The Effect of Diabetes Conversation Maps on Knowledge and Self-Management of Patients with Type 2 Diabetes

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ABSTRACT

Background: Diabetes Conversation Maps are considered as useful tools for the education of diabetes patients. Diabetes Conversation Map is interactive tools containing pictorial messages and directions designed to educate patients with diabetes and their family members. ***Aim:*** This study aimed to evaluate the effect of diabetes conversation maps on knowledge and self- management for patients with type 2 diabetes. ***Design:*** A quasi-experimental research design was used in this study. ***Setting:*** The study was conducted at outpatient clinics; Badr hospital in Helwan University. ***Sample:*** A purposive sample of 100 patients, from total 135 patients was attended in the above mentioned setting in the previous year. **Tools**: Two tools were used in this study: Structured interviewing questionnaire which includes patient's demographic characteristics, and patients' level of knowledge regarding diabetes mellitus and diabetes self-management questionnaire. ***Results:*** Demonstrates that, 2% of the studied patients had satisfactory total knowledge regarding diabetes mellitus during pre-implementation and improved post implementation of diabetes conversation map to become 82%. Also, 6% of the studied patients had good total self-management practices pre-implementation and improved to become 79% of them post implementation of diabetes conversation map. ***Conclusion:*** There was a statistically significant improvement in patients' knowledge and self-management practices regarding to diabetes mellitus post implementation of diabetes conversation map and comparing to pre implementation. ***Recommendations:*** Increase public awareness about diabetes conversation maps in improving knowledge and self-management of diabetic patients.

Keywords: *Diabetes Conversation Maps, Knowledge, Self-Management, Type 2 Diabetes*

INTRODUCTION

Diabetes mellitus (DM) is a chronic progressive metabolic disorder characterized by hyperglycemia mainly due to either absolute insulin deficiency (type 1 DM) or relative deficiency of insulin hormone (type 2 DM) ***(Hegazy et al., 2021).***

Traditionally, patients with diabetes used to receive education related to their disease process, metabolic control, exercise and diabetic diet through didactic lectures, brochures, pamphlets, and face to face counseling. But, there are various educational tools have been developed to enhance the delivery of the knowledge and practices. Among the educational tools that have been developed was Diabetes Conversation Map (DCM) which has been used to engage patients in a facilitated group education to help in making changes toward behavior for good health ***(Zakaria et a., 2023).***

Diabetes Conversation Maps (DCM) are considered as useful tools for the education of diabetes patients. DCM is interactive tools containing pictorial messages and directions designed to educate patients with diabetes and their family members. Since the messages are predominantly self-explanatory depicted in pictures, it does not need formal education. ***(Qasim et al., 2019).***

Diabetes Conversation Maps has already been tested in several countries across the world. In the developing world, it has shown some impact through observational studies however, literature generated from randomized control trials is limited. Factors such as formal education, access to the modern modes of communication (internet, social media), sociodemographic characteristics and environmental exposures are

different in the low-and middle-income countries (LMIC) as compared to the first world countries and hence there is a need to test the effectiveness of DCM in the developing world context *(Qasim et al., 2020).*

Significance of the study:

Globally, the prevalence of DM will continue to increase every year, there were 537 million individuals with diabetes in 2021. This number is expected to grow to 783 million by 2045. Diabetes was responsible for 6.7 million deaths worldwide, in 2021. The prevalence of type 2 diabetes was estimated as 8.8% worldwide and is continuing to increase and is estimated to reach 9.9% among people aged 20–79 in 2045. This corresponds to 628.6 million individuals living with type 2 diabetes globally *(Alsous et al. 2020).*

Egypt ranks ninth in the prevalence of DM worldwide, and the number of adult diabetic patients was 8,850,400 in early 2020, with a prevalence of 15.2% and this number is expected to rise to 13 million by 2030 and to 20 million by 2045. In Egypt, DM is the leading cause of chronic kidney failure, blindness, amputation of the lower extremities, stroke, and acute coronary syndrome *(Abouzid et al., 2022).*

AIM OF THE STUDY

This study aimed to evaluate the effect of diabetes conversation maps on knowledge and self- management for patients with type 2 diabetes through:

1. Assessing level of knowledge and self-management activities of patients with type 2 diabetes.

2. Implementing diabetes conversation maps for patients with type 2 diabetes according to their needs.

3. Evaluating the effect of diabetes conversation maps on knowledge and self- management for patients with type 2 diabetes.

