Original Article

Evaluation of self-care practices and relative components among type 2 diabetic patients

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ABSTRACT

Background: The purpose of this study was to assess self-care practices and their relative components among type 2 diabetic patients. We hypothesized that some sociodemographic and health-related factors, high diabetes distress, and low self-efficacy would be associated with poorer self-care practices. **Materials and Methods:** A cross-sectional study was conducted for a period of 6 months in 2011. Study population was type 2 diabetic patients referring to Omolbanin center, an outpatient diabetic center in Isfahan. One hundred forty diabetic patients met the inclusion criteria and were all included in the study. Patients' self-care practices were measured by Summary of Diabetes Self-care Activities (SDSCA) self-report scale that includes items on the following aspects of the diabetes regimen: General diet, specific diet, exercise, blood glucose testing, foot care, medications, and smoking. Diabetes distress measured by Diabetes Distress Scale (DDS) scale and Stanford diabetes self-efficacy scale was used for scoring this issue. Collected data were analyzed by using SPSS software version 11.5. **Results:** Participants were between the ages of 37 and 75 years, with a mean of 53.23 years (SD=7.82). Fifty-four percent (n=76) were females; 97.1% were married (n=136), and 53.6% had education lower than diploma (n=75). Mean of duration of diabetes was 7.1 (SD=5.63) years. "Medications" subscale was considered as the most important one in measuring diabetes self-care practices (5.24 ± 2.38 days/week). Study findings revealed that general diet had significant relation with comorbidity, type of treatment, body mass index (BMI), fasting blood sugar (FBS), (Blood Sugar) (BS), waist circumference, diabetes distress, and self-efficacy. Specific diet had significant relation with comorbidity, education, triglyceride (TG), diastolic blood pressure (DBP), and low density lipoprotein (LDL). Exercise showed significant relation with history of diabetes, education, type of treatment, disease duration, TG, BMI, and BS. Also, blood glucose testing showed significant relation with disease duration, self-efficacy, TG, DBP, BS, LDL, and high density lipoprotein (HDL). On the other hand, foot care was related to age, diabetes distress, TG, BMI, HDL, and diabetes complications. Medications subscale as the most important subscale of self-care practices was relevant with age, disease duration, diabetes

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complications, type of treatment, FBS, HDL, and self-efficacy. The last subscale, smoking, had significant relation with sex, diabetes complications, diabetes distress, self-efficacy, TG, total cholesterol, BS, and HDL. **Conclusion:** This information should be used in clinical practice when targeting and designing educational and care plan for patients with type 2 diabetes.

Key words: Diabetes distress, self-care, self-efficacy, type 2 diabetes

INTRODUCTION

Diabetic patients carry out most of their day to day activities by themselves and their families, and they should be responsible about their self-management practices with respect to their chronic condition.[1] Effective diabetes self-care practices have an important role in enhancing diabetes outcomes.

Because the enormous great part of the daily care in diabetes is managed by diabetic patients and their families, there is a necessity for assessing different domains of self-care behaviors and their relative factors.[1,2] More information in this aspect is valuable both for clinicians and educators treating individual patients and for researchers evaluating new approaches to care.

Diabetes self-care practice consists of a series of activities (e.g., self-monitoring of blood glucose, eating a low-saturated fat diet, and adherence to medications) and it is confirmed that these different components do not associate well.

Today, several studies have revealed a number of provider- and patient-related factors which can control health-related outcome as well self-care practices in patients with diabetes. Considering this fact, diabetes distress[3-5] and self-efficacy[6] will be considered in the current study.

As Sulaiman *et al.*, have proved, patients with diabetes and a comorbid psychiatric disorder are at enlarged risk of poorer management outcomes than those without a psychiatric disorder.[3] The prevalence of psychological disorders in diabetic patients is more or less twice that in the general population, and affects the health-related outcomes and diabetic patients' quality of life in an adverse way.[4] The continuous gap between clinical results and goals of treatment has shown the need to increased understanding of the relationships between treatment outcomes and diabetes-related distress.

Diabetic patients do not achieve suggested treatment goals with receiving better care. It can be the result of diabetes distress and other psychosocial difficulties.[5]

Furthermore, self-efficacy concept is the belief in one's abilities in a specified and challenging situation, as a main component in successfully managing several chronic diseases like type 2 diabetes.[6]

The least valid of these important determinants is the self-care practices of using measures of diabetes control, such as glycated hemoglobin or professionals' decisions, as indicators of patients' self-care behaviors.[1]

The aim of the study was to assess the self-care practices and their relative components among patients with type 2 diabetes. The study has the potential to improve our understanding about the level of self-care behaviors and can help decision-makers tailor appropriate and timely intervention programs.[2] We hypothesized that some sociodemographic and health-related factors, high diabetes distress, and low self-efficacy would be associated with poorer self-care practices.

