patients and those with disability (Neves, 2017).

According to the findings of individual interviews, the majority of health centers affiliated with the MoH were unanimously identified as unsuitable for the elderly and people with disabilities.

Table (5.4): Distribution of the study participants according to their data related to Follow-up

Items	Num.	%
Follow -up in the health center for type 2 diabetes service?		
▪ Yes	332	83.0
▪ No	68	17.0
Total	**400**	**100.0**
Cause of don't follow-up in the health center		
▪ I don't like the general appearance and the internal facilities of the clinic ▪	40	58.8
▪ My movement and leaving the house are not easy	26	38.2
▪ I need a companion with me ▪	16	23.5
▪ The necessary analyses are not available ▪	14	20.6
▪ The price of transportation is not always available	12	17.6
▪ I don't like the health staff inside the center	2	2.9
▪ I am not welcome inside the center	4	5.9

▪ I don't feel comfortable inside the center and I don't trust them	7	10.3
▪ I don't have enough time	23	5.8
▪		
▪ Medicines are not available	5	7.4
▪	14	20.6
▪ There is no point in visiting	7	10.3
▪ Other (I don’t have enough time)	1	1.5

5.4 Process

5.4.1 Waiting time

Table (5.5): Distribution of the study participants according to waiting time

On average, how many minutes do you wait to enter the nurse to receive diabetes-related service? '		
▪ 10 and less	224	56.0
▪ 11 to 19	38	9.5
▪ 20 and Above	138	34.5
Total	**400**	**100.0**
Mean:14.63, Median:10.0, SD ± 11.55		
On average, how many minutes do you need to go to the doctor to get diabetes-related services? '		
▪ 10 and less	165	41.3
▪ 11 to 19	60	15.0
▪ 20 and Above	175	43.8
Total	**400**	**100.0**
Mean:16.46, Median:15.00, SD ± 8.36		
How much time do you need to receive the service from entering the center until leaving it?'		
▪ Less than 30 Minutes	65	16.3
▪ 30 to 45	223	55.8
▪ Above 45	112	28.0
Total	**400**	**100.0**
Mean:39.13, Median:30.0, SD ± 17.93		
In your opinion, is it a suitable time?		
▪ Short	11	2.8
▪ Accepted	344	86.0
▪ Long	45	11.3
Total	**400**	**100.0**

The average nursing station waiting time was 14.63 minutes, this finding is the same as Hammad's study in 2019 for UNRWA PHCS says at Naser Health Center, the longest wait time was 24 minutes, while at Dier Alballah Health Center, the shortest wait was 5

minutes. The average wait time at the nursing station was 15 minutes (Hammad, 2019). The average physician station wait time was 16.46 minutes, and the average total time to receive the service from entering the center until leaving was 39.13 minutes, as illustrated in Table (5.5).

In a primary healthcare clinic, Ahmad and colleagues evaluated patient waiting times and doctor consultation times. They found that 53% of patients were registered in less than 15 minutes, the average wait time to see a doctor was 41 minutes, and that the average consultation time was 18.21 minutes (Ahmad *et al.*, 2017). Moreover, 86% of all study participants accepted the time wait and reported no problems, while 11.3% reported a long time wait.

5.4.2 Appointment system

The individual interviews revealed that there is a wide variation in the effectiveness of an appointment system between nurses and doctors. For example, a 35-year-old nurse participant stated, "*It's quite good, approximately 50% effective*," but on the other hand, a 45-year-old doctor participant stated, "*It's not good; all patients come on peak time from 9 to 11 am, they rush to the doctors in the early morning to follow up, do analyses, and take the appropriate medications, resulting in a massive crowd and overcrowding that disrupts work*." Another 42-year-old doctor claims" *that the appointment system is ineffective because many patients do not keep their appointments; additionally, if the patient does not attend, communication with him is not done, and the reasons for his non-attendance are not known for follow-up*". Finally, 39-year-old nurse participant contends," *The majority of patients do not attend scheduled follow-up appointments but do attend medication appointments*".

Individual interviewees proposed numerous ways to improve the appointment system, including scheduling time slots for patients during all working hours, booking time slots for patients who are not bound by specific appointments or who work in government departments afternoon, as the number of patients decreases after this time and they can thus get more contact time and attention, creating a system for communicating with patients who are unable to attend their scheduled appointments.

A systemic review by Nuti and Colleagues (2015) aimed to assess the impact of interventions on appointment and clinical outcomes for individuals with diabetes. This review examined the interventions based upon three focus areas: 1) scheduling the

patient with their provider; 2) getting the patient to their appointment, and; 3) having patient information integral to their diabetes care available to the provider. The literature review showed that simple phone calls and letters of reminders for scheduling or prompting the date and time of an appointment to more complex web-based multidisciplinary programs can have a positive impact on clinical and behavioral outcomes for diabetes patients (Nuti *et al.*, 2015a) .

5.4.3 Documentation

The individual interviews revealed a wide variation in the effectiveness of documentation between nurses and doctors. For example, a 32-year-old nurse participant stated, "*It's good, approximately 80% effective*," , on the other hand, a 56-year-old doctor participant stated: " *The documentation in the center is inadequate. Many patients' files are missing information, and not all results and follow-ups are documented*".

The majority of the individual interview results indicated that the documentation were inadequate. Many patient files are incomplete, and therefore the data presented in the files were not up-to-date, particularly laboratory results, which are not documented in the system regularly.

Annersten and Colleagues say Accurate documentation ensures that Federal health care programs pay the right amount to the diagnosed people—not too much or too little. Good documentation is essential for protecting your patients. It is shown that good documentation may promote patient safety and increase care quality (Annersten Gershater *et al.*, 2011).

5.4.4 T2DM follow-up care

Table (5.6): Distribution of the study participants according to their data related to Follow-up

Items	Num.	%
Follow- up in the health center for type 2 diabetes service?		
▪ Yes	332	83.0
▪ No	68	17.0
Total	**400**	**100.0**
If No why? (n = 68)		
▪ The price of transportation is not always available	12	17.6
▪ My movement and leaving the house are not easy	26	38.2
▪ I don't have enough time	23	5.8
▪ I am not welcome inside the center	4	5.9
▪ I don't like the health staff inside the center	2	2.9
▪ I don't feel comfortable inside the center and I don't trust them	7	10.3
▪ I need a companion with me	16	23.5
▪ I don't like the general appearance and the internal facilities of the clinic	40	58.8
▪ Medicines are not available	5	7.4
▪ The necessary analyses are not available	14	20.6
▪ There is no point in visiting	7	10.3
▪ Other (I don’t have enough time)	1	1.5
Check your sugar in Blood regularly in the clinic?		
▪ Yes	242	60.5
▪ No	22	8.3
▪ Not Always	125	31.3
Total	**400**	**100.0**
Do you do the test elsewhere?		
▪ Yes	77	19.9
▪ No	309	80.1
Total	**386**	**100.0**
If Yes why		
▪ I do not trust the results of the center	10	13.0
▪ Inconvenient working hours in the health center laboratory for me	4	5.2
▪ To save Time	35	45.5
▪ To ensure the validity of the results	48	62.3
▪ The tests I need are not available	22	28.6
▪ Other, (Hospital Discount)	1	0.3
Communicate with you regarding your failure to attend the scheduled appointment		
▪ Yes	50	12.5
▪ No	380	87.5

Total	**400**	**100.0**
You have currently own a glucose meter (glucometer)		
▪ Yes	118	29.5
▪ No	282	70.5
Total	**400**	**100.0**
Can you afford to buy test strips?		
▪ Yes	76	64.4
▪ No	4	3.4
▪ Sometimes	38	32.2
Total	**118**	**100.0**

Conducting regular follow-up care

Only 17% of study participants did not make regular follow-up visits to PHCS for MoH, even though more than two-thirds of participants (83%) did, according to Table (5.6). The primary reasons for not following up with patients regularly were: that they disliked the clinic's overall appearance and internal facilities (58.8%); movement and difficulty leaving the house (38.2%). Other reasons, such as not having the necessary analyses available (20.6%); the cost of transportation not always affordable (17.6%); patients not feeling comfortable or trusting the facility (10.3%); and patients not having the time or feeling welcome at the facility (5.8%).

Blood sugar monitoring

As shown in Table (5.6), In total, 60.5% of study participants monitor their blood glucose level exclusively at the PHCS for MoH, 31.5% do so occasionally outside the PHCS for MoH, and only 8.3% monitor their blood glucose level outside the PHCS for MoH. The main reasons for monitoring blood glucose levels outside the PHCS for MoH were to ensure the validity of the results (as expressed by 68.3%), to save time (45.5%), because the tests I need are not available (28.6%), do not trust the results of the center (13%), and because working hours in the health center laboratory are inconvenient for me (5.2%).

Just 76% of participants can afford to buy glucometer strips from the participants who had a glucometer, out of the one-quarter (29.5%) who own a glucometer. According to this low percentage, only 29.5% of clients could self-monitor their blood glucose (SMBG),

These findings are approximately with the Karter study, less than one-quarter (22.8%) of participants have their glucometer, and of them, only 36.6% can afford the cost of purchasing glucometer strips. This low percentage means only 22.5% of clients can self-monitor their blood glucose (SMBG). Regular SMBG is linked to improved glycemic control through a multitude of pathways of causes (Karter, 2006) .

Reasons for today's visit

About more than half of the study participants (57.3%) stated that the main reason for their visit to the health center was to do laboratory tests, followed by 37.8% stated that the main reason for their visit was to conduct regular follow-up, 37% their visit to the health center was to take drug prescriptions, and only 5.3% stated that the main reason for their visit was to conduct unregular follow- up, as illustrated in Figure (5.2).

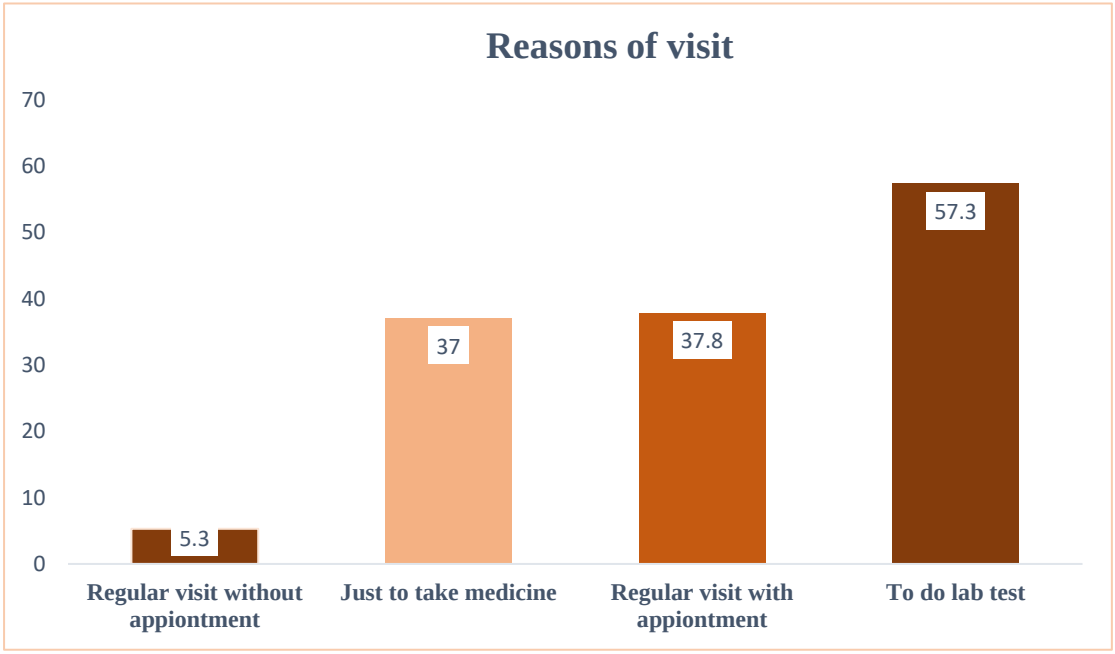

Figure (5.2): Distribution of the study participants according to their Reasons for Visit the Health Center

Receiving services from other service providers

Table (5.7): Receiving services from other service providers

Receiving Health services to treat Diatomic from another Nongovernmental center		
▪ Yes	84	21.0
▪ No	316	79.0
Total	**400**	**100.0**
If yes Where? (n = 84)		
▪ UNRWA	42	50.0
▪ Private clinics	46	54.8
▪ NGO's	8	9.5
▪ Hospitals	2	2.4
Why (n = 84)		
▪ The quality of the service provided in the center is poor	7	8.3
▪ The lack of necessary medicines and tests	65	77.4
▪ Working hours are not appropriate	18	21.4
▪ To avoid a long wait	17	20.2
▪ There is no privacy inside the center	6	7.1
▪ Because I need a specialized center	10	11.9
▪ For center distance	17	20.2
▪ I do not have enough confidence in the service provided	3	3.6
▪ The service is not free	39	52.0
▪ Other, specify	0	0.0

More than two-thirds of study participants (79%) only use PHCS for MoH. On the contrary, 21% of study participants use health services from other providers in addition to MoH services. In terms of other service providers, as shown in Table (5.7), participants primarily use private providers (54.8%), followed by UNRWA health centers (50%) and non-governmental centers and hospitals only 11.9%.

Table (5.7)shows that the primary reasons given for receiving services from other service providers in addition to MoH were: a lack of necessary medicines and tests (77.4%), the service is not free (52%), working hours are not appropriate as indicated by 21.4% of study participants; avoiding long waiting times as indicated by 20.2% of study participants; center distance as indicated by 20.2% of study participants; availability of specialized services as indicated by 11.9% of study participants; the

quality of service provided in the center is poor, according to 8.3% of study participants; there is no privacy inside the center, according to 7.3% of study participants; and they lack confidence in the service provided, according to 3.6% of study participants.

5.4.5 User-provider interaction

The user-provider interaction was evaluated by observing it during the data collection period. It was found that the interaction between the patient and the service provider varies depending on the patient's condition, age, and duration of his disease diagnosis, with the newly diagnosed patient sitting with him for a longer period and giving him extensive advice and instructions, as well as listening to the patient's inquiries and answering them. Patients with DM complications are also seated with them for a longer period, average interaction period between the patient and the doctor is approximately 10 minutes, with some cases being slightly longer, while the interaction period between the patient and the nurse is approximately 5 minutes.

Contact time is very important, for both the patient and the health provider. Petek Šter, Švab & Živčec Kalan (2008), studied consultation time-related factors and found that the mean consultation time was 6.9 minutes. Longer consultation time was related to patient factors like female gender, higher age, higher level of education, higher number of health problems, and change of physician within the last year. Also related to physician factors like higher age, physicians‘workload absence of high workload), and the type of visit (consultation and/or clinical examination) (Petek Šter et al., 2008).

Ahmad and Colleagues assessed patient waiting time and doctor consultation time in a primary healthcare clinic and found that more than half of the patients were registered within 15 minutes (53%) and the average total waiting time to see the doctor was 41 minutes, the mean consultation time was 18.21 minutes (Ahmad *et al.*, 2017). According to a study in Mexico, the family doctor spends sufficient time on the consultation of patients suffering from DM2 and/or hypertension and that plays an important role in those patient's satisfaction Prado-Galbarro et al. (2020).

5.4.6 Training

Provider training

Individual interviews have revealed various opinions about training and that the medical staff requires periodic training and knowledge of the most recent scientific

developments to follow up on patients with T2DM and how to deal with them. A 45-year-old nurse stated, "*She received only one training session during the operation*". Another 36-year-old nurse stated, "*She is constantly attending training and educational courses on how to deal with DM, the most recent of which was an educational course on teaching a diabetic patient how to deal during Ramadan*".