Research hypothesis:

H1: Diabetes conversation maps will have a positive effect on diabetic patients' level of knowledge.

H2: Diabetes conversation maps will have a positive effect on diabetic patients' self-management activities.

Operational definition:

Diabetes conversation map is a new educational initiative tool that engages patients with type 2 diabetes in group discussions. It provides visual cards to enable diabetic people improve their knowledge and self-management practices with regard to their condition.

SUBJECT AND METHODS

Research design:

A quasi-experimental research design was used in this study.

Setting:

The current study was conducted at outpatient clinics; Badr hospital in Helwan University.

Subjects:

A purposive sample of 100 patients, from total 135 patients was attended in the above mentioned setting in the previous year. They were selected according to the following

Inclusion criteria:

- Adult patient, from both genders.

- Willing to participate in the study.

- Able to communicate and answer questions

Sample size calculation:

The sample size was calculate by adjusting the power of the test to 80%, and the confidence interval to 95% with a margin of error accepted   adjusted to 5% using the following equation:

Type I error (α) = 0.05%

Type II error (B) = 0.20%

With power of test 0.80%

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

N x p(1-p);	=135x 0.5 x (1-0.5)
N-1	=(135-1)x
d2/z2	=0.0025 / 3.8416+
p(1-p)	=0.5x (1-0.5)
N	= 100

Tools of data collection:

Two tools were used to collect necessary data to fulfill the study aim.

Tool I: Structured interviewing questionnaire:

This questionnaire was designed by the investigator based on reviewing related literature *(Qasim et al. 2020)*; *(Srulovici et al. 2020)* and was written in simple Arabic language, it consists of two parts:

Part one: Patient's demographic characteristics: -

It was concerned with demographic characteristics of the studied patients which includes; age, gender, marital status, educational level, occupation and monthly income.

Part two: Patients' level of knowledge regarding diabetes mellitus

This tool was adapted from *(Speight & Bradly, 2001)*, and was used to assess patients' knowledge regarding diabetes mellitus. It consists of (64) questions and reflecting (5) parts:

Part 1: Meaning, patho-physiology of diabetes mellitus (6 items).

Part 2: Causes, risk factors and signs and symptoms of diabetes mellitus (10 items).

Part 3: Lifestyle management of diabetes mellitus included dietary management, physical activity, smoking and alcohol (22 items).

Part 4: Medication, complications and follow up (11 items).

Part 5: Foot care which included; foot examination, foot care, nails care, shoes and dry skin care (15).

Scoring system: Total global score of 64 questions with 64 scores, formed of multiple choice (incorrect= Zero and correct = 1). These scores were summed and converted into a percent score. It was classified into two categories according to the following: *(Hasan & Ramadan, 2022).*

- ➢ Satisfactory knowledge if total score ≥ 75%.
- ➢ Unsatisfactory knowledge if total score from < 75%.

Tool II: Diabetes self-management questionnaire:

This tool was adapted from *(Schmitt, et al. 2013)*, and was used to assess patients' self-management activities regarding diabetes mellitus which included 4 subscales;

- Dietary scale which included (3 items).

- Physical activity scale which included (3 items).

- Heath care use scale which included (3 items).

- Blood glucose management scale which included (4 items).

Scoring system: Total global score of 13 items with 39 scores, were rated on three likert scale as (never= 1, sometimes= 2 and always= 3) for all items except for 2rd item in dietary practices, 2rd and 3rd items in physical activity practices, 2rd item in health care and 4th item in blood glucose management. These scores were summed and converted into a percent score. It was classified into three categories according to the following: *(Zwane et al., 2023).*

➢ Poor self-management practices if total score < 60% (< 23.4 scores)

➢ Average self-management practices if total score from 60% -< 75% (23.4 -< 29.25 scores).

➢ Good self-management practices if total score ≥75% (≥29.25 scores).

Content validity and reliability

      Content validity (refers to how well a scientific test actually measures what it is intended to measure) of the proposed tools was done using face and content validity. Face and content validity was ascertained by a panel of five experts 2 professors and 3 assistant professor of medical surgical nursing from Faculty of Nursing, Helwan University and Galala University. The expertise reviewed the tools for clarity, relevance, comprehensiveness, simplicity, and applicability; minor modifications were done and the final forms were developed.