MATERIALS AND METHODS

Participants and study design

A cross-sectional study was conducted during 6 months in 2011 (between February and July 2011) with continuous sampling. Patients were eligible to participate if they 1) were at least 30 years old, 2) had type 2 diabetes diagnosed for at least 1 year, and 3) were able to fill up informed consent. Total number of participants was 140 patients on the basis of *P* ratio between diabetic patients with a confidence level 95% and power test 80%. All the patients were informed about the purpose of the study. From ethics point of view, no patient was forced or obliged to participate in this study.

Measures

Data gathering was performed by self-reporting scale. The multidimensional questionnaire consisted of four sections as follows:

1. Demographic and disease-related information (11 items) including age, marital status, level of education, income, disease duration, family history of diabetes, type of treatment, and so on.
2. The Summary of Diabetes Self-care Activities (SDSCA; 13 items) developed by Toobert *et al.*: This measurement includes items on the following aspects of the diabetes regimen: General diet (2 items), specific diet (2 items), exercise (2 items), blood glucose testing (2 items), foot care (2 items), medications (2 items), and smoking (1 item).[1] Responses in each subscale were based on a 7-day week, ranged from 0 to 7 days, with the greater number of days reflecting better self-care practices.
3. Diabetes Distress Scale (DDS) developed by Polonsky *et al.*:[7] The DDS is a 17-item self-report scale with subscales reflecting four domains of DDS, i.e. emotional burden, physician distress, regimen distress, and interpersonal distress. Responses were scored on a 6-point Likert scale from 1=no problem to 6=serious problem. Scores ranged from 17 to 102, in which higher scores represented higher diabetes distress in living with diabetes.

4. Diabetes self-efficacy was measured by Stanford self-efficacy scale,[8] an 8-item scale assessing how confident patients are in doing certain activities. All items are scored on a scale of 1 (not at all confident) to 10 (totally confident); higher mean score indicates greater self-efficacy.
5. Metabolic and cardiovascular measures including A1C, lipids, blood pressure [systolic blood pressure (SBP) and diastolic blood pressure (DBP)], waist circumference, and body mass index (BMI) were collected during first assessment sessions. $HbA1_C$ and lipid levels [high density lipoprotein (HDL), low density lipoprotein (LDL)] were obtained from the last medical records of the participants.

Self-efficacy and self-care have been used in several Iranian articles in diabetes aspects,[9-11] but DDS was employed after assessing its validity and reliability. In order to validate the scale, content validity method was used; hence, translated items were given to 10 members of scientific board of Isfahan University of Medical Sciences. Internal reliability of the original DDS and the four subscales was adequate ($\alpha>0.87$). In order to determine internal reliability of DDS in this study, test–retest was used. Thirty diabetic patients completed the final scale twice in 2 weeks interval. Cronbach's alpha was 0.77. The internal reliabilities of four domains were 0.81, 0.71, 0.78, and 0.77 Cronbach's alpha, respectively. The results of pilot phase were not included in the main study.

Statistical analysis

Descriptive statistics were used to assess the demographic and disease-related characteristics of the participants. Bivariate correlations were conducted to examine quantitative values, and *t*-test and analysis of variance (ANOVA) were used to compare means and to assess relations. Results were considered significant at conventional $P<0.05$ level.

RESULTS

The response rate was 100%. Table 1 presents the demographic and disease-related characrtstics of the study sample. Participants were between the ages of 37 and 75 years, with a mean of 53.23 years (SD=7.82). Fifty-four percent ($n=76$) were females, 97.1% were married ($n=136$), and 53.6% had education lower than diploma ($n=75$). Mean of duration of diabetes was 7.1 (SD=5.63) years. About 69.3% ($n=97$) of the participants had borderline metabolic control according to World Health Organization criteria.

Table 2 presents participants' clinical, self-care, and psychological measure. "Medications" subscale was considered as the most important one in measuring diabetes self-care practices (5.24 ± 2.38 days/week). The average score of total diabetes distress was 2.96 ± 0.83. The average score of each domain of DDS was 3.40 ± 1.18, 2.57 ± 0.88, 2.97 ± 0.90, and 2.76 ± 0.91, respectively. "Emotional burden" was considered as the most important domain in measuring diabetes distress.