Employee retention and competitiveness are enhanced by staff training, which also helps the organization reach its objectives. As a result, innovative learning strategies and effective training support the organization's efforts to grow and retain its workforce and produce better results (Yano *et al.*, 2021)

Several studies have demonstrated a negative correlation between medical professionals' years of practice and their level of knowledge (El-Dahiyat *et al.*, 2023; NghiepKe Le *et al.*, 2021b; Sørensen *et al.*, 2020). As a result, the MoH diabetes healthcare providers should standardize the services they offer, and they also should regularly evaluate healthcare workers‘ knowledge and abilities.

Patient's education and promotion

Table (5.8): Distribution of the study participants according to Training and Health Education

Items	Num.	%
Health training and education about managing your diabetes at the health center before?		
▪ Yes	312	78.0
▪ No	88	22.0
If Yes When (n = 312)		
▪ Only at the time of my diabetes diagnosis (the day I learned I had diabetes	252	80.0
▪ Regularly at each follow-up visit	60	19.2
▪ From time to time during follow-up visits, but not every visit	77	24.7
The person responsible for health education inside the clinics		
▪ Nurse	155	49.7
▪ Physician	123	39.4
▪ Other	34	10.9
Fro The benefits of training and health education that you received inside the health center, whether from the nurse or the doctor from 0-4.		
▪ 0	4	1.3
▪ 1	21	6.9
▪ 2	24	7.8
▪ 3	128	45.5

▪ 4	77	25.0
Mean:3.00, Median:3.00, SD ± 0.85		
Did you receive any health education training materials about diabetes during your visit to this health center in the last year?		
▪ Yes	213	53.3
▪ No	185	46.3
▪ Don't Know	2	0.5
Type of Material		
▪ Teach individually	184	86.4
▪ Support group	25	11.7
▪ Attachments	15	7.0
▪ Video clips	7	3.3
▪ Lectures	66	31.0
Has your doctor/nurse talked to you about your diet or eating habits over the past year?		
▪ Yes	269	67.3
▪ No	126	31.5
▪ Don't Know	5	1.3
Has your doctor/nurse talked to you about physical activity or exercise in the past year?		
▪ Yes	287	71.8
▪ No	113	28.2
Total	**400**	**100.0**
Has your doctor/nurse advised you to stop smoking (if you smoke) in the past year? '		
▪ Yes	299	74.8
▪ No	99	24.8
▪ Don't Know	2	0.5
In which areas of diabetes management do you feel you need health education and training? ':		
▪ Managing stress and tension	225	56.3
▪ Disease self-care	174	43.5
▪ High and low signs and symptoms of high blood sugar	150	37.5
▪ Complications of diabetes	139	34.8
▪ Diet	131	32.8
▪ Exercise	99	24.8
▪ Diabetes follow-up	91	22.8
▪ Take medications	84	21.0
▪ The nature of the disease	70	17.5
How would you rate your understanding of your disease? From 0-4'		
▪ 0	3	0.8
▪ 1	36	9.8
▪ 2	59	14.8
▪ 3	218	54.5
▪ 4	84	21.0
Mean:2.86, Median:3.00, SD ± 0.88		

According to Table (5.8), 78% of participants did receive T2DM self-care education inside the health center, while only 22% did not. When study participants were asked about T2DM self-care education components such as diet, physical activity, and smoking cessation, the results were almost the same. Approximately 70% or more of study participants had received health education on diet, physical activity, or smoking cessation.

The study participants must receive T2DM self-care education (management tension and stress (56.3%), T2DM self-care (43.5%), high and low signs and symptoms of high blood sugar (37.5%), T2DM complications (34.8%), diet (32.8%), exercise (24.8%), DM2 follow-up (22.8%), and medication administration (21%). It also reflects the need for more health education among study participants not just when diagnosed with the disease. This is reflected in the 70.5% of study participants who believe that health education is beneficial (score 3,4).

According to the study findings, the nurse (49.5%) was the primary self-care educator for patients with T2DM, followed by the physician (39.4%).

5.4.7 Accessibility

Table (5.9): Distribution of the study participants according to Accessibility

Items	Num.	%
Is it easy to reach the health center to receive the service? '		
▪ Yes	339	84.8
▪ No	61	15.3
Total	**400**	**100.0**
If not, Why?		
▪ I come on foot and the distance is long	6	9.8
▪ I come by public transportation and it is not always affordable.	44	72.1
▪ I do not like the services inside this center	8	13.1
▪ Other (My Movement is difficult	7	11.5
On average, how many minutes do you wait to enter the nurse to receive diabetes-related service? '		
▪ 10 and less	224	56.0
▪ 11 to 19	38	9.5
▪ 20 and Above	138	34.5
Total	**400**	**100.0**

Mean:14.63, Median:10.0, SD ± 11.55		
On average, how many minutes do you need to go to the doctor to get diabetes-related services? '		
▪ 10 and less	165	41.3
▪ 11 to 19	60	15.0
▪ 20 and Above	175	43.8
Total	**400**	**100.0**
Mean:16.46, Median:15.00, SD ± 8.36		
How much time do you need to receive the service from entering the center until leaving it?'		
▪ Less than 30 Minutes	65	16.3
▪ 30 to 45	223	55.8
▪ Above 45	112	28.0
Total	**400**	**100.0**
Mean:39.13, Median:30.0, SD ± 17.93		
In your opinion, is it a suitable time?		
▪ Short	11	2.8
▪ Accepted	344	86.0
▪ Long	45	11.3
Total	**400**	**100.0**
Are all DM-related services always available inside the center?		
▪ Yes	76	19.0
▪ No	293	73.3
▪ I Don't Know	31	7.8
Total	400	100.0
Do the health services for diabetics meet your needs?		
▪ Yes	331	82.8
▪ No	69	17.3
Total	400	100.0
If No Why?		
▪ Unavailability of Drugs	57	82.6
▪ Need Specialized Center	12	17.4
Total	**69**	**100.0**
Are there any obstacles that you face while receiving the health service for patients with type 2 diabetes at the center?		
▪ Yes	253	63.2
▪ No	147	36.8
Total	**400**	**100.0**
If Yes What are the obstacles? (n = 253)		
▪ Unavailability of medicines	246	97.2
▪ Unavailability of specialized services	84	33.2
▪ Lack of specialists such as ophthalmologists'	64	25.3
▪ The availability of appropriate analyses	32	12.6
▪ hustle'	32	12.6
▪ Failure to adhere to deadlines	17	6.7

▪ Poor communication and interaction between the medical staff	13	5.1
▪ The fragility of the work system within the center	2	0.8
▪ Distinguish between patients'	2	0.8
▪ The fragility of the work system	2	0.8
During the past year, have you returned from the center without receiving the service you came for? '		
▪ Yes (Unavailability of medicines)	131	32.8
▪ No	269	67.3
Total	**400**	**100.0**

As shown in Table (5.9), 84.8% of study participants indicated that it was easy to access the health center to utilize the available services for patients with T2DM. On the other hand, 15.3% of the study participants expressed not having an easy access to the health center to receive DM health services. The most frequent causes, as reported by study participants who expressed that access was not easy, were the transportation cost, as reported by 72.1% of study participants, followed by dissatisfaction with the service provided by the center by 13.1% of study participants.

High poverty rates and deteriorating economic conditions in the GS are limiting access to health care services, with 15% of study participants citing transportation costs as a barrier to using health services. These may cause the same findings as Hamad's study in 2019 for UNRWA PHCs that show different obstacles that prevent patients with T2DM from utilizing diabetes services at UNRWA health centers, which can be divided into intra-clinic and extra-clinic barriers. Intra-clinic barriers include long waiting times, diabetic patients' refusal of clients to some treatment options, namely insulin, limited availability of specialized services, mistrust relationship between service providers and clients, and limited client knowledge about drugs. Extra clinic barriers include the physical distance between home and the clinic, transportation costs, and clinic working hours that aren’t convenient for clients (Hammad,2019). However, a high percentage of participants (84%) reported good physical accessibility and financial affordability, which reflects the affordability and accessibility of PHCS for MoH services.

According to Table (5.9), the mean waiting time to receive nursing services was 14.63 minutes with SD (11.55), 56% of study participants waited less than 10 minutes, and 34.5% of participants waited 20 minutes or more.

Furthermore, the mean waiting time to receive DM health services from a doctor was 16.46 minutes with SD (8.36), with 41.3% of study participants waiting less than 10 minutes and 34.5% waiting 20 minutes or more. The average time for participants to receive all services from entry to the health center to exit was 39.13 minutes, with an SD (17.93). In total, 16.6% of study participants waited less than 30 minutes, 55.5% waited 30-45 minutes, and 28% waited more than 45 minutes.

5.5 Outputs

5.5.1 Patients satisfaction

Table (5.10): Distribution of the patient's satisfaction according to tertial percent

Patients satisfaction		
Items	**Num.**	**%**
▪ Less satisfaction	152	38
▪ Moderate satisfaction	35	8.8
▪ High satisfaction	213	53.3
Total	**400**	**100.0**

The majority of participants, with a mean of 74.37 and an SD of 10.83, were satisfied with MoH T2DM health services. This finding is almost the same Hammad's study results, the results show that most participants expressed their satisfaction with UNRWA T2DM health services, with a mean of 84.07 and SD 7.22 (Hammad,2019).

Using tertiles for satisfaction scores, the score was divided into: low (equal or less than 72.90% of total points), moderate (72.91-76.40% of total points), and high (more than 76.40% of total points). Therefore, as shown in Table (5.10), more than half of the study participants expressed high satisfaction, however 38% expressed less satisfaction.

The most satisfying issue in the satisfaction domain for study participants was the cleanliness of the health center, with a mean of 85.5%, and the least satisfying issue was the availability of medicine, with a mean of 58.8%, which may reflect the majority of cases that did not go to follow-up in MoH health centers.

The satisfaction level reported by this study was higher than that by Elkhatib (2018), in which the overall satisfaction level with services for non-communicable diseases was 72% (Elkahtib, 2018).

According to Table (5.11), the overall satisfaction with MoH T2DM health services is high (90%). As a result, the vast majority, nearly all clients (97%), recommend MoH T2DM health services to their relatives and friends. Furthermore, MoH health centers continue to provide T2DM health services to 97.5% of study participants.

Furthermore, 41.8% of study participants believe that DM health services met their expectations, and 72.5% believe that their health status has improved since receiving MoH T2DM health services. According to 85.5% of study participants, the most common challenge with T2DM services provided in PHCS was a lack of medicines. The primary difficulty with T2DM services provided in PHCS was the cost of services for nearly half of the study participants (43.3%), while blood sugar regulation was the most common challenge for 37% of the study participants.

Table (5.11): Distribution of the study participants according to Satisfaction

Items	Num.	%
Do you recommend that your relatives, if they contract the disease, receive the service at this center?		
▪ Yes	392	98.0
▪ No	8	2.0
Total	**400**	**100.0**
Do you intend to continue receiving service at this center?		
▪ Yes	390	97.5
▪ No	10	2.5
Total	**400**	**100.0**
Are you satisfied with the service you received today at the center?		
▪ To High Extent	358	89.5
▪ Uncertain	9	2.3
▪ Unsatisfied	33	8.3
Total	**400**	**100.0**
Did the service you received meet your expectations?		
▪ Yes	167	41.8
▪ To some Extent	224	56.0
▪ No	9	2.3
Total	**400**	**100.0**
How do you expect the service to be?		
▪ Best	1	11.1
▪ Worst	8	88.9
Total	**9**	**100.0**
What are the needs and challenges that you still suffer from and need care for?		
▪ Blood sugar regulation	148	37.0
▪ Providing medication	342	85.5
▪ Providing the necessary analyses	119	29.8
▪ Cost of services	173	43.3

▪ The treatment of the medical staff	51	12.8
▪ Knowing the appropriate type of food	69	17.3
▪ Knowing the appropriate exercises	68	17.0
▪ The existence of regular cumulative sugar check services and examination of complications	86	21.5
Total	**400**	**100.0**
How would you describe your health condition after receiving the service today from the center?		
▪ Good	290	72.5
▪ Same	102	25.5
▪ Worst	0	0.0
▪ Don't Know	8	2.0
Total	**400**	**100.0**

5.5.2 Control status as assessed by HbA1c level

HbA1c was used to assess the controlled status of T2DM in this study, and it is considered the most reliable and sensitive indicator that could be used to assess the controlled status of T2DM. It is also used to predict complications and mortality caused by DM2. HbA1c measures the control of blood glucose levels over the previous six months.

HbA1c levels of 7% or less are considered controlled, while levels above 7% are considered uncontrolled, according to guidelines. Only 35.5% of T2DM patients have HbA1c control, according to study findings obtained from patients with T2DM and verified from medical records for all study participants.

5.5.3 DM complications

Table (5.12): Distribution of the study participants according to Screening for complications of T2DM

Items	Num.	%
Eye and retina examination during the previous year		
▪ Yes	242	60.5
▪ No	143	35.8
▪ Not Remember	15	3.8
Total	**400**	**100.0**
When was the examination (how many months ago)?		
▪ 2 and less	95	39.3
▪ From 3 to 5	85	35.1
▪ Above 5	62	25.6
Total	**242**	**100.0**

Mean:4.46, Median:3.00, SD ± 6.40		
Feedback receive on the examination		
▪ Yes	167	69.0
▪ No	50	20.7
▪ Don't Know	25	10.3
Total	**242**	**100.0**
If the result indicated a problem, how did you deal with it?		
▪ Your treatment plan has changed	28	17.8
▪ You have been referred to ophthalmology services.	69	43.9
▪ A preventive or remedial procedure, such as a laser, was performed.	17	10.8
▪ Lifestyle, nutrition and sports have been changed'	10	6.4
▪ Nothing was done	61	39.1
▪ I Don't Know	1	0.6
Foot examination during the previous year		
▪ Yes	166	41.5
▪ No	221	55.3
▪ I Don't Know	13	3.3
Total	**400**	**100.0**
When was the examination, how many months ago?'		
▪ 2 and less	73	44.0
▪ From 3 to 5	65	39.2
▪ Above 5	28	16.9
Total	**166**	**100.0**
Mean:3.51, Median:3.00, SD ± 2.57		
Feedback receive on the examination		
▪ Yes	106	63.9
▪ No	43	25.9
▪ Don't Know	17	10.2
Total	**166**	**100.0**
If the result indicated a problem, how did you deal with it?		
▪ Your treatment plan has changed	28	26.4
▪ You have been referred to a neurologist or vascular specialist	25	23.6
▪ Have liquid medications such as aspirin been added?	3	2.8
▪ Nothing is done	56	52.8
▪ I don't know	1	0.9
Blood sugar tested during the previous year		
▪ Yes	392	98.0
▪ No	6	1.5
▪ Not Remember	2	.5
Total	**400**	**100.0**
HbA1c checked over the past six months		
▪ Yes	398	99.5
▪ No	1	0.3

▪ Not Remember	1	0.3
Total	**400**	**100.0**
What is the result?		
▪ Controlled	142	35.5
▪ Uncontrolled	258	64.5
Total	**400**	**100.0**
Mean:8.24, Median:8.00, SD ±2.06		
If the result is above 9, how did you deal with it?		
▪ Your treatment plan has changed	54	38.3
▪ Emphasis on exercise and weight loss	89	63.1
▪ Giving you insulin	10	7.1
▪ You have been referred to a nutritionist	4	2.9
▪ Nothing is done	31	22.1
▪ I don't know	6	4.3
ECG done even once when opening your file		
▪ Yes	380	95.0
▪ No	16	4.0
▪ Not Remember	4	1.0
Total	**400**	**100.0**
kidney function test been done during the past year		
▪ Yes	382	95.5
▪ No	14	3.5
▪ Not Remember	4	1.0
Total	**400**	**100.0**
Comprehensive fat check been done during the past year		
▪ Yes	380	95.0
▪ No	12	3.0
▪ Not Remember	8	2.0
Total	**400**	**100.0**

DM Eye Retina Examination

As shown in Table (5.12), 60.5% of study participants had their annual retina eye examinations performed in the previous year; however, 35.8% of study participants did not have their annual retina eye examinations performed.

