Evaluation of Diabetes Self-Management Behavior among type-2 diabetes patients at University Center in Riyadh, Saudi Arabia - A Nursing Study

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Abstract

Background and Objective: Diabetes is a chronic endocrine disease, which requires self-care from experienced health-care professionals such as nurses to obtain a healthy lifestyle. This responsibility requires self-care to manage their condition and delay diabetes-related complications. Therefore, this study aimed to assess the diabetes self-management behavior and associated demographic factors of Saudi Type 2 diabetes patients in, Riyadh, Saudi Arabia. **Methods:** A cross-sectional, self-administered questionnaire-based study was conducted at the University Diabetes Center, College of Medicine, King Saud University located in Riyadh, Saudi Arabia. The Diabetes Self-Management Behavior was assessed using a Summary of the Diabetes Self-Care Activities questionnaire-8 which includes two items for general diet, two items for exercise, two items for blood glucose testing, and two items for foot care. **Results:** Of the 98 subjects, 48 (49%) were male and 50 (51%) were female. The mean age of the diabetes was 46.0 years (SD = 13.80). The current findings revealed that 18.4% (n = 18) of the respondents followed a healthy eating plan for 7 days in a week, while 19.4% (n = 19) followed 5 days in a week. Among the respondents, 18.4% (n = 18) of the participants had never participated in any physical activities throughout the week, and only 17.3% (n = 17) participated in 30 min of physical activity for 5 days in a week. The overall mean self-management behaviors were 4.37 days per week (SD = 1.63). The mean score of the diet was 4.36 days (SD = 2.38), exercise 3.90 (SD = 2.0), blood sugar testing was 4.59 days (SD = 2.50), while foot care was 4.63 days (SD = 2.71) in the past week. There was no significant association between the mean score of the SDCA (F = 0.60, df = 10, P > 0.01). **Conclusion:** The findings reported very poor self-care practice, with respect to physical activity and healthy diet were reported among Saudi diabetic patients. Furthermore, self-management behavior was not significantly associated with the demographic characteristics of diabetics. Therefore, consultations with health-care professionals such as nurses help in providing dietary advice and lifestyle recommendations which may help in glycemic control.

Key words: Demographics, diabetes, foot-care, self-care activities, sugar control

INTRODUCTION

The concept of self-management in patients with type-2 diabetes mellitus is widely valued for more than four decades.[1-3] Today, the empirical work on self-management increases more rapidly.[4] When considering chronic conditions, for example, diabetes, the concept of self-management is frequently employed and is effective.[5] Self-management was first used by Thomas Creer to indicate the active participants of the individual in managing their chronic conditions.[6] At a broad level, self-management is defined as the everyday management of chronic conditions by individuals throughout a disease.[6]

Self-management involves an individual responsibility for the daily care of their condition. This responsibility requires performing behaviors to manage their condition and delay diabetes-related complications. These behaviors, also known as diabetes self-management behaviors, are diet, exercise,

SMBG, medication, and foot care.[7,8] For this study, diabetes self-management behavior is defined as a set of behaviors (diet, exercise, SMBG, medication, and foot care) that DMT2 patients must perform regularly to achieve diabetes control.[7,9] Thus, self-management behaviors are pivotal and have been shown to improve several outcomes for patients with diabetes, for example, glycemic control, diabetes complications, and quality of life.[10,11] While diabetes self-management behaviors are crucial to ensure optimal diabetes control, both in terms of frequency and types of behaviors, many people with DMT2 do not perform these behaviors regularly, and consequently can affect their health.[8,11,12] For example, numerous studies have demonstrated that the administration of medication was observed as the most common behavior performed, whereas diet, exercise, SMBG, and foot care were less self-management behavior performed among patients with DMT2.[8,11,12-14]

