The Effectiveness of an Educational Program in Improving Knowledge and Self-efficacy in Type 2 Diabetes Patients

Prepared by
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Supervised by

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A Thesis
Submitted to Faculty of Nursing as a Partial Fulfillment of the Requirement for Master Degree in Nursing \Chronic Care Nursing

October 2021

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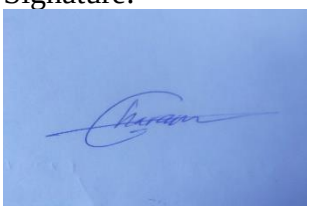

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جامعة الإسراء
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This Thesis (The effectiveness of an educational program in improving knowledge andself-efficacy in type 2 diabetes patients) was successfully defended and approved on 28\10\2021

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DEDICATION

I dedicate this work to my parents. Thank you for the love, guidance andunconditional support you have given me.

I am forever grateful to my brothers Abdullah, Ali and Ammar and my sisters Islam and Majd.

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TABLE OF CONTENTS

Contents

LIST OF TABLES

LIST OF APPENDICES

LIST OF ABBREVIATION

Abbreviation	The meaning of the abbreviation
CGMS	continuous glucose monitoring system
CINAHL	Cumulative Index to Nursing and Allied Health Literature
DHEP	Diabetic Health Education Program
DD	diabetes distress (DD).
DKN	Diabetes Knowledge Assessment
DM	Diabetes mellitus
DSME	diabetes self-management education
HbA1c	glycosylated hemoglobin
IDF	InternationalDiabetes Federation
M	Mean
Medline	Medical literature on-line
P-value	Significant Value
SPSS	Statistical package for social sciences
WHO	World Health Organization

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ABSTRACT

Background: Diabetes is a complex and exhausting disease that needs the diabetic patients to pay attention regarding food, physical activity, and medication. Furthermore, it requires the patient to be knowledgeable and able to perform certain skills. Diabetic patients are exposed to long-term complications, including cardiovascular, neurological, renal and ophthalmic diseases. As well as, acute diabetic-related health conditions that can be life threatening and impact the diabetic patients' quality of life.

Aim: The current study aims to examine the effectiveness of the Diabetic Health Education Program (DHEP) designed according to the guidelines of the International Diabetes Association in improving type 2 diabetes patient's knowledge and self-efficacy.

Method: This study used a quasi-experimental design aimed at determining the effect of DHEP in improving knowledge and self-efficacy. The program utilized in this study was constructed by the researcher according to the International Diabetes Association guidelines. A sample of 130 diabetic patients was selected. Patients were randomly assigned into experimental and comparison groups, each group consisted of 65 patients. The experimental group attended the DHEP that was carried out in the diabetic clinic at Al-Hussein Medical

City, Amman – Jordan, while the comparison group remained on the traditional care. The questionnaire utilized in this study was administered twice as a pretest and posttest for each group.

Results: The study demonstrated the effectiveness of DHEP in improving diabetic patient's knowledge and self-efficacy. There were statistically significant improvements in patients' knowledge and self-efficacy between the two study groups. There were also statisticallysignificant differences in knowledge and self-efficacy related to patient's training and higher level of formal education (p<0.05). However, the t-test showed that there were no significantdifferences in knowledge and self-efficacy due to gender and age (P > 0.05).

Conclusions: DHEP has a positive effect on type 2 diabetes patients to improve their knowledge, self-efficacy, and clinical conditions such as blood glucose levels. Therefore, the generalization of such DHEPs is highly recommended. The findings of the current study present worthy data for the clinical nurses in recognizing diabetes patients self-efficacy, easing their experience in the clinical diabetes settings, as well as establishing an efficient diabetes educational program. This study could benefit future research.

Key Words: Health education program, Jordan, Knowledge, Self-efficacy, Type 2 diabete

Chapter One: Introduction

Introduction

Diabetes Mellitus (DM) is a persistent rise in blood sugar as a result of a chronic metabolic disorder ((Goyal & Jialal, 2018)). This metabolic disorder occurs due to insulin resistance, insufficient insulin secretion, or both (Deepthi, Sowjanya, & Lidiya, et al., 2017). In type 2 diabetes, insulin resistance increases and insulin response decreases (Deepthi et al., 2017). Type 2 diabetes occurs more often in people over 45 years of age dueto certain risk factors such as lack of physical activity, high-calorie diet, obesity, and familypropensity (Goyal & Jialal, 2018). Type 2 diabetes may appears at a younger age, includingchildren, adolescents, and youth (Goyal & Jialal, 2018).

Diabetes constitutes one of the most common non-communicable diseases in the world (Alsous, Abdel Jalil, Odeh, and Al Kurdi, et al., 2019). According to the International Diabetes Federation (IDF), the number of adults suffering from diabetes aged 20-79 years was approximately 415 million in 2015 and may rise in 2040 by 200 million cases, (Goyal & Jialal, 2018). According to the World Health Organization (WHO) in 2019, diabetes wasthe number nine among the top leading causes of the death (WHO, 2020). Globally, Type 2 diabetesin the Middle East and North Africa region ranks second in terms of the prevalence, with anestimated number of adults with type 2 diabetes reaching 54.8 million (Awad et al., 2020). Locally, several studies were conducted in Jordan between the years 1994-2017, which indicated an increase in the prevalence of type 2 diabetes (Awad et al., 2020). It is expectedthat the prevalence of diabetes in Jordan will double after 10 years, as it was 17.1%

Education about type 2 diabetes aims to improve metabolic control and prevent acute and chronic complications (Amelia, R. 2018). Previous research indicates that the process of educating patients about their disease and its treatment gives them the ability to improve the quality of life and bring changes in knowledge and behavior to maintain and improve health (Pueyo-Garrigues et al., 2019). As knowledge raises, self-efficacy it promotes best health practicesand health-seeking behaviors (Artino, 2012). Self-efficacy is the level of confidence requiredto complete a task, as well as confidence is an important part of knowledge about the disease in its various aspects according to Albert Bandra's theory of self-efficacy (Artino, 2012). When individuals acquire self-efficacy, they better control their behavior. And they are expected to apply positive health behaviors and concern for their well-being. The lack of self-efficacy greatlyreduces the demand for health care (Mehta et al., 2016). Self-efficacy can be enhanced through improved care and self-management which is developed through awareness and knowledge (Amer, Muhammad, & Al-Bar et al., 2018). By teaching how to deal with disease and survive the complex nature of the disease (Amer et al., 2018).

Diabetes education is the cornerstone of establishing diabetes self-management of diabetes, reducing risk, and improving control (Jiang et al., 2019). However, the quality of diabetes education varies. Structured diabetes education is an important part of the routine treatment of diabetic patients (Jiang et al., 2019). Through guidelines, the educational program is based on evidence that it has specific goals and commensurate with the needs of patients, and has a written bound curriculum, which is facilitated by teachers and trainers (Chatterjee et al., 2018). Self-efficacy plays a role in behavior change, as it indicates a belief inan individual's ability to perform behaviors (Jiang et al., 2019). Educational interventions are based on the theory of self-efficacy that is effective in promoting behavioral changes and improvement in blood glucose levels (Jiang et al., 2019).

Therefore, this study will be carried out to fill gap in the literature. Furthermore, thisstudy will add to the breadth of understanding the problem in the international literature fromthe Jordanian perspective.

Problem Statement

Diabetic patients ear exposed to many short and long-term complications resulting fromdiabetes, including cardiovascular, neurological, renal and ophthalmic diseases (Al-Eitan, & Nassar., 2017). In addition, several problems and conditions can be life-threatening and pose a threat to the duration and quality of life of the individual (Al-Eitan et al., 2017). Diabetic patients also face many barriers when attempting to self- manage their chronic condition (Amer et al., 2018). When a patient receives the diagnosis of diabetes, there can be feelings of failure, confusion, uncertainty, anxiety, depression, anger, worry, frustration, and possibly denial **(**Amer et al., 2018**).** This can lead to patient noncompliance **(**Amer et al., 2018**).**

Diabetes Mellitus (DM) is associated with many major effects such as the economic burden and negative social effects (Amer et al., 2018). DM also causes many major changes inthe patient's daily life due to psychological, financial and emotional tensions, (Bernard et al., 2019). Diabetic patient may face some difficulties in communicating and understanding with their doctors, resulting in lack of knowledge and self-efficacy. But the health care staff will question the patients to increase their knowledge andself-efficacy through follow-up (Ohta, Ryu, & Kitayuguchi., 2021). Healthcare teams becoming proactive in providing a structured diabetes education program that can be more effective for patients by helping their disease identify and dealing (Rasheed 2013). Diabetes is a complex and exhausting disease that needs the patient with diabetes to pay attention regarding food, physical activity, and medication. Furthermore, it requires the

patient to be skilled in performing some procedures (Qiu, Huang, & Wang, 2020). Therefore, providing health education for diabetic patient to improve the in quality of life and prevent complications is essential.

Significance of the Study

Diabetic Health Education Program (DHEP) would bring about awareness on diabetes management and contribute to existing diabetes literature. It addresses the clinical significance of enhancing diabetes knowledge and motivation in self-efficacy behaviors. Hence, DEHP has the potential to closethe gap between applications of knowledge to self-efficacy behaviors, which in turn would result in better self-efficacy, (Qiu et al., 2020).

Accordingly, this research project aimed to identify the effectiveness of educational program in improving knowledge and self-efficacy level among patients with diabetes in Jordan. Conducting this study will help the nursing programmers, administrators, researchers, educators, and practitioners identify the knowledge and self-efficacy level of the Jordanian patients toward DM by measuring the correlation between the knowledge and self-efficacy level of the diabetes patients and their socio-demographic characteristics. This study could provide directions for nursing programmers (i.e., people who are specialized in nursing informatics) to design electronic patient records that encompass the risk factors for diabetes incidence. Nursing researchers may carry out research projects in the future that depend on the findings of this research project. Nursing practitioners should build their practices and provide care for patients with diabetes based on the current study's recommendations.

Aims of the Study

The study aims to examine the effectiveness of the DHEP, designed according to the guidelines of the International Diabetes Association, in improving type 2 diabetic patient's knowledge and self-efficacy.

Research Questions

The following research questions were developed for this study.

R. Q.1. What is the effect of the diabetic health education program on the knowledge and self-efficacy of patients with type 2 diabetes?

R. Q.2. What is the relationship between specific demographic factors related to the knowledge and self-efficacy of patients with type 2 diabetes?

Theoretical and Operational Definitions of the Main Variables

Knowledge: Conceptual definition: According to the Merriam-Webster dictionary, knowledge is defined as the score of what is recognized: The form of truth, principles, and information that humans acquire (Olson & Oudshoorn, 2020). In the current study, knowledge is defined as the information provided to participants about type 2 diabetes regarding the nature of type 2 diabetes, management and treatment of diabetes, nutritional instructions, and Insulin delivery methods.

Operational Definition: Knowledge was operationally defined as the average of correct measured answers to the 10 questions reported in the study questionnaire.

Self-efficacy: conceptual definition: According to Bandura (1994), self-efficacy is defined as the individual's belief in his ability to accomplish and complete tasks in order to obtain the desired goal and produce an impact on the individual's life, (A. Bandura &

Wessels, 1994). Therefore, in the current study, self-efficacy is defined as the participants' belief in their abilities regarding learning about type 2 diabetes and implementing procedures that affect management and controlling their disease, insulin therapy, and how to deal with acute symptoms i.e., hypoglycemia and hyperglycemia, as well as, complications related to long term impact of the disease and its treatment.

Operational Definition: The level of self-efficacy is operationally defined as the score obtained on the Self- Efficacy Scale for type 2 diabetic.

Summary

Diabetes constitutes one of the most common non-communicable diseases in the world. However, few studies addressed the effectiveness of conducting educational program on the level of knowledge and self-efficacy among patients with type 2 diabetes mellitus. Consequently, this study regarded as one of the early studies that examined this problem. This study intends to identify level of knowledge, self-efficacy, and effectiveness of the educational program on these variables Moreover, this study seeks to examine the relationships between the participants demographics/characteristics and the knowledge and self-efficacy experiences. Two research questions were identified to guide this study. Nursing researchers may carry out research projects in the future that depend on the findings of this research project. Nursing practitioners should build their practices and provide care for patient with diabetes based on the current study's recommendations.