      Testing reliability (refers to the extent to which the same answers can be obtained using the same instruments more than one time). In the present study, reliability was tested using Chronbach's Alpha coefficients for patients' knowledge regarding diabetes mellitus which was 0.86, patients' self-management practices regarding diabetes mellitus which was 0.93.

Pilot study:-

      A pilot study was carried out on 10% (10 patients) of sample size to test the applicability, clarity and efficiency of the tools. Depending on the results of the pilot study no modifications or refinements were done and the patients were included in the actual study sample.

Field work:

- Once the permission was obtained, the investigator was interviewed with the patients and explained the aim of the study and took their approval to participate and cooperate in the study through oral consent.

- Data collection took a period of 6 months started from the beginning of August 2023 to the end of January 2024

Data collection was included 3 phases as the following:

Phase I: Assessment phase:

- The data was collected by the investigator throughout assessing patients' demographic data, medical, health history and patients' knowledge **(tool I)** and patients' self-management activities **(tool II)** as a baseline data assessment pre implementation of diabetes conversation map.

Phase II: Planning and implementation phase (Intervention):

Once the initial assessment finished, the investigator planned the sessions of individualized patients for start explanation of diabetes conversation maps and the investigator was presented in hospital 2 days/week.

- Patients were divided into small groups (5 patients/session) each group perceived the same content using the same teaching strategies and handout.

- The total number of sessions was 6/week for each group and each session take 30-45 minutes, and from 2 hours to 3 hours for all sessions.

- Description of Diabetic Sessions using diabetes conversation map: each map is a large piece of laminated paper with colorful images and text:

First session: Map 1; What is diabetes map; which included sources and destinations of blood glucose in normal humans, two types of diabetes mellitus and how to treat and improve diabetes?

Second session: Map 2; Walk with diabetes map; which was used to teach definition of diabetes mellitus, measuring blood sugar level, useful complementary measures, symptoms associated with hyperglycemia and hypoglycemia, humanistic care (possible feelings and moods of people with diabetes), as well as demonstrating and re-demonstration for self-measuring of blood glucose level.

Third session: Map 3; Healthy diet and exercise map; which included advantages (importance) of exercise and healthy eating, suggestions for a healthy diet, suggestions for exercise routine and bad habits to avoid; smoking, drinking.

Fourth session: Map 4; Be with insulin; which included concept of insulin, benefits of insulin therapy, demonstration and re-demonstration for insulin injection route, places of injection, rotation rules and possible causes of hypoglycemia and related symptoms.

Fifth session: Map 5; Diabetic foot and steps of foot care map; which included causes of diabetic foot, demonstration and re-demonstration for self-care steps for foot and ways to prevent diabetic foot.

Sixth session: Map 6; Ramadan map for diabetes mellitus patients; which included which happen in body during fasting, complications due to fasting, when to stopping fasting and warning signs during fasting, self-management practices during Ramadan fasting and ideal fasting day practices.

- The media was used in the diabetes mellitus maps sessions as following: power point presentation, maps of diabetes mellitus, discussion, demonstration and re-demonstration as a method of teaching were also conducted during each session.

- During each session the investigator used simple, brief and clear words. At the end of each session, a brief summary was given by the investigator, emphasizing the most important points included in each session and ask each patient to follow this maps in the home.

- Before starting of each session, patients were asked questions related to the topics discussed in the previous session to ensure that they remember the instruction was given and to reinforce the knowledge. Missed or unclear points were re-emphasized by the investigator.

- Diabetes mellitus maps was given to each patient in the study to grasp their attention, motivate, help for reviewing at home and support teaching and practicing.

Phase III: Evaluation phase (Post implementation Diabetes Conversation Map):

- It included reassessment using the same tools of data collection which aimed to evaluate the effect of diabetes conversation maps on diabetic patients' knowledge and self-management activities; it was done by the investigator as following:

- Evaluation of patients' post implementation diabetes conversation map sessions using patients' knowledge and self-management activities (tool I; part III and Tool II) by comparison of each patient's findings with

the preceding one by comparing between pre-test results with post findings to evaluate the effect of diabetes conversation maps on patients' knowledge and self-management activities.

Ethical Considerations:

The research approval was obtained from the Faculty Scientific Ethical Committee before starting the study. The investigator clarified the objectives and aim of the study to the patients included in the study before starting. Investigator assured the anonymity and confidentiality of the patients included in the study. The patients in the study was informed that they are allowed to choose to participate or not in the study and they have the right to withdraw from the study at any time without any reasons.