Demographic characteristics and self-management are well established in the literature, although the findings were not always consistent with whether demographic factors such as age, gender, and level of education are associated with the performance of diabetes self-management behaviors.[15,16] For example, some demographic factors such as age, gender, and duration of diabetes were found to affect diabetes self-management.[17] To illustrate, in a correlational study several demographic characteristics were significantly found to be associated with participants' self-management behaviors. In particular, older age was associated with greater performance of foot self-management, and being female was associated with a greater frequency of SMBG.[18] Similarly, another descriptive correlational study found that female participants scored higher in following a healthy diet, exercise, SMBG, and foot care than was reported by male participants, although this difference was not significant.[7] Earlier reports also found that female participants adhere significantly to taking medication more than male participants.[7,14]

Furthermore, another study among the Omani population, where the culture and context are similar to Saudi Arabia, indicated that exercise was performed more regularly by male diabetics than females, whereas, medication-taking behavior was more regularly by females than males.[11] Furthermore, the results showed that those who are highly educated were found to have good practice of exercise, monitoring blood glucose, and performing foot care than those who are less educated.[11] The study also showed that younger age participants performed exercise and foot care more regularly than older participants.[11] In addition, the study found no significant relationship between gender and diet, SMBG, foot care, and marital status had no significant relationship with any of the diabetes self-management behaviors.[11]

Similarly, in Saudi Arabia, Al-Johani *et al*. reported significant relationships between gender and diet, SMBG, and foot care, with males, having inadequate time to practice these behaviors. In addition, a previous study indicated that the duration of diabetes was associated with good exercise self-management.[19] Huang *et al*. (2014) found a significant difference in the patients' self-management behavior scores according to the patients' age, level of education, and duration of diabetes.[12] In addition, the role of nurses in diabetes management is well documented in the literature, for instance, nurses after the physician consultations help patients by providing dietary advice to lower the risk of developing type 2 diabetes, nurses offer helpful lifestyle recommendations. In addition, nurses play a critical role in increasing public knowledge of the warning signs and symptoms to guarantee early diagnosis and treatment. There are very little data on Diabetes Self-Management Behavior and Associated Factors among Saudi Type 2-Diabetes in Saudi Arabia. Thus, is it essentially important to assess the self-management practice of diabetes by visiting the University Diabetes Center (UDC), such data are essential to the design of public health regulations, with specific reference to its implementation nationally. Therefore, the objective of this study is to assess the Diabetes Self-Management Behavior and Associated Factors among Saudi Type2-Diabetes visiting UDC in Riyadh, Saudi Arabia.

METHODS

A cross-sectional, study was conducted at the UDC located in Riyadh, Saudi Arabia. The UDC is affiliated with the College of Medicine, King Saud University. The UDC is one of the leading diabetes-related research centers in the country. The center consists of thirteen specialized clinics including a general diabetes clinic, foot, retina, and nutrition clinic.[20] The UDC provides care to people with diabetes from the Riyadh city region and suburban areas. Based on the data from the Saudi National Diabetes Registry (SNDR), more than 84,000 patients were registered in SNDR and growing by 10% annually.[20] The Adult with DMT2 was recruited. The study included those adults who are Saudi citizen's males and females, aged 18 years or more. The potential participants must speak, read and write Arabic. Adults with T1DM, pregnant women with gestational diabetes mellitus; and those who do not speak, read, and write Arabic were excluded from the study.

The instruments used in this study were divided into two parts. Part one of the study questionnaire collected patients' demographics such as age, gender, marital status, level of education, and duration of diabetes. While the second part of the study deals with the Summary of Diabetes Self-Care Activities-Arabic (SDSCA-Arabic).[19] The SDSCA-Arabic is an 8-item self-administered scale with four subscales intended to assess diabetes self-management behaviors which include two items for general diet, two items for exercise, two items for blood glucose testing, and two items for foot care. Items on the SDSCA-Arabic ask respondents to report on how many days in the past week they performed self-management behavior. For example, participants are

asked, "On how many of the last 7 days did you participate in at least 30 mins of physical activity?." The SDSCA-Arabic is an eight-point Likert scale ranging from 0 to 7, with 0 indicating "not at all" and 7 representing "every day," with higher scores indicating adequate self-management.[19] The individuals' burden to complete this questionnaire is minimal, as the survey required 5–10 min to complete.

