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Self-Care Behaviors among Type Two Diabetes Mellitus Patients attending Diabetes and Endocrine Center in Sulaimani City – Iraq

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Abstract

Type Two Diabetes Mellitus is a chronic disease characterized by elevated blood glucose, polyphagia, polydipsia, and poly-urea. It comes with several devastating complications, including macrovascular and microvascular complications. A patient's self-care behaviors can have a significant role in reducing complications and controlling blood glucose. The overall aim of this study is to assess the self-care behaviors among patients with type 2 diabetes. In this descriptive study, data was collected from October 2020 to January 2021, by which 350 patients consented and were recruited in the study. Self-care scores were obtained by a self-care behavior assessment questionnaire, and patients' clinical parameters were assessed by HbA1c% and fasting blood glucose among the participants. SPSS software version 25.0 was used to determine the self-care behaviors among the patients concerning their socio-demographic characteristics, in which $p \leq 0.05$ is considered significant and $p > 0.05$ is not significant. Generally, participants in this study are a poor self-care score which comprises 59.4% of the sample, and 33% have moderate self-care score meanwhile, only 6.1% have the acceptable level of self-care scores. Negative correlations were found between FBG, HbA1%c, and self-care behaviors. Finally, there are highly significant relationships between level of education, duration of diabetes, types of treatment, and self-care scores.

Introduction

Diabetes Mellitus (DM) is an aggressive metabolic disorder characterized by elevated levels of blood glucose. Type 2 Diabetes is occurring a result of inadequate insulin or cell resistance to insulin. It can have several negative effects on the human body organs, mainly when glycaemic control is not achieved ***[1]***. Moreover, it is associated with several complications such as cardiovascular diseases, retinopathy, nephropathy, and neuropathy, which can consequently lead to disability and death ***[2]***.

The World Health Organization (WHO) recently explored more than 422 million people living with diabetes, particularly in low and middle-income countries. The mortality rate of diabetes is an estimated 1.6 million deaths annually***[3]***. The number of people with diabetes rose from 108 million in 1980 to 422 million in 2014***[4]***. International Diabetes Federation (IDF) reported that, in 2000, the global estimate of adults living with diabetes was 151 million. By 2009 it had grown by 88% to 285 million. Nowadays, 9.3% of adults aged

20–79 years are affected by the disease. Precisely, 463 million people live with diabetes nowadays, and this number is expected to rise by 2030 to 578 million ***[5]***.

The contentious care of diabetic patients is essential to reduce chronic complications. Sustainability, on the other hand, is one of the most challenging tasks facing health care facilities in providing comprehensive care to patients. For that reason (WHO) and the Centers for Disease Control and Prevention (CDC) recommended that patients should be involved in the diabetic care plan to establish durability ***[6]***. To obtain ultimate management, patients need to do lifestyle modifications including, monitoring of glucose level in the blood, dietary understanding, health education, foot care, regular exercise, and adequate physical activity ***[7,8]***.

Diabetes self-management education (DSME) has been considered a cornerstone of diabetes clinical management since the 1930s. The Canadian Diabetes Association 2013 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada emphasize that DSME, incorporating knowledge and skills development and cognitive-behavioral interventions, should be implemented for individuals with diabetes. Patients' knowledge, attitudes, and behaviors (KABs) are influenced by factors, such as age, gender, schooling, marital status, occupation, diagnosis, and treatment, and knowledge itself does not always lead to changes in attitudes. In addition, the same KAB parameters are potentially influenced by the delivery of education and ultimately affect clinical outcomes, such as glycaemic control ***[9].***

Patients can be educated to perform self-care management such as foot-care, dietary modification, adhering to medications, physical activity, and exercise, by which patient's Fasting Blood Glucose (FBG), Glycated hemoglobin (HbA1c%), and lipid profiles will be improved ***[10,11]***. Additionally, patients can reduce weight, improve their Body Mass Index (BMI), and progress overall health to overcome diabetes complications ***[12]***. American Diabetes Association (ADA) defines diabetes self-care as referring to the patients' self-care behavior aiming, management of the disease, control of blood glucose, reduce chronic complications and prevent acute complications such as hypoglycemia, diabetic ketoacidosis (DKA), and Hyperosmolar hyperglycemic state ***[13]***.

Self-care management is a major technique proven to be crucial in caring for patients with T2DM to provide glycaemic control. Through this, patients can be enabled to be aware of their illness ***[15]***. Meanwhile, this complex chronic disease requires contentious care with risk reduction for acute and chronic complications in multiple ways. A substantial amount of literature confirmed that patients' self-care management could reduce chronic complications and preventing acute complications ***[7,16]***.
Blood glucose control in diabetic patients significantly reduces the risk of microvascular complications, including eye, kidney diseases, and sensory impairment. Micro-vascular difficulties consequently lead to cataracts, glaucoma, renal failure, and lower limb amputation. Blood glucose control also appears to reduce the risk of macro-vascular complications such as heart attack and stroke ***[7,17]***.