Administrative item:

An official permission was obtained by submission of official letters issued from the dean of faculty of nursing, Helwan University to the general manager of Badr Hospital that affiliated to Helwan University. The title and aim of the study was explained as well as the main data items and the expected outcomes.

Statistical design:

Data were summarized, tabulated, and presented using descriptive statistics in the form of means and standard deviations as a measure of dispersion. A statistical package for the social science (SPSS), version (26) was used for statistical analysis of the data, as it contains the test of significance given in standard statistical books. Qualitative data were expressed as a percentage. For quantitative data, a comparison between two variables was done using a student's t-test. Probability (P-value) is the degree of significance, less than 0.05 was considered significant. The smaller the P-value obtained, the more significant is the result (*), less than 0.001 was considered highly significant (**) and the correlation coefficient was done by using the Pearson correlation test. Fisher's Exact Test is a way to test the association between two categorical variables. When in case of small cell sizes (expected values less than 5). T- test is used when the cell sizes are expected to be large. If the sample size is small (or you have expected cell sizes <5). Chi-square (X2) test of significance was used in order to compare proportions between qualitative parameters.

RESULTS

Table (1): Percentage distribution of demographic characteristics of the studied patients with type 2 diabetes mellitus (n=100

Demographic data	No.	%
Age		
30 < 40 years	9	9.0
40< 50 years	23	23.0
50< 60 years	58	**58.0**
60 < 70 years	10	10.0
Mean±SD	52.88±7.74	
Gender		
Male	34	34.0
Female	66	**66.0**
Marital Status		
Married	90	**90.0**
Divorced	5	5.0
Widow	5	5.0
Education level		
Not read and write	54	**54.0**
Read and write	38	38.0
Secondary education	7	7.0
University education	1	1.0
Occupation		

| Worker	41	41.0
Not working	59	**59.0**
Monthly income		
Adequate	24	24.0
Inadequate	76	**76.0**

Table (2): Percentage distribution of the studied patients' knowledge dimensions regarding to diabetes mellitus (n=100).

Items	Pre				Post				X^2	p value
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory			
	No.	%	No.	%	No.	%	N	%		
Meaning, patho-physiology of diabetes	9	9.0	91	91.0	64	64.0	36	36.0	5.563	0.018*
Causes and risk factors	18	18.0	82	82.0	63	63.0	37	37.0	9.311	0.002**
Signs and symptoms of diabetes mellitus	11	11.0	89	89.0	70	70.0	30	30.0	5.297	0.021*
Diabetes management by diet	6	6.0	94	94.0	79	79.0	21	21.0	5.479	0.015*
Diabetes management by physical activity	14	14.0	86	86.0	80	80.0	20	20.0	4.07	0.044*
Diabetes mellitus medication	22	22.0	78	78.0	80	80.0	20	20.0	7.051	0.001**
Smoking	8	8.0	92	92.0	82	82.0	18	18.0	.679	0.410
Alcohols	12	12.0	88	88.0	69	69.0	31	31.0	6.126	0.013*
Complications of diabetes mellitus	10	10.0	90	90.0	79	79.0	21	21.0	5.002	0.025*
Follow up	27	27.0	73	73.0	79	79.0	21	21.0	9.832	0.002**
Foot care	3	3.0	97	97.0	79	79.0	21	21.0	3.980	0.034*
Total	2	2.0	98	98.0	82	82.0	18	18.0	.448	0.503

