
Effect of Self-Care Management Program on Knowledge, Health Behaviors, and Self-Efficacy of Type 2 Diabetic Patients

¹ Asmaa Ibrahim Alasfory; ² Reda Ibrahim El-Mowafy; ³ Magda Ali Mohamed

¹ Bachelor of Nursing, Faculty of Nursing, Port Said University; ² Professor of Family and Community Health Nursing; ³ Assistant Professor of Family and Community Health Nursing, Faculty of Nursing, Port Said University.

ABSTRACT

Background: Patients with diabetes need to be knowledgeable enough to confidently engage in the right kind of self-care. **Aim:** This study aimed to evaluate how a self-care management program affected the knowledge, health behaviors, and self-efficacy of patients with type 2 diabetes. **Subjects and methods:** A quasi-experimental study design was used. Five health facilities and chronic disease clinics in Port Said governorate, Egypt, were randomly selected to participate in the study. A purposive sample of ninety diabetic patients was collected for the six-month duration of the study. **Tools:** The Diabetes Self-Care Activity, the Diabetes Management Self-Efficacy Scale (DMSES), and the Self-Administered Diabetic Knowledge Questionnaire Test (pre/post). **Results:** Following the implementation of a diabetes self-management education program, the mean diabetes management self-efficacy scores of the diabetes patients increased to 81.59 ± 3.41 . Approximately 55.6% of patients with diabetes had good knowledge and 100% of patients had satisfactory self-care practices. **Conclusion:** Implementing the self-care management program resulted in positive outcomes for diabetic patients regarding their knowledge, health behaviors, and self-efficacy. All diabetic patients demonstrated satisfactory self-care practices, and there was a significant increase in mean self-efficacy scores following the program. **Recommendation:** All diabetic patients attending health care centers should be presented with trustworthy evidence-based information, awareness campaigns, and the production of illustrated posters and booklets on type 2 diabetes self-care management, as well as important points for accurate assessment of self-efficacy level.

Keywords: Health Behaviors, Knowledge, Self-Care Management Program, Self-Efficacy, and Type 2 Diabetic Patients

INTRODUCTION

Diabetes mellitus (DM) is one of the most common chronic non-contagious diseases. It is characterized by hyperglycemia, or elevated blood glucose levels, caused by metabolic problems that inhibit the body's ability to produce sufficient insulin (Herath, Weerasinghe, Dias, & Weerarathna, 2020). The disease can be prevented and managed by adopting certain habits and lifestyles, such as regular exercise, a nutritious diet, quitting smoking, and regulating blood sugar and fat levels. According to the World Health Organization, 422 million people worldwide have type II diabetes mellitus (T2DM), and 1.6 million deaths are reported from the disease each year (Zainudin, Ang & Soh, 2019).

By 2040, 642 million people worldwide are expected to be affected by the disease. The actual number of people living with the disease in 2019 may be much higher than the reported prevalence, as most people with diabetes only seek medical attention when they experience difficulties (Ogurtsova, 2019). Several variables, such as tobacco use in men and unhealthy behaviors such as obesity, are contributing to the increase in the prevalence of diabetes mellitus. Diet, exercise, blood glucose monitoring, adherence to appropriate medication use, effective problem solving, coping mechanisms, and risk reduction behaviors are the seven main behaviors associated with diabetes self-care management (Borhani, 2018)

Maintaining self-care reduces the likelihood of problems with T2DM. However (Bekele, Negash & Bogale, 2020), the majority of people with DM do not use appropriate self-care strategies, such as managing fasting blood glucose levels. Several factors are emphasized in managing DM, including education, meal planning, lifestyle changes, exercise and habits. According to one study, educational interventions have an impact on health literacy, knowledge, food intake, physical activity, and self-efficacy (Adarmou ch, Elyacoubi, Dahmash, El Ansari, Sebbani & Amine, 2019).

Self-efficacy, one of the five constructs of Bandura's social cognitive theory, is probably the strongest predictor of health behavior. It is defined as the degree of confidence an individual needs to perform a particular behavior to the best of their ability. Self-efficacy is also a critical component of diabetes self-management (Bandura, 1989). Therefore, diabetes self-management education (DSME) is essential to enable people

with diabetes to adopt and maintain lifestyle changes that have been shown to improve health outcomes (Shrivastva, Phadnis, Rao & Gore, 2020).

In addition, DSME is the process of enabling the skills, dispositions, and information necessary for self-management.⁹ Furthermore, DSME has a significant impact on the self-care routines and self-efficacy of people with diabetes mellitus. Therefore, nurses must provide individuals with diabetes mellitus with the information, decision-making, problem-solving, and resource-use skills, as well as the self-assurance needed to perform self-care tasks (Bintoro, Putra, Made & Yunica, 2019).