The reliability of the scale was found to be r = 0.91 using test–retest reliability and internal consistency of Cronbach's α = 0.76. The internal consistency of the subscales for diet, exercise, blood glucose monitoring, and foot care were found to be reliable α = 0.89, α = 0.80, α = 0.92, and α = 0.77, respectively.[19] According to Al-Johani *et al.* (2014), the analysis of the content validity provides an acceptable score level R-CVI of 95% and a clarity score C-CVI of 94.8%. The instrument has been used in previous studies and has been shown to be valid.[7,19] Permission to use the questionnaire was obtained from the author to measure diabetes self-management behaviors in Saudi Arabia.[19] A non-probability convenience sampling was applied to recruit the potential participants because of the accessibility and availability of the target population. A convenience sample was obtained by approaching the subjects who were available at the time of data collection until the required sample size was reached.

Data Analysis

The data were analyzed using the Statistical Program for the Social Sciences (SPSS) version 26. Descriptive statistics such as percentages (%) and frequencies (n) were used to describe demographic characteristics. The data were also presented in the form of means, standard deviations, skewness, and kurtosis. Multiple regression was the primary statistical analysis applied to find out the factors affecting self-care. Results with a p <0.05 were considered statistically significant.

RESULTS

Description of Sample Characteristics

A total of 98 diabetes attended the study. The participants were aged between 18 and 73 years with an average age of 46.0 years (SD = 13.80). Of the 98 subjects, 48 (49%) were male and 50 (51%) were female. The majority of participants were married (n = 67, 68.4%), and 15.3% (n = 15) reported being single, six participants (6.1%) reported being divorced or separated and ten participants (10.2%) reported being widowed [Table 1]. Educational levels varied among the participants. The majority of the sample (*n* = 35, 35.7%) had completed a college degree, 26 participants (26.5%) reported completed high school, 22 participants (22.4%) had completed primary school, and 15 participants (15.3%) have a secondary school. The study results also showed that the duration for having DMT2 ranged from 6 months to 432 months with an average duration of 115.0 months (SD = 102.6).

Table 2 shows the frequency of participants toward a summary of diabetes self-care activities on a weekly basis**.** Our Analysis revealed that 18 (18.4%) of the participants followed a healthy eating plan for 7 days in a week, while 19 (19.4%) followed 5 days a week. In this study, we found that patients with diabetes lacked self-care planning for physical activity and exercise. Among the respondents, 18 (18.4%) of the participants had never participated in any physical activities in a week, only 17 (17.3%) participated 30 min of physical activity for 5 days in a week while only 14 (14.3%) engaged it for 4 days in a week.

Likewise, our findings showed a very poor level of self-care planning for diabetic patients in terms of foot care and blood sugar monitoring. Regarding testing blood sugar levels, one-third of the participants tested the blood sugar level 6 days a

Table 1: Demographic Characteristics of the Participants (N=98)					
Characteristics	*n* **(%)**	**M (SD)**	**Range**	**Min**	**Max**
Age (year)		46 (13.7)	55	18	73
Diabetes Duration (Month)		115 (102.6)	426	6	432
Gender					
Male	48 (49)				
Female	50 (51)				
Marital Status					
Married	67 (68.40)				
Single	15 (15.30)				
Divorced/Separated	6 (6.10)				
Widowed	10 (10.20)				
Level of Education					
Primary School	22 (22.40)				
Secondary School	15 (15.30)				
High School	26 (26.50)				
College degree or	35 (35.70)				

Table 2: Details regarding the frequencies at which respondents performed diabetes self-care activities