Chapter two: Literature Review

Introduction

The purpose of this study was to examine the effectiveness of DHEP designed according to the guidelines of the International Diabetes Association in improving type 2 diabetes patients' knowledge and self-efficacy. This chapter focuses on reviewing the literature on this topic. The searched data were collected from various sources, such as the Cumulative Index of Nursing and Allied Health Literature (CINAHL), Google, and Google Scholar. The literature review in this chapter includes the topics of knowledge and self-efficacy of type 2 diabetes patients, and Diabetes Health Education Programs. The chapter begins by identifying the utilized search strategy. Then, the identified literatures were fully discussed. The last section summarizes the chapter findings.

Search Strategy

The literature search involved exploring published material relating to the area of effectiveness of DHEP among patients with type 2 diabetes. The searches involved utilization of various databases which included Medline (Medical literature on-line), CINAHL (Cumulative Index to Nursing and Allied Health Literature), Psych Info (Psychology Information), and PubMed. Besides that Google Scholar search engine was used to select further studies. Keywords included educational program (similar terms like training program, intervention were included as well)**,** knowledge (relative keywords such as awareness, recognition were included), self-efficacy (another similar terms included like self-awareness), diabetes mellitus, patients, clinical settings, and Jordan in different combinations. A search was also undertaken to identify additional studies which have used the research instruments utilized in the present study.

Eligibility Criteria

Articles were included in the review according to the subsequent inclusion criteria, studies published between 2016 and 2021. Reported in the English, included patients with type 2 diabetes mellitus or, if other samples were measured, presented information related to diabetes patients independently, and the study concentrated merely on the clinical experiences of those patients or, in different conditions, offers information regarding clinical experiences separately. The abstracts of all those studies which were identified by the search strategies were examined, and full-text version of those which achieved the eligibility criteria was then obtained. Moreover, reference lists from chosen papers were checked for additional related studies. Several studies were identified, but few met the criteria. Therefore, the final sample consisted of 20 studies. Then those studies that resulted from the identified search strategy will be discussed thoroughly.

Type 2 diabetes is one of the most common chronic diseases in terms of dealing with the disease (Martino, Caputo, & Bellone, et al., 2020). Thus, detection, treatment, and self-management are important in reducing the risk of complications and improving the quality of life (Karaoui, Deeb, & Nasser, et al., 2018). According to data from the International IDF, diabetes is a chronic disease with an upward curve (Lin, Pan, &Ding, et al., 2020.). To keep blood sugar levels stable and prevent complications of the disease, the individual needs to monitor blood sugar levels, maintain on the prescribed diet, engage in regular physical activity, and adhere to medication (Karaoui et al.,2018). When necessary, type 2 diabetes patients need self-management to be aware of the disease, its complications, and its treatment. The greater knowledge of the disease and its treatment, the greater the likelihood of positive self-management attitudes (Martino et al., 2020).

Education is considered a low-cost strategy that uses training for individuals with diabetes on self-management (Brito, Gois, & Zanetti, et al., 2016). Health education programs add a positive value in acquiring knowledge and adopting positive attitudes towarddisease and treatment ((Brito et al., 2016). Consequently, it is reflected in the quality of life (QOL) (Brito, Gois, Zanetti, & Resende, et al., 2016). Several studies were conducted to evaluate the effect of educational interventions of knowledge regarding disease, treatment adherence, and glycemic control on type 2 diabetes patients (Sinclair, Zamora-Kapoor, & Townsend-Ing, et al., 2020). A randomized controlled studywas conducted on 48 participants from the three randomly selected study sites in the Pacific Islands of Honolulu, Hawaii to evaluate an educational intervention for diabetes self-management and support. The study indicated that interventions that promote and support patient education were effective in improving quality of life, reducing disease complications,controlling blood sugar, and solving problems, as well as in making and supporting informeddecisions. The results of the research also supported the education approach and consideredit's feasible in the areas of health care and the community (Sinclair et al., 2020). Similarly, a study was conducted on 140 patients with type 2 diabetes in the Diabetes Clinic in Kerala toevaluate the effectiveness of the educational program by altering the level of Hemoglobin A1c (HbA1c) using a quasi-experimental design. The study consisted of two groups; the experimental group received the educational program and the control had a standard treatment only. Using the ANOVA test, the difference between the two groups was determined, and it was statistically significant. The study provided recommendations for health care providers to take advantage of the educational opportunities for diabetics to maintain blood sugar and good glycemic control, (Sindhu, Kumar, & Research, 2018). Education is one of the most important element in the care for all diabetic because of its rolein reducing long term risks, complications and in supporting the prevention

of severe complication (Figueira, Boas, & Coelho, et al., 2017).In this context, a study was conducted. Using an experimental design, on 180 patients with type 2 diabetes participated. The Diabetes Knowledge Assessment (DKN) scale was used to assess the effect of educational interventions for knowledge on the disease, medication adherence and glycemic control of diabetes mellitus patients. The data was collected before and after the educational interventions. The results indicated that the educational interventions positively contributed to the participants' knowledge about diabetes, patients' adherence to treatment, and HbA1c improvement (Figueira et al., 2017). Moreover, Bernard et al., (2019) conducted a cluster randomized controlled trial.Study centers were randomly allocated to the experimental and the comparison group. Members of the intervention group participated in the Dialife educational program, while the membersof the comparison group did not participate in the program. Dialife efficacy education was studiedby comparing diabetes-related knowledge between the two intervention and comparison groups. Long-term efficacy was assessed 6-12 months after the intervention using hierarchical regression models to analyze effects over time. It was concluded that educational programs for diabetics and their relatives alike may improve their quality of life. Additionally, one of the studies examined the effect of implementing an educational program on diabetics patientsthrough pattern management (PM) using results of a continuous glucose monitoring system (CGMS) on individual self-care behaviors and self-efficacy in type 2 diabetes patients. The 60 participants were distributed, 30 participants in each the experimental group and comparison group. In the experimental group, a CGMS test was performed before and after diabetes education. The result showed a significant difference in the self-efficacy score of PM between the experimental and the control group and Self-efficacy can support and strengthen self-care and diabetes management. The study concluded that the development of health education methods can

reduce or prevent disease complications and premature deaths causedby diabetes Lee Shin, Kim, Y & Lee ,. 2019). Another randomized controlled study wasconducted on patients aged 18-79 years with type 2 diabetes, in healthy areas within the Basque Health Service. The study included two groups (the experimental group that followed the Spanish Diabetes Self-Management Program (SDSMP) educational program and the control group received standard care). A 594 adult patients diagnosed with type 2 diabetes participated in the study to assess the effectiveness of the program in gender care. The study indicated that self-efficacy improved significantly, thus improving diabetes control. The study also showedthat SDSMP educational programs can be considered as a suitable tool for controlling diabetes, (Moreno et al., 2013). In another study, a parallel randomized trial was conducted toevaluate the effectiveness of a structured education program focusing on self-efficacy versus routine education on metabolic and psychosocial, outcomes for adults with type 2 diabetes without insulin therapy. Patients were assigned to the experimental and comparison groups randomly. The experimental group underwent a structured education program focusing on self-efficacy, and the comparison group received routine education. The results of the study showed that the effectiveness of an educational program that is structured focuses on competency can reduce Hemoglobin A1C which contributes to a decrease in complications arising from diabetes, and may improve weight control, and alsoindicated that it is appropriate and can be implemented in patients with low educational backgrounds (Jiang et al., 2019). Another study indicated that participation in a multifactorial health educationprogram about diabetes has led to great improvement and achieved great benefits in controlling blood sugar and lipids (Mokabel et al., 2017). This study was carried out usinga longitudinal experimental research design in the outpatient clinic for diabetic patients in a King Fahd hospital in Collectors Kingdom of Saudi Arabia on 150 adult patients diagnosedwith type 2 diabetes.

They were randomly assigned within an intervention group and a controlgroup to evaluate the effectiveness of cultural programs for non-insulin-dependent diabetics. The rate of improvement in adherence was observed, and there were significant differences in the improvement and change of lifestyle of patients. A decrease in body mass index, and the level of blood sugar after participation in the educational program compared to the pre-education stage was also noticed (Mokabel et al., 2017).

In the context of diabetes education research have demonstrated the application of specific models such as the PRECEDE model, and these studies demonstrated the feasibility of the PRECEDE planning model for developing and evaluating interventions for adults with type 2 diabetes (Hosseini et al., 2017). In a randomized pilot study conducted in the Iranian city of Gorgan to determine the effect of educational intervention on self-care of diabetic patients using the PRECEDE model on 106 patients diagnosed with type 2 diabetes. The teaching methods of Lecture, inquiry, and group discussion techniques were used in the experimentalgroup, while Patients in the control group received routine education. The results showed that the educational intervention was beneficial in promoting self-care behaviors and controlling diabetes among type 2 diabetes patients, (Hosseini et al., 2017).

To achieve diabetes control in adults with type 2 diabetes, education is essential because it provides the patient with the knowledge and skills that allow the patient to self-care on a routine basis, and it is necessary to provide health education concerning self-management to prevent long-term complications and reduce the financial burden on the health system (Najee, Hassan. 2019). To achieve the best level of diabetes control, the application of comprehensive instructions for self-management of a diabetic patient is needed (Najee, Hassan, 2019). A little research has investigated the effectiveness of currentmethods of controlling blood sugar, taking medications regularly, and following up with a physician

(Najee, Hassan, 2019). A quasi-experimental study (pre-test and post-test) on patients with type 2 diabetes for self-care was conducted using a non-probability (purposive) sample. Where 60 patients diagnosed with type 2 diabetes were brought in from clinics of the Ministry of Foreign Affairs at the endocrinology center in the city of Nasiriya in Iraq. The sample was divided into two groups, comparison and experimental groups. The study group underwent a one- hour face-to-face educational program on knowledge and self-care directions. While the comparison group was not exposed to the intervention. The results showed that knowledge and self-efficacy increased significantly with the increase in the participants' educational level, (Najee & Hassan, 2019).

Moreover, education was instrumental in enhancing knowledge, self-efficacy, and disease awareness. In this regard, a randomized quasi-experimental study was conducted to evaluate the educational intervention in knowledge and perception of disease and self-efficacy of patients with type 2 diabetes (Nuong et al., 2018). The program also covered important aspects of diabetes and disease perceptions in three sessions taking about 60 minutes. The post-intervention result was statistically significant, and a remarkably clear and surprising effect of the intervention in the patient's perception and knowledge was observed (Nuong, Surit, & Dang, 2018).

Regarding the comprehensive care of type 2 diabetes patients, health education is not only limited to hospitalization, but also extended out-of-hospital care. A study was conducted on two groups of participants, who were randomly selected from inpatient and outpatient departments (Zhang & Chu, 2018). The control group received the usual care and the intervention group received a systematic health education program. The health education model utilized in this study was based on the following aspects, dissemination of educational materials, picture education, individual treatment, and medical nutrition programs, organized

health lectures, assessment of complications, lifestyle modification, self-monitoring, and blood sugar control. The health education model aimed to support informed decision-making and problem-solving, improving clinical outcomes, health status, quality of life, and increasing knowledge about the importance of controlling risk factors. The results revealed a preference for the health education model over the traditional education (Zhang & Chu, 2018).