Furthermore, it has been stated that the ultimate goal of education for patients with chronic diseases is lifestyle adjustment and improved self-care. Nursing education is a fundamental component of the care and treatment of chronic diseases. Therefore, patients experience fewer issues connected to their ailment the more trained they are. A literature analysis was prepared to highlight the effectiveness of DSME on T2DM based on the observation that patient education also reduces the frequency of unnecessary visits to emergency departments (Khosravizadeh, Mohseni Baghian, Maleki, Hashtroodi & Yari, 2021).

Significance of the study

Approximately 415 million people worldwide suffer from diabetes, and this number is expected to rise to 640 million by 2040. Egypt is believed to have one of the highest rates of diabetes mellitus (DM) in the world. The country's population is expected to increase by 2030 due to the rapidly growing prevalence of DM (Sirdah & Reading, 2020). Approximately 85% of people with diabetes in Egypt do not receive education on how to manage their own care. In addition, few studies have examined the healthcare practices of people with diabetes in Egypt using a research design that provides reliable data (El-Radad, Ahmed, & Eldahshan, 2022). Consequently, Community health nurses need to be able to assess patients' risk perceptions and self-care behaviors. They also need to develop a health behavior model based on an educational intervention for patients with diabetes that reduces perceived barriers to self-care, increases social cues for self-care, and increases self-efficacy to prevent complications in diabetic patients (Nikitara, Constantinou, Andreou, & Diomidous, 2021). The purpose of this study was to evaluate

the impact of a self-care management program on type 2 diabetic patients' health behaviors, knowledge, and self-efficacy.

AIM OF THE STUDY

The purpose of this study was to evaluate the impact of a self-care management program on type 2 diabetic patient's health habits, knowledge, and self-efficacy by:

1. Evaluate type 2 diabetic patients' understanding of self-care management in primary care settings.
2. Determine the self-care management habits of type 2 diabetes patients in primary healthcare facilities.
3. Find out how confident type 2 diabetic patients are in themselves in primary care facilities.
4. Create a self-care management program tailored to the needs of individuals with type 2 diabetes in primary healthcare facilities.
5. Provide type 2 diabetic patients in primary care facilities with a self-care management program.
6. Assess the impact of a self-care management program on type 2 diabetes patients' health habits, knowledge, and sense of self-efficacy in primary care settings.

Research hypothesis

After the implementation of the self-management program, people with type 2 diabetes will have higher levels of self-efficacy in terms of their knowledge and health practices.

SUBJECTS AND METHOD

Design:

A quiz-experimental (pre-post-test) research design was used in this study.

Study settings

The five hospitals and clinics for chronic illnesses in the governorate of Port Said served as the study's sites. As a result, one primary health care facility was chosen at

random from each district, with the following districts represented: El-Manakh center for El-Manakh district; Fatima Zahra Center for El-Dawahy district; Omar bin El-Khattab center for El-Zohur district; and Seha Awel center for El Shark district.

Study Subjects:

The current study included a purposive sample of ninety-nine diabetes patients who attended the previously mentioned setting and who met the following inclusion criteria: they were willing to participate in the study, could communicate and carry out daily activities independently, had a diagnosis of type 2 diabetes, and were available throughout the three-month data collection period.

Sample size.

According to the equation (Daniel, 1999), the sample size was calculated.

$$n = \frac{N \times P(1-P)}{N-1 \times (d^2 \div z^2) + P(1-P)}$$

Where:

N= 6450 total population

Z = Class standard corresponding to the level of significance equal to 0.95 and 1.96

D = the error rate is equal to 0.05

P = Ratio provides a neutral property = 0.50

$$n = \frac{1115 \times 0.5(1-0.5)}{6450-1 \times (0.05^2 \div 1.96^2) + 0.5(1-0.5)} = 85$$

Assuming a 5% attrition rate: $85 \times 5\% = 5.55$ and $85 + 5 = 90$.

The final sample size was **90 diabetic patients**.

Tools of data collection

Three tools were used for data collection in the pre and post-test program.

Tool 1: Self-administer diabetic knowledge questionnaire. It comprised two parts:

Part (1): Personal and clinical data: The researcher reviewed the relevant material before preparing it in basic Arabic. It contained information on the patient's age, marital status, education, employment status, number of hospitalizations for diabetes in the previous year, length of diabetes (in years), related chronic conditions, prescribed medications, results of laboratory testing, follow-up appointments at the diabetes clinic, and the patient's past, present, and family history.

Part (2): Revised Michigan Diabetes Knowledge Test (pre/post):

The researcher used Fitzgerald et al. (2016) to develop the Revised Michigan Diabetes Knowledge Test, which measures patients' awareness of diabetes-related topics such as diet, exercise, blood glucose levels, and self-care activities. Based on a review of relevant literature, the test was translated into simple Arabic. 23 multiple-choice questions spread over two areas make up this test. Each patient with type 2 diabetes can answer the first 14 questions, which assess general diabetes awareness. Only individuals using insulin should answer the final nine questions, which assess knowledge of insulin use.