SDSCA questionnaires	0 days n (%)	1 day n (%)	2 days n (%)	3 days n (%)	4 days n (%)	5 days n (%)	6 days n (%)	7 days n (%)	Mean (SD)
Following a healthy diet	26 (26.5)	3 (3.1)	10 (10.2)	11 (11.2)	18 (18.4)	11 (11.2)	1 (1.0)	18 (18.4)	4.21 (2.50)
How many days per week do you follow a healthy diet?	20 (20.4)	4 (4.1)	8 (8.2)	17 (17.3)	16 (16.3)	9 (9.2)	5 (5.1)	19 (19.4)	4.50 (2.44)
How many days per week do you engage in physical activity for at least 30 minutes	18 (18.4)	10 (10.2)	13 (13.3)	11 (11.2)	14 (14.3)	17 (17.3)	2 (2.0)	13 (13.3)	4.19 (2.31)
How many days per week do you engage in specific physical activity?	27 (27.6)	12 (12.2)	12 (12.2)	11 (11.2)	14 (14.3)	11 (11.2)	2 (2.0)	9 (9.2)	3.60 (2.28)
How many days per week do you engage in testing for blood sugar?	17 (17.3)	8 (8.2)	12 (12.2)	11 (11.2)	8 (8.2)	9 (9.2)	3 (3.1)	30 (30.6)	4.78 (2.66)
How many days per week do you engage testing blood sugar as recommended	19 (19.4)	15 (15.3)	7 (7.1)	10 (10.2)	12 (12.2)	9 (9.2)	1 (1.0)	25 (25.5)	4.40 (2.64)
How many days per week do you engage in checking the feet?	28 (28.6)	6 (6.1)	7 (7.1)	3 (3.1)	6 (6.1)	8 (8.2)	5 (5.1)	35 (35.7)	4.76 (2.99)
How many days per week do you engage in checking the inside of the shoes	26 (26.5)	10 (10.2)	7 (7.1)	8 (8.2)	5 (5.1)	6 (6.1)	6 (6.1)	30 (30.6)	4.51 (2.90)

week and 25 (25.2%) of the participants tested throughout a week as suggested by a physician, on the other hand, more than one-third of the participants (35.7%) examined their feet 7 days a week and 30 (30.6%) inspected inside of their shoes.

For this study, participants demonstrated varying levels of self-management according to a specific behavior. In general, people with DMT2 performed self-management behaviors had a mean of 4.37 days per week (SD = 1.63) [Table 3]. The mean score of the diet subscale was 4.36 days in the past week (SD = 2.38) ranging between 0 and 7 days. The mean score of the exercise subscale was 3.90 days in the past week (SD = 2.0) ranging between 0 and 7 days. The mean score for blood sugar testing was 4.59 days in the past week (SD = 2.50) ranging between 0 and 7 days while the mean score for the subscale of the foot care was 4.63 days (SD = 2.71). According to the findings, the behavior of providing foot care and blood sugar testing was the most frequently reported behaviors among participants, whereas, the least frequently reported self-management behavior was diet and exercise.

Multiple regression analysis was performed to address the variables predicting diabetes self-management behaviors. The findings from the regression analysis are summarized in Table 4. The overall F-test of the regression model failed to produce any statistically significant results. The overall one-way ANOVA was F = 0.60, df =10, $P > 0.01$). Thus, all predicting variables were not found to be statistically significant [Table 4].

DISCUSSION

Diabetes self-management behaviors of Saudi adults with DMT2 have not been adequately studied in Saudi Arabia; hence, this study may gain a better understanding of diabetes self-management in Saudi adults with DMT2 and provide insights that contribute to the understanding of which. Results from this study may provide baseline information about the relationship among the study's variables. The findings of the current study showed that the demographic characteristics of Saudi adults with DMT2 were not associated with diabetes self-management behaviors. These findings concur with those of previous studies reported among people with DMT2. For example, Wattanakul (2012) indicated that there was no significant relationship between age, gender, level of education, diabetes duration, and self-management behaviors.[21] Furthermore, Kurnia et al. (2017) found that demographic variables including gender, diabetes duration, and level of education had no significant correlations with diabetes self-management.[22] However, the findings of previous studies were inconsistent.[22] Previous research has found an association between individuals' demographic characteristics such as age, gender, level of education, and self-management behaviors among people with DMT2. For instance, the literature suggests that gender may influence