* Statistically significant at p≤0.05

** Highly statistical significant at p≤0.01
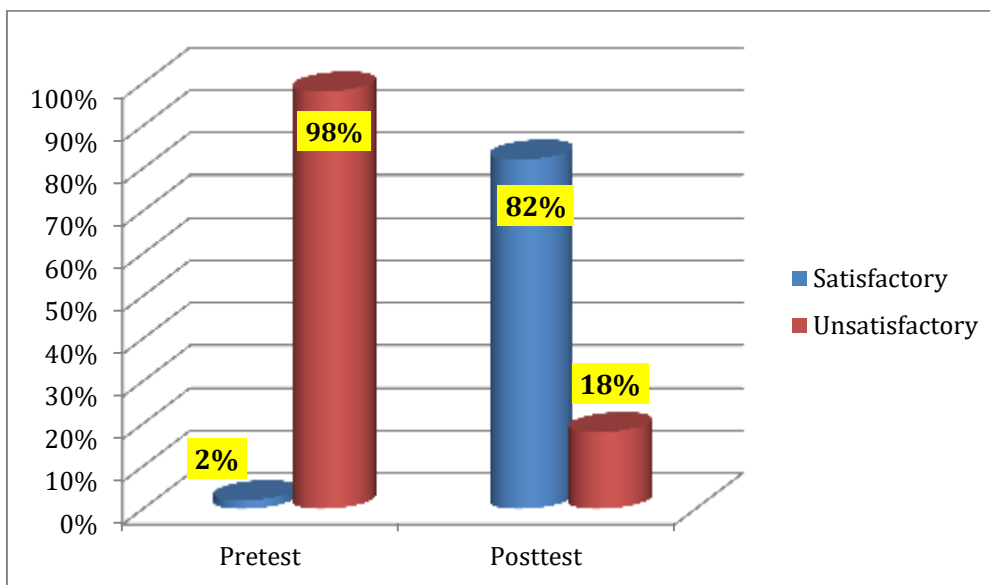
Figure (1): Percentage distribution of the studied patients according to total knowledge regarding to diabetes mellitus pre-post implementation of diabetic conversation map (n=100).

Table (3): Comparison of self-management dimensions among the studied patients pre and post implementation of diabetic conversation map (n=100).

Self-management dimensions	Pre						Post						X²	p value
	Poor		Average		Good		Poor		Average		Good			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Dietary practices	60	60.0	25	25.0	15	15.0	8	8.0	13	13.0	79	79.0	16.454	0.002**.
Physical Activity practices	55	55.0	24	24.0	21	21.0	10	10.0	21	21.0	69	69.0	21.091	0.000**
Health Care practices	56	56.0	18	18.0	26	26.0	8	8.0	11	11.0	81	81.0	12.025	0.01**
Blood glucose management practices	46	46.0	27	27.0	27	27.0	9	9.0	15	15.0	76	76.0	10.341	0.035*
Total	91	91.0	3	3.0	6	6.0	0	0.0	21	21.0	79	79.0	.906	0.635

* Statistically significant at p≤0.05
** Highly statistical significant at p≤0.01
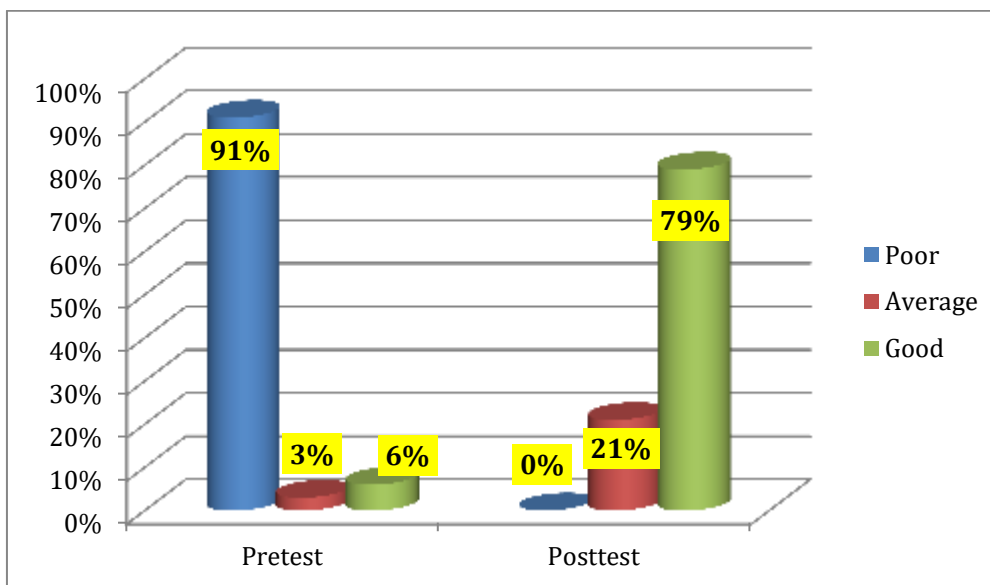
Figure (2): Percentage distribution of the studied patients' total self-management practices regarding to diabetes mellitus pre-post implementation (n=100).