Self-efficacy is an individual's belief in the influence and control of events that affecthis her life (Bandura A. Wessels, 1994). Research have identified certain important and basic conditions for successful diabetes control, as Self-efficacy, and self-awareness (Bakkar et al., 2017). Additionally, psychosocial problems are associated with managing diabetes and its complications (Amer et al., 2018).In this regard, almost a quarter of the developed world's population suffers from type diabetes distress (DD). A study of two parallel randomized controlled trials was conducted on 120 patients with type 2 diabetes through eligibility criteria and a DD screening tool. The intervention group received 40-minute educational sessions using Diabetes Conversation Map (DCM) for four weeks. The results indicated an inverse relationship between reducing DD and a significant improvement in the blood sugar level. DCM is considered a useful tool for educational empowerment for diabetics, and these tools have proven effective in controlling diabetes (Qasim et al., 2019). A cross-sectional study including 126 women with diabetes was performed to assess the relationship between knowledge of diabetes and self-efficacy. The result of age-adjusted multiple regression analysis showed a significant positive relationship between knowledge and self-efficacy. The study indicates that if individuals gain self-efficacy they feel that they are in control of their behavior, and their health behaviors will be positive. And when self-efficacy is low, it hinders the demand for health care, (Mehta et al., 2016). Amelia, Ariga, Sari, & Savira (2018) studied

the relationship between self-efficacy and quality of life in type 2 diabetic patients. This study was conducted interviews using a questionnaire type 2 diabetic's form with 83 patients. Data was analyzed using SPSS software and the chi-square test. The study a significant relationship between self-efficacy and quality of life for patients. Type 2 diabetesand quality of life are affected by cognition and self-efficacy. The study concluded that through continuous education of diabetic patients, self-efficacy and patient empowerment can be increased to control type 2 diabetes, improve quality of life, and reduce complications. Karaoui et al., (2018) conducted a cross-sectional study on 207 adult patients with type 2 diabetes to assess their knowledge and practice regarding type 2 diabetes self-management and disease monitoring. The results of the statistical analysis in their study revealed that there is a statistically significant correlation between knowledge and the degree of practice, and that more education increases practice. Education improves and reflects positively on practice. Participants with university degrees had higher knowledge than those with intermediate or primary education and they can follow a special diabetes diet.

In Another study that was conducted on 84 adolescents with diabetes type 1 using a simple random sampling and randomly divided into control and intervention groups using randomization of blocks. The intervention group received four training sessions on self-care behaviors in diabetes and the control group received routine training. The outcome of the intervention group was significantly higher than the scores for self-care behaviors of the comparison group. (Edraki, Zarei, Soltanian, Moravej, & Midwifery, 2020). Additionally,an interventional study was conducted with experimental and comparison groups, the participants were adult patients with type 2 diabetes. Knowledge of diabetes, self-care behaviors, and self-efficacy were measured. The results showed that the difference in mean score for the knowledge of diabetes management after the diabetes self-management

education (DSME) was significantly greater in the experimental group (Hailu et al., 2019). Finally, a semi- experimental study among 62 patients with diabetes type 2 from 8 primary health centers, using a purposive sampling technique was conducted. A knowledge questionnaire from a brief knowledge test for diabetic patients affiliated with the Michigan Research and Training Center for Diabetics was used. A significant difference in knowledge and self-efficacy was found after community education programs. This study revealed that the community education program led to a significant improvement in self-efficacy, and concluded that the improvement of knowledge and competence autonomy is highly required for patients with type 2 diabetes (Sari, Yamin, & Santoso, 2017). A quasi-experimental study among 110 patients with type 2 diabetes was conducted. The sample was divided into two groups: the comparison group, consisting of individuals who received a routine care from a multidisciplinarystaff in the clinic, and an experimental group, receiving the intervention. The study showed improvement in the quality of life after participating in an educational program and gaining knowledge. The program also contributed to raising the quality of life, increasing knowledgeabout the disease, and dealing with the disease. (Brito et al., 2016).

Summary

Diabetes is an increasing chronic illness affecting many individuals worldwide and does not discriminate cultural, racial, socioeconomic status, or gender. Diabetes education, in its various ways, can improve self-efficacy outcomes by allowing individuals to connect with health care professionals and obtain support from others who share the same chronic condition. Provide education, and build confidence to improve diabetes self-efficacy behaviors. Providing supportive environments for individuals that encourage active participation due to the sharing of ideas, personal experiences, and can help reduce fears and anxiety as well. Patients who are highly proficient and self-sufficient tend to be more

compliant and motivated in their care, goal setting, and control of diabetes and its complications. Patients, who have a stable and regular relationship with their caregiver, tend to meet their healthcare needs through office visits which in turn control blood sugar level and diabetes and its complications.

Chapter Three: Methodology

Introduction

The purpose of this study was to determine the effect of the diabetes education program on the knowledge and self-efficacy of type 2 diabetic patients. This chapterdescribes the study methodology including design, setting, sample and sampling method, study instruments, and psychometric properties, data collection procedures, ethical considerations, and statistical plan. Finally, the chapter provides a summary of what has beendiscussed in this chapter sections.

Research Design

This study used a quasi-experimental design that aimed at determining the effect of type 2 diabetes education program on knowledge and self-efficacy. Data were collected using a self-administered questionnaire regarding study variables including knowledge and self-efficacy. According to Polit & Beck (2008), this design as compared to other designs provides better evidence of the program's effectiveness.

Setting

The study was conducted at the General Military Hospital in Jordan. The hospital was chosen deliberately. The hospital provides secondary and tertiary levels of care for various age groups. The hospital contains a multi-specialized care unit that provides care and treatment for diabetics. This unit also provides health education for diabetics and receives approximately 25 patients per day, as it is the second largest specialized center for diabetes after the National Diabetes Center in the region.

Study Population

The target population for this study consists of type 2 diabetes patients in Jordan.

Sample Size

The sample size was determined by using G*power software by setting alpha at ("α≤0.05"), study power 80%, medium effect size (0.25), One-way ANCOVA, and the required sample was 128 participants. In the current study 130 participants were included due to possibility of withdrawal from the study, with 65 participants in both the experimental and comparison groups.

Study Sample

The study population consisted of 130 patients with type 2 diabetes. The convenience sampling technique was used to select type 2 diabetic patients from Al-Hussein Medical City in Amman – Jordan attending the Diabetes Education Clinic. In addition, patients were selected until they reached the target sample from the lists of patients visiting the clinic. Then, participants were randomly assigned to the experimental and comparison groupsby using a simple random sampling method (lottery method).

Inclusion Criteria

Patients who were eligible to participate had a diagnosis of type 2 diabetes, above 18 years old. Their native language is Arabic, they can use the phone and are able to participate in all diabetes self-care activities. In addition, they can read and write, and willing to participate in the study.

Exclusion Criteria

Exclusion criteria included those patients who have severe medical conditions that hinder them from participating in the data collection. In addition to the those patients with mental health problem that negatively impact their understanding of the study questionnaire.

Ethical Considerations

Ethical approval was obtained from the Deanship of Higher Studies and Scientific research at Isra University (see appendix 1), and the Royal Medical Services (see appendix 2). Then the nursing director of the selected hospital was met and briefed on the nature and purpose of the study and how it will be conducted.

In terms of the risk/benefit ratio, the benefits of undertaking this research project for the participant and the nursing profession as a whole outweigh those potential risks (see points 3 and 4). According to Polit and Beck (2008), one of the initial steps in a research project is to ensure that it is ethical, and to confirm that the potential risks associated with the study do not exceed the expected benefits. The main potential benefits of conducting this research were numerous and the risks related to this study were minimal. Patients have an opportunity to increase their awareness about themselves regarding their experiences that they may face during course of their diabetes illnesses. This was achieved by introspection and self-reflection or by direct contact with the researcher. Moreover, this study presented worthy data for clinical nurses in recognizing diabetes patients' knowledge and self-efficacy level. As a result, this will improve the quality of care for patients. However, the researcher informed the patients to discontinue filling the questionnaires at any time if psychological stress becomes intense. The researcher was also available to speak to the patient in private. In addition, the phone number of the researcher was given to the participants and they were encouraged to call for further information. The participants were provided with information

about the purpose of the study and they were given the researcher's phone number and email address to communicate. They were assured that the study is confidential and they have the right to accept or refuse the participation without any direct or indirect influence on their treatment. The participants were asked to sign the informed consent (see appendix 3). A package of informed consent, cover letter, self-report questionnaires, and demographic survey (see appendix 4) were distributed to all participants who expressed their interest in participating in the study. Theinformed consent includes information regarding the study purpose and significance, and astatement informing the participants of the protection of their privacy. It ensures that the participants' responses will be treated with strict confidence, especially the information thatmay reveal their identity. The research data was kept in a locked cabinet in the researcher'soffice, where no one but the researcher could access it. The soft copies of the research study was also kept on the researcher's personal computer and no one could access it. Data protection processes laws in Jordan were respected, together with requirements imposed bythe University of Jordan and the other participating hospitals.

Data collection instrument

The study used questionnaire consisting of three main parts for data collection. The first part is a demographic survey including socio-demographic characteristics of participants as age, gender, educational level, duration of diabetes, other chronic diseases associated with type 2 diabetes, the latest result of glycosylated hemoglobin (HbA1c), and whether any training on diabetes health education has been attended, see Appendix (5). The second part aims to assess the knowledge of the participants. It was developed in collaboration with a two diabetes education nurses holding a higher diploma, and a doctoral degree. The development of the second part went through different phases that was started with an in depth review of the current literature. The validity of the second part was maintained by

distributing the questionnaire to a panel of experts in the field consisting of a consultant endocrinologist, a specialized nurse in endocrinology, and two faculty members with a Ph.D. at Isra University. The reliability of the second part was also achieved by calculating Cronbach's alpha, a value of ($\alpha = 0.83$) was obtained. This part measures participants' knowledge by 10 multiple choice questions on type 2 diabetes. Including its symptoms and characteristics, knowledge of high blood sugar, hypoglycemia, insulin handling in terms of storage, physical activity, nutrition and eating habits, see Appendix (6).

The third part is the self-efficacy tool that was used to measure the patient's self-efficacy in relation to the activities of type 2 diabetes. This part was adopted after taking the verbal permission from the author, who is a master student at the University of Science and Technology, and it was in the Arabic language: The validity of the scale in its original form was (0.95). For objectivity and increased accuracy in the use of the questionnaire. It was revised by a team of experts in the field consisting of a consultant endocrinologist, a nurse specializing in endocrinology, and two faculty members with PhDs, at Al-Isra University. And modifications were conducted according to their suggestions. The scale reliability was also performed using Cronbach's alpha, and a value of ($\alpha = 0.89$) was obtained. The tool uses a Likert scale that ranges from 1 to 5 as: 1- Not at all able, 2- Not able, 3- Not sure, 4- Able, 5- Not at all, see Appendix (7).

Data Collection Procedure

Regarding the data collection process, the researcher met with a nurse in- charge of a health education clinic. The significance of the study was explained. The objectives and data collection procedures were also discussed. This was conducted after the researcher had obtained permission to conduct the research at Isra University and Royal Medical Services. Participants were selected according to the criteria of inclusion and exclusion and their

willingness to participate. Patients were selected until the target sample from the lists of patients visiting the clinic was reached. Participants were provided with information about the purpose of the study and given a phone number and an e-mail address for communication. Participants were informed that their participation in that the study is anonymous and they have the right to accept or refuse participation, without any direct or indirect influence on their treatment; and they finally signed an informed consent. A package of an informed consent, cover letter, self-report questionnaires, and a demographicsurvey was distributed to all randomly assigned participants in both the experimental and comparison groups. The participants also assured that their participation is voluntary and they have the right to refuse without any direct or indirect harm or influence to their treatment inthe clinic. The data collection process lasted for six weeks starting from 20 June until 4 March 2021, until the targeted sample size was reached. The data was kept in a locked cabinet in a locked researcher's office, where no one but the researcher could access it. All the computer software was kept on the researcher's personal computer where no one could access it either.

The adult participants with type 2 diabetes were randomly divided into the comparison group (65 patients) and the experimental group (65 patients). Participants were enrolled in a 6-week series of a type 2 diabetes education session. On the first day, the researcher asked participants to complete a consent form, demographic instrument, and a knowledge and self-efficacy scale regarding type 2 diabetes in two group.

As for the experimental group, the first 30-minute lecture begins for each participant in a dedicated teaching office, provided with a brochure, and forms to help them to understand information and acquire skills. Patients were followed up to determine any progression. Follow-up was conducted to obtain a broader explanation and to answer inquiries immediately after the intervention in two sessions of 10-20 minutes every 10 days. Followed

by phone. The American Diabetes Association Standards of Clinical Diabetes Care Education Program - revised 2020 edition was used to develop the study program consists of six core areas for improving diabetes care including, diet, self-care, complications, medication, glycemic control, and exercise (Association, 2020). These areas were also core components of the program utilized in thisstudy.

The program contained the most important recommendations related to primary care for patients with diabetes, the most important of which are:

1. Improving and enhancing diabetes care by facilitating healthcare systems and supporting self-management

2- Managing and maintaining diabetes helps prevent or delay serious health complications

3- Supporting treatment decisions by ensuring the appropriate time for decision-making on scientific and medical grounds.