Scoring system

Every correctly chosen item received one point, whereas an erroneous response received zero points. The total scores were between 0 and 14. The knowledge score was further divided into three categories based on the cutoff point: low = scores less than 50% of total scores (from 0 to less than 7 marks); fair = scores 50% to 65% of total scores (from 7 to less than 9 marks); and good = scores greater than 65% of total scores (more than 9 marks). Wilson, Egede, and Dawson (2017).

Tool II: Diabetes Management Self-Efficacy Scale (DMSES) (pre/ post).

Sturt, Hearnshaw & Wakelin, 2010, created this English-language tool. The researcher translated it into Arabic and made adaptations. It was designed to gauge the respondents' level of confidence in their ability to care for people with diabetes. There were four

subscales comprised of 20 items: Exercise, blood sugar, general nutrition, medical therapy, and weight-specific nutrition.

Scoring system

Items are given a numerical value between 0 and 10, where higher scores denote better levels of self-efficacy. Confidence levels range from 0 to 2, with 3 to 10 denoting intermediate confidence and 7 to 10 high confidences. Higher scores indicate greater confidence. The items are added together to provide a total score that ranges from 0 to 200.

Tool III: Diabetes Self-Care Activity (pre/post)

The following domains of the patient's self-care practices in the last seven days are assessed: diet (3 items), exercise (1 item), quitting smoking (1 item), foot care (3 items), medication regimen (2 items), blood glucose testing (1 item), and follow-up (1 item). It was developed by Vahidi et al., 2015) in English language and translated into simple Arabic language by the researcher based on reviewing the related literature.

Scoring System

This 12-item self-report survey asks about how often you completed certain tasks for the last seven days. Every item was given one mark. The item scores (which could have a range of 0–12 points) were added up to determine the overall results for each domain. The percentage was obtained by converting the self-care practice scores. Based on the researchers' cutoff point, the self-care practices score level was divided into two categories: satisfactory (scores 65% of total scores and above) and unsatisfactory (scores less than 65% of total scores).

Validity and Reliability

The tools were tested for content validity by 5 experts (2 academic internal Medicine staff and 3 nursing staff from the Faculty of Nursing) at Port-Said University who reviewed the tools for clarity, relevance, comprehensiveness, and understanding. No modifications were required. The final form of the tool was designed and tested for reliability by using internal consistency for the tools measured using Cronbach's alpha

(tau-equivalent reliability) coefficient for tools (I, II, and III,) ($r= 0.817, 0.794,$ and 0.894 respectively).

Pilot Study

It was done on 10% of the study sample of nine diabetic patients-had the procedure. This was done to find out how applicable, clear, and relevant the tool was and to figure out how long it would take to finish the questionnaire sheet. The pilot subjects comprised the study's main sample.

Fieldwork

The study was conducted in four phases: assessment, session design, implementation, and evaluation. The installation of the sessions and the pre-and post-data collection took place for four months, starting on 20 September 2022 and ending on 20 January 2023.

Assessment phase (Pre-test phase)

The researcher met the type 2 diabetic patients; After giving them an explanation of the study's goal, the diabetic participants gave their verbal agreement to conduct the study. The researcher began by introducing herself to type 2 diabetic patients and providing a brief overview of the study's purpose and scope. To collect patients' data baseline and medical history utilizing the study tool (I) part (1,2), Each diabetic patient was interviewed individually before applying for the awareness and educational program. Assessment of type 2 diabetic patients' knowledge about diabetes including diet, exercise, blood glucose level, and self-care activities using a tool (II) Assessment of self-efficacy levels of type 2 diabetic patients in primary health care centers using a tool (III) Identifying type 2 diabetic patients' Self-Care Activity concerning (diet, exercise, smoking cessation, foot care, medication regimen, blood glucose testing & follow-up in primary health care centers the time required for each patient to complete the tool was about 10 to 15 minutes. This phase's sessions (pretest) yielded the data, and rigorous confidentiality guidelines were followed when gathering all the material.

Planning phase

Based on the information obtained from the initial assessment, in addition to the literature, the researcher designed the educational sessions under the educational program of the supervisors. Its main aim is to improve the knowledge of diabetic patients regarding type 2 diabetes, self-efficacy, and self-care activities: Including the following items:

- Diabetes: Definition, symptoms, types, causes, complications, and lines of treatment.
- Healthy nutrition for diabetics.
- Preventing complications.
- Medication compliance.
- Blood glucose monitoring.
- Physical activity.

The booklet was written in a simple Arabic language with different illustrated color pictures to enhance the learning process and facilitate diabetic patients' understanding. After developing the booklet, it was revised by a panel of five experts in the field of Community Health Nursing, faculties of nursing, at Port Said University.

Implementation phase

- The educational sessions were carried out by the aforementioned director of primary health care centers. The subjects were divided into small groups; (8 groups) each one consisting of 10 to 12 patients, and the researcher visits each center two to three weeks, four days each week, according to the sample size.
- The implementation of educational sessions was conducted as; each group obtained four sessions, and each session took about one hour (the researcher sometimes took more than one group each day and sometimes more than one session each week).
- At the beginning of the first session, the aim of the study was oriented to the aim of the study, and the goals of the guideline take place. Also, patients were oriented about the phases of the study and the guideline sessions (time, duration, place, and contents). The researcher stressed the importance of continuous attendance and

active participation.