Table 1: Demographic and clinical data

Variables	Frequency (%)	Variables	Frequency (%)
Gender		Comorbidity	
Male	64 (45.7)	Yes	80 (57.1)
Female	76 (54.3)	No	60 (42.9)
Level of education		Type of treatment	
Illiterate	20 (14.3)	Oral agents	92 (65.7)
Up to diploma	75 (53.6)	Insulin	20 (14.3)
Diploma and higher	45 (32.1)	Oral agents and insulin	28 (20)
Marital status		History of type2 diabetes	
Married	136 (97.1)	Yes	100 (71.4)
Unmarried	4 (2.9)	No	40 (28.6)
Diabetes complication		Metabolic control ($HbA1_C$)	
Yes	103 (73.6)	Optimal control (<7.0%)	14 (10)
No	37 (26.4)	Borderline control (7.0–8.5%)	97 (69.3)
		Poor control (>8.5%)	29 (20.7)

Table 2: Clinical and psychological measure of participants

Variables	Mean±SD	Variables	Mean±SD
FBS (mg/dl)	159.14 ± 39.69	$HbA1_C$ (%)	7.81 ± 0.74
BS (mg/dl)	237.89 ± 57.66	SBP (mmHg)	133.47 ± 13.44
HDL (mg/dl)	48.60 ± 25.60	DBP (mmHg)	84.21 ± 6.94
LDL (mg/dl)	102.94 ± 36.74	BMI	29.37 ± 4.20
TG (mg/dl)	206.50 ± 18.49	Total cholesterol (mg/dl)	190.58 ± 61.07
Self-care subscales (days/week)			
General diet	3.89 ± 1.55	Diabetes distress	2.96 ± 0.83
Specific diet	3.51 ± 1.08	Emotional burden	3.40 ± 1.18
Exercise	2.11 ± 1.89	Physician distress	2.57 ± 0.88
Blood glucose testing	2.12 ± 2.12	Regimen distress	2.97 ± 0.90
Foot care	4.56 ± 2.14	Interpersonal distress	2.76 ± 0.91
Medications	5.24 ± 2.38		
Smoking	0.08 ± 0.18	Waist circumference	97.55 ± 12.52
Self-efficacy	4.04 ± 0.92	Female	97.51 ± 13.01
		Male	97.61 ± 11.96

In this study, Pearson correlation coefficient revealed that age of participants had positive correlation with foot care ($r=0.18$, $P=0.002$) and medication ($r=0.26$, $P=0.002$).

Study findings revealed that variables of disease duration had significant association with exercise ($t=-1.97$, $P=0.02$), blood glucose testing ($r=0.30$, $P<0.001$), and medication ($r=-0.33$, $P<0.001$). Gender of participants had significant relation only with smoking ($P<0.001$), history of diabetes

with exercise ($P=0.05$), and comorbidity with general ($P=0.04$) and specific diet ($P=0.02$).

Diabetes complication had significant relation with blood glucose testing ($P=0.003$), foot care ($P<0.001$), medication ($P=0.04$), and smoking ($P=0.01$).

Also, the study findings showed that level of education had significant association with specific diet ($P=0.04$) and exercise ($P=0.002$). Type of treatment regimen had significant relation with general diet ($P=0.005$), exercise ($P=0.002$), and medication ($P=0.005$). Health-related status had significant association with blood glucose testing ($P<0.001$) and smoking ($P<0.001$). Marital status was unrelated to self-care practices in the current study.

Metabolic and cardiovascular measures including A1C, lipid profile, fasting blood sugar (FBS), BS, and anthropometric indices were assessed with different subscale of self-care scale as shown in Table 3.