4- Helping diabetics to understand their disease, its nature and classification, as well as the therapeutic management and complications associated with it.

At the same time, the comparison group receives routine training. Post-test was conducted using the study questionnaire over the phone in two group by communicating with the participant and recording the correct answer due to the current COVID-19 illness.

Upon completion of the education session, the participants were retested regarding knowledge and self-efficacy of type 2 diabetes. The researcher then released the participants from the study after completing the 4-week diabetes education lessons.

Pilot testing

A pilot study was conducted before the process of data collection using a random sample of 13 diabetes patients from the target population accounting 10% of the sample size. Before

carrying out the current study the researcher conducted a pilot study, to assess the instruments feasibility and to determine if any modifications needed to be made prior to using the study instruments (e.g., identifying possible new items for both Knowledgesubscale and self-efficacy subscale, determining the suitability and quality of the translated Arabictools. In addition to assess the clarity of questionnaire and ability of participants to comprehend the items). Also, to evaluate the appropriateness of the study procedures and methods, identifyany extraneous variables that have to be controlled, and recognize any potential problems that mayarise during the data collection (Polit & Beck, 2008).

The pilot study tested the instrument's psychometric properties and explored any obstacles encountered during the data collection. It evaluates the readability of the instrument and evaluated the instrument as suitability for participants' cultural beliefs. In addition, piloting help the researcher in determining the required time for completing the questionnaire that was estimated about (20-25 minutes). Data from the pilot study were not included in the final study analysis, the questionnaires were administered to pilot diabetic patients' type 2 in the same way as it was administered in the main study. In addition to checking the clarity of questions, the researcher also examined the questionnaire reliability. Pilot testing revealed an acceptable level of Cronbach's alpha coefficient for knowledge and self-efficacy scales, as shown in table (1).

Regarding adding the new items of the study tools, most of the participants' suggestions were presented implicitly in already existing items. Therefore, no new items have been identified. And as for the reliability of Arabic tools using Cronbach's alpha, the result indicated that the total Knowledge has good internal consistency ($\alpha = 0.83$) and the total Self-efficacy has adequate internal consistency ($\alpha = 0.89$). The procedure of "Alpha if item deleted" was used to examine individual items to establish how each of the

items affected the reliability of the scale (Gliem & Gliem, 2003) and was used for item refinement. However, none of the item's deletions resulted in improving Cronbach's alpha neither for total Knowledge nor for total Self-efficacy. Therefore, all Knowledge and Self-efficacy items were used in the current study. Third, in relation to the tools' clarity, some students indicated that a few items were unclear or difficult to answer. Accordingly, the researcher reworded (or paraphrased) some items and added clarifying words for others. Fourth, concerning the research protocol and procedures, they were adequate and appropriate. Lastly, no extraneous variables had been identified, nor problems had been occurring during the data collection.

Table 1 Result of Cronbach's alpha of the study questionnaire

Number of item	Variables	Alpha
10	Knowledge	0.83
15	Self-efficacy	0.89

Data Analysis

IBM-SPSS software version 25 was used to analyze data. Descriptive statistics such as frequency and percentage were used to describe categorical data as (Age, Gender, Educationlevel, Chronic diseases, Performing HbA1c, Prior and, Sufficient training, and Chronic diseases) while Mean±SD was used for disease duration and HbA1c results.

A one-way ANCOVA was used to test if there is a statistically significant mean difference of post-test score for knowledge and self-efficacy among the two groups after controlling the pretest score as a covariate. Eta square was also calculated to measure the effect size of the health education program. Mc Guigan's Ratio for program effectiveness was calculated for the intervention group. An independent t-test and one-way analysis of variance were used for the group's mean differences on scale-dependent variables.

Linear trend analysis was used to determine the trend in data linked by a categorical factor, alpha level set at ($\alpha<0.05$) for statistical significance was used.

Chapter Four: Results

Introduction

This study aimed to examine the effectiveness of a health education program designed according the International diabetes association guidelines in improving patient's knowledge and self-efficacy. This chapter describes study results, including sample characteristics, statistical methods used to describe the data and answers to research questions. This chapter starts with the elaboration of information regarding the sample characteristics. Soon after, the results relating to each of the number specific research questions are presented. In the last part of this chapter, the researcher summarizes the major mentioned findings.

Data management:

Initial steps were taken prior to data analysis to ensure that the data were appropriate to perform the statistical analysis. A standard screening of the data was performed to check for any missing values, outliers, or unusual values for qualitative and quantitative variables. In addition, scale variables were also examined in order to assume normality. Finally, the assumptions of the statistical test were assumed and, accordingly, the data were free from any violation of their assumptions.

Sample Characteristics:

A total of 130 diabetic patients were enrolled in the study and assigned randomly into the intervention and control group with 65 patients in each group. The males constitute the majority in the study n=73 (56.2%), as compared to female n=57(43.8%). More than one third of participants n=52 (40.0%) were in the age category of (48-60) years. Where the age

category of (37-47) years had the least percentage n=34 (26.2%). The participant's educational level was almost equal between the educational groups. The least percentage was diploma degree n=29(22.3%) and the large percentage was for the participants with bachelor degree n=36(27.7%). The mean duration of disease in the sample was (5.8±4.3 years). Regarding the HbA1c test, the majority of study participants had the test n=103(79.2%) compared to n=27(20.8%) who did not. The mean HbA1c test result among the sample was (8.6±1.4). As for diabetes training, the majority of the sample had no prior diabetic training n=88(67.7%), while only 42 (32.3%) received training. And 26 (61.0%) of the participants who had received training answered that their training was enough. Finally, regarding the presence of other chronic diseases among the study sample, the results showedthat heart diseases were present in most of them n = 62 (47.7%) as compared to n = 6 (6.6%)of those with other chronic diseases. The demographic characteristics of the sample are shown in Table No. (2).

Table 2 Sample Demographic Characteristics (N-130)

Socio-demographic variables	**N (%)**	**Mean ±SD, (Min-Max)**
Gender		
- Male	73 (56.2)	
- Female	57 (43.8)	
Age/ years		
- Less than 36	44 (33.8)	
- 37-47	34 (26.2)	
- Above 48	52 (40.0)	
Educational level		
- Less than tawjihi	31 (23.8)	
- Tawjihi	34 (26.2)	
- Diploma	29 (22.3)	
- Bachelor	36 (27.7)	
Disease Duration/years		5.8±4.3 (1-20)

Performing HbA1c -Yes -No	103 (79.2) 27 (20.8)	
HbA1c results (%)		8.6±1.4 (5-12)
Prior diabetes training -Yes -No	 42 (32.3) 88 (67.7)	
Was the training sufficient (n=42) -Yes -No	 26 (62.0) 16 (38.0)	
Chronic diseases associated with DM -Cardiac diseases -Urology diseases - Gastrointestinal diseases - Rheumatoid disease - Gynecological disease - Others -No	 62 (47.7) 18 (13.8) 14 (10.8) 10 (7.7) 10 (7.7) 6 (4.6) 10 (7.7)	

Participant's knowledge of type 2 diabetes:

To measure patient's knowledge on type 2 diabetes, a knowledge scale was used. It consisted of ten multiple choice questions. The questionnaire was administered twice for both groups. Descriptive statistics such as frequency and percentage were used to calculate the participant's answers between the pre-test and post-test for both groups, as shown in Table2.

Table 3 Descriptive statistics for correct answers of knowledge scale in the interventiongroup. N=65

Item description	Pretest N (%)	Posttest N (%)
1. All the followings are symptoms of hyperglycemia except. A. Polyuria B. Abdominal pain C. Polydipsia **D. Difficulty Swallowing**	8 (12.3)	56 (86.2)
2. All the followings are true regarding type 2 diabetes except. A. Its most common among adults B. It's due to inadequate production of insulin or the body's resistance to insulin. **C. No endogenous insulinat all.** D. No antibodies in theblood.	20 (30.8)	39 (60.0)
3. Which of the following injection sites are least affected by physical activity? A. The upper arm **B. The abdomen** C. The thigh D. The lower arm	32 (49.2)	65 (100)
4. The response of blood glucose to physical activity depends on the following except: A. Duration, intensity, and type of exercise.	15 (23.1)	32 (49.2)

B. Blood sugar and insulin level at the start of physical activity. C. The amount of carbohydrates stored in thebody. **D. The place where exercise takes place.**		
5. Before starting exercises or physical activities that may last for an hour or more, it is recommended that the level of blood sugar before the activity should be between. A. 80-120. **B. 126- 180.** C. 50-100. D. 300-400.	15 (23.1)	55 (84.6)
6.The blood sugar level may drop for the following reasons, except? A. Omitting meals. **B. Omitting insulin.** C. Increasing insulin dose. D. Hyperactivity	23 (35.4)	47 (72.3)
7. To avoid hypoglycemia during and after physical activity, the patient should be given. A - Simple sugars likejuice only. B - Complex carbohydrates such as potatoes and rice only. C- A piece of chocolateonly. **D- Simple sugars such as juice, and complex sugarslike bread together.**	30 (46.2)	50 (76.9)
8. which of the following protein sources contain, carbohydrates A- Meat B - Eggs **C –Legumes**	26 (40.0)	46 (70.8)

9. One of the healthy eating habits that diabeticspatients are advised to adhere to. A- Reducing the amount of sodium to avoid complications related to vessels B- Eating balanced meals that contain all food groups C- Minimizing as much as possible consuming sweets, soft drinks, and sweetened juices **D- All of the above**	25 (38.5)	46 (70.8)
10. Which of the followingis an example of a fat thatis not recommended for people with diabetes. A- Olive oil **B- Fast food** C- Nuts D- Oily fish, such as tuna and sardines	32(49.2)	54(83.1)

The bolded choice is the correct answer

Table 4 Descriptive statistics for correct answers of knowledge scale in the control group.

N=65

Item description	Pretest N (%)	Posttest N (%)
1. All the followings are symptoms of hyperglycemia except. A. Polyuria B. Abdominal pain C. Polydipsia **D. Difficulty Swallowing**	28(43.1)	35(53.8)
2. All the followings are true regarding type 2 diabetes except. A. Its most common among adults B. It's due to inadequate production of insulin or the body's resistance to insulin. **C. No endogenous insulin at all.** D. No antibodies in the blood.	18(27.7)	39(60.0)
3. Which of the following injection sites are least affected by physical activity? A. The upper arm **B. The abdomen** C. The thigh D. The lower arm	33(50.8)	46(70.8)
4.The response of blood glucose to physical activitydepends on the following except: A. Duration, intensity, and type of exercise	25(38.5)	32(49.2)

B. Blood sugar and insulin level at the start of physical activity. C. The amount of carbohydrates stored in thebody. **D. The place where exercise takes place.**		
5. Before starting exercisesor physical activities that may last for an hour or more, it is recommended that the level of blood sugar before the activity should be between. A. 80-120 **B. 126-180** C. 50-100 D. 300-400	20(30.8)	25(38.5)
6. The blood sugar level may drop for the following reasons, except: A. Omitting meals **B. Omitting insulin** C. Increasing insulin dose D. Hyperactivity	38(58.5)	27(41.5)
7. To avoid hypoglycemia during and after physical activity, the patient shouldbe given. A - Simple sugars like juice only. B - Complex carbohydrates such as potatoes and rice only C- A piece of chocolate only. **D- Simple sugars such as juice, and complex sugars like bread together.**	37(56.9)	46(70.8)

8. which of the following protein sources also contain carbohydrates A- Meat B -Eggs **C -Legumes** D - Cheese of all kinds	44(67.7)	53(81.5)
9. One of the healthy eating habits that diabetics patients are advised to adhere to. A- Reducing the amount of sodium to avoid complications related to blood. B- Eating balanced meals that contain all food groups. C- Minimizing as much as possible consuming sweets,soft drinks, and sweetened juices. **D- All of the above.**	15(23.1)	20(30.8)
10. Which of the following is an example of a fat that is not recommended for people with diabetes. A- Olive oil **B- Fast food** C- Nuts D- Oily fish, such as tuna and sardines	40(61.5)	44(67.7)

The bolded choice is the correct answer

Tables 2 and 3 show that there was an apparent increment in the percentages of correct answers for diabetes knowledge between the posttest for both groups. To test this difference from the statistical standpoint, a one-way analysis of covariance (ANCOVA) was conducted to investigate the mean differences between the two groups on posttest knowledge total scores, after controlling the pretestas a covariate, and after verifying the homogeneity of regression slope that was not violated ($F=0.724, p=0.467$). The results, as presented in table (4), revealed that there was a statistically significant mean difference between both groups ($F=60.635$, $p<0.0001$, $\eta 2 =0.323$). This means that the intervention group had a significantly higher mean (7.54 ± 1.63) than the comparison group (5.43 ± 1.52). The adjusted mean for the intervention group and the comparison group were (7.62 and 5.37) respectively, indicating that the health education program designed according the International Diabetes Association guidelines enhanced the participants' knowledge of the in the intervention group more than in the comparison group. Moreover, the eta squared for the effect size ($\eta 2=0.323$) indicated that 32.3% of the variation in posttest scoreis explained by groups and eta squared was higher than the value of 0.14 which was determined by (Thomas & Krebs, 1997). This implies that the health education program designed according to the International Diabetes Association guidelines had a significant effect on diabetic patient's knowledge scores.