- During the interview, the researcher used questions, discussion, and different teaching methods such as group discussion, brainstorming, demonstration, and re-demonstration. Numerous didactic aids were used, such as data show, and pictures, and a printed booklet was presented in a clear and concise form and distributed to students after implementation of sessions.
- Each session started with a summary of the previous session and the objectives of the new session, using very simple language that suits the level of patients without ignoring motivation and reinforcement techniques. patients were asking for any interpretation, elaboration, or explanation of any item included in the sessions the patients answered all questions.

Evaluation phase (Post-test)

After the implementation of the sessions, a post-test was done immediately to evaluate the effect of the sessions; using the same tools used in the pretest.

Administrative design

Before conducting the study, an official letter explaining the aim of the study was issued from the Dean of the Faculty of Nursing, Port Said University to directors of primary health care centers to obtain their permission to conduct the study. Also, approval was taken from the participants themselves, after an explanation to each of them of the purpose of the study.

Ethical considerations

The investigator adhered to the following ethical guidelines for research: Each participant (a diabetic patient) provided their oral agreement after being informed of the purpose of the study before it started. The study protocol code was authorized by the Port Said University Faculty of Nursing's research and ethical committee (1/5/2024) (37). The researcher claims that the patient experiences no negative psychological or physiological effects from the trial. The confidentiality and privacy of the collected data were protected throughout the study, and any participant was free to leave the research at any time without facing any consequences.

Statistical Analysis

Data analysis was carried out using Statistical Package for Social Sciences (SPSS) version 25.0 (IBM Corp, Armonk, NY, USA). The demographic characteristics of the studied diabetic patients were described using descriptive statistics. Knowledge self-efficacy and self-care activities of the studied patients regarding type 2 diabetes were classified into good and poor knowledge levels in addition to, high or low self-efficacy level while satisfactory and unsatisfactory practice for self-care activity respectively as well as each level of them was represented in numbers and percentages. An independent sample t-test was used to identify differences between pre- and post-program implementation scores. The significance level was considered at P-value < 0.05.

RESULTS

Table (1) illustrates that 61.1% of patients with Type 2 diabetes were female and about 76.7% of them were married. Moreover, the majority of the studied patients (82.2%) were in the age group between 50 to less than 60 years old, and 44.4 % of them had secondary education. Concerning occupation and family income of the studied T2DM patients, it was indicated that 60.0 & 92. % of them were employees and had enough income respectively.

Table (2): concerning patients' knowledge, and awareness of diabetes according to the revised Michigan Diabetes Knowledge Test, it was revealed from this table that, 21.1, 13.3 and 15.6 % of the studied patients defined type of food is highest in carbohydrate, fat and that named a free food correctly before conducting the program, which improved to 52.2, 46.7 and 46.7 % post-program implementation respectively, with a very highly statistically significant differences at $p < 0.001$. While 75.6% of them answered that blood testing is the best method for home glucose testing before conducting the program, which decreased to 11.1% post-program implementation, with very highly statistically significant differences at $p < 0.001$.

Table (3) clarifies that 11.1 and 38.9 % of the studied patients reported the correct answer regarding the best way to take care of your feet and disease risk that decreased by eating foods lower in fat pre-program implementation respectively, which improved to 72.2 and 80% post-program implementation respectively, with a very highly statistically significant difference at $p < 0.001$.

Table (4) shows that 87.8 and 91.1% of the studied patients had poor knowledge about Diabetes knowledge and the Revised Michigan diabetes knowledge test before conducting the program respectively, which decreased to 1.1% and 22.2 % post-program implementation respectively, with a very high statistically significant differences at $p < 0.001$. Also in this table, statistically significant differences were found between the overall patients' knowledge about diabetes pre & post-program implementation at $p < 0.001$.

Table (5) points out that, **the total mean scores of Diabetes patients' Management Self-Efficacy** was 41.76 ± 4.69 preprogram implementation which increased to 81.59 ± 3.41 post-program implementation, with very highly statistically significant differences at $p < 0.001$.

Table (6): illustrates that there were highly statistically significant differences between before and after the program implementation at $p < 0.001$. It was noticed that 100% of the diabetic patients had satisfactory self-care practice post-program implementation.

Table (7) reveals that the total mean score of patients' diabetes self-activity practice was 21.86 ± 6.55 preprogram implementation which increased to 54.74 ± 3.43 , with a very highly statistically significant difference at $p < 0.001$.

Table (8) demonstrates a correlation between patients' overall knowledge, Diabetes Management Self-Efficacy Scale (DMSES), and diabetes self-care activity pre- and post-program implementation. It was shown that there was a significant positive correlation between patients' Diabetes Management Self-Efficacy Scale (DMSES) and diabetes self-care activity preprogram implementation with highly statistically significant differences at $p < 0.001$.