Approximately 69% of participants who had the retina eye annual examination had their results communicated to them. Only 17.8% of those with abnormal findings had their treatment regimen changed, even though 9% of the retina eye examination revealed abnormal findings such as retinopathy or DM eye disease.

The anomalous results may indicate that 9% of people have diabetic retinopathy. In comparison to other countries, such as the USA, where approximately one-third of adults over 40 and more than one-third of African-Americans and Mexican-Americans

have diabetes, this prevalence of diabetic retinopathy is low (CDC, 2018). The lack of a national screening program for diabetic retinopathy may be the cause of the low detection rate.

One of the most avoidable causes of blindness and vision loss is diabetic retinopathy. For 90% of diabetics, early detection and treatment can avoid or postpone blindness from diabetic retinopathy (CDC, 2018).

DM Foot Examination

According to Table (5.12), 41.5% of study participants had their foot screening exam within the previous year, while 55.3% had not. Also, almost two-thirds of the participants who had their feet screened were informed of the results of their examination (64%). Only 26.4% of patients with abnormal findings had their treatment regimen changed, even though 63.7% of foot screenings revealed abnormal findings such as ulcers and neuropathy. This finding is high when compared with Hammad (2019) study at the UNRWA clinics. In the UNRWA clinics, 9.8% of foot screening revealed abnormal findings such as ulcers and neuropathy, surprisingly, only 31% of those patients with abnormal findings, their treatment regimen changed, accordingly (Hammad, 2019). The abnormal findings could measure the prevalence of diabetic foot (63.7%). This high prevalence of diabetic foot is very comparable to international studies. The lifetime risk of developing a diabetic foot ulcer ranges from 19% to 34%. Recurrence is common after initial healing; roughly 40% of patients had a recurrence within a year following ulcer healing, nearly 60% within three years, and 65% within five years (Edmonds *et al.*, 2021).

Annual laboratory analysis

According to Table (5.12), more than 95% of study participants had completed their annual laboratory analysis in the previous year; however, less than 5% of study participants did not complete their annual laboratory analysis. Aslo, the annual laboratory analysis revealed abnormal findings such as high HbA1c (more than 9) and lipid profile tests; however, 38.3% of those patients with abnormal findings had their treatment regimen not changed as a result. These unusual findings could be used to estimate the prevalence of uncontrolled patients with T2DM (64.5%). This low prevalence of DM retinopathy contrasts with the HbA1c study findings, which show that 64.5% of study participants are uncontrolled (HbA1c greater than 7%).

Diabetes Complication Index (DCI)

Table (5.13): Distribution of the study participants according to the Diabetes Complications Index (DCI).

Items	**Yes**	
	Num.	**%**
▪ **Heart attack**	562	50
▪ **CVA**	129	19.3
▪ **PVD**	182	35.8
▪ **Neuropathy**	482	71.3
▪ **Foot Problems**	75	16.5
▪ **Eyes Problems**	159	36.3
DCI score		
▪ **0**	77	19.3
▪ **1**	73	18.3
▪ **2**	68	17
▪ **3**	73	18.3
▪ **4**	62	15.5
▪ **5**	42	10.5
▪ **6**	5	1.3

CVD indicates cerebrovascular disease and PVD is peripheral vascular disease

The frequency of complications among the participants of the study is given in Table (5.13).

The most common macrovascular complication was neuropathy, with 71.3% of patients reporting one or more of them, followed by heart attack diseases, with 50% of patients reporting one or more of them, eye problems, Peripheral Vascular Disease (PVD), Cerebrovascular diseases (CVD), and foot problems were the next most common complications.

According to Table (5.13), 19.3% of study participants had no T2DM complications, in contrast, nearly 12% of participants in the study had 5 or more T2DM complications, and 18.3% of participants in the study had 3 T2DM complications. Also, te DCI and patients' perceptions of how much diabetes had affected their health were substantially correlated (r = 0.35, P =.0001) (Fincke et al., 2005).

5.5.4 Diabetes self-management

Table (5.14): Distribution of the study participants according to DSMQ

Items		
	Mean	**SD**
DSMQ		
▪ Diabetes self-management score	6.66	1.88
▪ Glucoses management	6.87	1.02
▪ Dietary control	6.35	2.06
▪ Physical activity	6.10	3.50
▪ Health-care use	6.90	2.28

Response analysis resulted in the identification of 16 items that comprised the final scale for full psychometric assessment. In terms of what is considered effective self-care, seven of these items are phrased positively and nine are phrased negatively. The questionnaire allows you to calculate a 'Sum Scale' score as well as estimate four subscale scores. The subscales were labeled 'Glucose Management' (items 1, 4, 6, 10, 12), 'Dietary Control' (items 2, 5, 9, 13), 'Physical Activity' (items 8, 11, 15), and 'Health-Care Use' (items 3, 7, 14) based on their contents. One item (16) requests an overall rating of self-care and is to be included in the ‘Sum Scale’ only.

The study participants' mean for total self-management was 6.66 and SD (1.88), and the mean for glucose management was 6.87 and SD (1.02), but the study participants' mean for dietary control was 6.35 and SD (2.06), the study participants' mean for physical activity was 6.10 and SD (3.50), and finally, the study participants' mean for health-care use was 6.90 and SD (2.28), as shown in Table (5.14).

This finding is consistent with the Schmitt and colleagues' study in 2013 shows, allows for an effective evaluation of self-care behaviors linked to glycemic control and offers preliminary evidence that the DSMQ is a valid and reliable instrument. The questionnaire should be useful for both clinical use in patients with type 1 and type 2 diabetes, as well as for scientific analyses (Schmitt *et al.*, 2013).

The DSMQ scales and their parallel SDSCA scales (GM: 0.57; DC: 0.52; PA: 0.58; HU: n/a; SS: 0.57), as well as HbA1c (GM: -0.39; DC: -0.30; PA: -0.15; HU: -0.22; SS: -0.40), demonstrated significant convergent correlations. The HbA1c correlations were all noticeably higher than the SDSCA correlations (Schmitt *et al.*, 2013).

The day-to-day management of diabetes is primarily the responsibility of the patients and their families. Self-management is the capacity to deal with the day-to-day physical and psychological effects, treatment plans, and lifestyle modifications that accompany living with diabetes (Almutairi *et al.*, 2020).

5.6 Inferential analysis

5.6.1 Control Status and Demographic Data

Table (5.15): Association between HbA1c and demographic data

Items		Control status				X^2	Sig.
		Controlled		Uncontrolled			
		Num.	%	Num.	%		
Governorates	Gaza	52	13.0%	107	26.8%	3.39	0.33
	North Gaza	18	4.5%	42	10.5%		
	Middle	18	5.5%	22	4.5%		
	South	54	13.5%	87	21.8%		
	Total	142	64.5%	258	35.5%		
Age group	Less 55	29	20.4%	64	24.8%	4.10	0.25
	55 to 60	30	21.1%	65	25.2%		
	61 to 69	50	35.2%	88	34.1%		
	70 and above	33	23.2%	41	15.9%		
		142	99.90%	258	100.00%		
Gender	Male	59	41.5%	102	39.5%	0.155	0.69
	Female	83	58.5%	156	60.5%		
Education Group	Primary	25	17.6%	52	20.2%	7.25	0.12
	Secondary	41	28.9%	78	30.2%		
	Intermediate diploma	38	26.8%	66	25.6%		
	University	27	19.0%	28	10.9%		
	Un educated	11	7.7%	34	13.2%		
Marital Status	Married	107	75.4%	207	80.2%	1.29	0.25
	Not Married	35	24.6%	51	19.8%		
Work	Yes	21	14.8%	36	14.0%	4.97	0.08
	No	101	71.1%	203	78.7%		

	Retired	20	14.1%	19	7.4%		
Income Group	500 and less	53	37.3%	90	34.9%	4.01	0.26
	501 to 999	26	18.3%	38	14.7%		
	1000	21	14.8%	59	22.9%		
	Above 1000	42	29.6%	71	27.5%		
Disease duration	5 and less	55	38.7%	76	29.5%	5.28	0.07
	6 to 10	52	36.6%	93	36.0%		
	above 10	35	24.6%	89	34.5%		
Family history	Yes	90	63.4%	174	67.4%	0.67	0.41
	No	52	36.6%	84	32.6%		
Smoking	Yes	11	7.7%	24	9.3%	0.321	0.852
	No	119	83.8%	211	81.8%		
	Leaving	12	8.5%	23	8.9%		

*P value < 0.05 is statistically significant

Table 5.15 shows that the findings of the Fisher Chi-Square test show no significant association between control status and demographic data. The association was not statistically significant (P> 0.05).

5.6.2 Control Status and Lifestyle

Table (5.16): Association between control status and lifestyle

Items		**Control status**				**X^2**	**Sig.**
		Controlled		**Uncontrolled**			
		Num.	**%**	**Num.**	**%**		
Knowledge	Low	82	57.7%	165	64.0%	1.49	0.22
	moderate to high	60	42.3%	93	36.0%		
Attitude	Less	49	34.5%	85	32.9%	0.12	0.94
	moderate	48	33.8%	91	35.3%		
	high	45	31.7%	82	31.8%		
Practices	Low	125	88.0%	192	74.4%	10.31	0.001
	moderate to high	17	12.0%	66	25.6%		
Patients satisfaction	less	53	37.3%	99	38.4%	0.07	0.95
	moderate	13	9.2%	22	8.5%		
	high	76	53.5%	137	53.1%		

DCI	.00	32	22.5%	45	17.4%	30.63	0.001
	1.00	34	23.9%	39	15.1%		
	2.00	35	24.6%	33	12.8%		
	3.00	19	13.4%	54	20.9%		
	4.00	9	6.3%	53	20.5%		
	5.00	13	9.2%	29	11.2%		
	6.00	0	0.0%	5	1.9%		

Self-management								
	Num.	**Mean**	**SD**	**Num.**	**Mean**	**SD**	**Test**	**Sig.**
Glucose management	142	11.30	3.12	258	9.75	2.81	**T** -5.05	0.001
Dietary control	142	7.21	1.80	258	5.87	2.05	**T** -6.51	0.001
Physical activity	142	7.55	2.97	258	5.30	3.52	**T** -6.44	0.001
Health-care use	142	7.23	2.27	258	6.72	2.27	**T** -2.14	0.031

*P value < 0.05 is statistically significant

Table 5.16 shows that the findings of the Chi-Square test show no significant association between control status and knowledge and attitude scores. The relationship was not statistically significant (P > 0.05).

In Table 5.16, the findings of the Fisher Chi-Square test show a significant association between control status and practice score. The association was highly statistically significant with ($\mathbf{X^2}$ = 10.34, P = 0.001). The highest prevalence of control HbA1c (88.8%) was among the study participants with low practice scores. In contrast, 12% of study participants reported having moderate to high practice scores. Patients with diabetes mellitus and/or their families are primarily responsible for carrying out the daily disease management tasks required to attain glycemic control and enhance their quality of life. Finding out how diabetic patients manage their condition on their own can aid in the development of interventions that improve these habits and help avert complications (Almutairi *et al.*, 2020)

Table 5.16 shows that the findings of the Fisher Chi-Square test show a significant association between control status and DCI. The association was highly statistically significant with ($\mathbf{X^2}$ = 30.63, P = 0.001). The study participants with two types of T2DM complications had the highest prevalence of control HbA1c (24.6%). However, in 23.9% of the study, participants reported having one type of T2DM complication, while 22.5% reported not having any type of T2DM complication. Finally, 28.9% reported having three or more types of T2DM complications. A significant fraction of patients with diabetes had complications from their diabetes and inadequate glycemic control. As a result, suitable interventions are needed to keep glycemic control at its best and shield DM patients from developing potentially fatal complications (Dimore *et al.*, 2023)

The results of the T-test show a significant association between control status and dietary control, **as shown in Table 5.16.** (T = 6.51, P = 0.001) The association was highly statistically significant. When compared to study participants with uncontrolled T2DM, those who had their blood sugar levels under control had better dietary control.

The findings of this study are consistent with Schmitt and colleagues (2013), The SDSCA equivalent scale "General Diet" (ρ = 0.52) and "Specific Diet" (ρ = 0.28) showed significant correlations with the subscale "Dietary Control." Moreover, a significant negative correlation was observed with HbA1c (ρ = -0.30) (Schmitt *et al.*, 2013).

In Table 5.16, the findings of the T-test show a significant association between control status and glucose management. The association was highly statistically significant with (T = -5.05, P = 0.001). When compared to participants with uncontrolled T2DM, those with controlled T2DM had better glucose management.

The findings of this study are consistent with Schmitt and colleagues (2013), The subscale "Glucose Management" demonstrated a strong correlation with both the HbA1c value ($\rho = -0.39$) and the corresponding SDSCA scale "Blood-Glucose Testing" (ρ = 0.57) (Schmitt *et al.*, 2013).

The Independent sample T-test results **in Table 5.16 show** a significant association between control status and physical activity. The association was statistically significant (T = -6.44, P = 0.001). When compared to study participants with uncontrolled T2DM, those with controlled T2DM engaged in more physical activity.

The findings of this study are consistent with Schmitt and colleagues (2013), The corresponding SDSCA scale, "Exercise," and the subscale "Physical Activity," had a

strong correlation (ρ = 0.58). There was a strong negative correlation (ρ = −0.41) with the BMI and a −0.15 correlation with the HbA1c value (Schmitt *et al.*, 2013).

The Independent sample T-test results show a significant association between control status and healthcare use, **as shown in Table 5.16.** The association was statistically significant (**T** = -2.14, P = 0.031). When compared to study participants with uncontrolled T2DM, those with controlled T2DM engaged in more health-care use.
The findings of this study are consistent with Schmitt and colleagues (2013), no SDSCA scale is comparable to the subscale "Health-Care Use." However, it exhibited a strong negative correlation with the HbA1c value of -0.22 and a significant positive correlation with the SDSCA scales "General Diet" (ρ = 0.13), "Blood-Glucose Testing" (ρ = 0.26), "Foot Care" (ρ = 0.10), and "Smoking" (ρ = −0.19). Lastly, the DSMQ "Sum Scale" was highly correlated with the SDSCA's total score of 0.57 and demonstrated substantial to high correlations with all SDSCA scales between 0.20 and 0.51. It had a strong negative correlation (ρ = -0.40) with the HbA1c value (Schmitt *et al.*, 2013).