In addition, Mc Guigan's Ratio for program effectiveness was calculated for the intervention group based on this equation (pre-test mean – post-test mean / total score – pre-test mean). Accordingly (pretest mean= 3.40, posttest mean = 7.54), total score = 10) Mc Guigan's Ratio = (0.63) .The calculated Gain Ratio exceeded the threshold point (0.6) which was determined by Mc Guigan's, indicating that the program had a significant impact (Roebuck, 1973)

Table 5 Results of ANCOVA between Intervention and control groups on knowledgeposttest scores

Groups	N	Mean±SD	Adjusted Mean	Sum of squares		F value	Sig	η2
Intervention	65	7.54±1.63	7.62	Between	149.168	60.635	0.000	0.323
Control	65	5.43 ±1.52	5.37	Corrected total	462.469			

Diabetes self-efficacy items analysis:

To measure diabetic patient's self-efficacy, a diabetes self-efficacy scale was used. It consisted of fifteen items on a five-point Likert scale with a maximum score of seventy-five. This scale was administered as pre and post-test for both groups. Descriptivestatistics such as Mean±SD were used to explore average change between pre-test and post- test for both groups as shown in the following tables:

Table 6 Descriptive statistics for self-efficacy scale for the intervention group. (N=65)

Variable Name		Pretest Mean(SD)	Posttest Mean(SD)
1	I'm able to distinguish the normal value of HbA1c	3.16(0.82)	4.45(0.50)
2	I am able to check the blood glucose level correctly using the home device	3.75(0.94)	4.52(0.50)
3	I am able to record the blood glucose level and share them with the medical team	3.63(91)	4.28(0.57)
4	I am able to choose the right size of subcutaneous insulin injection needles	3.28 (0.98)	4.12 (0.48)
5	I am able to change the insulin injection site correctly	3.17 (0.86)	3.82(0.58)

6	I'm able to discriminate different brands of insulin	2.75 (0.89)	4.26(0.73)
7	I am able to retain insulin in the right way	3.42 (0.88)	4.09(0.74)
8	I am able to adjust corrective doses of insulin to the higher readings	3.20 (0.90)	3.97(0.61)
9	I am able to adjust insulin doses according to diets	3.05 (0.98)	4.14(0.66)
10	I'm able to adjust insulin doses according to physical activity	3.08 (0.85)	4.08(0.69)
11	I'm able to adjust insulin doses to manage hyperglycemia during sick day management	2.89(0.87)	3.85(0.67)
12	I'm able to adjust insulin doses to manage hypoglycemia during sick day management	3.00 (0.77)	3.49(0.62)
13	I am able to distinguish skin atrophy associated with insulin injection	2.62 (0.87)	4.03(0.83)
14	I am able to distinguish food sources that contain simple and complex sugars and starches	3.33 (0.90)	4.63(0.49)
15	I am able to prepare a nutritious meal that includes all nutrients properly	3.61 (0.86)	4.63(0.78)

Table 7 Descriptive statistics for self-efficacy scale for control group. N=65

Variable Name		Pretest Mean(SD)	Posttest Mean(SD)
1	I'm able to distinguish the normal value of HbA1c	3.40(0.81)	3.82(0.61)
2	I am able to check the blood glucose level correctly using the home device	3.55(0.77)	4.00(0.56)
3	I am able to record blood glucoselevel and share them with the medical team	3.38(0.76)	3.77(0.52)
4	I am able to choose the right size ofsubcutaneous insulin injection needles	2.86(0.79)	3.08(0.51)
5	I am able to change the insulin injection site correctly	2.78(0.86)	3.25(0.59)
6	I'm able to discriminate different brands of insulin	2.06(0.77)	2.58(0.58)
7	I am able to retain insulin in the right way	3.17(0.74)	3.78(0.48)
8	I am able to adjust corrective doses of insulin to the higher readings	2.83(0.76)	3.28(0.65)
9	I am able to adjust insulin doses according to diets	2.75(0.77)	3.29(0.55)
10	I'm able to adjust insulin doses according to physical activity	2.89(0.85)	3.43(0.50)
11	I'm able to adjust insulin doses to manage hyperglycemia during sick day management	2.82(0.77)	3.14(0.46)
12	I'm able to adjust insulin doses to manage hypoglycemia during sick day management	2.54(0.66)	3.08(0.46)
13	I am able to distinguish skin atrophy associated with insulin injection	1.95(0.48)	2.54(0.71)
14	I am able to distinguish food sources that contain simple and complex sugars and starches	3.43(0.85)	4.03(0.53)
15	I am able to prepare a nutritious meal that includes all nutrients properly	3.70(0.70)	4.15(0.44)

Tables 5 and 6 show that there is an apparent improvement in the mean score of diabetes self-efficacy between pre-test and post-test for both groups. To test these differences from the statistical standpoint, a one-way analysis of covariance (ANCOVA) was conducted to investigate mean differences between two groups on total post-test self-efficacy score, after controlling the pretest as acovariate, and after verifying that the homogeneity of regression slope was not violated ($F=1.087, p=0.341$). The results revealed that there was a statistically significant mean difference between the two groups ($F=163.889$, $p<0.0001$, $\eta 2 =0.502$). This means that the intervention group had a significantly higher mean (4.16 ± 0.32) than the comparison group (3.41 ± 0.30). The adjusted mean for the intervention group and comparison group were (4.14 and 3.43) respectively, indicating that the health education program designed according to the International Diabetes Association guidelines enhanced participant's self-efficacy in the intervention group more than the comparison group. Furthermore, the eta squared for the effect size ($\eta 2=0.502$) indicatingthat 50.2% of the variation in the post-test score is explained by groups and the eta squaredwas higher than the 0.14 values which were determined by (Thomas & Krebs, 1997).

This implies that the health education program designed according the International DiabetesAssociation guidelines had a significant impact on the diabetic patient's self-efficacy scores. In addition, Mc Guigan's Ratio for program effectiveness was calculated for the interventiongroup based on this equation (pre-test mean – post-test mean / total score - pretest mean). Accordingly (pre-test mean= 3.20, post-test mean = 4.16, total Mean score = 5) Mc Guigan's Ratio = (0.61) the calculated Gain Ratio exceeded threshold point (0.6) which determined by Mc Guigan's that implies the program was effective (Roebuck, 1973).

Table 8 ANCOVA results for the interventional and control groups on the self-efficacy in the post-test

Groups	N	Mean±SD	Adjusted Mean	Sum of squares		F value	Sig	η2
Intervention	65	4.16±0.32	4.14	Between	15.033	163.889	0.000	0.502
Control	65	3.41 ±0.30	3.43	Corrected total	29.942			

Second research question:

What it the relationship between specific demographic factors relate to the knowledge and self-efficacy of patients with type 2 diabetes?

To investigate mean differences of post-test knowledge and self-efficacy score between (Gender, Prior training, age, and educational level), an independent sample t-test and one-way ANOVA were used as follow. An independent sample t-test shows that there is no statistically significant mean difference of knowledge and self-efficacy score based on gender ($P>0.05$).On the other hand, statistically significant results were found in the knowledge and Self-efficacy score based on prior training. This means that the participants who had previous training possess a significantly higher knowledge mean score than those who did not. ($M=6.98$, $SD=1.75$ vs $M=6.25$, $SD= 1.93$) respectively, $t= (128)\ 2.071$,$p=0.040$). In the same context, the participants who had previous training had significantly higher self-efficacy mean scores than those without ($M=3.99$, $SD=0.46$ vs $M=3.69$, $SD=0.46$)respectively, $t=(128)3.493$, $p=0.001$).

Table 9 independent sample t-test results for mean differences of knowledge and self-efficacy posttest score based on gender and previous training

Variables		N	Mean±SD	Df	T value	Sig	Dependent variables
Gender	Male	73	6.67 ± 1.82	128	1.275	0.205	Knowledge
	Female	57	6.24 ± 1.97				
	Male	73	3.78 ± 0.46	128	0.203	0.839	Self-efficacy
	Female	57	3.80 ± 0.51				
Prior Training	Yes	42	6.98 ± 1.75	128	2.071	0.040	Knowledge
	No	88	6.25 ±1.93				
	Yes	42	3.99± 0.46	128	3.493	0.001	Self-efficacy
	No	88	3.69± 0.46				

For investigating the relationship between mean differences of knowledge and self-efficacy posttest score and age groups, a one-way analysis of variance" Anova" yielded thatthere are no statistically significant differences in the mean differences of knowledge and self-efficacy post-test scores and age categories ($p>0.05$) as shown in table (9).

Table 10 One-way Anova results for mean differences of knowledge and self-efficacyposttest score based on participant's age

Age /years	N	Mean±SD	F value	Df		Sig	Dependent variables
18-36	44	6.52 ±1.75	1.592	Between	2	0.207	Knowledge
37-47	34	6.91 ± 1.80					
Above 48	52	6.17 ± 2.05		Within	127		
18-36	44	3.85 ± 0.50	0.903	Between	2	0.408	Self-efficacy
37-47	34	3.80 ± 0.54					

Above 48	52	3.72 ± 0.48		Within	127		

The results in table (10) indicate that the statistically significant results were found in the knowledge and Self-efficacy posttest scores are based on the participant's educational level. $F(3,126)=5.709$, $p=0.001$) and $F(3,126)=23.365$,$p<0.001$) respectively.

To evaluate the nature of differences between four means further the statistically significant ANOVA was followed up with scheffe post hoc test. The reason of choosing this test was have unequal sized groups (Shingala, Rajyaguru, & Engineering, 2015). The result revealed that differences between bachelor degree with primary, secondary and diploma level were statistically significant in favor of bachelor degree which had a higher mean knowledge score($p=0.006$, $p=0.016$, $p=0.038$) respectively while differences between other categories were not statistically significant ($p>0.05$).