Table (1): Frequency distribution of the studied sample according to socio-demographic characteristics(n=90)

Items	No.	%
Sex		
Male	35	38.9
Female	55	61.1
Marital status		
Married	69	76.7
Widowed	21	23.3
Age (years)		
50 – 59	74	82.2
60 +	16	17.8
Mean ±SD	44.65± 6.285	
Education		
Not read and write	2	2.2
Read and write	3	3.3
Primary	15	16.7
Preparatory	25	27.8
Secondary	40	44.4
University	5	5.6
Occupation		
Employee	54	60.0
Literal	5	5.6
Doesn't work	31	34.4
Family income		
Enough	83	92.2
Not enough	7	7.8

Table (2): Distribution of the studied sample regarding their knowledge, of diabetes according to revised Michigan diabetes Knowledge pre- and post-program implementation (n = 90).

Michigan knowledge	Pre		Post		P
	No.	%	No.	%	
The diabetes diet is:					
The way most Egyptian people eat	41	45.6	2	2.2	0.639
A healthy diet for most people #	13	14.4	71	78.9	
Too high in carbohydrates for most people	14	15.6	9	10.0	
Too high in protein for most people	22	24.4	8	8.9	
Type of food is highest in carbohydrate					
Baked Chicken	18	20.0	12	13.3	0.001*
Swiss cheese	36	40.0	8	8.9	
Baked potato #	19	21.1	47	52.2	
Peanut butter	17	18.9	23	25.6	
Type of food is highest in fat					
Low fat (2%) milk #	12	13.3	42	46.7	<0.001*
Orange juice	35	38.9	34	37.8	
Corn	22	24.4	12	13.3	
Honey	21	23.3	2	2.2	
Type of food is a "free food"					
Any unsweetened food	22	24.4	2	2.2	<0.001*
Any food that has "fat-free" on the label	45	50.0	4	4.4	
Any food that is "sugar-free" on the label	9	10.0	45	50.0	
Any food that has less than 20 calories per serving #	14	15.6	39	46.7	
A1C is a measure of average blood glucose level for the past:					
Day	5	5.6	0	0.0	<0.001*
Week	49	54.4	1	1.1	
6-12 weeks #	14	15.6	61	67.8	
6 months	22	24.4	28	31.1	
The best method for home glucose testing					
Urine testing	10	11.1	0	0.0	<0.001*
Blood testing #	68	75.6	10	11.1	
Both are equally good.	12	13.3	80	88.9	
The effect of unsweetened fruit juice on blood glucose?					
Lowers it	28	31.1	12	13.3	<0.001*
Raises it #	37	41.1	7	7.8	
Has no effect	25	27.8	71	78.9	

#correct answer

Table (3): Distribution of the studied sample regarding their knowledge, of diabetes according to revised Michigan diabetes Knowledge pre- and post-program implementation (n = 90). Cont.

Michigan knowledge items	Pre		Post		P
	No.	%	No.	%	
Drinks that not used to treat low blood glucose					
3 hard candies	6	6.7	5	5.6	0.002*
1/2 cup orange juice	54	60.0	5	5.6	
1 cup diet soft drink #	9	10.0	76	84.4	
1 cup skim milk	21	23.3	4	4.4	
The effect of exercise on blood glucose					
Lowers it. #	27	30.0	35	38.9	0.217
Raises it.	43	47.8	14	15.6	
Has no effect	20	22.2	41	45.6	
The effect of infection on blood glucose					
Lowers it #	18	20.0	39	43.3	0.010*
Raises it	40	44.4	25	27.8	
Has no effect	32	35.6	26	28.9	
The best way to take care of your feet:					
Look at and wash them each day #	10	11.1	65	72.2	<0.001*
Massages them with alcohol each day	16	17.8	4	4.4	
Soak them for one hour each day	42	46.7	4	4.4	
Buy shoes a size larger than usual	22	24.4	17	18.9	
Disease risk that decreased by eating foods lower in fat					
Nerve disease	5	5.6	4	4.4	<0.001*
Kidney disease	43	47.8	10	11.1	
Heart disease #	35	38.9	72	80.0	
Eye disease	7	7.8	4	4.4	
Numbness and tingling may be symptoms of:					
Kidney disease	14	15.6	3	3.3	0.107
Nerve disease #	48	53.3	78	86.7	
Eye disease	23	25.6	9	10.0	
Liver disease	5	5.6	0	0.0	
Problems are usually not associated with diabetes					
Vision problems	8	8.9	0	0.0	<0.001*
Kidney problems	18	20.0	2	2.2	
Nerve problems #	22	24.4	5	5.6	
Lung problem	42	46.7	83	92.2	

#correct answer

Table (4): Percentage distribution of the studied patients according to levels of knowledge pre and post-program implementation (n = 90).