5.6.3 Control status (HbA1c) and T2DM Complication

Table (5.17): Association between the result of Hb1Ac and T2DM complication

Indication		**The result of Hb1Ac**						**X^2**	**Sig.**
		Controlled		**Uncontrolled**		**Total**			
		Num.	**%**	**Num.**	**%**	**Num.**	**%**		
Heart attack	No	84	42.0	116	58.0	200	100.0	7.381	0.004
	Yes	58	29.0	142	71.0	200	100.0		
	Total	**142**	**35.5**	**258**	**64.5**	**400**	**100.0**		
CVA	No	119	36.8	204	63.2	323	100.0	1.320	0.155
	Yes	23	29.9	54	70.1	77	100.0		
	Total	**142**	**35.5**	**258**	**64.5**	**400**	**100.0**		
PVD	No	106	41.2	151	58.8	257	100.0	10.363	0.001
	Yes	36	25.2	107	74.8	143	100.0		
	Total	**142**	**35.5**	**258**	**64.5**	**400**	**100.0**		
Neuropathy	No	52	45.2	63	54.8	115	100.0	6.656	0.007
	Yes	90	31.6	195	68.4	285	100.0		
	Total	**142**	**35.5**	**258**	**64.5**	**400**	**100.0**		
Foot Problems	No	123	36.8	211	63.2	334	100.0	1.555	0.134
	Yes	19	28.8	47	71.2	66	100.0		
	Total	**142**	**35.5**	**258**	**64.5**	**400**	**100.0**		
Eyes Problems	No	106	41.6	149	58.4	255	100.0	11.314	0.001
	Yes	36	24.8	109	75.2	145	100.0		
	Total	**142**	**35.5**	**258**	**64.5**	**400**	**100.0**		

*P value < 0.05 is statistically significant

As shown in Table 5.17, the more controlled study participants according to HbA1c were the participants who had not been diagnosed with a heart attack (42%), and the less controlled study participants, according to HbA1c, were the participants who had been diagnosed with a heart attack (29%). A chi-squared test was conducted to examine whether there was a significant difference between study participants' heart attack complications and their controlling status. The test revealed a high statistically significant difference between participants with heart attack complications about controlled status ($\mathbf{X^2}$ = 7.381, p = 0.004).

This finding was consistent with Prasad study (2018). HbA1c was shown to have a positive correlation with CVD, including hypertension, ischemic heart disease, ischemic stroke, and atherosclerosis of the coronary and carotid arteries. In addition to raising blood viscosity, oxidative stress, C-reactive protein, and dyslipidemia and hyperhomocysteinemia, HbA1c also causes hypertension and dyslipidemia. These conditions could lead to the development of cardiovascular diseases (Prasad, 2018) .

A chi-squared test was conducted to examine whether there was a significant difference between study participants' CVD complications and their controlling status. The test revealed no statistically significant difference between participants with CVD complications and those with controlled status ($\mathbf{X^2}$ = 1.320, p = 0.155), **as shown in Table 5.17.**

Table 5.17 shows that the more controlled study participants according to HbA1c were the participants who had not been diagnosed with a PVD (41.2%), and the less controlled study participants, according to HbA1c, were the participants who had been diagnosed with a PVD (25.2%). A chi-squared test was conducted to examine whether there was a significant difference between study participants' PVD complications and their controlling status. The test revealed a high statistically significant difference between participants with PVD complications about controlled status ($\mathbf{X^2}$ = 10.363, p = 0.001). the finding of this study was consistent with the Shatnawi and colleagues' study in 2021, Patients with HbA1c > 7.5% had a significantly higher prevalence of hemodynamically relevant atherosclerotic lesions of the leg vessels, femoro-popliteal, crural, and superficial femoral arteries than did those with HbA1c ⩾ 7.5% (Shatnawi *et al.*, 2021). However, the finding of this study was inconsistent with the cross-sectional study done by Majid Khan and colleagues (2021). No significant association between type of

diabetes and PVD was found (p-value 0.326) (Majid Khan *et al.*, 2021) .

As shown in Table 5.17, the more controlled study participants according to HbA1c were the participants who had not been diagnosed with a neuropathy disease (45.2%), and the less controlled study participants, according to HbA1c, were the participants who had been diagnosed with a neuropathy disease (31.6%). A chi-squared test was conducted to examine whether there was a significant difference between the study participants' neuropathy complications and their control status. The test revealed a statistically significant difference between participants with neuropathy complications about controlled status ($\mathbf{X^2}$ = 6.656, p = 0.007). These finding were consistent with Hunaifi and colleagues' study in 2021. In patients with type 2 diabetes, the degree of neuropathy is correlated with the HbA1c level. The Neuropathy Disability Score increases with increasing HbA1c. It is essential to monitor HbA1c levels to stop additional diabetic complications in the nervous system and other organs (Hunaifi *et al.*, 2021).

A Case–Control Study by Nozawa and colleagues (2022) found that during the 3-year observation period, the Diabetic Peripheral Neuropathy group's mean HbA1c levels were 7.2 ± 1.0%, while the control groups were 6.9 ± 1.1%. While HbA1c variability was not significantly correlated, elevated 3-year mean HbA1c levels were (adjusted odds ratio: 1.23, 95% confidence interval 1.06–1.42) significantly associated with DPN records. The unadjusted and adjusted mean HbA1c values that distinguished patients with and without DPN records were 6.5% and 7.1%, respectively (Nozawa *et al.*, 2022).

In Table (5.17), A chi-squared test was conducted to examine whether there was a significant difference between study participants' foot problems and complications about their controlling status. The test revealed no statistically significant difference between participants with foot problems and complications about controlled status ($\mathbf{X^2}$= 1.555, p = 0.134).

Table 5.17 shows that the more controlled study participants, according to HbA1c, were the participants who had not been diagnosed with any eye problems (41.6%), and the less controlled study participants, according to HbA1c, were the participants who had been diagnosed with an eye problem (24.8%). A chi-squared test was conducted to examine whether there was a significant difference between the study participants' eye problems and complications about their controlling status. The test revealed a high

statistically significant difference between participants with eye problems and complications about controlled status ($\mathbf{X^2}$ = 11.314, p = 0.001).

5.6.4 T2DM Complication (DCI) and Demographic Data

Table (5.18): Relationship between demographic data and T2DM complication

Personal Data		Num.	Mean	SD	factor	Factor	Sig
Gender	Male	161	2.16	1.67	t	1.195	0.231
	Female	239	2.37	1.68			
Age	55 years and less	93	1.94	1.59	f	2.951	0.033
	56 to 60 years	95	2.43	1.69			
	61 to 69 years	138	2.21	1.69			
	70 and above	74	2.67	1.67			
	Total	400	2.29	1.68			
Education	Primary	77	2.41	1.72		F 6.167	0.001
	Secondary	119	2.21	1.53			
	Intermediate diploma	104	2.30	1.70			
	University	55	1.54	1.68			
	Un educated	45	3.15	1.52			
	Total	400	2.29	1.68			
Work	Yes	57	1.57	1.61		F 6.111	0.002
	No	304	2.40	1.64			
	Retired	39	2.43	1.80			
	Total	400	2.29	1.68			
Income	500 and less	143	2.27	1.70		F 1.353	0.257
	501 to 999	64	2.65	1.42			
	1000	80	2.22	1.96			
	Above 1000	113	2.14	1.61			
	Total	400	2.29	1.68			
Smoking	Yes	35	2.00	1.78		F 0.703	0.496
	No	330	2.30	1.67			
	Leaving Smoking	35	2.45	1.61			
	Total	400	2.29	1.68			
Duration of disease	5 and less	131	1.87	1.74		F 13.00	0.001
	6 to 10	145	2.15	1.56			
	Above 10	124	2.88	1.58			
	Total	400	2.29	1.68			
Family history	Yes	264	2.44	1.66		T - 2.55	0.011
	No	136	1.99	1.66			
Other Chronic Diseases	Yes	255	2.59	1.60		T - 4.906	0.001
	No	145	1.75	1.68			
Governorates	Gaza	159	1.76	1.67		F 9.350	0.001
	North	60	2.60	1.68			
	middle	40	2.55	1.33			

	South	141	2.68	1.63			
	Total	400	2.29	1.68			

*P value < 0.05 is statistically significant

As shown in Table 5.18, the fewer DCI study participants according to years of education were the participants with an uneducated mean (3.15), followed by the participants with a primary education mean (2.41), followed by the participants with an intermediate diploma mean (2.30), and secondary education participants with a university education in the order means (2.21) (1.54).

A one-way ANOVA test was conducted to examine whether there was a significant difference between participants' DCI and education level. There was a highly statistically significant relationship between the level of education and DCI (F = 6.16, P = 0.001). The Beefaroni posthoc test has revealed that the DCI for participants with primary education was higher by 0.87 compared to participants with university education. The difference was statistically significant; statistics are not shown.

The cross-sectional study done by Koelina and colleagues (2020), demonstrated an inverse relationship between the development of complications and education, i.e., the more educated one is, the fewer complications one has from diabetes (Koelina Sil, 2020) .

In Table 5.18, the most DCI study participants according to age group were the participants with an age of 70 years or older (2.67), followed by the participants with ages between 56 and 60 years old (2.43), and the participants with ages between 61 and 69 years old (2.21). Also, a one-way ANOVA test was conducted to examine whether there was a significant difference between participants' DCI and age group; there was a highly statistically significant relationship between age and DCI (F = 2.95, P = 0.033). The Beefaroni post-hoc test has revealed that the DCI for participants aged less than 55 years old was lower by 7.29 compared to participants in the study aged 70 years old or older. The difference was statistically significant; statistics are not shown.

Table (5.18) reveals that the more DCI study participants, the higher the mean (2.43) among retired participants compared to unemployment and working participants (2.40) (1.57) in order. Also, the one-way ANOVA test was conducted to examine whether there was a significant difference between participants' DCI and work status. There was a highly statistically significant relationship between work status and DCI (F = 6.11, P =

0.002). The Beefaroni posthoc test has revealed that the DCI for participants with working was lower by 0.82 compared to participants with unemployment and lower by 0.85 compared to participants with retired from working. The difference was statistically significant; statistics are not shown.

As shown in Table 5.18, the more DCI study participants according to the duration of the diseases, the participants with a duration of T2DM of more than 10 years mean (2.88), followed by the participants with diagnosed T2DM between 6 and 10 years mean (2.15), and the participants with diagnosed T2DM less than 5 years mean (1.87). Also, the one-way ANOVA test was conducted to examine whether there was a significant difference between participants' DCI and disease duration. There was a highly statistically significant relationship between disease duration and DCI (F = 13.00, P = 0.001). The Beefaroni post-hoc test has revealed that the DCI for participants with the diagnosis of T2DM aged 5 years or less was lower by 1 compared to participants in the study with more than 10 years of diagnosed T2DM. The difference was statistically significant, but statistics are not shown.

The finding in this study was consistent with the Cortez and colleagues study (2015), The findings also suggested that the time at which diabetes-related complications first appeared may be related to the disease's diagnosis, since among patients who had the condition for more than ten years, the proportion of those who experienced problems (32.2%; 156) was higher than the percentage of complications overall (Cortez *et al.*, 2015).

Table 5.18 reveals that the more DCI study participants, the higher the number of participants with a family history mean (2.44) compared to the participants with no family history mean (1.99). Also, the independent sample t-test was conducted to examine whether there was a significant difference between participants' DCI and family history. There was a highly statistically significant relationship between family history and DCI (T = 2.55, P = 0.01).

The finding of this study was consistent with Xiong and colleagues' study in 2020, a potential association between diabetic retinopathy and a family history of diabetes (Xiong et al., 2020). A cross-sectional study done by Alharithy and colleagues (2018) show, A sibling's history of T2DM is strongly linked to a worse prognosis for cerebrovascular disease (Alharithy *et al.*, 2018)

Table 5.18 shows that the more DCI study participants were higher among patients with co-morbidity participants mean (2.59) compared to no co-morbidity patients with participants mean (1.75). The independent sample t-test was conducted to examine whether there was a significant difference between participants' DCI and co-morbidity. There was a highly statistically significant relationship between co-morbidity and DCI (T = 4.90, P = 0.001). Also, among the T2DM participants, hypertension (71%; 95% CI 69–73), hyperlipidemia (34%; 95% CI 32–36), and obesity (27%; 95% CI 25–29) were the most prevalent complications/comorbidities (Ekoru *et al.*, 2019) .

In Table 5.18, the most DCI study participants according to governorate were the participants from the south governorate (2.68), followed by the participants who lived in the north Gaza (2.60), followed by the participants who lived in the middle Gaza and Gaza City (2.55, 1.76, respectively). Aslo, the one-way ANOVA test was conducted to examine whether there was a significant difference between participants' DCI and governorate. The results show that there was a highly statistically significant relationship between governorate and DCI (F = 9.35, P = 0.001). The Beefaroni post-test has revealed that the DCI for participants who live in north Gaza was higher by 0.15 compared to participants in the study who live in Gaza City. The difference was statistically significant; statistics are not shown.

A one-way ANOVA test was conducted to examine whether there was a significant difference between participants' DCI and smoking, gender, and income; there was no statistically significant association between this variable and DCI (P> 0.05).

5.6.5 T2DM Complication (DCI) and Lifestyle

Table (5.19): Relationship between lifestyle data and T2DM complication

Items		Num.	Mean	SD	Test	Sig
Knowledge	Low	247	2.44	1.70	T 2.30	0.020
	Moderate to high	153	2.04	1.61		
Attitude	Low	134	2.30	1.67	F 0.009	0.991
	Moderate	139	2.28	1.65		
	High	127	2.28	1.73		
Practice	Low	317	2.29	1.68	T 0.078	0.938
	Moderate to high	83	2.27	1.68		
Patients satisfaction	Low	152	2.57	1.64	F 3.897	0.021
	Moderate	35	2.28	1.70		
	High	213	2.08	1.67		
Self-management						

		Num.	Mean	SD	Test	Sig.
Self-management	.00	77	6.87	1.99	F 2.98	0.007
	1.00	73	6.66	1.97		
	2.00	68	7.08	1.62		
	3.00	73	6.68	1.85		
	4.00	62	6.62	1.73		
	5.00	42	5.85	1.97		
	6.00	5	4.75	0.81		
	Total	**400**	**6.66**	**1.88**		
Dietary control	.00	77	6.58	1.86	F 3.79	0.001
	1.00	73	6.50	1.99		
	2.00	68	6.91	1.79		
	3.00	73	6.29	2.18		
	4.00	62	6.11	2.07		
	5.00	42	5.55	2.27		
	6.00	5	3.66	2.67		
	Total	**400**	**6.35**	**2.06**		
Physical activity	.00	77	6.79	3.16	F 3.67	0.001
	1.00	73	6.62	3.11		
	2.00	68	6.74	3.41		
	3.00	73	5.70	3.76		
	4.00	62	5.77	3.47		
	5.00	42	4.41	3.82		
	6.00	5	3.33	3.68		
	Total	**400**	**6.10**	**3.50**		
Health-care use	.00	77	6.62	2.66	F 1.12	0.34
	1.00	73	6.72	2.42		
	2.00	68	7.02	2.30		
	3.00	73	7.24	2.02		
	4.00	62	7.27	2.06		
	5.00	42	6.50	1.95		
	6.00	5	6.22	2.43		
	Total	**400**	**6.90**	**2.28**		
Glucose management	.00	77	10.36	3.56	F 1.73	0.11
	1.00	73	9.69	3.45		
	2.00	68	10.83	2.61		
	3.00	73	10.69	2.72		
	4.00	62	10.46	2.55		
	5.00	42	9.69	2.75		
	6.00	5	8.40	1.67		
	Total	**400**	**10.30**	**3.01**		

*P value < 0.05 is statistically significant

According to Table 5.19, participants with low knowledge scores had more T2DM complications than participants with moderate to high knowledge scores.