In the same context, Scheffe post hoc test revealed that the differences between bachelor's degree with primary, secondary, and diploma levels were statistically significant in favor of bachelor degree which had a higher mean of self-efficacy score ($p<0.001$, for all). Also, diploma degree had a statistically significant higher mean than the secondary andprimary ones ($p<0.001$, for both) while no statistically significant differences were found between bachelor degree with a diploma, secondary with primary ($p=0.159$ and $p=0.995$) respectively

Table 11 One-way Anova results for mean differences of knowledge and self-efficacyposttest score based on participant's educational level

Educational level	**N**	**Mean±SD**	**F value**	**Df**		**Sig**	**Dependent variables**
Primary	31	5.94±2.34	5.709	Between	3	0.001	Knowledge
Secondary	34	6.12±1.68					
Diploma	29	6.21±1.59		Within	126		
Bachelor	36	7.53±1.50					
Primary	31	3.35±0.35	23.365	Between	3	0.000	Self-efficacy
Secondary	34	3.73±0.41					

Diploma	29	3.91±0.37		Within	126		
Bachelor	36	4.11±0.39					

Furthermore, a linear trend analysis was performed to see whether the participant's knowledge and self-efficacy score increase or decrease with respect to the increase of educational level. It is important to note here that surprisingly the linear trend analysis was statistically significant ($p<0.001$ for both). This means that these scores increased with the increase of the educational level as shown in Figures 1 an 2

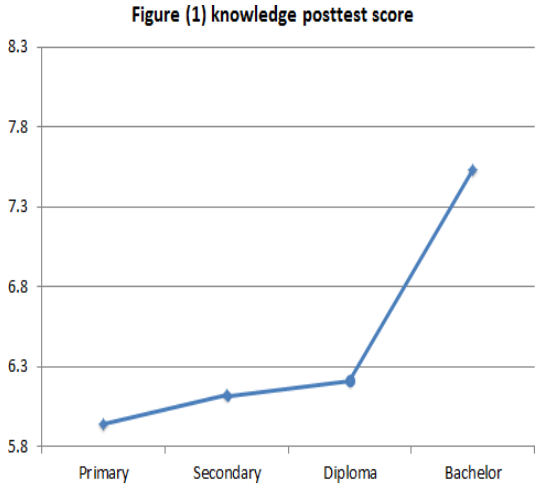

Figure 1

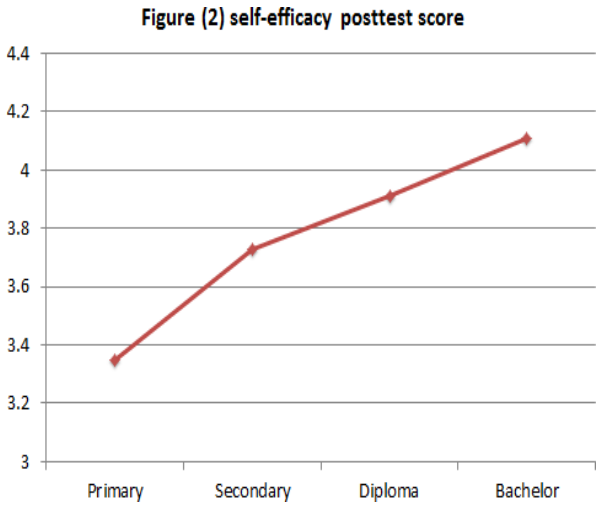

Figure 2

Chapter Five: Discussion

Introduction:

This chapter discusses the main results and provides an interpretation of the research findings in light of the relevant literature, purpose of the study, and research questions. The purpose of this study was to determine the effectiveness of a health education program designed according to the American Diabetes Association Standards for Clinical Diabetes Care in improving type 2 diabetic patient knowledge and self-efficacy.This chapter sums up the major findings of the present study and discusses these findings inthe light of the prior research reports and existing theory in the literature. The researcher addssome personal reflections to a number of interesting issues that raised by the study findings in order to influence the study from his own personal experience.

Overview

Diabetes Health Education Programs are important because they contribute to the management and care of diabetes. These programs are promising tools that produce positiveand long-term effects. People with diabetes learn to understand and assimilate information about their disease and improve their decisions. Discussing and applying information with diabetic patients has an important role in improving their knowledge and raising their self- efficacy (Haas et al., 2012; Jenlink, 2020). Moreover, Self-efficacy is essential in achieving success, and it is considered an effective indicator of education and the ability to complete tasks and reach the desired goals. Meaning that people who enjoy self-efficacy can improvepersonal achievements, well-being, and health care (Piette, Heisler, & Wagner, 2004).

The Effectiveness of the Educational Program

The results of the current study revealed the effectiveness of a diabetes health education program on knowledge and self-efficacy of type 2 diabetes patient. This improvement was manifested through statistically significant differences between the experimental and comparison groups. The results of the current study are consistent with the results of a randomized study conducted in Germany to measure the effectiveness of an educational program reported by Bernard et al., (2019). The program has proven to be a successful approach to diabetes care and management, as well as creating positive long-termeffects for diabetic patients and increasing their public awareness without any complicationsin patients' daily lives. Moreover, the results of the current study are consistent with the results reported by Lee et al., (2019). Their results showed positive changes in patients' self- care behavior after the diabetes education program. Additionally, the results of the current studysupports the result of other studies reported by Moreno et al., (2013), and Jiang et al., (2019).Who indicated that the use of educational software raises the participants' self-efficacy level. Qasim et al., (2019) reported in a randomized controlled study conducted in the Netherlands, where their results did not support the results of the current study. Patients do not remember the information given this is because the program took a long time from 4 to 12 months; this may be also due to the participants' lack of interest in this type of intervention.On the other hand, the program implemented in the current study took place in 6 weeks andwas effective in raising efficacy in 6 weeks. This means that the short period between educational sessions may increase the impact of education on participants in improving knowledge and raising the level of self-efficacy (Delamater, 2006).

Implementation of Diabetes Health Education Programs encourages diabetics to takecare of themselves, be able to manage their disease, and control their blood sugar levels.

Consequently, increasing public awareness and thus reducing acute and chronic complications of diabetes (Piette et al 2004). A previous study showed that diabetes patients' knowledge of diabetes is insufficient and that patients do not have the necessary knowledgeto control their disease. The study revealed a lack of knowledge among pretest participants for both groups (Bakkar et al; 2017)**.** The current study confirmed the effectiveness of the Diabetes Health Education program in improving the knowledge of diabetes patients. The study also found a clear increase in the percentages of participants' correct answers related to knowledge of diabetes between the pre- and post-tests of the experimental groups. The results of the current study are consistent with similar studies conducted by Figueira et al., (2017) who indicated that educational interventions had a clear impact on improving participants' knowledge of diabetes and blood sugar control. This was evident in our study, that several reasons contributed to this achievement and remarkable improvements such as the use of patient's booklet including brochures, teaching lessons by nurses who are specialized in diabetes health education, and allowing patients to participate in their management plans.

In a controlled and reported before-and-after study conducted by Hailu et al., (2019) in Sahara, South Africa (Ethiopia). The effectiveness of educational programs in increasing knowledge and self-efficacy was supported, revealing statistically significant results inpatients with type 2 diabetes. In addition, in another randomized controlled study reported by Mehta et al., (2016), in Pakistan, which included 120 participants to measure the effectiveness of the education tool. Their study results significantly raised the participants' level of knowledge, which supported the current study results. Moreover, their results showed that teaching through educational means such as brochures, and individual discussions significantly increase of the average level of knowledge. In addition, therapeutic

institutions providing educational programs are important to increase diabetes knowledge to enhance, motivate and train patients to use the knowledge and reinforce their behavior to achieve goals.

Relationship between Individual Demographics and Knowledge and Self-Efficacy

The current study also revealed a significant relationship between the educational level ofthe participants i.e., diploma or bachelor's degree with their level of knowledge and self- efficacy. The analysis revealed that there were statistically significant differences between the bachelor's degree and the primary, secondary, and diploma levels to the favor of the bachelor's degree that had a higher average ($p = 0.006$, $p = 0.016$, $p = 0.038$) respectively, but the differences between the remaining categories were not statistically significant ($p > 0.05$). This links between knowledge and self-efficacy with the educational level that may beattributed to the fact that attitudes and behavior become more positive with the rise in the educational level, which positively affects the increase of awareness, common understanding, and ways of obtaining and expanding information. Thus, the purpose of applying this information is to control diabetes. These results are supported by the results ofa study conducted in Lebanon by Karaoui et al; (2018), which showed that the level of education is closely related to participants' knowledge regarding their diabetes and its management and control. Similarly, a study conducted in Portugal by Almeida et al., (2019)-reported that there was a clear negative relationship between the level of education and the prevalence of diabetes. Based on that, participants with lower educational levels were unableto control and manage the disease and commonly have diverse clinical manifestations as they lack the important knowledge needed in controlling diabetes and its acute and chronic complications.

The results of the current study also showed that there are no statistically significant relationships between gender, and knowledge and self-efficacy. This may be due to the diabetes health education program methodology followed in our study in a one-to-one (face-to-face) manner in discussing the participants and following up during the intervention period through their inquiries and answers. The results of the current study are in agreement with a study by Karaoui et al; (2018), as there were no significant differences between gender concerning knowledge and competence. On the other hand, a study reported by Amelia et al; (2018) was incongruent with the current study. The study was conducted in the city of Medan (Indonesia), it was pointed out that women were the majority in the study and they had control over health careand diabetes management more than men. This means that they have knowledge and self-efficacy that allow them to control their disease and health.

Furthermore, no associations were found between age with self-efficacy and knowledge. The results of the current study showed no statistically significant differencesbetween age with knowledge and self-efficacy ($P > 0.05$). The results of the current study areconsistent with a reported study by Karaoui et al., (2018), in which they found no clear association between age and knowledge. In the current study, it was found that advancing age was not associated with worse results, as well as, the study results also supported the idea that educational health programs should not be limited to any age group.

In conclusion, diabetes is a complex and stressful disease that requires a person with diabetes to make many daily decisions regarding food, physical activity, and medication. It

also entails the person being proficient in several self-management skills. In order for peopleto learn the skills needed to be effective self-managers, health education programs are essential in laying the foundation with ongoing support to sustain the gains made during education and to meet the needs of adults living with and dealing with type 2 diabetes.

Implications of the study

In terms of practice: The results of this study revealed the effectiveness of a diabetes health education program designed according to the guidelines of the International Diabetes Association in improving self-care behaviors and knowledge among patients with type 2 diabetes. Therefore, stakeholders and decision makers are recommended to make use of evidence-based training sessions to get better results from treatment. In addition, this trainingprogram can be used to monitor diabetes patients, which may improve the relationship withthe patient when they feel that someone is taking care of their health. This would also illustrate the importance of communication between patients and health care providers.

Accordingly, the main practical contribution of the current research study is to provide muchneeded empirical data on the use of the training program to improve the practice of self-care behaviors among diabetic patients by increasing their knowledge and awareness regarding self-care activities that may reduce the complications of type 2 diabetes. And it effectivelypromotes the health status of diabetic patients.

The main practical implications of the findings of this study stem from a reformulation of thequestion of how a diabetes health education program tailored to IDA guidelines can play an important role in promoting health in general, and among patients with type 2 diabetes in particular.

In terms of research: A Diabetes Health Education Program designed according to IDA guidelines has been shown to be effective. Therefore, there is a need to implement such

programs with different populations, places and diseases. The content of the educational program can be modified in the future in order to direct it to healthy people also in order to provide them with adequate knowledge regarding the risk factors and facts about type 2 diabetes.

Regarding management: It is important for administrative authorities to promote of the patient-health-care-provider relationship, the presence of patients as activeparticipants rather than passive participants, and, if feasible, to train health-care providers onhow to communicate effectively with patients and to use evidence-based training programs effectively for this purpose. Diabetics will also begin to form a trustworthy relationshipwith the healthcare staff, especially the diabetes caregiver and educator. When communication gaps are filled, barriers to healthcare delivery to patients are identified and solutions are formed.

The results of the current study provide research-based evidence on how evidence-based interventions, specifically the IDA guidelines, can significantly improve the practice of self-care activities in type 2 diabetes patients. Adoption of evidence-based interventions may significantly reduce costs, efforts and challenges for health care facilities when dealing withpatients with chronic diseases such as type 2 diabetes. This is due to the increased knowledge and self-efficacy that have a significant role in the management of diabetes and its acute and chronic complications.

Implications for Nursing Education

Nursing administrators, such as deans and department heads, should keep their staff updatedwith the latest information regarding the provision of care to these patients with diabetes using study results. Also, by participating in conferences discussing the latest reforms in nursing education bearing in mind that the results of this study can help teachers to make such reforms regarding the topic of diabetes. Take advantage of the findings identified in thisstudy in order to update nursing

students or nurses with the latest information about diabetes patients**.** Encouraging diabetes educators to facilitate educational programs for patients with diabetes, allowing patients to assess their level of understanding of diabetes and, therefore, their sense of support, while controlling their chronic condition.

Implications for patients

Using the results of the current study may enable diabetic patients to further develop their skills fromexperience, knowledge and basic self-efficacy to integrate skills in diabetes management as well as to budget for nursing care plans linked to diabetes education. Nurse managers should plan appropriate continuing education programs for people with diabetes (in collaboration with the hospital's in-service education department). These programs aim to improve the knowledge base of diabetic patients and increase their abilities to deal with diabetes and its complications. The results of the current study can be used to create social networking groups in different platforms (eg. Facebook, Twitter, and Instagram) that support and encourage diabetes patients to increase knowledge and self-efficacy in adhering to prescribed medications in order to manage diabetes.