Knowledge levels	Pre		Post		P
	No.	%	No.	%	
Diabetes knowledge					
Poor knowledge (<7)	79	87.8	1	1.1	<0.001*
Fair knowledge (7 – 9)	10	11.1	10	11.1	
Good knowledge (≥10)	1	1.1	79	87.8	
Revised Michigan diabetes knowledge test					
Poor knowledge (<7)	82	91.1	20	22.2	<0.001*
Fair knowledge (7 – 9)	7	7.8	49	54.4	
Good knowledge (≥10)	1	1.1	21	23.3	
Overall					
Poor knowledge (<14)	81	90.0	2	2.2	<0.001*
Fair knowledge (14– 19)	9	10.0	38	42.2	
Good knowledge (≥20)	0	0.0	50	55.6	

*: Statistically significant at $p \leq 0.05$

Table (5): The total Mean scores of Diabetes patients' Management Self-Efficacy (DMSES)pre and post-program implementation (n = 90)

Items	Pre Mean ±SD	Post Mean ±SD	T	P
Total Diabetes Management Self-Efficacy Score (DMSES)	41.76 ± 4.69	81.59 ± 3.41	63.334*	<0.001*

SD: Standard deviation

t: Paired t-test

*: Statistically significant at $p \leq 0.05$

Table (6): Distribution of patients' total reported practice about Diabetes Self-Care Activity pre and post (n = 90).

Diabetes Self-Care Activity	Pre		Post		P
	No.	%	No.	%	
Unsatisfactory <65%	90	100.0	0	0.0	<0.001*
Satisfactory ≥65%	0	0.0	90	100.0	

SD: Standard deviation McN: McNemar test *: Statistically significant at $p \leq 0.05$

Table (7): Total mean scores of patients' Diabetes Self-Care Activity pre and post-program implementation (n = 90).

Variable	Mean ±SD		Paired t-test	
	Pre	Post	T	P
Total Diabetes Self-Care Activity score	21.86 ± 6.55	54.74 ± 3.43	45.820	<0.001*

Table (8): Correlation between patients' overall knowledge, Diabetes Management Self-Efficacy Scale (DMSES), and Diabetes Self-Care Activity (n = 90).

Variables	R	Pre	Post
	P values		
Overall, of knowledge Vs. Diabetes Management Self-Efficacy (DMSES)	r p	0.145 0.172	-0.082 0.440
Overall, of knowledge Vs. Diabetes Self-Care Activity	r p	-0.110 0.304	0.092 0.387
Diabetes Management Self-Efficacy (DMSES)Vs. Diabetes Self-Care Activity	r p	0.347* 0.001*	-0.008 0.939

r: Pearson coefficient*: Statistically significant at $p \leq 0.05$

DISCUSSION

The scientific management of T2DM requires an adjusted lifestyle, regular glycemic monitoring, periodic screening for complications, and proper pharmacological treatment. It was evident from the literature that DM knowledge was continuously increasing, which might contribute to providing better insight into the development of

preventive strategies and management. Moreover, patients with good DM knowledge were significantly associated with self-efficacy as well as being a prerequisite for appropriate self-management (Alanazi, Alotaibi, Paliadelis, Alqarawi, Alsharari, & Albagawi, 2018). So, the present study aimed to assess the effect of a self-care management program on the knowledge, health behaviors, and self-efficacy of type 2 diabetic patients.

Concerning patient's knowledge, and awareness of diabetes according to the revised Michigan Diabetes Knowledge Test, it was revealed from the current study that, less than one-quarter of the studied patients defined baked potato as a type of food that is highest in carbohydrates, before conducting the program, which improved to more than half of them post-program implementation, with very highly statistically significant differences at $p < 0.001$.

This result disagreed with Thu & Minh, (2019), who conducted a study about " Identifying the Need for Self-Management Education in Adult Patients with Type-2 Diabetes in Ho Chi Minh City, Vietnam" and stated that the majority of Type 2 diabetes patients recognized Rice as a source of high carbohydrates before and after implementing the educational program. This present finding may be due to physicians' dietary recommendations for them that concentrate on non-heavy consumption of bread and rice only as they contain high carbohydrates and calories therefore, most patients do not know about baked Potato as a source of high carbohydrates. From the point of the researcher's view, these results might be due to they did not give enough information about dietary recommendations for them therefore, most patients do not know about baked potatoes as a source of high carbohydrates.

While, it was illustrated in the current findings that, more than three-quarters of the studied participants answered that blood testing is the best method for home glucose testing before conducting the program, which decreased to 11.1% post-program implementation, with a very highly statistically significant difference at $p < 0.001$. This present study was not consistent with Hailu, Moen & Hjortdahl, (2021), who conducted a study about " Diabetes Self-Management Education (DSME) Effect on Knowledge, Self-Care Behavior, and Self-Efficacy Among Type 2 Diabetes Patients in Ethiopia: A Controlled Clinical Trial " and showed that more than two-thirds of the participants reported that home blood glucose testing is not the best method for monitoring their

blood glucose before the educational program while only one-fifth of the participants reported having glucometers at home and reported that blood glucose testing is the best method for home glucose testing after the educational program. From the point of the researcher's view, these results might be due to the easily accessible to measure and monitor blood glucose at home.