An independent sample t-test was used to determine whether there was a highly statistically significant association between participants' DCI and knowledge score (T = 2.30, P = 0.02). This finding was consistent with Kifle and colleagues (2022) where high knowledge scores regarding diabetes mellitus and its long-term complications found in this study. Participants knowledge of chronic complications was significantly associated with age, educational attainment, length of diabetes diagnosis, and employment status (Kifle *et al.*, 2022).

Based on Table 5.19, most DCI study participants, according to their patient satisfaction, had a low patient satisfaction mean (2.57), followed by moderate and high patient satisfaction means (2.28) and (2.08), respectively.

A one-way ANOVA test was used to determine whether there was a significant difference between participants' DCI and patient satisfaction, which had a highly statistically significant association with DCI (F = 3.89, P = 0.02). The Beefaroni posthoc test has revealed that the DCI for participants with low patient satisfaction was higher by 0.49 compared to participants in the study with high patient satisfaction. The difference was statistically significant; statistics are not shown.

Environmental convenience to ask questions, politeness of service providers and availability of ordered drugs at the primary healthcare centers were statistically significant factors for patient satisfaction in Ethiopia(Ayele *et al.*, 2022)Also, diabetic patients’ satisfaction has been associated with blood glucose levels, management treatment plans, and treatment evaluations (Ayele *et al.*, 2022; Prado-Galbarro *et al.*, 2020)

In Table 5.19, According to the DCI score, study participants with greater self-management scores had a mean of two types of T2DM complications (7.08), followed by those with a mean of no type of T2DM complications (6.87), and finally, those with a mean of one type of T2DM complications (6.66).

A one-way ANOVA test was used to determine whether there was a significant

difference between participants' DCI and self-management scores and whether there was a highly statistically significant association with DCI (F = 2.98, P = 0.007). The Beefaroni post-hoc test showed that participants with two types of T2DM complications, as measured by the DCI score, had self-management scores that were 1.23 higher than those of participants in the study who had five types of T2DM complications. Statistics are not shown, but the difference was statistically significant.

Studying has demonstrated that while those with type II diabetes who are careless with their own needs frequently experience complications, those who practice good self-management can achieve and maintain glycemic control and avoid frequent complications (Karthik *et al.*, 2020; Oluma *et al.*, 2021) .

Patients and their families are primarily responsible for the day-to-day management of their diabetes. The ability to effectively manage or cope with the symptoms, course of treatment, physical and psychological effects, and lifestyle adjustments that come with having a chronic illness on a day-to-day basis is known as self-management (Almutairi *et al.*, 2020) . Therefore, Karthik and colleagues (2020) shows that self-management is essential for reaching glycemic control, enhancing the quality of life, and reducing treatment costs (Karthik et al., 2020),

Support for self-management in individuals with T2DM may also enhance clinical outcomes, including blood pressure, lipid profiles, and fasting plasma glucose (Hisni et al., 2019). Healthy eating, exercise, self-monitoring blood sugar, taking medication as prescribed, problem-solving techniques, constructive coping strategies, and lowering risky behaviors are among the most popular self-management practices (Almutairi et al., 2020; Karthik et al., 2020).

As shown in Table 5.19, a one-way ANOVA test was used to determine whether there was a significant difference between participants' DCI and glucose management and health-care use, which had no statistically significant association with DCI (P > 0.05).

In Table 5.19, According to the DCI score, study participants with greater dietary control had a mean of two types of T2DM complications (6.91), followed by those with a mean of no type of T2DM complications (6.58), and finally, those with a mean of one type of T2DM complications (6.50).

A one-way ANOVA test was used to determine whether there was a significant

difference between participants' DCI and dietary control and whether there was a highly statistically significant association with DCI (F = 3.79, P = 0.001). The Beefaroni posthoc test showed that participants with two types of T2DM complications, as measured by the DCI score, had dietary controls that were 3.24 higher than those of participants in the study who had six types of T2DM complications. Statistics are not shown, but the difference was statistically significant.

As shown in Table 5.19, According to the DCI score, study participants with greater physical activity had a mean of no types of T2DM complications (6.79), followed by those with a mean of two types of T2DM complications (6.74), and finally, those with a mean of one type of T2DM complications (6.62).

A one-way ANOVA test was used to determine whether there was a significant difference between participants' DCI and physical activity and whether there was a highly statistically significant association with DCI (F = 3.67, P = 0.001). The Beefaroni post-hoc test showed that participants with two types of T2DM complications, as measured by the DCI score, had a physical activity that was 2.33 higher than those of participants in the study who had five types of T2DM complications. Statistics are not shown, but the difference was statistically significant.

5.6.6 Control Status with Follow-up and Accessibility

Table (5.20): Differences between follow-up and accessibility with control status

Indication		**Hb1Ac**						**X^2**	**Sig.**
		Controlled		**Uncontrolled**		**Total Num. %**			
		Num.	**%**	**Num.**	**%**				
Regular visits to the health center	No	20	14.1	48	18.6	68	100.0	1.326	0.24
	Yes	122	85.9	210	81.4	332	100.0		
Check T2DM regularly	No	7	4.9	26	10.1	33	100.0	3.415	0.18
	Yes	91	64.1	151	58.5	242	100.0		
	Not always	44	31	81	31.4	125	100		
Patients education	No	23	16.2	65	25.2	88	100.0	4.320	0.038

	Yes	119	83.8	193	74.8	312	100.0		
Accessibility	No	17	12	44	17.1	64	100.0	1.831	0.17
	Yes	125	88	214	82.9	339	100.0		
Waiting time	Short	7	4.9	4	1.6	11	100.0	6.250	0.044
	Accept	124	87.3	220	85.3	344	100.0		
	Long	11	7.7	34	13.2	45	100.0		

*P value < 0.05 is statistically significant

Table 5.20 shows the more controlled study participants according to HbA1c, where the participants had been educated about T2DM (83.8%), and the less controlled study participants, according to HbA1c, where the participants had not been educated about T2DM (16.2%). A chi-squared test was conducted to examine whether there was a significant difference between the study participants' education and control status. The test revealed a statistically significant difference between participants with patients' education and controlled status ($\mathbf{X^2} = 4.320$, $p = 0.038$). This finding was consistent with Phillips and colleagues in 2018, individuals without prior diabetes education had a mean HbA1c that was 0.86% higher and an average MDKT score that was 15.3% lower than that of those who had previously received diabetes education (Phillips *et al.*, 2018) .

In Table 5.20, the more controlled study participants according to HbA1c were the participants who had accepted waiting time (87.3%), and the less controlled study participants, according to HbA1c, were the participants who had short waiting time and long waiting time (4.9%) (7.7%) in order. A chi-squared test was conducted to examine whether there was a significant difference between waiting time and controlling status. The test revealed a statistically significant difference between waiting time and controlled status ($\mathbf{X^2} = 6.250$, $p = 0.044$). All other variables in **Table 5.20** were not statistically significant compared to the control status ($P > 0.05$).

Chapter Six

Conclusion and Recommendations

6.1 Conclusion

The rapid shift in the disease profile of GS from communicable to non-communicable diseases—primarily diabetes and hypertension—is indicative of an epidemiological transition. In Palestine, T2DM is the second leading cause of death and a major risk factor for the other two top causes, strokes and cardiovascular illnesses. In the GS, MoH is the primary healthcare provider of choice for Palestinian citizens.

All citizens in the GS are entitled to a comprehensive package of primary health services, which includes integrated healthcare services for clients with diabetes. Therefore, the evaluation of the MoH T2DM health services' outcomes and the production of evidence that could be applied to improve and promote the caliber of T2DM health services rendered were imperative. Additionally, the study may have contributed to the creation of new policies or the improvement of current ones, thereby enhancing the overall efficacy and efficiency of service delivery.

By evaluating the key elements and results of T2DM services through a mixed methods study, the MoH T2DM health services were assessed. 380 participants were asked to complete a structured questionnaire designed to gather quantitative data regarding their opinions of the T2DM services they received. Utilizing one-on-one interviews, a qualitative approach was used to gather data from service providers about their opinions of the services they receive, their strengths and weaknesses, and the biggest obstacles they encounter.

The quantitative findings of this study were collected from female (59.8%), and male (40.3%) T2DM patients, with a mean age of 60 years. 78.5% of study participants were married, and about two-thirds of the study participants (76%) were unemployed compared to 14.2% of the participants were employed.

The study findings have revealed that the average monthly income of the study participants was 1019.92 NIS. Of the study male participants, 8.8% of were smokers at the time of data collection. The mean duration of being diagnosed with diabetes for study participants was 9.5 years and more than two-third (63.7%) have other co-

morbidity, mainly hypertension. The major cause for their visit to the health center was to do laboratory tests.

The majority of participants have a reasonable little amount of knowledge about diabetes mellitus (T2DM); the mean appropriate knowledge was 47.08%. The areas where clients with diabetes lack knowledge are in the areas of T2DM despite this are clients' knowledge of symptoms and signs of hyperglycemia and hypoglycemia, and clients' knowledge on self-care management, including diet, foot care, and follow-up. In contrast, the attitude score for participants study was moderate (25.05%), These results reflect an attitude gap. Furthermore, the practice score was low at 52.03%. All patients completed the KAP questionnaire, and the average score was low (47.08%).

The majority of the study participants (84.8%) have expressed high accessibility to MoH T2DM services, as only 15.3% have reported accessibility problems mainly financial accessibility due to transportation costs. To receive the needed services, clients need to spend approximately 39.13 minutes, of which only approximately ten minutes as contact time with health providers and approximately 5 minutes with nurses. Despite such a long time, less than one-quarter (11.3%) of the study participants consider the time was reasonable.

MoH T2DM services met the expectations of the vast almost half of the participants as expressed by 41.8% of the study participants. The main barriers for utilizing T2DM services from the participant's perspective were Providing medication 85.5%, Cost of services (43.3%), and blood sugar regulation (37%).

Approximately one quarters (22%) of the study participants did not receive any kind self-care education on T2DM by health care providers. Of those who have received self-care education, it was mainly provided by nurses (49.7%) and physicians (39.4%). The study participants have expressed their need to have more knowledge about T2DM, including of managing stress and tension, signs and symptoms of hyperglycemia and hypoglycemia, disease self-care and complication and prevention of DM complications.

The majority of (83%) the study participants conduct regular follow up visits to MoH health centers, and the main reasons for not conducting regular follow-up care were: not like the general appearance and the internal facilities of the clinic (58.8%) followed by the movement and leaving the house are not easy (38.2%). About 60.5% of participants monitor their blood sugar at the MoH health center exclusively; the rest did it outside

MoH to moving and leaving the house is not easy (as expressed by 62.3%), followed by saving time (45.5%) and tests I need are not available (28.6%).

About T2DM complications screening, less than two-thirds (60.5%) of study participants had done their annual fundus eye examination during the last year, 41.5% of study participants had done their foot screening exam during the last year and 98 % of study participants had done their annual laboratory analysis during the last year. Compared to international studies, these results were considered as good, but the problem is found in changing the T2DM management accordingly.

Study participants perceived that MoH T2DM services were feeling satisfied with 89.5%. The vast majority of participants (98%) recommend the MoH T2DM services to their friends and relatives, and they continue to receive the T2DM services from MoH PHCS.

The most common macrovascular complication was neuropathy, with 71.3% of patients reporting one or more of them, followed by heart attack diseases, with 50% of patients reporting one or more of them, eye problems, Peripheral Vascular Disease (PVD), Cerebrovascular diseases (CVD), and foot problems were the next most common complications.

The study participants' mean for total self-management was 6.66, and the mean for glucose management was 6.7, but the study participants' mean for dietary control was 6.35, the study participants' mean for physical activity was 6.10, and finally, the study participants' mean for health-care use was 6.90. The study findings have revealed a statistically significant relationship between control status and practice score, DCI, self-management including dietary control, physical activity, glucose management, and healthcare use, and T2DM such as heart attack, PVD, neuropathy disease, and eye problems. However, there is no significant association between control status demographic data, and knowledge and attitude scores.

In addition, there is a statistically significant relationship between the participants' DCI and disease duration, level of education, age, work status, family history, governorates, family history, co-morbidity, knowledge, self-management, and patient’s satisfaction. However, there was no statistically significant association between participants' DCI and smoking, gender, income, attitude, and practices.

The study findings show there is a statistically significant relationship between the control status, waiting time, and patients' education. However, there was no statistically significant association between control status and accessibility, regular visits to the health center, and T2DM.

According to study results, only 35.5% of participants had glycemic control according to HbA1c (more or equal to 7%). Female participants and never-smoked participants were the more control participants according to HbA1c.

Notably, the qualitative study stressed the significance of healthcare providers' knowledge, expertise, and experience in delivering high-quality T2DM services. By reducing the amount of time that health providers spend with T2DM patients, their overload prevents them from giving their all. The health provider wants to receive training in critical areas of T2DM management, such as communication, T2DM complications, and T2DM self-care, because they view it as a vital tool for enhancing T2DM health services. The health providers think that the appointment system for MoH diabetes services is effective, but the economic situation makes it hard for T2DM patients to commit to the appointment date.

The appropriate health provider-patient contact time is very important to provide qualitative T2DM services, they need at least 10 minutes to do that, but unfortunately, they have only 5 minutes to do all necessary jobs. This short contact time led to the previously mentioned poor communication between health providers and patients and insufficient T2DM self-care education.

6.2 Recommendations

General recommendations

- Improving the control status of T2DM is highly important by enhancing the patient's self-care management.
- The communication and interaction between health providers and patients need to be strengthened through using illustrative means and increasing means of communication.
- Contact time with T2DM patients’ needs to increase. This could be achieved by decreasing the health provider workload and effectively use the appointment system.

- Examine and update health institutions' training curricula to incorporate DM awareness and screening techniques. Those who are expected to instruct others may see a positive impact on their health behavior as a result of this.
- Enhancement of the role of media (TV/Radio, newspaper, and magazines) in the providing of information and increasing awareness about self-management for T2DM and complications.
- Improving the control status of T2DM is highly important by enhancing the patient's self-care management and complications.
- Strengthening the monitoring system in MoH health centers is necessary.
- The MoH guidelines need to be updated with the most recent information regarding the management of T2DM, particularly about complications and uncontrolled patients.

6.3 Recommendation for future research

- Conduct research investigations to investigate the primary factors influencing the caliber of health services provided to T2DM patients.
- Research is required to determine how patient-client interactions affect treatment results.
- Conduct additional research using both qualitative and quantitative techniques to fully examine DCI and the variables that influence it.
- evaluating health care workers' knowledge, awareness, and screening and T2DM-related behaviors through research.

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Annexes

Annex (1): Helsinki Committee research approval

المجلس الفلسطيني للبحث الصحي

Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee

For Ethical Approval

Date: 06/06/2022 **Number:** PHRC/HC/1134/22

Name: Walaa klay Daloul الاسم:

We would like to inform you that the committee had discussed the proposal of your study about: نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Evaluation of Type 2 Diabetes Mellitus Services Provided by the Ministry of Health in Gaza Strip: A Mixed Study

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/1134/22 in its meeting on 06/06/2022 و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

Chairman

Genral Conditions:-

1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

E-Mail:pal.phrc@gmail.com

Gaza - Palestine غزة - فلسطين

شارع النصر - مفترق العيون

Annex (2): Time framework.