Table 3: Relation between clinical and psychological measure of participants and self-care practices

Variables	Self-care practices	Test, *P* value
Metabolic control		
$HbA1_c$	General diet	r=0.3, <0.001
	Medication	r=0.3, <0.001
FBS	General diet	r=−0.3, <0.001
	Medication	R=−0.22, 0.009
BS	General diet	r=−0.24, 0.003
	SCBG	r=−0.26, 0.002
	Smoking	r=0.26, 0.001
	Exercise	r=−0.24, 0.004
Anthropometric indices		
BMI	General diet	r=−0.27, 0.001
	Foot care	r=−0.20, 0.01
Waist circumference	Smoking	r=−0.16, 0.01
	General diet	r=−0.2, 0.01
Lipid profile		
LDL	Specific diet	r=−0.21, 0.01
	SCBG	r=−0.28, 0.001
HDL	Smoking	r=−0.19, 0.02
	SCBG	r=0.28, 0.001
	Medication	r=0.19, 0.02
TG	Foot care	r=−0.18, 0.03
	Specific diet	r=−0.24, 0.003
Total cholesterol	SCBG	r=−0.27, 0.001
	Smoking	r=0.19, 0.02
	Exercise	r=−0.36, <0.001
	Foot care	r=−0.28, 0.001
	Smoking	r=0.3, <0.001
DBP	Specific diet	r=−0.16, 0.05
	SCBG	r=0.27, 0.001
	Smoking	r=0.195, 0.02
Psychological measure		
Diabetes distress	General diet	r=−0.17, 0.04
	Foot care	r=0.21, 0.01
	Smoking	r=0.17, 0.03
Self-efficacy	General diet	r=0.22, 0.007
	Exercise	r=0.44, <0.001
	SCBG	r=−0.16, 0.05
	Medication	r=0.24, 0.003
	Smoking	r=−0.31, <0.001

DISCUSSION

This study was designed to assess the self-care practices and their relative components among type 2 diabetic patients. Also, we wanted to assess two psychosocial conceptions, "self-efficacy" and "diabetes distress," and their relation with self-care practices among the study population. Identification and focusing of the modifiable determinants of self-care practices plays a key role in appropriate intervention planning programs and to distinguish special barriers in adopting self-care practices to achieve the best possible outcomes.

The present study finding showed that medication and exercise subscales had higher and lower mean score, respectively. These findings are similar to those of Miller' s study, in which taking medication was the most frequently reported (5.5 days/week) self-care activity and exercise was the least frequently reported (3.0 days/week) activity.[12]

Findings of the current study about diabetes distress matched with those of Leyva *et al.*'s study which showed that reduction in diabetes distress was associated with a clinically significant reduction in HbA1c;[13] on the other hand, the relation between adoption of self-care activities and glycemic control was approved in several studies.[1] This comparison can be helpful for psychological support. Ogbera and Adeyemi-Doro's study suggested that psychosocial factors directly influence glycemic control and diabetes mellitus (DM) self-care habits, which is similar to the current study findings.[14] It can be suggested that health care professionals should assess diabetes distress of diabetic patients in the early phase, offer emotional support and consultation, and provide strategy-based empowerment approach to promote their health primal behaviors, as Liu *et al.* recommended.[15]

Nouwen *et al.*, reported that dietary self-care was longitudinally associated with self-efficacy and changes in dietary self-care were predicted by changes in self-efficacy, which are similar to our study findings.[16]

Venkataraman *et al.*'s study (2011) reported a strong positive association between self-efficacy and glycemic controls, with self-efficacy being the strongest determinant of glycemic control. In addition, this has been earlier revealed in other populations, including patients with other chronic diseases.[17,18]

Adherence to dietary control and diet pattern was also related to improved diabetes control. Similar findings were detailed by Howteerakul *et al.*[19] that adherence to diet control and exercise were significantly associated with

glycemic control. Another study by Matsushita *et al*.[20] found that patients who can estimate their energy intake rationally healthy had better glycemic control.

As it was shown in Table 3, most of the metabolic control, cardiovascular, and psychosocial indices had significant relation with adoption of self-care practices. But it will be considered that several barriers to adoption of self-care practice have been suggested for patients with type 2 DM. Diabetes educators should be alert of the barriers to each subscale of self-care practices and afford selection and support to their patients to solve barriers if they are present. It can be useful to achieve better diabetes control in these patients. These observations and findings need to be more validated in longitudinal studies with interventions targeted toward improving patients' self-care practices in Iran.

This study suffers from some limitations. This study was a single-center experience and a cross-sectional one which had rather similar and homogeneous samples with limited sample size and used a self-reporting tool.

CONCLUSION

It seems that self-care practices have significant relation with metabolic control, cardiovascular, and psychosocial indices. This information should be used in clinical practice when targeting and designing educational and care plan for patients with type 2 diabetes. Intervention study is needed to consider the causal relationship between metabolic control, cardiovascular, and psychosocial indices and health-promoting behaviors in major diabetic type 2 populations in Iran.

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