Recommendations

Based on the findings of this study, the following recommendations are made:

- A study with additional variables, such as hospital accreditation, nurses' perceptions of DFU management, the number of staff, and the time management
- A study should be conducted after providing nurses with an educational program about DFU.
- Decision-makers should provide national guidelines regarding DFU treatment.
- Interventional research or educational programs should be conducted for nurses.
- Further study is needed to replicate the study results.

Limitations of the Study

A primary limitation in the current study was the difficulty in detecting changes in the health status of study participants. For example, the progression or deterioration of health, as well as the addition of certain medications or changes to the recommended diet is important to modify the content of the educational program to meet their own learning needs, so failure to update the health status of the participants may prevent the events of the educational content from approaching its goals. This study was conducted in one of the military hospitals. Thus, any generalization to cover other hospitals with similar features can be done with caution. Besides, the study was limited to clinic health education.

Conclusion

Evidence-based health interventions have been reported to help patients significantly reduce the burden of care for a chronic disease. Training programs designed according to International Diabetes Association guidelines have been found to be an appropriate approach to providing customized knowledge content for these patients. Simplicity, accessibility and low cost were characteristic of training programs based on health promotion models. In addition, the current study investigated the effectiveness of the educational, program in improving the knowledge and self-efficacy among type 2 diabetes patients in Jordan. The use of a training program designed according to International Diabetes Association guidelines can be a useful and promising way to design interventions that seek to promote adherence to recommended lifestyle behaviors and self-care activities, such as making manydaily decisions regarding food, physical activity, and medication. Despite the costs of training programs, they will be cost-effective compared to the cost of non-adherence. Furthermore, implementing training programs designed according to International Diabetes Association guidelines is an easy and effective way to communicate with patients, make interventions personal, interactive and can reach a large number of patients. However, health education programs are essential in laying the foundation with ongoing support to sustain thegains

made during education and to meet the needs of adults living with and coping with type2 diabetes.

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Appendix 1

جامعة الإسراء
Isra University

Ref :
Date :

الأفاضل مديرة دائرة القبول و التسجيل المحترمة

الموضوع : تعيين مشرف على رسالة الماجستير

تحية طيبة و بعد ...

قرار رقم (2021-2020/ 5-21)
صادر عن مجلس الدراسات العليا

فأعلمكم بأن مجلس الدراسات العليا في الجامعة قد قرر في جلسته رقم (5) المنعقدة بتاريخ 2020/11/25، تعيين الدكتور محمد عثمان ابو حشيش (أستاذ مشارك) مشرفاً على رسالة الماجستير الموسومة " The effectiveness of an educational program in improving Knowledge and self-efficacy in type 2 diabetes patients" للطالبة هزام بركات عبدالله العجالين.

مرفقة لكم النموذج الخاص بذلك بعد أن تم توقيعه حسب الأصول لاتخاذ الإجراءات اللازمة بهذا الخصوص.

واقبلوا فائق الاحترام و التقدير،،

عميد البحث العلمي و الدراسات العليا

أ.د. رامي عبد القادر السامرائي

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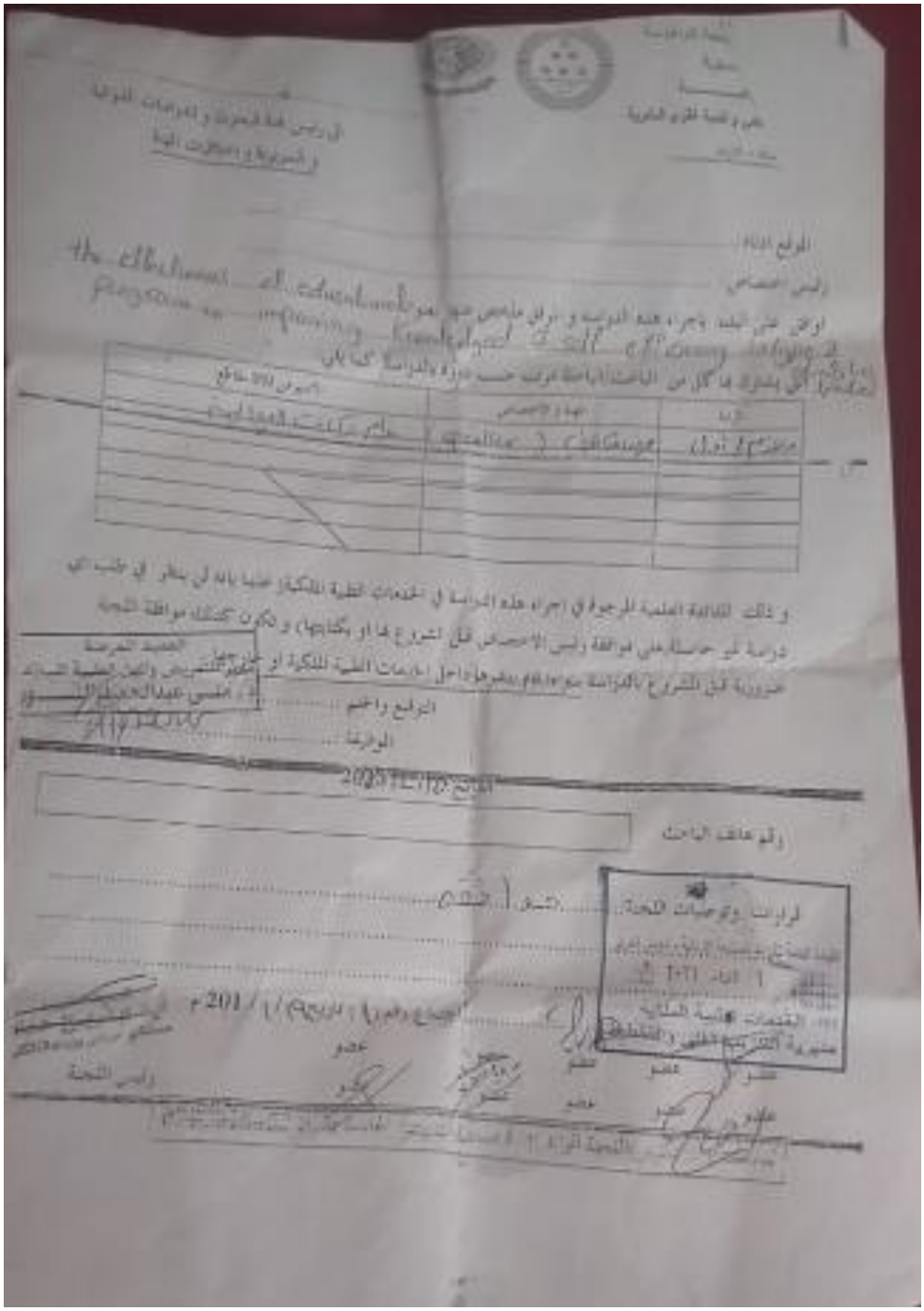
Appendix 2



Appendix 3

نموذج موافقة على المشاركة في دراسة علمية

انت مدعو للمشاركة في دراسة بحثية حول برنامج تدريبي لتحسين المعرفة والفعالية الذاتية لدى مرض السكري من الثاني. يستغرق أكمال الدراسة (45) يوم ، كما يتطلب منك تعبئة استبيان لمدة 15-20 دقيقة قبل وبعد تطبيق البرنامج. لا توجد مخاطر او مضاعفات معروفة مرتبطة بهذه الدراسة. ان النتائج التي سيتم الحصول عليها قد تساعد في نهاية المطاف في تحسين المعرفة والفعالية الذاتية لدى مرض السكري من النوع الثاني .

المشاركة في هذه الدراسة كاملة طوعياً. لن يترتب على عدم المشاركة أي عقوبة او فقدان المزايا التي يحق لك الحصول عليها بخلاف ذلك. وسيتم التعامل مع جميع المعلومات الشخصية التي سيتم الحصول عليها بهذه الدراسة في سرية تامة.

لقد قرأت وفهمت كامل المعلومات الواردة في ورقة معلومات الدراسة، وكان لدي أسئلة تم الرد عليها بشكل مرض، وانا أوافق عن طيب خاطر على المشاركة في هذه الدراسة .افهم انه اذا كان لدي أي أسئلة حول حقوقي كموضوع بحث، يمكنني الاتصال بالباحث. كما وتلقيت نسخة من نموذج الموافقة هذا .

أوافق على المشاركة في الدراسة :

التوقيع.....

التاريخ.....

Appendix 4

استبيان قياس المعرفة والكفاءة الذاتية

لدى البالغين المصابين بمرض السكري –النوع الثاني

أخواتي/أخواني

السلام عليكم

تهدف هذه الدراسة إلى تقييم فاعلية برنامج تعليمي لتحسين معرفة ومستوى الكفاءة الذاتية لدى مرضى السكري من النوع الثاني، حيث يعتمد البرنامج التدريبي على إرشادات الجمعية الدولية لمرض السكري من النوع الثاني. ستكون هذه الدراسة استكمالاً لمتطلبات الحصول على درجة الماجستير في تمريض الحالات المزمنة بكلية التمريض -جامعة الاسراء. علما بأن المشاركة بالدراسة طوعية تماما ولن تؤثر على جودة أي خدمة تتلقاها بالمستشفى، وسوف يتم التعامل مع الإجابات بسريه تامه ولن تستخدم إلا لأغراض البحث العلمي فقط، ولن يتمكن أي شخص من تحديد هويتك او إجاباتك، وتحتاج الأجابة على الاستبيان 15 -20 دقيقة .

للاستفسار حول هذه الدراسة أو اجراءاتها، يمكنك التواصل مع الباحث من خلال البريد الالكتروني التالي:

ghagaleen@gmail.com

- **أو الجوال : 0775273716**

نرجو إعلامكم بأن إجاباتكم هي محط اهتمامنا وتقديرنا

ولكم جزيل الشكر والتقدير

الباحثة : غرام بركات العجالين

Appendix 5

الجزء الأول:

استبيان قياس المعرفة والكفاءة الذاتية لدى البالغين المصابين بمرض السكري من النوع الثاني

العمر:

-1- (اقل من 36) 2-(37-47) 3- (اكثر من 48)

الجنس:

(1) ذكر (2) انثى

المستوى التعليمي:

(1) أقل من توجيهي (2) توجيهي (3) دبلوم (4) بكالوريوس

مدة الإصابة بالسكري بالسنين: _____

أمراض مزمنة أخرى مصاحبة للنوع الثاني من السكري:

(1) امراض قلب (2) امراض المفاصل (3) امراض الجهاز الهضمي

(4) امراض نسائية (5) امراض مسالك (6) أخرى

هل تجري الفحص التراكمي: (1) نعم (2) لا

ما نتيجة اخر فحص تراكمي:_____

هل تلقيت تعليماً وتدريباً بخصوص مرض السكري من النوع الثاني: (نعم) (لا)

إذا كانت الإجابة ب "نعم", هل تعتبر التعليم والتدريب الذي تلقيته كافيا حتى تكون قادرا على إدارة المرض بنفسك

(1) نعم (2) لا

Appendix (6)

الجزء الثاني

يرجى قراءة الفقرات الاتية بدقة واختيار الإجابة

1 -**من أعراض ارتفاع السكر بالدم <u>الاتية ما عدا</u>:**

أ -كثرة التبول ب -الم بالبطن ج -كثرة العطش د -صعوبة البلع

2-**يتصف النوع الثاني من مرض السكري بما يلي ,<u>ما عدا</u> :**

أ -الأكثر شيوعا بين الكبار ب -يتواجد الأنسولين بالجسم ولكن بكميات غير كافية وضعيفة الفعالية
ج -لا يتواجد الأنسولين بالجسم نهائي د -عدم وجود أجسام مضاد.