Table (4): Correlation between total score of knowledge and total self-management activities pre and post implementation.

Pretest		Self-management	Posttest		Self-management
Knowledge	r	.137	Knowledge	r	.766
	p	0.175		p	0.030*

* Positive correlation at p≤0.05
**Strong positive correlation at p≤0.01

Table (1): shows that, 58% of the studied patients their age group was 50< 60 years with mean age 52.88±7.74 years, 66% of them were females, 90% of them were married, 54% of them weren't read and write, 59% of them weren't working and 76% of them had inadequate monthly income.

Table (2) reveals that, 94%, and 97% of the studied patients had unsatisfactory knowledge level regarding diabetes management by diet, and total foot care dimensions, during pretest, and improved posttest to become 79% of the studied patients had satisfactory knowledge level, respectively. There was a statistically significant improvement in patients' all knowledge dimensions regarding to diabetes mellitus post implementation of diabetes conversation map and comparing to pre implementation with (p value= ≤0.05).

Figure (1): illustrates that, 2% of the studied patients had satisfactory total knowledge regarding diabetes mellitus during pre-implementation, and improved post implementation of diabetes conversation map to become 82%.

Table (3): presents that, 26% and 27%, of the studied patients had good self-management practices level regarding health care and blood glucose management practices pre diabetic conversation map implementation, in comparison to 81% and 76% respectively, of them post implementation. there was a statistically significant improvement in patients' all self-management practices dimensions post implementation of diabetes conversation map and comparing to pre-implementation with (p value= ≤0.05).

Figure (2): 6% of the studied patients had good total self-management practices pre-implementation and improved to become 79% of them post implementation of diabetes conversation map.

Table (4): shows that, there was a negative correlation between total knowledge and total self-management practices pre implementation. While, there was a positive correlation between total knowledge and total self-management practices post implementation.

DISCUSSION

Diabetes is a chronic illness that requires continuing medical care and education to prevent acute complications and reduce the risk of long-term complications. Diabetes self-management education (DSME) is a cornerstone in managing diabetes and aims to modify lifestyle and promote self-management practices to improve metabolic outcomes. Several DSME implementation methods include one-on-one sessions, group education, web-based information, and audio, video, and printed materials. One of the most recent education tools for DSME is the set of Diabetes Conversation Maps *(Tri Rahayu et al., 2023).*

In relation to demographic characteristics of the studied patients with type 2 diabetes mellitus, the current study revealed that, more than half of the studied patients their age group was 50< 60 years with mean age 52.88±7.74 years. This result was in agreement with *Öberg et l., (2020)* who conducted a study entitled "Using the self-management assessment scale for screening support needs in type 2 diabetes" and revealed that less than two thirds of the studied patients their age group was ≥ 50 years.

The present study reported that, about two thirds of the studied patients were females. This finding was supported by *Mahzari et al., (2022)* who carried out a study entitled "Knowledge, attitude, and practice regarding diabetes mellitus among type 2 diabetic patients attending primary health care centers in the Jazan region of Saudi Arabia" and found that more than half of the studied patients were females.

The current study revealed that, most of the studied patients were married, in the researcher point of view, this might be related to more than half of the studied patients their age group was 50< 60 years. This result was in accordance with *Shawahna et al., (2021)* who conducted a study entitled "Knowledge, attitude, and practice of patients with type 2 diabetes mellitus with regard to their disease: A cross-sectional study among Palestinians of the West Bank" and reported that less than three quarters of the studied patients were married.

The present study found that, more than half of the studied patients weren't read and write. This study was similar to *Garg et al., (2019)* who carried out a study entitled "Impact of health education on knowledge, attitude, practices and glycemic control in type 2 diabetes mellitus" and revealed that more than half of the studied patients were illiterate.

The current study revealed that, more than half of them weren't working. This finding was on the same line with *Nguyen et al., (2022)* who studied "Diabetes self-management and its associated factors among patients with diabetes in central Vietnam" and found that more than two thirds of the studied patients were retired.

The present study reported that, more than three quarters of the studied patients had inadequate monthly income, on the researcher point of view; this could be related to that more than half of them weren't working. This study was in agreement with *Hasniati et al., (2023)* in their study entitled "Health education-based group on self-care adherence among patients with diabetes mellitus in Cendrawasih public health center, Makassar City" and revealed that more than half of the studied patients had insufficient monthly income.