Activity	Duration	1	2	3	4	5	6	7	8	9	10	11	12
Proposal writing	2 months												
Proposal Approval & Tool designing	1 month												
Pilot Study	2 weeks												
Data Collection	3 months												
Data Entry	2 months												
Data Analysis	2 months												
Writing the final thesis	3 months												

Annex (3):

Table: Health centers and their number of diabetes clients

No.	Health Centers	No. of DM patients	Sample No.
1- North Gaza			
1-	Jabaliya	128	35
2-	Alshimaa	100	25
2- Gaza			
1-	Alrimal	314	125
2-	Alzytoon	176	15
3- South Gaza			
1-	Rafah	120	55
2-	Kanyounis	185	85
4- Middle Gaza			
	Dier Alballah	109	35
2-	Maghazi	20	5
Total			380

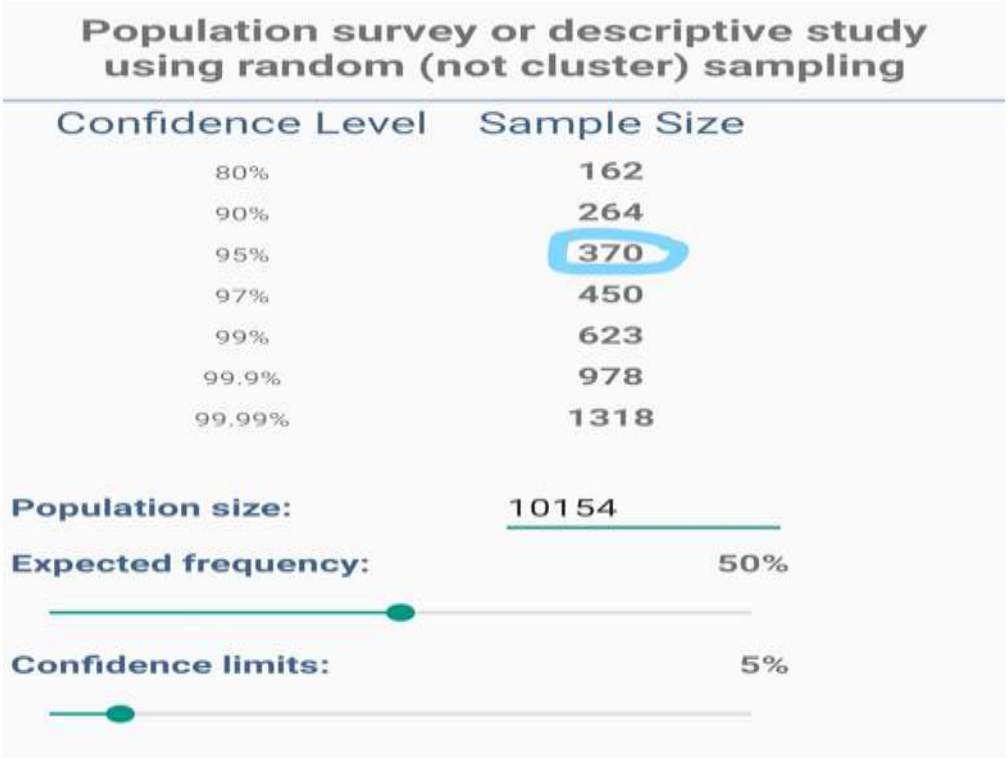
Annex (4) Distribution of the study participants according to Knowledge

Items	False		True		Total	
	Num.	%	Num.	%	Num.	%
What is diabetes	92	23.0	308	77.0	400	100.0
Know the types of diabetes do you know	111	27.8	289	72.3	400	100.0
type 2 diabetes is: The body is insulin resistant (usually occurs in obese people over 40 years of age	142	35.5	258	64.5	400	100.0
Who is at risk of developing diabetes?						
Obese people	212	53.0	188	47.0	400	100.0
People who suffer from lack of movement	316	79.0	84	21.0	400	100.0
People who eat a lot of fat, sweet, starch, and tobacco	229	57.3	171	42.8	400	100.0
People with a family history of diabetes	123	30.8	277	69.3	400	100.0
Muscular people	1	0.2	399	99.8	400	100.0
People who exercise regularly, eat well	1	0.2	399	99.8	400	100.0
People who do not have a family history of diabetes	10	2.5	390	97.5	400	100.0
Skinny people, eat normally	2	0.5	398	99.5	400	100.0
People who do not smoke	2	0.5	398	99.5	400	100.0
People who are going through a bad psychological state as a result of severe anger or a difficult situation	125	31.3	275	68.8	400	100.0
Symptoms of diabetes						
Eating a lot	261	65.3	139	34.8	400	100.0
Drinking a lot	291	72.8	109	27.3	400	100.0
Peeing a lot	174	43.5	226	56.5	400	100.0
Losing weight a lot	282	70.5	118	29.5	400	100.0
Eating normally	28	7.0	372	93.0	400	100.0

Lose a little weight	71	17.8	329	82.3	400	100.0
Moderate Urination	29	7.2	371	92.8	400	100.0
How many types of diabetes complications are there?						
Two Types Severe and Chronic	395	98.8	5	1.3	400	100.0
What are the acute complications of diabetes						
Insomnia and anxiety	245	61.3	155	38.8	400	100.0
High blood sugar	173	43.3	227	56.8	400	100.0
Coma due to hyperglycemia	191	47.9	209	52.3	400	100.0
Hypoglycemia	301	75.3	99	24.8	400	100.0
Weight loss	264	66.0	136	34.0	400	100.0
Chronic complications of diabetes						
Cardiovascular complications	178	44.5	222	55.5	400	100.0
Kidney failure	245	61.3	155	38.8	400	100.0
ED	208	52.0	192	48.0	400	100.0
Insomnia and anxiety	148	37.0	252	63.0	400	100.0
Low vision	109	27.3	291	72.8	400	100.0
Foot ulcers	183	45.8	217	54.3	400	100.0
The ways to prevent complications in patients with diabetes						
Take prescribed medications	63	15.8	337	84.3	400	100.0
Routine blood glucose test	256	64.0	144	36.0	400	100.0
Reasonable eating	123	30.8	277	69.3	400	100.0
Do proper exercise	115	28.7	285	71.3	400	100.0
There is no need for routine blood glucose testing, no need for food, no medication, and limited movement	29	7.2	371	92.8	400	100.0
Test whenever you want, just taking medication is enough without the need for healthy eating and exercise	37	9.3	363	90.8	400	100.0
The signs of hypoglycemia in diabetic patients						
Dizziness	51	12.8	349	87.3	400	100.0
Sweating	232	58.0	168	42.0	400	100.0

Not feeling comfortable	284	71.0	116	29.0	400	100.0
Stomach pain	25	6.3	275	93.8	400	100.0
High fever	19	4.8	381	95.3	400	100.0
Difficulty breathing	78	19.5	322	80.5	400	100.0

Annex (5) sample size calculation



Annex (6) Informed consent for the quantitative part and Questionnaire

Dear participant,

I'm Walaa Klay Daloul, a master's student at Al Quds University's Faculty of Public Health, and I'd like to invite you to participate in the research called "Evaluation of Type 2 Diabetes Mellitus Services Provided by the Ministry of Health in Gaza Strip: A Mixed Study".

Participation is entirely voluntary, and you are free to decline. If you say no, it have no negative consequences for you. You may also withdraw from the study at any time, even if you have agreed to participate previously.

The study aims at evaluating the T2DM services provided at PHC of the MoH in the GS from providers' and patients' perspectives to suggest possible recommendations to improve the control status, and patient satisfaction and reduce mortality, morbidity, and complications.

We invite you to share your expertise as a patient with diabetes, and your role be to fill out a questionnaire with information relevant to the study's objectives.

The information gathered from you be kept in a locked folder and treated as confidential. There is no risk in participating in this study. Your identity as a participant be kept strictly confidential if it is used in a publication or thesis.

You not be paid to participate in the research, and there be no costs to you if you do.

Please sign the attached Declaration of Consent if you agree to participate in this study.

DECLARATION BY PARTICIPANT

By signing below, I.....agree to take part in a

The research study entitled **"**Evaluation of Type 2 Diabetes

Mellitus Services Provided by the Ministry of Health in Gaza

Strip: A Mixed Study**".** and conducted by: Walaa Daloul.

عزيزي المشارك،

أنا ولاء كلاي دلول، طالبة ماجستير في كلية الصحة العامة بجامعة القدس، وأود أن أدعوكم للمشاركة في البحث المسمى "تقييم خدمات مرض السكري من النوع 2 التي تقدمها وزارة الصحة في قطاع غزة: دراسة مختلطة ".

المشاركة طوعية تمامًا، ولك مطلق الحرية في الرفض. إذا قلت لا، فلن يكون لذلك عواقب سلبية عليك. يمكنك أيضًا الانسحاب من الدراسة في أي وقت، حتى إذا كنت قد وافقت على المشاركة مسبقًا.

تهدف الدراسة إلى تقييم خدمات مرض السكري من النوع 2المقدمة في الرعاية الصحية الأولية بوزارة الصحة في قطاع غزة من وجهة نظر مقدمي الخدمة والمرضى لاقتراح التوصيات الممكنة لتحسين حالة التحكم ورضا المريض وتقليل الوفيات والمراضة والمضاعفات.

ندعوك لمشاركة خبرتك كمريض مصاب بداء السكري، وسيكون دورك هو ملء استبيان بالمعلومات ذات الصلة بأهداف الدراسة.

سيتم الاحتفاظ بالمعلومات التي تم جمعها منك في ملف مغلق وسرية. لا يوجد خطر في المشاركة في هذه الدراسة. سيتم الاحتفاظ بهويتك كمشارك بسرية تامة إذا تم استخدامها في منشور أو أطروحة.

لن يتم الدفع لك مقابل المشاركة في البحث، ولن تتحمل أي تكاليف إذا قمت بذلك.

يرجى التوقيع على إعلان الموافقة المرفق إذا كنت توافق على المشاركة في هذه الدراسة.

إعلان من قبل المشارك

بالتوقيع أدناه، .....أوافق على المشاركة في

الدراسة البحثية بعنوان "تقييم خدمات مرض السكري من النوع الثاني التي تقدمها وزارة الصحة في قطاع غزة: دراسة مختلطة". وأجريت من قبل: ولاء كلاي دلول.

شكرا لتعاونك

مع فائق الاحترام والتقدير

Informed consent for the qualitative part

Dear participant,

I'm Walaa Klay Daloul, a master's student at Al Quds University's Faculty of Public Health, and I'd like to invite you to participate in the research called "Evaluation of Type 2 Diabetes Mellitus Services Provided by the Ministry of Health in Gaza Strip: A Mixed Study".

Participation is entirely voluntary, and you are free to decline. If you say no, it have no negative consequences for you. You may also withdraw from the study at any time, even if you have agreed to participate previously.

The study aims at evaluating the T2DM services provided at PHC of the MoH in the GS from providers' and patients' perspectives to suggest possible recommendations to improve the control status, and patient satisfaction and reduce mortality, morbidity, and complications.

We invite you to share your expertise as a healthcare provider with us, and your role be to provide us with information about the study's objectives by participating in a focus group discussion.

The research not benefit you personally, but it provide policymakers with systematic data to develop a future plan. There is also no risk in participating in this research.

The information gathered from you be audio recorded/saved and kept private and confidential. Your identity as a participant be kept anonymous if it is used in a publication or thesis. You not be paid to participate in the research, and there be no costs to you if you do.

If you agree to participate in this study, please sign and return the attached Declaration of Consent.

DECLARATION BY PARTICIPANT

By signing below, I.....agree to take part in a

The research study entitled **"**Evaluation of Type 2 Diabetes

Mellitus Services Provided by the Ministry of Health in Gaza

Strip: A Mixed Study**".** and conducted by: Walaa Daloul.

Thanks for your cooperation

With high respect and appreciation

عزيزي /تي المشارك،

أنا ولاء كلاي دلول، طالبة ماجستير في كلية الصحة العامة بجامعة القدس، وأود أن أدعوكم للمشاركة في البحث المسمى "تقييم خدمات مرض السكري من النوع 2 التي تقدمها وزارة الصحة في قطاع غزة: دراسة مختلطة ".

المشاركة طوعية تمامًا، ولك مطلق الحرية في الرفض. إذا قلت لا، فلن يكون لذلك عواقب سلبية عليك. يمكنك أيضًا الانسحاب من الدراسة في أي وقت، حتى إذا كنت قد وافقت على المشاركة مسبقًا.

تهدف الدراسة إلى تقييم خدمات مرض السكري من النوع 2المقدمة في الرعاية الصحية الأولية بوزارة الصحة في قطاع غزة من وجهة نظر مقدمي الخدمة والمرضى لاقتراح التوصيات الممكنة لتحسين حالة التحكم ورضا المريض وتقليل الوفيات والمراضة والمضاعفات.

ندعوك لمشاركة خبرتك كمريض مصاب بداء السكري، وسيكون دورك هو ملء استبيان بالمعلومات ذات الصلة بأهداف الدراسة.

ندعوك لمشاركة خبرتك كمقدم رعاية صحية معنا، وسيكون دورك هو تزويدنا بمعلومات حول أهداف الدراسة من خلال المشاركة في مناقشة جماعية مركزة.

لن يفيدك البحث شخصيًا، لكنه سيزود صانعي السياسات ببيانات منهجية لتطوير خطة مستقبلية. لا يوجد خطر أيضًا في المشاركة في هذا البحث.

سيتم تسجيل / حفظ المعلومات التي يتم جمعها منك صوتيًا والحفاظ على خصوصيتها وسريتها. سيتم الاحتفاظ بهويتك كمشارك مجهولة إذا تم استخدامها في منشور أو أطروحة. لن يتم الدفع لك مقابل المشاركة في البحث، ولن تتحمل أي تكاليف إذا قمت بذلك.

يرجى التوقيع على إعلان الموافقة المرفق إذا كنت توافق على المشاركة في هذه الدراسة.

إعلان من قبل المشارك

بالتوقيع أدناه، .....أوافق على المشاركة في

الدراسة البحثية بعنوان "تقييم خدمات مرض السكري من النوع الثاني التي تقدمها وزارة الصحة في قطاع غزة: دراسة مختلطة". وأجريت من قبل: ولاء كلاي دلول.

شكرا لتعاونك

مع فائق الاحترام والتقدير

تقييم الخدمات المقدمة لمرضى السكري من النوع الثاني في مراكز الرعاية الأولية التابعة لمراكز وزارة الصحة الفلسطينية

مقدمة عن الدراسة

الأمراض غير المعدية هي من بين الأسباب الرئيسية للوفيات والممراضة على مستوى العالم .وأحد اهم هذه الأمراض هو مرض السكري من النوع الثاني

في قطاع غزة، تعد وزارة الصحة الفلسطينية واحدة من أهم مقدمي الخدمات الصحية الرئيسيين .للأمراض الغير معدية، بما في ذلك مرض السكري من النوع الثاني

تهدف هذه الدراسة إلى تقييم الخدمات المقدمة لمرضى السكري من النوع الثاني في مراكز الرعاية الأولية التابعة لوزارة الصحة الفلسطينية في قطاع غزة لاقتراح توصيات لتحسين جودة هذه الخدماتوالعمل على تقليل حدوث مضاعفات لدى مرضى السكري.

حصلت هذه الدراسة على الموافقة الأخلاقية من المجلس الفلسطيني للبحث العلمي (لجنة هلسنكي) وموافقة من جامعة القدس أبو ديس.

تم تصميم هذه الدراسة بطريقة مختلطة، اي انها تحتوي على كل من دراسة كمية ونوعية. تسيتم جمع البيانات الكمية من المستفيدين الذين استخدموا الخدمات الصحية المقدمة لمرضى السكري من النوع الثاني في المراكز الرعاية الأولية التابعة لوزارة الصحة، سيتم التعامل مع 420 مريضا في الدراسة الكمية. أما الدراسة النوعية، تم جمع البيانات من خلال ثمان مجموعات نقاش مركزة مع مقدمي الرعاية الصحية لمرضى السكري (الأطباء والممرضين). سيتم إجراء تحليل البيانات ، وسيشمل التحليل الاحصائي العديد من الاختبارات الإحصائية SPSS الكمية باستخدام برنامج المختلفة.