It was indicated from the current study that, the vast minority of the studied diabetic patients knew that looking at and washing their feet each day regarding the best way to take care of their feet preprogram implementation, which improved to nearly three-quarters of them post-program implementation, with a very highly statistically significant difference at $p < 0.001$.

This finding was Sari, Upoyo, Isworo, Taufik Sumeru, Anandari & Sutrisna, (2020), who studied "Foot self-care behavior and its predictors in diabetic patients in Indonesia" and reported that more than three-quarters of the participants were well knowledgeable about feet assessment and feet' wash as well as it's hygiene before the intervention. From the point of the researcher's view, these results might be due to the patient's level of education which increases the chance of adequate knowledge about foot care.

These present findings might be due to most of them being educated which increases the chance of adequate knowledge about foot care. This present finding may be due to the non-receiving or non-attendance of the majority of the participants for any educational programs regarding foot care in diabetes concerning patients' knowledge about disease/ complications risk reduction method according to the revised Michigan Diabetes Knowledge Test, it was clarified from the current study that, more than one-third of the studied patients reported that heart disease decreased by eating foods lower in fat pre-program implementation, which improved to a higher proportion of them post-program implementation, with a very highly statistically significant difference at $p < 0.001$.

This finding was supported by Powers, Bardsley & Cypress, (2022), who studied "Diabetes self-management education and support in type 2 diabetes" and reported that a few diabetic participants answered correctly that cardiac diseases can be decreased by consumption of a low-fat diet before the educational program while this percentage

improved to the greatest percentages of them after conducting of the program. These findings might be explained in the light of the fact that poor education and inadequate dietary recommendations might affect negatively their knowledge and their dietary intake which might expose them to disease risk. From the point of the researcher's view, these results might be due to the patient having not participated in any educational programs regarding foot care in diabetes.

Concerning the overall knowledge about diabetes, it was found in the present finding that, no one of them had good knowledge before conducting the program, which is improved to become more than half of them post-program implementation, with very high statistically significant differences at $p < 0.001$.

This finding was not in harmony with Valle Nascimento, Resnicow & Nery, (2019) who conducted a study about " A pilot study of a community health agent-led type 2 diabetes self-management program using motivational interviewing-based approaches in a public primary care center in Sao Paulo, Brazil" and found that two fifth of the diabetic sufferers had good knowledge regarding diabetes prior the provision of education for them which their proportion increased to the vast majority of them after provision of education for them. These findings may be due to cultural beliefs and individual's experiences toward the method of managing diabetes by receiving diabetic oral medicine or insulin only without modifying their lifestyle as evidenced by the vast majority of them depending on oral medication and insulin for diabetes control only as well as lack of educational programs and adequate training that should be provided for the patient to strengthen defect areas in patients' knowledge. From the point of the researcher's view, these results might be due to the cultural, beliefs and individual experiences with the method of managing diabetes without changing their lifestyle.

On the mean score of diabetic patients' total Diabetes Management Self-Efficacy, it was demonstrated from the present result that, the mean score of diabetic patients' total Diabetes Management Self-Efficacy was 41.76 ± 4.69 preprogram implementation which increased to 81.59 ± 3.41 post-program implementation, with a very highly statistically significant differences at $p < 0.001$.

This result was proportionate with Yao, Zhao & Gao, (2020) who studied General self-efficacy modifies the effect of stress on burnout in T2DM patients with different

personality types" and reported that the general self-efficacy mean score of diabetic patients was 2.42 ± 0.59 before the education which increased to 7.59 ± 0.71 post the education. The researcher illustrated that this finding might be due to high self-efficacy is usually related to or affected by good knowledge, understanding, and effective education about disease aspects and complications. From the researcher's point of view, this might be because of educational sessions given to patients, which provide them with basics and necessary information about diabetic care its prevention, and early detection.

As regards patients' total reported practice about Diabetes Self-Care Activity pre and post-program implementation, It was noticed that all of the diabetic patients had satisfactory self-care practice post-program implementation with highly statistically significant differences between before and immediately after the program implementation at $p < 0.001$.

This result was proportionate with Siti Khuzaimah, Aini, Surindar Kaur, Hayati Adilin, & Padma, (2018) who conducted a study about " Self-Care Behavior among Type 2 Diabetes Patients" and proved that the majority of the diabetic patients had poor level of self-care practice regarding Type 2 diabetes before the health education programs compared with the greatest percentage of them who had good level of self-care practice regarding Type 2 diabetes after the health education programs. This result might be related to many factors such as not having good knowledge about diabetes and its management before program implementation and the absence of cooperation between healthcare professionals and patients which affected patients' practice negatively.

Pertaining to the mean score of diabetic patients' total diabetes self-activity practice, it was demonstrated from the present result that, the mean score of diabetic patients' total diabetes self-activity practice was 21.86 ± 6.55 preprogram implementation which increased to 54.74 ± 3.43 , with a very highly statistical significant differences at $p < 0.001$. This result was proportionate with Effiong, (2020) who studied " Knowledge, attitudes, and practices on diabetes mellitus among outpatients with type 2 diabetes in Uyo, south-south Nigeria" and reported that the general self-activity practice mean score of diabetic patients was moderately high (38.94 ± 11.93) after the education.