Concerning patients' knowledge dimensions regarding to diabetes mellitus, the current study reported that, there was a statistically significant improvement in patients' all knowledge dimensions regarding to diabetes mellitus post implementation of diabetes conversation map comparing to pre implementation, in the researcher point of view, this could be related to the positive effect of conversation map in empowerment of patients' knowledge regarding diabetes mellitus. This finding was on the same line with *Pliszka et al., (2023)* who found that there was high statistically significant improvement in all dimensions of knowledge regarding diabetes mellitus post program.

In relation total knowledge regarding to diabetes mellitus pre-post implementation of diabetic conversation map, the current study found that, minority of the studied patients had satisfactory total knowledge

regarding diabetes mellitus during pre-implementation, and improved post implementation of diabetes conversation map to become majority. This result was in agreement with *Yuniartika & Nur Hidayati (2021)* who conducted a study "Improving Knowledge of Diabetes Mellitus Patients Using Booklet" and mention the majority of the knowledge level were in the poor category. Following the post-test, there was still a poor category but the level of knowledge of moderate and good increased. There was a significant effect of health education with a booklet on knowledge of diabetes mellitus patients.

In relation to self-management dimensions among the studied patients pre and post implementation of diabetic conversation map, the present study found that, about one quarter of the studied patients had good self-management practices level regarding dietary, physical activity, health care and blood glucose management practices pre diabetic conversation map implementation, in comparison to more than three quarters of them post implementation. there was a statistically significant improvement in patients' all self-management practices dimensions post implementation of diabetes conversation map and comparing to pre-implementation, in the researcher point of view, this reflect the effect of conversation map in improving patients' self-management practices.

This study was on the same line with *Ibrahim et al., (2019)* who conducted a study entitled "Self-care management educational program diabetic patients in health insurance sector at Zagazig City" and reported that there was statistically significant improvement among intervention group regarding total score for adequate diabetes self-management post intervention.

Concerning patients' total self-management practices regarding to diabetes mellitus pre-post implementation, minority of the studied patients had good total self-management practices pre-implementation and improved to become more than three quarters of them post implementation of diabetes conversation map, in the researcher point of view, this might be due to that, the current study provide the patients' the best practices for enhancing their self-management to improve their health status.

This finding was in accordance with *Abo Elyzed et al., (2023)* in their study entitled "Effect of health educational guidelines on knowledge and self-care practice for patients with diabetic ketoacidosis" and found that there was a statistically significant difference for patients' self-care practice and daily living activities level before and after the health educational guidelines. Also, this study finding was similar to *Abd-Alrahman et al., (2019)* who conducted a study entitled "Effect of diabetes educational program on self-care and diabetes control among type 2 diabetic patients in Al-Baha–Saudi Arabia" and stated that the diabetes self-care scale was significantly improved after intervention.

Regarding correlation between total score of knowledge and total self-management activities pre and post implementation, the present study found that, there was a negative correlation between total knowledge and total self-management practices pre implementation. While, there was a positive correlation between total knowledge and total self-management practices post implementation, in the researcher point of view, this might be related to that, increasing patients' knowledge affect positively on their total self-management practices.

This result was in agreement with *Shawahna et al., (2021)* who revealed that there was strong positive correlation between total knowledge and total practices. Contrariwise, this finding was in disagreement with *Eldesouky et al., (2024)* who found that there was positive correlation between total knowledge and total practices during pretest.

CONCLUSION

The present study showed that, minority of the studied patients had satisfactory total knowledge regarding diabetes mellitus during pre-implementation, and improved post implementation of diabetes conversation map to become majority. Also, minority of the studied patients had good total self-management practices pre-implementation and improved to become more than three quarters of them post implementation of diabetes conversation map. Finally, there was a statistically significant improvement in patients' knowledge and self-management practices post implementation of diabetes conversation map when comparing to pre-implementation.

RECOMMENDATIONS

- Increase public awareness about diabetes conversation maps in improving knowledge and self-management of diabetic patients.
- There should be widespread access to diabetes conversation maps usage education programs that emphasize empowering diabetes conversation maps use among individuals with diabetes mellitus and related information as crucial components of diabetes mellitus management programs.
- Replication of the study on longer sample to be able to generalize the result study.
- Further studies are recommended to consider describing the differing cultural, demographic, and contextual aspects of diabetic patients regarding to their knowledge and self-management based on using diabetes conversation map.

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