The overall aim of this study, therefore, is to assess the level of self-care behavior among type 2 diabetic patients. It also aims to find out the association between demographic characteristics of the participants and level of self-care behaviors, and finally, to explore self-care behaviors and glycaemic control among patients with Type 2 Diabetes Mellitus (T2DM).

Materials and methods

A. Study design: A cross-sectional study was conducted on 350 subjects who were selected from the Diabetes and Endocrine Center in Sulaimani City / Iraq.

B. Population and sample size: sample size was estimated by the Raosoft sample size calculator, considering 3950 active cases (P.3950) in the diabetes center and α= 0.05 and CI = 95%, the sample size of 350 patients were determined ***[24].***

C. Sampling and data collection: data collection was performed in the Diabetes and Endocrine Center in Sulaimani City. Patients who met the inclusion criteria participated, and informed consent was taken from the participants before the data collection.

D. Tools in data collection: A self-care questionnaire was developed to assess self-care behaviors among participants. The questionnaire comprises three main parts: socio-demographic characteristics, clinical parameters, and self-care behaviors assessment, which consist of a Likert scale of three different responses. Self-care scores are calculated based on a response to sets of 10 questions, and the overall responses were calculated from 10 -30 (Does not apply to me =1×10 questions = 10, applies to me in some degree= 2×10 questions = 20 and applies to me very much=3×10 questions = 30) The reliability of the Likert questionnaire was tested with Cronbach's Alpha to determine the stability, and it showed 0.88. Glycemic control was assessed by the clinical parameters in which blood samples were taken from the participants on the same day, then FBG mg/dl and HbA1c% tests were measured by chemistry lab machine, COBS C111in the Diabetes and Endocrine Center laboratory.

E. Measures of the clinical parameters: the normal blood glucose varies depending on the time the test is performing. For example, random blood glucose can be measured at any time. However, fasting plasma glucose (FBG) should be performed 8 hours after the last meal. Random Blood Glucose of 70-180 mg/dl is considered targeted or controlled blood glucose. HbA1c is also significant in patients' care plans and follow-up. The target level of HbA1c for controlling blood glucose in diabetic patients is below 7%; meanwhile, HbA1c of ≥ 7% indicates poor glycaemic control ***[16]*** .

F. Ethical considerations: The current study was presented to the ethics committee of the University of Sulaimani, College of Nursing, and College of Medicine. Ethical approval was guaranteed by the ethical committee of the medical colleges with Issue Number 219 on 11th October 2020. Participants in the study were informed about the nature and objectives of the study. Besides, patients' rights, confidentiality, and data protection are highly considered. They were also offered the right to withdraw from this study, and finally, they consented to the study.

G. Inclusion and exclusion criteria: according to the inclusion criteria of this study, adult patients with type two diabetes mellitus (T2DM) and who consented to the study were included. Meanwhile, Type one DM, Gestational diabetes, pregnant women with T2DM, patients with organ failure, mental and physically disabled patients are excluded.

Results and discussion

In this study, patients aged between 35 to 90 years old have participated, but the results explored that the youngest participant was aged 35 years and the oldest 88 years with a mean age of 59 years in the total sample. It also reviles that the majority of patients visiting the diabetes and endocrine center in Sulaimani city were females with Type 2 Diabetes Mellitus. Regarding their level of education, a mass number of them cannot read and write, which comprises (47.4%) of the total sample; only two targets (0.6%) were detected with university or higher degrees. On the subject of duration of diabetes, a bulk number was detected with 6-11 years history of living with T2DM that cover (41.7%) of the sample. In the current study also most of the participants, 212 patients (60.6%), were consuming oral anti-diabetic therapy, and 133 (38%) had oral anti-diabetic and insulin injection while only five (1.4%) patients were taking insulin injection. Pre-existing health conditions varied among the patients including, hypertension, heart diseases, and chronic kidney diseases.

Table-1: Frequency distribution of the socio-demographics of the participants.

Gender	**Frequency (n)**	**Percent %**
Male	71	20.3
Female	279	79.7
Level of education		
Illiterate	166	47.4
Primary School	100	28.6
Secondary School	56	16.0
Diploma	26	7.4
University Degree or Higher	2	0.6
Duration of Diabetes		
1-5 year	98	28.0
6-11 year	146	41.7
12-17	72	20.6
18 and more	34	9.7
Type(s) of Treatment		
Tablet	212	60.6
Insulin	5	1.4
Tablet and Insulin	133	38.0
Other chronic diseases		
Hypertension	164	46.9
Heart diseases	30	8.6
HTN & Heart Disease	59	16.9
Chronic Kidney disease (CKD)	4	1.1
HTN, Heart disease and CKD	3	0.9
No other diseases	90	25.7
Total	350	100.0

The above table explains the frequency distribution among participants, including gender, level of education, history or duration of the disease, types of treatment, and other chronic diseases.