It was proved from the current study that, there was a significant positive correlation between patients' Diabetes Management Self-Efficacy Scale (DMSES) and

diabetes self-care activity preprogram implementation with highly statistically significant differences at $p < 0.001$. This result did not agree with Sousa, Malaquias, Chavaglia, Ohl, Paula & Silva, (2020), who studied "Self-efficacy in elderly with type 2 Diabetes Mellitus" and indicated that self-efficacy is associated with DM self-care practice and the most important predictor of DM self-care as well as it was associated with attitude ($p < 0.001$) and knowledge ($p < 0.001$) after the health education program implementation. From the researcher's point of view, self-efficacy is a person's belief in his or her capacity to carry out life-influencing activities, or self-care. These activities are related to self-care behaviors in the context of type 2 diabetes (T2DM).

CONCLUSION

Based on the current study's findings, it was found that the self-care management program improved the knowledge, health behaviors, and self-efficacy of diabetic patients. This was evidenced by an increase in the patients' mean self-efficacy scores, improved knowledge, and satisfactory self-care practices for all diabetic patients after the program was implemented

RECOMMENDATION

- The study recommended reliable evidence-based information, awareness programs, and the establishment of illustrated posters and booklets about type 2 diabetes self-care management.
- Health education should be an integral part of diabetes management and should be included in the Standards of Practice (SOP) of diabetes care to be implemented at all levels of health care in Egypt.

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أثر برنامج تدابير الرعاية الذاتية على المعرفة والسلوكيات الصحية والكفاءة الذاتية لمرضى السكري من النوع الثاني

اسماء ابراهيم العصفورى¹ , أ.د/ رضا ابراهيم الموافقى² , أ.م.د/ ماجده على محمد³

¹ماجستير تمريض صحة الأسرة والمجتمع- كلية تمريض - جامعة بورسعيد ؛ ²استاذ تمريض صحة الأسرة والمجتمع- كلية تمريض جامعة بورسعيد ؛ ³استاذ مساعد تمريض صحة الأسرة والمجتمع - كلية تمريض جامعة بورسعيد

الخلاصة

يحتاج مرضى السكري إلى أن يكونوا على دراية كافية ليتفاعلوا بثقة في رعاية أنفسهم بشكل صحيح حيث تهدف هذه الدراسة الى تقييم كيفية تأثير برنامج إدارة الرعاية الذاتية على المعرفة والسلوكيات الصحية والكفاءة الذاتية لدى مرضى السكري من النوع الثاني. تم استخدام تصميم دراسة شبه تجريبية حيث تم اختيار خمسة مراكز صحية وعيادات الأمراض المزمنة في محافظة بورسعيد، مصر، بشكل عشوائي للمشاركة في الدراسة. وقد تضمنت الدراسة تسعين مريضاً مصاباً بالسكري لمدة ستة أشهر. كما تم استخدام 3 أدوات في هذه الدراسة لجمع البيانات وهم نشاط الرعاية الذاتية لمرضى السكري، ومقياس الكفاءة الذاتية في إدارة السكري (DMSSES) ، واستبيان المعرفة الذاتية لمرضى السكري (قبل/بعد تطبيق البرنامج). وقد اوضحت النتائج في هذه الدراسة ان بعد تنفيذ برنامج التعليم لإدارة السكري، زادت متوسط درجات الثقة بالنفس في إدارة السكري لدى المرضى إلى 81.59 ± 3.41 . علاوة على ذلك حوالى 55.6% من مرضى السكري كان لديهم معرفة جيدة و100% من المرضى كانوا يمارسون ممارسات رعاية ذاتية مرضية. تشير النتائج الى ان تنفيذ برنامج إدارة الرعاية الذاتية ادى إلى نتائج إيجابية لمرضى السكري فيما يتعلق بمعرفتهم وسلوكياتهم الصحية وكفاءتهم الذاتية كما انها اوضحت ان جميع مرضى السكري لديهم ممارسات رعاية ذاتية مرضية، وكان هناك زيادة ملحوظة في متوسط درجات الكفاءة الذاتية بعد تطبيق البرنامج. اوصت هذه الدراسة بضرورة تقديم معلومات موثوقة قائمة على الأدلة لجميع مرضى السكري الذين يحضرون مراكز الرعاية الصحية، بالإضافة إلى تقديم حملات توعية وإنتاج ملصقات وكتيبات توضيحية حول إدارة الرعاية الذاتية لمرضى السكري من النوع الثاني، بالإضافة إلى توضيح النقاط المهمة للتقييم الدقيق لمستوى الكفاءة الذاتية.

الكلمات المرشدة: السلوكيات الصحية، المعرفة، برنامج إدارة الرعاية الذاتية، الكفاءة الذاتية، ومرضى

السكري من النوع الثاني