استبان تقييم الخدمة الصحية المقدمة لمرضى السكر النوع الثاني في مراكز الرعاية الصحية الأولية التابعة لوزارة الصحة/غزة

:الرقم التسلسلي

الجزء الأول: المعلومات الشخصية		
-1	اسم المركز الصحي:	المحافظة:
-2	الجنس: ذكر / أنثى	العمر:
-3	المستوى التعليمي: 1-ابتدائي 2-اعدادي 3-ثانوي 4-دبلوم 5-جامعة 6-غير متعلم	
-4	الحالة الاجتماعية: 1-متزوج/ة 2-أعزب/عزباء 3-مطلق/ة 4-أرمل/ة 5-منفصل	
-5	هل تعمل حاليا؟ 1-نعم 2-لا 3-متقاعد	
-6	إذا مازلت تعمل فما هو عملك؟	
-7	ما هو الدخل الشهري للعائلة؟ .....شيكل	
-8	هل أنت مدخن؟ 1- نعم 2- لا 3- مدخن سابق أذا كان الجواب نعم، منذ متى تدخن؟ كم هو عدد السجائر التي تدخنها خلال الأسبوع؟	
-9	هل تدخن الشيشة؟ 1- نعم 2- لا منذ متى؟ كم هي عدد المرات التي تدخنها خلال الأسبوع؟	
-10	ما سبب زيارتك للمركز الصحي اليوم؟ (غير موجه -أكثر من إجابة) 1-زيارة متابعة اعتيادية بموعد محدد سابقا 2-زيارة متابعة اعتيادية من غير موعد محدد سابقا 3-لأخذ الدواء 4- لعمل تحاليل مخبرية 5- أخرى، حدد ما هي.....	
الجزء الثاني: الملف الصحي		
-11	منذ متى تعاني من مرض السكري بالسنوات؟ .....سنة	
-12	هل يوجد تاريخ وراثي لمرض السكر في العائلة؟ 1- نعم (أجب السؤال التالي) 2- لا 3- لا أعلم	

-13	إذا كان الجواب نعم فما هي درجة القرابة؟ 1- قرابة من الدرجة الأولى (الأب، الأم، قرابة من الدرجة الثانية (الجد، الجدة، العم، الخال،) -2 الأخوان، الأخوات)اولاد العم، بنات العم
-14	هل تعاني/ين من امراض مزمنة أخرى؟ 1- لا (تخطى السؤال التالي) 2- نعم
-15	إذا نعم، حدد ماهي؟ (ممكن أكثر من واحد) 1- ضغط دم 2- أمراض في الكلى (اعتلال الكلى) 3 – أمراض القلب الوعائية 4- مشاكل في الاعصاب (الاعتلال العصبي) 5- أخرى، حدد.....
-16	هل تتلقى خدمات صحية لمعالجة مرض السكري من مقدم خدمة اخر غير الحكومة؟ 1- نعم (أجب الأسئلة التالية) 2- لا(اذهب الى السؤال التالي) 14.1- إذا نعم، من أين؟ 1-الوكالة 2-العيادات الخاصة 3-المؤسسات الاهلية والجمعيات 4- أخرى، حدد..... 14.2- لماذا؟ 1- جودة الخدمة المقدمة في المركز سيئة 2- عدم توافر الادوية والفحوصات اللازمة 3-ساعات العمل غير مناسبة 4-لتجنب الانتظار الطويل 5-عدم وجود خصوصية داخل المركز 6- لأني احتاج الى مركز متخصص 6- بعد المركز 7- لا أحب طاقم العمل 8- ثقة أكثر 9- عدم توافر المال حدد..... 10-أخرى،
الجزء الثالث: متابعة الحالة المرضية	
-17	هل تقوم بزيارة المركز الصحي للحصول على الخدمة الخاصة بمرض السكر من النوع الثاني بانتظام؟ 1- نعم، إذا نعم, إلى السؤال التالي 2- لا، لماذا؟ 1- عدم توافر ثمن المواصلات دائما 2- حركتي وخروجي من المنزل ليس بالسهل 3- لا املك الوقت الكافي 4- غير مرحب بي داخل المركز 5- لا أحب الطاقم الصحي داخل المركز 6- الموظفون غير مؤهلون للتعامل مع حالتي 7- لا أشعر بالراحة داخل المركز 8- لا أثق بالطاقم الصحي داخل المركز 9- أحتاج الى مرافق معي 10-لا أحب المظهر العام والمرافق الداخلية للعيادة 11- الادوية غير متوفرة 12- التحاليل اللازمة غير متوافرة 13- لا يوجد فائدة من الزيارة 14- غيره، حدد.....

-18	هل تقوم بفحص السكر بانتظام داخل العيادة؟ 1- نعم، تخطى السؤال التالي 2- لا 3- ليس دائما
-19	إذا كنت تفحص بالخارج فما هي الأسباب؟ 1- لا أثق بنتائج المركز 2- لتوفير الوقت 3- لتأكد من نسبة السكر خاصة بالليل والمركز مغلق 4- للتأكد من النتائج 5- الفحوصات التي احتاجها غير متوافرة 6- أخرى، حدد .....
-20	هل يتم التواصل معك بشأن عدم حضورك بانتظام للمركز؟ 1- نعم 2- لا
-21	هل تمتلك جهاز فحص سكر شخصي (جليكوميتر)؟ 1- نعم 2- لا، تخطى السؤال التالي
-22	إذا كنت تمتلك هل تستطيع تحمل نفقات شراء الأشرطة الخاصة بالفحص؟ 1- نعم 2- بعض الأحيان 3- لا
الجزء الرابع: التدريب والتثقيف الصحي	
-23	هل تلقيت تدريبًا صحيًا وتثقيف حول إدارة مرض السكري لديك داخل المركز الصحي من قبل؟ 1- نعم 2- لا انتقل إلى السؤال 22 21.1. إذا نعم متى؟ (غير موجه - أكثر من خيار) 1- في وقت تشخيص إصابتي بمرض السكر فقط (في اليوم الذي علمت فيه أنى مصاب بالسكري) 2- بانتظام كل زيارة متابعة 3- من فترة لأخرى خلال زيارات المتابعة لكن ليس بكل زيارة 21.2. من الشخص المسئول عن التثقيف الصحي داخل العيادة؟ 1- ممرض 2- طبيب 3- غير ذلك 21.3. من وجهة نظرك، كيف تقيم فوائد التدريب والتثقيف الصحي الذي تلقيته داخل المركز الصحي من 0-4؟ كم تعطيه؟ 0 1 2 3 4
-24	هل تلقيت أي مواد تدريبية تثقيفية صحية حول مرض السكري أثناء زيارتك لهذا المركز الصحي في العام الماضي؟ 1- نعم 2- لا 3- لا أعلم

-25	هل تحدث معك الطبيب /الممرض المتابع لحالتك عن نظامك الغذائي أو عاداتك الغذائية خلال العام الماضي؟ 1- نعم 2- لا 3- لا أعلم
-26	هل تحدث معك الطبيب / الممرض المتابع لحالتك عن نشاط بدني أو ممارسة الرياضة خلال العام الماضي؟ 1- نعم 2- لا 3- لا أعلم
-27	هل نصحك الطبيب / الممرض المتابع لحالتك بالإقلاع عن التدخين (إذا كنت مدخنًا) خلال العام الماضي؟ 1- نعم. 2- لا 3- لا أعلم
-28	في أي مجالات إدارة معالجة مرض السكري تشعر أنك بحاجة إلى التدريب والتثقيف الصحي؟ 1- النظام الغذائي 2- العلامات والأعراض المنخفضة والعالية لارتفاع مستوى السكر في الدم 3- التمارين الرياضية 4- متابعة مرض السكري 5- مضاعفات مرض السكري 6- تناول الأدوية 7- غير ذلك، حدد .....
-29	كيف تقيم فهمك لمرضك؟ من 0-4 0 1 2 3 4
الجزء الخامس: تحري المضاعفات ومؤشر مضاعفات السكري	
أولا: تحري مضاعفات مرض السكري	
-30	هل سبق وان قمت بفحص العين وشبكية العين خلال العام السابق؟ 1- نعم 2- لا 3- غير متذكر
-31	متى كان الفحص؟ قبل كم شهر؟
-32	هل تلقيت تغذية راجعة عن الفحص؟ 1-نعم 2- لا 3- لا أعلم
-33	إذا دلت النتيجة ان هناك مشكلة، كيف تم التعامل معك؟ 1- تم تغيير خطة علاجك 2- تم تحويلك الى خدمات طب العيون 3- لم يتم عمل أي شيء 4- لا أعلم
-34	هل سبق وقمت بفحص القدمين خلال العام السابق؟ ا- نعم 2- لا 3- غير متذكر
-35	قبل كم شهر؟ متى كان الفحص؟
-36	هل تلقيت تغذية راجعة عن الفحص؟ 1-نعم 2- لا 3- لا أعلم

37-	إذا كانت النتيجة تدل على وجود مشكلة ، كيف تم التعامل معك ؟1- تم تغيير خطة علاجك 2- تم تحويلك الى اختصاصي طب الاعصاب 3- لم يتم عمل أي شيء 4- لا أعلم		
38-	هل سبق وقمت بعمل التحليل نسبة السكر في الدم خلال العام السابق؟ 1- نعم 2- لا 3- غير متذكر		
39-	هل تم فحص مخزون السكر التراكمي لك خلال الست شهور الماضية؟ 1- نعم 2- لا 3- غير متذكر		
40-	كيف كانت النتيجة؟ 1- عالية 2- ضمن الحد الطبيعي 3- منخفضة		
41-	إذا كانت النتيجة عالية، كيف تم التعامل معك ؟ 1- تم تغيير خطة علاجك 2- التشديد على ممارسة الرياضة وتخفيف الوزن 3- لم يتم عمل أي شيء 4- لا أعلم		
42-	هل تم عمل تخطيط قلب ولو مرة واحدة عند فتح الملف الخاص بك؟ 1.نعم 2. لا 3- غير متذكر		
43-	هل تم عمل فحص وظائف الكلى خلال العام الماضي؟ 1- نعم 2- لا 1- غير متذكر		
44-	هل تم عمل فحص شامل للدهون خلال العام الماضي؟ 1- نعم 2- لا 3- غير متذكر		
ثانيا: مؤشر مضاعفات السكري			
مرض القلب التاجي 1- **1=مرض القلب التاجي أو/والذبحة الصدرية أو/والنوبة او الازمة القلبية** **0= لا يوجد**			
45-	هل أخبرك الطبيب من قبل أن لديك انسداد في تدفق الدم إلى قلبك ؟ مثل هذا الانسداد يمكن أن يؤدي إلى ألم في الصدر، وتسمى أيضًا الذبحة الصدرية.	نعم 1	لا 0
الذبحة الصدرية **0= إذا لا يوجد اي عرض** **1= إذا ظهر عرض واحد على الأقل**			
46-	خلال الأشهر الستة الماضية هل شعرت بألم في صدرك أو ضغط؟	نعم	لا

-47	خلال قيامك بنشاط بدني (كالرياضة او المشي) او اجهدت نفسك في عمل ما هل شعرت بألم في الصدر أو ضغط؟	نعم	لا
-48	عند الراحة او تناول النتيروجليسرين هل خف ألم الصدر أو الضغط عليه؟	نعم	لا
النوبة او الازمة الصدرية			
-49	هل أخبرك الطبيب من قبل أن لديك نوبة او أزمة قلبية؟	نعم	لا
السكتة أو الجلطة الدماغية 2- **1TIA= وجود السكتة أو /والسكتة الدماغية العابرة** **0= لا يوجد سكتة دماغية**			
-50	هل سبق أن أخبرك الطبيب أنك مصاب أو قد أصبت بسكتة دماغية	نعم	لا
السكتة الدماغية العابرة			
-51	هل سبق وأخبرك طبيبك ان كان حدث أو تعرضت ل ؟ تسمى أيضا "السكتة الدماغية العابرة "أو" سكتة TIA دماغية تحذيرية ".	نعم	لا
-52	هل سبق لك أن ظهرت عليك أعراض تشبه السكتة الدماغية المفاجئة، مثل الضعف في جانب واحد من جسدك، صعوبة التحدث، تدلي جانب واحد من الفم، سيلان اللعاب، أو صعوبة الرؤية، التي عادت إلى طبيعتها تمامًا خلال يوم؟	نعم	لا
3- أمراض الأوعية الدموية الطرفية/الشرايين المحيطية **1= إذا وجد عرض واحد على الاقل** **0= لا يوجد**			
-53	هل أخبرك طبيب من قبل أن لديك انسداد الأوعية الدموية والشرايين في ساقيك، أو ما يسمى أيضًا مرض الشرايين المحيطية؟	نعم	لا
-54	خلال الأشهر الستة الماضية، هل حصل معك تقلصات في الساق أو ألم فيها أثناء المشي ثم يزول عند الراحة	نعم	لا

4-الاعتلال العصبي **1= إذا وجد أي من الاعتلال العصبي المحيطي و/أو الاعتلال العصبي اللاإرادي** **0= لا يوجد أي عرض**			
الاعتلال العصبي المحيطي			
-55	خلال الأشهر الستة الماضية، هل شعرت في تنميل (خدلان) أولا شعور في قدميك؟	نعم	لا
الاعتلال العصبي اللاإرادي **1= مرة واحدة على الأقل** **0= ابدا**			
-56	خلال الأسابيع الأربعة الماضية، كم مرة عانيت من فقدان السيطرة على الأمعاء أو الإسهال أثناء النوم؟ 1-أبدًا 2- مرة أو مرتين 3- مرة واحدة في الأسبوع تقريبًا 4- مرتين أو ثلاث مرات في الأسبوع 5- معظم الوقت		
5- مشاكل في القدم **1= وجود عرض واحد على الاقل** **0= لا يوجد**			
-57	خلال الأشهر الستة الماضية، هل كان لديك تقرحات في أصابع قدميك أو قدميك نفسها أو أسفل ساقيك؟	نعم	لا
-58	هل سبق أن أصبت بالغرغرينا في أي من اصابع قدمك؟ هل تم بتر أي جزء من أصابع قدمك او بتر القدمين بسبب مرض السكر؟	نعم	لا
6- مشاكل العيون **1= وجود عرض واحد على الاقل** **0= لا يوجد**			
-59	هل تعاني الآن من المياه البيضاء أو ما يسمى بإعتام عدسة العين؟	نعم	لا
-60	هل أخبرك طبيب من قبل أن لديك اعتلال الشبكية أو مرض العين السكري؟	نعم	لا