Table-2: Self-care behaviors among the participants.

Self-care categories	Frequency (n)	Percent %	Cumulative Percent
Poor self-care score (10-16.99)	208	59.4	59.4
Moderate self-care score (17-23.99)	118	33.7	93.1
Good self-care score (24-30)	24	6.9	100.0
Total	350	100.0	

Although, a substantial amount of literature concluded that poor self-care behavior is linked with poor glycaemic control among type two diabetes mellitus patients ***[2,8,14,18,19]***. According to the analyzed results, only 24 patients performed good self-care behavior; on the other hand, 208 patients have poor self-care and 118 targets with moderate self-care scores.

Table-3: The relationships between level of education, duration of diabetes, types of diabetic therapy, and self-care behavior scores.

Variables		Poor self-care score (10-16.99)	Moderate self-care score (17-23.99)	Good self-care score (24-30)	P-value
Level of education	Illiterate	128	35	3	0.001
	Primary School	48	49	3	
	Secondary School	29	21	6	
	Diploma	3	13	10	
	University Degree or Higher	0	0	2	
Duration of Diabetes	1-5 years	51	32	15	0.001
	6-11 years	82	56	8	
	12-17 years	51	21	0	
	18 years and more	24	9	1	
Type(s) of Treatment	Tablet	114	79	19	0.007
	Insulin	1	3	1	
	Tablet and Insulin	93	36	4	

Regarding the relationships between self-care scores and socio-demographic characteristics of the participants, the Pearson Chi-Square test was used by which the highly significant relationships were found between (the level of education, duration of diabetes, types of diabetic therapy) and self-care behavior scores at $p < 0.01$. At the same time, no significant relationships were discovered between variables such as (age, gender, and other chronic diseases) and self-care behavior scores. Additionally, fasting blood glucose and glycated hemoglobin (HbA1c %) are reported lower in patients with higher self-care scores.

Table-4: Correlations between self-care scores, fasting blood glucose& HbA1c.

Self-care scores	FBG	HbA1c %
Pearson Correlation	-.432**	-.474**
Sig. (2-tailed) P-value	0.001	0.001
N	350	350

In our study, a two-tailed Pearson correlation test was used to find out the nature of the relationships between self-care behaviors and fasting blood glucose, also self-care behavior, and glycated hemoglobin. The results are shown in table ***[4]***. There are highly significant negative correlations between the variables. This finding declares that self-care scores or self-care activities can provide glycaemic improvement among patients with type 2 diabetes. Additionally, it may lead to glycaemic control among them accordingly. In this regard, a randomized controlled study was carried out by Surucu HA, Kizilci S, Ergor G (2017) confirmed the impact of self-care scores on glycaemic control among T2DM patients in Turkey ***[11]***. The second instance can be seen in a systematic review by Chrvala CA, Sherr D, and Lipman RD (2016), which included 118 trials, and the overall mean reduction in A1C was 0.74 in the intervention groups ***[19]***. Finally, The results of a study by Bukhsh A, Khan et al. (2018) is in line with the present study by which the better self-care activities provided higher glycaemic control ***[20]***.

In this study, a strong relationship was found between the level of education and self-care scores among diabetic patients. This result is in line with a study conducted by Jansen T et al., 2018 in the Netherlands on 1811 units; in their results, they found a strong relationship between educational attainment and self-care behavior, they also tested for correlation and regression, there was a positive correlation between education level and health literacy ***[21]***. Another study in Iran revealed a positive correlation between health literacy and self-care behaviors among type 2 diabetic patients ***[22]***. In the current study, we found a significant relationship between types of treatment and self-care scores in which patients on oral anti-diabetic tend to have higher self-care scores at $p<0.007$. However, this result was not found in any studies after a deep search. In the study also a statistically significant relationship was found between the duration of diabetes and self-care behaviors at $p<0.001$, and the same result was found in a study by Dehghan H et al., 2017 in north Iran, which was conducted on 251 patients with type 2 diabetes mellitus. The results explored, furthermore, a negative correlation between the duration of diabetes and self-care behavior which affected glycaemic control negatively ***[23]***.

Conclusion

The self-care scores, moreover, are categorized into three main levels, including poor, moderate, and good self-care scores. The results of this study explored that the level of self-care behaviors among the achieved sample is mainly poor and moderate. In the present study, patients with higher self-care scores have better glycaemic control, and those with lower scores were found to have poor glycaemic control. Finally, a significant relationship is found between (health literacy, duration of diabetes, types of treatment) and self-care behaviors.

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