3-**إن مكان الحقن الاقل تأثراً بالنشاط العضلي والحركي هو:**

أ -أعلى الذراع ب -البطن ج -الفخذ د -أسفل الذراع

4-**استجابة مستوى السكر بالدم للنشاط البدني تعتمد على التالي <u>ما عدا</u>:**

أ -مدة وشدة ونوع الرياضة ب -مستوى السكر والأنسولين بالدم عند بداية النشاط البدني
ج -مقدار الكربوهيدرات المخزنة بالجسم د -المكان الذي يتم فيه ممارسة الرياضة

5-**قبل بداية التمارين أو الأنشطة البدنية التي قد تستمر لمدة ساعة أو أكثر، ينصح بأن يكون مستوى السكر بالدم قبل النشاط ما بين:**

أ - 120-180 ب - 50-100 ج - 30-400 د – 80 -120

6-قد **يهبط مستوى السكر بالدم للأسباب الأتية <u>ما عدا</u>:**

أ - حذف الوجبات ب - حذف الأنسولين او ادوية مرض السكري
ج - زيادة جرعة الأنسولين او ادوية مرض السكري د - النشاط الزائد

7 - لتفادي حدوث هبوط مستوى السكر بالدم خلال وبعد النشاط الرياضي، يجب إعطاء المريض:

أ - سكريات بسيطة كالعصير فقط ب - نشويات معقدة كالبطاطس والأرز فقط
ج - قطعه من الشوكولاتة فقط د - السكريات البسيطة كالعصير والمعقدة كالخبز معا

8-**من العادات الغذائية الصحية التي ينصح مرضى السكري بالالتزام بها**

أ-تقليل كمية الصوديوم لتفادي المضاعفات المتعلقة بالأوعية الدموية

ب-تناول وجبات غذائية متوازنة تحتوي على جميع المجموعات الغذائية

ج-التقليل ما أمكن من تناول الحلويات والمشروبات الغازية والعصائر المحلاة

د-جميع ما ذكر

9-أي من مصادر البروتين التالية يحتوي على الكربوهيدرات أيضا:

أ - اللحوم ب - البيض ج - البقوليات د - الجبن بأنواعه

10-أي من الأصناف التالية يعتبر <u>مثالا على</u> الدهون التي لا ينصح بالإكثار منها لمرضى السكري

أ -زيت الزيتون ب - الوجبات السريعة ج - المكسرات د - الاسماك الزيتية كالتونة والسردين

Appendix 7

الجزء الثالث

مقياس الكفاءة الذاتية للمصابين بالنوع الثاني من السكري

ضع إشارة (√) مقابل الخيار الذي يناسبك

الرقم	البنود	قادر تماماً 5	قادر 4	لست متأكداً 3	غير قادر 2	غير قادر نهائياً 1
1	أنا قادر على تمييز المعدلات الطبيعية للفحص التراكمي					
2	أنا قادر على فحص مستوى السكر بالدم بالشكل الصحيح باستخدام الجهاز المنزلي					
3	انا قادر تسجيل قراءات السكري ومشاركتها مع الفريق الطبي					
4	أنا قادر على اختيار الحجم المناسب لأبر حقن الأنسولين تحت الجلد					
5	أنا قادر على تغيير مكان حقن الانسولين بالشكل الصحيح					
6	أنا قادر على تمييز الأنواع المختلفة للأنسولين					
7	أنا قادر على الاحتفاظ بالأنسولين بالطريقة الصحيحة					
8	أنا قادر على ضبط جرعات تصحيحية من الأنسولين بما يتناسب مع القراءات المرتفعة					
9	أنا قادر على ضبط جرعات الأنسولين بما يتناسب مع الوجبات الغذائية					
10	أنا قادر على ضبط جرعات ادوية مرض السكري بما يتناسب مع النشاط البدني					
11	أنا قادر على ضبط جرعات الأنسولين أثناء الهبوط في الحالات المرضية					
12	أنا قادر على ضبط جرعات الأنسولين أثناء الارتفاعات في الحالات المرضية					
13	أنا قادر على تمييز ضمور الجلد المصاحب لحقن الأنسولين					
14	أنا قادر على تمييز المصادر الغذائية التي تحتوي على سكريات البسيطة والمعقدة والنشويات					
15	أنا قادر على تحضير وجبة غذائية مكونه من العناصر الغذائية بالشكل الصحيح					

Appendix 8

Diabetes Health Education Program

Diabetes is a complex chronic disease that requires ongoing medical care to reduce the risk of poor blood sugar control. Education and self-efficacy support for type 2 diabetes patients is important to prevent severe complications and reduce long-term risks (Association, 2020). To achieve the purpose of the current study, a health education program was constructed according to the Standards of Medical Care in Diabetes—2020 Enhanced for Primary Care Providers. This program aimed to help diabetic patients learn how to take the best care of themselves, control their blood sugar, thereby, significantly reducing acute and chronic complications. As well, the program improves patients' knowledge and self-efficacywith type 2 diabetes. The program contained the most relevant recommendations for primarycare for patients with diabetes, the most important of which are:

1. Improving and enhancing healthcare for diabetic patients by facilitating healthcaresystems and self-management support, using patient-centered methods, patient-centered language, and active listening. As well as patients' participation in meeting their requirements and needs and encouraging them to take effective roles to treat and control theirdisease to prevent or delay acute and chronic complications.

2- Managing and maintaining diabetes will help to avoid or delay serious health complications, and to optimize quality of life.

3- Supporting decisions to take treatment by ensuring the appropriate time for decision-making on scientific and medical grounds.

4- Helping diabetics understand their disease, its nature, and classification, as well as the therapeutic management and associated complications (Association, 2020).

The Americans Diabetes Association criteria for clinical diabetes care – A revised 2020 version- consists of six core domains to optimize the care of patients with diabetes, including Diet, self-care, complications, medications, blood sugar control, and exercise (Association, 2020). These domains were also the core elements of the constructed program in this study.

Diet: The ideal ratio of calories from protein, carbohydrates, and fats varies for

diabetic patients, so the individual should evaluate eating patterns and metabolism taking into account (culture, traditions, health beliefs, and economic status). With a comprehensive treatment plan, including the use of medications and physical activity.

Complications: The risk of coronary heart disease, cerebrovascular disease or surrounding arterial disease increases for individuals with diabetes, and is also the main cause of death for individuals with diabetes. Obesity, high blood pressure, dyslipidemia, smoking, family history, kidney disease, and albuminuria are also considered Risk factors for diabetic patients.

Blood sugar control: Monitoring blood sugar is the basis and is the most important goal that a diabetic patient can achieve. It also helps patients achieve the goal of maintaining an acceptable Hemoglobin A1C without a noticeable drop in blood sugar or the appearance of other negative effects. (Association, 2020)

Objectives of the diabetic health education program:

In the current study, after implementing the diabetic health education program, participants with type 2 diabetes are expected to be able to live a happier, healthier lifestyle, specifically:

1. Improving the well-being and health of diabetic patients
2. Taking care of themselves, manage their disease, and control their blood sugar levels, thereby reducing long-term risks and acute complications.
3. Dealing with acute complications and reduce the risk of exposure to them.
4. Dealing with the types of insulin and the way to manage and store them.
5. Monitoring blood sugar independently.

The following checklists present the necessary information that participants were asked to complete, and the important knowledge that was provided to participants by the researcher

during the implementation of the program.

✓ Patient profile:

Patient profile		
NO	**paragraph**	
1	**Patient's age**	
2	**Patient's address**	
3	**Patient's phone**	
4	**Smoking status**	
5	**Social statue**	
6	**Gender**	

✓ Patient history:

Patient history (screening and diagnosis)		
1	**Date of diagnosis:**	
2	**Type of diagnosis:**	
3	**Type of treatment:**	
4	**Diabetes comorbidities:** hypertension Dyslipidemia CVD	

5	**Chronic complication:** Retinopathy Nephropathy Neuropathy Cardiovascular disease Peripheral vascular disease Stroke	
6	**Acute complication :** Hyperglycemia Hypoglycemia lipohypertrophy	
7	**Foot assessment:**	

✓ Visit health information data:

Visit Data		
1	**Body mass index**: No heights found	
2	**Blood pressure**: Non found	
3	**HBA1C:** No data available for HBA1C	
4	**Fasting blood sugar**	
5	**Medical record**	
6	**Medications**	

✓ **Essential teaching Components**

Data pathology of diabetes (teaching points)			
NO	**Component**	**Done**	**Not done**
1	Diabetes definition		
2	Acute complication		
3	Hypoglycemia management		
4	Hyperglycemia management		
5	Chronic complication		
6	Diet education		
7	Foot care		
8	Diabetes and pregnancy		
9	Exercise , Daily activity		
10	Medication use		
11	Lab & follow up		
12	Hyperlipidemia & DM		

NO	Component	Done	Not done
13	Hypertension & DM		
14	Sexual Disorders		
15	DM & Ramadan		
16	Unawareness hypoglycemia		
17	Self-glucose monitoring		
18	Sick day roll		
19	Outdoor day		

✓ Insulin delivery- self-administration

Insulin Delivery Method			
NO	**Component**	**Done**	**Not done**
1	Syringe /Pen		
2	Dose adjustment		
3	Dose administration		
4	Site of injection		
5	Insulin timing		
6	Insulin storage		
7	Hypoglycemia		
8	Hyperglycemia		
9	Self- glucose monitoring		

Appendix 9

فاعلية برنامج تعليمي في تحسين المعرفة والكفاءة الذاتية لدى مرضى السكري من النوع الثاني

أعدت من قبل

غرام بركات العجالين

أشرف عليها

د محمد عثمان أبو حشيش

الملخص

الخلفية: مرض السكري هو مرض معقد ومرهق ويحتاج إلى الانتباه فيما يتعلق بالطعام والنشاط البدني والأدوية. علاوة على ذلك، يتطلب الأمر أن يكون المريض على دراية وقادرًا على أداء مهارات معينة. يتعرض مرضى السكري لمضاعفات طويلة الأمد، بما في ذلك أمراض القلب والأوعية الدموية، والجهاز العصبي، وأمراض الكلى، وأمراض العيون. بالإضافة إلى الحالات الصحية الحادة المرتبطة بمرض السكري والتي يمكن أن تهدد الحياة وتؤثر على نوعية حياة مرضى السكري.

الهدف: تهدف الدراسة الحالية إلى تحديد فعالية برنامج صحي تعليمي لمرضى السكري، المصمم وفقًا لإرشادات الجمعية الدولية للسكري، في تحسين المعرفة والفعالية الذاتية لدى مرضى السكري من النوع الثاني.

الطريقة: استخدمت هذه الدراسة تصميم شبه تجريبي يهدف إلى تحديد فعالية برنامج تعليمي في تحسين المعرفة والفعالية الذاتية لدى مرضى السكري من النوع الثاني. تم إنشاء البرنامج المستخدم في هذه الدراسة من قبل الباحث وفقًا لإرشادات الجمعية الدولية للسكري. تم اختيار عينة من 130 مريض بالسكري. كما تم تقسيم المرضى عشوائيا إلى مجموعتين تجريبية وضابطة، وكل مجموعة تتكون من 65 مريضا. حضرت المجموعة التجريبية البرنامج الذي تم تطبيقه في عيادة مرضى السكري في مدينة الحسين الطبية _عمان

_ الأردن. بينما بقيت المجموعة الضابطة على الرعاية الاعتيادية.

النتائج: أظهرت الدراسة فعالية البرنامج التعليمي في تحسين معرفة مرضى السكري من النوع الثاني وزيادة الكفاءة الذاتية لديهم. كانت هناك تحسينات ذات دلالة إحصائية في معرفة المرضى والكفاءة الذاتية بين مجموعتي الدراسة. هناك أيضًا فروق ذات دلالة إحصائية في المعرفة والكفاءة الذاتية المتعلقة بتدريب مريض السكري ($p < 0.05$). ومع ذلك، أظهر اختبار t أنه لا توجد فروق ذات دلالة إحصائية في المعرفة والكفاءة الذاتية تعزى الى الجنس والعمر ($P > 0.05$).

الاستنتاجات: لقد كان للبرنامج تأثير إيجابي على مرضى السكري من النوع الثاني في تحسين معرفتهم وكفاءتهم الذاتية، وعلى السيطرة على مستويات السكر في الدم. لذلك، يوصى بشدة بتعميم مثل هذه البرامج. وتقدم نتائج الدراسة الحالية أيضاً بيانات جديرة بالممرضين الإكلينيكيين في التعرف على المعرفة والكفاءة الذاتية لمرضى السكري، وكذلك إنشاء برنامج تعليمي فعال لمرض السكري. هذه الدراسة يمكن أن تفيد البحوث المستقبلية.

الكلمات الدالة : البرنامج التعليمي، الأردن، المعرفة، الكفاءة الذاتية، مرض السكري من النوع الثاني.