الجزء السادس: القدرة على الحصول على الخدمة			
-61	هل من السهل الوصول الى المركز الصحي لتلقي الخدمة؟ 1-نعم 2-لا		
-62	إذا كان الجواب لا لماذا؟ 1- أنا آتي مشيا على الاقدام والمسافة طويلة 2- أنا آتى بالمواصلات العامة وليس دائما متوافر التكلفة 3- أنا لا أحب الخدمات داخل هذا المركز حدد..... 4-غير ذلك،		
-63	هل المركز مؤهل لذوي الاحتياجات الخاصة مثل توافر ممرات خاصة بهم ووجود مساحة في المكان تسهل سيرهم وغيرها؟ 1-نعم 2- لا		
-64	في المتوسط كم دقيقة تنتظر للدخول الى الممرض لتلقي الخدمة المتعلقة بالسكر؟ .....دقيقة		
-65	في المتوسط كم دقيقة تحتاج للدخول الى الطبيب للحصول على الخدمة المتعلقة بالسكر؟ .....دقيقة		
-66	كم الوقت الذي تحتاجه لتلقي الخدمة منذ دخول المركز حتى خروجه؟		
-67	من وجهة نظرك هل هذا الوقت مناسب؟ 1-قصير 2- معقول 3-طويل		
-68	هل جميع الخدمات المتعلقة بالسكر دائما متوفرة داخل المركز؟ 1-نعم 2-لا 3-بعض الأحيان غير متوفرة		
-69	هل الخدمات الصحية الخاصة بمرضى السكر تلبي طلباتك؟ 1- نعم 2- لا، لماذا؟		
-70	ما هي المعوقات التي تواجهك أثناء تلقيك الخدمة الصحية الخاصة بمرضى السكر من النوع الثاني داخل المركز؟ 1-عدم توافر الادوية 2- عدم توافر الخدمة الخاصة 3- الانتظار أوقات طويلة 4-الزحام 5-ضعف التواصل مع الطاقم الطبي 6- عدم توافر التحاليل المناسبة دائما 7- لا يوجد تفاعل بينك وبين الطاقم الطبي 8-عدم الالتزام بالمواعيد المحددة 9- هشاشة نظام العمل داخل المركز 10- التمييز بين المرضى 11- عدم وجود أخصائيين 12- غيره، حدد		

71-	خلال العام الماضي، هل عدت من المركز من غير تلقي الخدمة التي حضرت من أجلها؟ 1- نعم 2- لا إذا نعم، لماذا؟ .....
الجزء السابع: المعرفة والموقف والسلوك	
أولا: معرفة المريض (الأسئلة غير موجه- أكثر من خيار)	
72-	ما هو مرض السكر؟ 1- مرض السكري هو مرض مزمن يتميز بارتفاع السكر في الدم 2- مرض السكري هو مرض مزمن مع مظهر من مظاهر نقص السكر في الدم 3- مرض السكري هو مرض ينتشر في المجتمع
73-	أي من انواع السكري التالية تعرفهم؟ 1- السكري من النوع الاول (هو ناتج عن عوامل جينية ووراثية نتيجة خلل في الجهاز المناعي) 2- السكري من النوع الثاني (يرتبط عادة مع تقدم السن والسمنة المفرطة وتاريخ وراثي للعائلة) 3- سكري الحمل
74-	ما هو مرض السكري من النوع 2؟ 1- أن الجسم ينتج انسولين بكمية قليلة أو لا ينتج الأنسولين 2- أن الجسم مقاوم للأنسولين (يحدث عادةً عند الأشخاص الذين يعانون من السمنة المفرطة والذين تزيد أعمارهم عن 40 عامًا) 3- يُصاب به المرأة الحامل (لا يوجد سكري سابق)
75-	من هو المعرض لخطر الإصابة بمرض السكري؟ 1- الأشخاص الذين يعانون من السمنة المفرطة 2- الاشخاص الذين يتصفون بقلة الحركة 3- الاشخاص الذين يأكلون الكثير من الدهون، والحلو، والنشا، والتبغ 4- الاشخاص الذين لديهم تاريخ عائلي لمرض السكري 5- أصحاب العضلات 6- الاشخاص الذين يمارسون الرياضة بانتظام، يأكلون جيدًا

	الاشخاص الذين لا يدخنون -7 الأشخاص النحفاء، يأكلون بشكل طبيعي -8 الاشخاص الذين ليس لديهم تاريخ عائلي بمرض السكري -9
-76	ما هي أعراض مرض السكري؟ الاكل كثيرا -1 الشرب كثيرا -2 خسارة وزنك كثيرا -3 تبول كثيرا -4 الأكل بشكل طبيعي -5 فقدان القليل من الوزن -6 التبول المعتدل -7
-77	كم عدد أنواع مضاعفات مرض السكري الموجودة؟ نوع واحد: المضاعفات الحادة (التي تظهر بشكل مفاجئ) -1 نوع واحد: المضاعفات المزمنة (التي تظهر مع الزمن وتستمر لوقت طويل) -2 نوعان: المضاعفات الحادة والمزمنة -3
-78	ما هي المضاعفات الحادة لمرض السكري؟ ارتفاع السكر في الدم -1 الأرق والقلق -2 فقدان الوزن -3 نقص السكر في الدم -4 الغيبوبة بسبب ارتفاع السكر في الدم -5
-79	ما هي المضاعفات المزمنة لمرض السكري؟ مضاعفات القلب والأوعية الدموية -1 انخفاض الرؤية -2 الفشل الكلوي -3 الضعف الجنسي -4 تقرحات القدم -5 الأرق والقلق -6

-80	ما هي طرق الوقاية من المضاعفات عند مرضى السكري؟ اختبار جلوكوز الدم الروتيني -1 الأدوية الموصوفة -2 الأكل المعقول -3 التمارين الرياضية المناسبة -4 ليست هناك حاجة لفحص جلوكوز الدم الروتيني، ولا حاجة للطعام، ولا -5 للأدوية، والحركة المحدودة اختبر وقتما تشاء، فمجرد تناول الدواء يكفي دون الحاجة إلى الأكل الصحي -6 والتمارين الرياضية					
-81	ما هي علامات نقص السكر في الدم لدى مرضى السكري؟ حمى شديدة -1 الشعور بعدم الراحة -2 التعرق -3 الدوخة -4 ألم في البطن -5 صعوبة في التنفس -6					
ثانيا: الموقف						
	تدرج من 0 الى 4 كم تعطي من وجهة نظرك درجة لكل من الجمل التالية	0	1	2	3	4
-82	هل مرض السكري قابل للعلاج					
-83	يمكن علاج داء السكري بالحمية والتمارين الرياضية					
-84	يمكن إيقاف الأدوية إذا ارتفعت مستويات					

	الجلوكوز(السكر) في الدم وظهرت الأعراض.					
-85	يقلل مرض السكري من متوسط العمر المتوقع.					
-86	الأدوية العشبية لها مضاعفات أقل من أدوية الأطباء.					
-87	السيطرة على نسبة الدهون وضغط الدم ضرورية لمرضى السكري.					
-88	التمارين المنتظمة يساعد في السيطرة على مرض السكري					
-89	يتفاقم مرض السكري ومضاعفاته عن طريق تناول الأنسولين.					
-90	يمكن أن يقي علاج السكري من الفشل الكلوي والعمى.					
-91	تتفاقم المضاعفات الوعائية (أمراض الاوعية الدموية) المرتبطة بالسكري بسبب التدخين.					
ثالثا: الممارسات						
-92	هل زرت طبيب العيون خلال العام الماضي؟ 1- نعم 2- لا					

	إذا نعم متى كانت آخر زيارة لك إلى طبيب عيون؟ .....شهر
93-	هل تستخدم الأدوية العشبية للسيطرة على مرض السكري؟1- نعم 2- لا .....
94-	هل قمت بزيارة لك إلى اخصائي تغذية؟1- نعم 2- لا .....
95-	هل تقوم بفحص قدمك خلال الاسبوع؟ 1- نعم 2- لا إذا نعم، كم مرة في الأسبوع تقوم بفحص قدمك؟ .....
96-	ما هو الوقت المناسب لفحص الجلوكوز في الدم؟1- صباحا 2- مساءا 3- ظهرا 4- عصرا .....
97-	هل تمارس الرياضة؟ 1- نعمم 2- لا إذا نعم، كم يوما في الأسبوع تمارس الرياضة؟ .....
98-	هل تدخن السجائر؟ 1- نعم 2- لا كم سيجارة في اليوم؟ سجائر _____ منذ متى وانت تدخن؟
99-	كم عدد الوجبات الرئيسية التي تتناولها يوميا؟ ..... هل تضيف ملح إضافي إلى نظامك الغذائي المعتاد؟ .1- نعم 2- لا ..... هل تتحكم في وزنك؟.1- نعم 2- لا.....
100-	في العام الماضي، كم مرة قمت بزيارة الطبيب؟ .....
101-	هل سبق لك أن شاركت في فصل تثقيفي عن مرض السكري؟ 1- نعم 2- لا .....

الجزء الثامن: الإدارة الذاتية لمرضى السكري من النوع الثاني					
العبارات التالية تصف أنشطة الرعاية الذاتية المتعلقة بمرض السكري لديك. بالتفكير في الرعاية الذاتية خلال الأسابيع الثمانية الماضية، يرجى تحديد مدى انطباق كل عبارة عليك.		ينطبق كثيرا جدا	ينطبق عليا	ينطبق الى حد ما	لا ينطبق
-102	الطعام الذي أختار تناوله يجعل من السهل الوصول إلى مستويات السكر المثالية في الدم.	3	2	1	0
-103	أتحقق من مستويات السكر في الدم بعناية واهتمام.				
-104	أحافظ على جميع المواعيد الموصي بها لعلاج مرض السكري.				
-105	أتناول دواء السكري (مثل الأنسولين، والأقراص) على النحو الموصوف.				
-106	من حين لآخر أتناول الكثير من الحلويات أو الأطعمة الأخرى الغنية بالكربوهيدرات.				
-107	أقوم بتسجيل مستويات السكر في الدم بانتظام (أو أقوم بتحليل القيمة باستخدام جهاز قياس السكر في الدم).				
-108	أميل إلى تجنب مواعيد الطبيب المتعلقة بمرض السكري.				
-109	أمارس نشاطًا بدنيًا منتظمًا لتحقيق مستويات السكر المثلى في الدم.				
-110	أتبع بدقة التوصيات الغذائية التي قدمها طبيبي أو أخصائي مرض السكري.				

111-	لا أقوم بفحص مستويات السكر في الدم بشكل متكرر بما يكفي لتحقيق تحكم جيد في نسبة الجلوكوز في الدم.					
112-	أتجنب النشاط البدني، على الرغم من أنه من شأنه أن يحسن مرض السكري.					
113-	أميل إلى نسيان تناول أو تخطي دواء السكري (مثل الأنسولين والأقراص).					
114-	أحيانًا أعاني من "نوبات فرط في الطعام" (لا تحدث بسبب نقص السكر في الدم).					
115-	في كثير من الأحيان، فيما يتعلق برعاية مرض السكري، يجب أن أرى التعليمات والممارسات الطبية الموصي بها.					
116-	أميل إلى تخطي النشاط البدني المخطط له.					
117-	الرعاية الذاتية لمرض السكري لدي سيئة.					
الجزء التاسع: رضا المرضى						
الخدمة المقصود بها خدمات المقدمة لمرضى السكر من النوع الثاني داخل مراكز الرعاية الأولية التابعة لوزارة الصحة **ضع إشارة عند الرقم الذي يعبر عن مدى رضاك** **1-غير راضي بشدة 2- غير راضي 3- محايد 4- راضي 5- راضي بشدة**						
ما مدى رضاك عن		1	2	3	4	5
118-	اخذك لمواعيد المتابعة					
119-	وقت انتظار الخدمة في المركز					
120-	صالة انتظار الخدمة في المركز من ناحية النظافة					

-121	الترحيب من قبل الطاقم الطبي					
-122	الوقت الذي قضاه معك الطاقم الطبي					
-123	شرح الطاقم الطبي (طبيب/ممرض) عن الخدمة الصحية المتوافرة الخاصة بالسكري					
-124	احترام الطاقم الطبي للخصوصية					
-125	طريقة تعليم وشرح الطاقم الطبي لك					
-126	كفاءة الطاقم الطبي المقدم للخدمة الطبية					
-127	توافر الادوية داخل المركز					
-128	توافر التحاليل المخبرية					
-129	جودة الخدمات المقدمة					
-130	المتابعة والمراجعة داخل المركز					
-131	المشاركة في العناية الصحية					
-132	الإجابة على الاستفسارات والاسئلة من قبل الطاقم الطبي					
-133	مدى تفهم وضعك الصحي					
-134	مستوى رضاك العام عن الخدمة المقدمة داخل المركز					
-135	هل توصي أقاربك إذا أصيبوا بالمرض تلقي الخدمة داخل هذا المركز؟ 1- نعم 2- لا، لماذا؟					
-136	هل تنوي باستمرار تلقي الخدمة بهذا المركز؟ 1- نعم 2- لا					
-137	هل انت راض عن الخدمة التي تلقيتها اليوم في المركز؟ 1- الى حد كبير 2- غير متأكد 3- غير راضي					
-138	هل تلبي الخدمة التي تلقيتها توقعاتك؟ 1- نعم 2- الى حد ما 3- لا					
-139	إذا لا كيف تتوقع ان تكون الخدمة؟ 1- أفضل 2- أسوأ					
-140	ما هي الاحتياجات والتحديات التي ما زلت تعانين منها وتحتاج الى رعاية؟ انتظام السكر بالدم -1					

	توفير الادوية -2 توفر التحاليل -3 تكلفة الخدمات -4 تعامل الطاقم الطبي -5 وجود خدمات فحص السكر التراكمي بانتظام وفحص المضاعفات -6 معرفة نوع الاكل الملائم -7 معرفة التمارين المناسبة -8
-141	كيف تصف حالتك الصحية بعد تلقيك الخدمة اليوم من المركز؟ 1-جيدة 2- نفس السابق 3- أسوأ 4- لا أعلم

Qualitative part

Evaluation of diabetes mellitus services from services providers (physicians and nurses)

Main Themes

1- What differentiates the services provided to patients with type 2 diabetes in care centers for MoH from other centers?

Probing questions

o Cost of services

o Quality of care

o Qualified staff

2- Do you have written protocols and technical instructions related to DM II ?

Probing questions

o Do you have access to such protocols, if available?

o Do you think your colleagues fully applying the written protocols, and full compliance?

 If no, why

 If sometimes, why not all the time

1- Have you received training on those protocols?

Are these protocols up-to-date?-2

3- If you have the option, what could you add to the current protocol?

3- To what extent do you believe primary care centers are appropriate for patients with disabilities, in your opinion?

Probing questions

- Movement within the clinic is simple.
- All necessary services and lab tests are easily accessible.
- The presence of elevators for the elderly and those with mobility issues.

4- Do you have an in-service training program related to DM management?

Probing questions

o If yes, how often do they offer training

o What topics were covered before?

o What training you wish to have?

 Life-style

 Dietary instruction for diabetic clients

 Consequences of DM

 Self-care of diabetic clients

5- What do you think of the current appointment systems?

Probing questions

o Efficient/effective, explain why

o What could be done to improve the efficiency of the system?

6- From your perspective, how do you evaluate the contact time with your clients?

Probing questions

o Short, consequences, why it is short

o Do you recommend a certain contact time?

 What could be done to achieve this contact time

 What are the barriers that prevent you from achieving the recommended contact time.

From your view, what are the main barriers that prevent clients from utilizing-7

your services?

Probing questions

o Distance to the clinic

o Cost

o Work schedule

o Waiting time

o Limited availability of services

Do you have any recommendations?

Thanks a lot for your time and efforts

Annex (7): Experts and professional consulted

The study tool (interviewed questionnaire) was reviewed and evaluated by the following experts:

Dr. Bassam Abu Hamad, Al Quds University

Dr. Yehia Abed, Al Quds University

Dr. Khitam Abu Hammad, Al Quds University

Dr. Nuha El-Sharif, Al Quds University

Dr. Randa Masaoud, UNRWA, Health Program