Table 3: Descriptive statistics and internal consistency of the study measures (n=98)								
Variables	Number of items	Cronbach's Alpha (α)	M (SD)	Range	Min	Max	Skewness	kurtosis
DSMB	8	0.78	4.37 (1.63)	7	1	8	−0.01	−0.80
SDSCA_Diet_score	2		4.36 (2.38)	7	1	8	0.03	−1.13
SDSCA_Exer_score	2		3.90 (2.05)	7	1	8	0.28	−0.71
SDSCA_BST_score	2		4.60 (2.50)	7	1	8	0.04−0.08	−1.34
SDSCA_Footcare_score	2		4.63 (2.71)	7	1	8		−1.57

Table 4: Summary of regression models of the DSMB Predictors (n=98)						
Variables	Unstandardized Coefficients		t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error			Lower Bound	Upper Bound
Age	−0.007	0.018	−0.402	0.689	−0.044	0.029
Diabetes Duration	0.003	0.002	1.315	0.192	−0.001	0.007
PSS	0.025	0.019	1.290	0.201	−0.013	0.063
Gender						
Female	REF					
Male	0.112	0.396	0.283	0.778	−0.676	0.900
Marital status						
Married	REF					
Single	−0.163	0.586	−0.277	0.782	−1.328	1.003
Divorced	0.249	0.745	0.335	0.738	−1.230	1.729
Widowed	0.123	0.646	0.190	0.850	−1.161	1.406
Level of Education						
Primary School	REF					
Secondary School	0.076	0.604	0.126	0.900	−1.125	1.277
High school	0.469	0.519	0.904	0.368	−0.562	1.500
College	0.630	0.496	1.269	0.208	−0.357	1.617

self-management, and males exhibit significantly higher self-management compared to females, and level of education is also significantly associated with performing diabetes self-management behavior.[11,23-25]

In addition, individuals who follow self-care in terms of diet and posing adequate knowledge about the disease suggested good outcomes in the management of disease.[26,27] Furthermore, studies examining the relationship between demographic variables and diabetes self-management among people with diabetes, indicated that the relationship between the duration of diabetes and diabetes self-management is poor and as diabetes duration increases, diabetes self-management becomes less effective.[28-30] This may indicate that both male and female had more knowledge about diabetes self-management to prevent complication. Moreover, this could be explained by the cultural gender role expectations within the Saudi culture. Diabetes self-management behaviors may be attributed to several potential barriers such as economic, cultural, and other factors that are not measured in this study that may influence participants' self-management behaviors.

This study has some limitations. First, the study involved a cross-sectional design. All the measurements for a sample member are obtained at a single point in time. Therefore, the nature of the cross-sectional design prevents the researcher from suggesting definite reports regarding the underlying relationships among the variables examined. Second, the collection of data depends on the self-report provided by the study's participants, thus, the findings of this study could rely on the accuracy of participants' self-evaluation. However, the researcher made a tremendous effort to warrant the validity of the participants' self-report. The sample size may have been too small that reducing the potential to detect significant changes, and further larger studies are required to confirm these results. Furthermore, the study may be underpowered for using regression analysis particularly when the sample size is small, consequently may affect the study findings. Thus, for significant findings, a larger sample size is warranted in future research.

CONCLUSION

The findings reported varying levels of self-management among Saudi diabetic patients. According to the findings,

the behavior of providing foot care and blood sugar testing was the most frequently reported behaviors among patients; whereas, the least frequently reported self-management behavior was diet and exercise. Furthermore, self-management behavior was not significantly associated with the demographics of diabetics. The findings of this study could be used as references to apply strategies to improve diabetes self-management among adults with DMT2.

AVAILABILITY OF DATA

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

ACKNOWLEDGMENTS

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