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Sociodemographic factors associated with diabetes self-care activities at a primary healthcare center in Riyadh: an analytical cross-sectional study

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Abstract

Background: Diabetes is a lifestyle disease that can be successfully managed by good self-care activities such as diet, exercise, blood monitoring. Adequate baseline information about the prevalence of good self-care activities is not available for Saudi Arabia.

Objectives: Evaluate existing self-care behaviors and determine factors influencing these behaviors in adult patients.

Design: Observational cross-sectional study.

Setting: The study was conducted in 2 of 12 primary health care centers (diabetic and family medicine clinics) in Riyadh City and in comprehensive specialties clinics in the Khashm El Aan area. All clinics are associated with King Abdulaziz Medical City, National Guard Health Affairs, and a tertiary care hospital in Riyadh.

Main Outcome Measures: Analysis of the scores on the self-care activities questionnaire.

Patients and Methods: All patients diagnosed with type 2 diabetes mellitus for at least one year and who attended the clinics during the 2-week data collection period (approximately 1000 persons) were invited to participate in the study. Those who agreed to participate were interviewed and self-care was assessed using the Arabic translation of the Summary of Diabetes Self-Care Activities Questionnaire.

Results: One hundred fifty-three Saudi patients of age 20-79 years old agreed to participate. Of those, 51.6% were females and 48.4 % were males, 52.9% of the sample was of age 20-50 years. The overall mean (standard deviation) scores of 2.27 (1.46) showed a low level of self-care management. Participants of age >50 years were more likely to undertake appropriate self-care (β =0.194, P=.003), Females were more likely to undertake appropriate self-care (β= 0.256, P=.054), educated participants were more likely to undertake appropriate self-care (β=2.06, P=.041) and lastly those earning more than 5000 Riyals (1323 $) were more likely to undertake appropriate self-care (β=3.10, P=.002).

Conclusion: We concluded that compliance with self-care behavior was not good in the adult diabetic population in these clinics. This may indicate a misunderstanding of the importance of adherence to self-care practices. Old age, female gender, education level, and high income predicted the use of appropriate self-care. Further research is needed in multicenter units that cater to a large proportion of diabetic patients.

INTRODUCTION

Of 415 million people worldwide with diabetes, 35.4 million are from the Middle East and North Africa (MENA) [1]. The International Diabetes Federation (IDF) also reported in 2015 that Saudi Arabia had 3.4 million cases of diabetes, which is present in 17.6% of the adult population. The IDF Diabetes Atlas showed that Saudi Arabia has the seventh highest prevalence of diabetes for adults 20–79 years old worldwide [2]. The number of deaths in adults 20-79 years of age was 23,420 in 2015. Like every other developing country, Saudi Arabia is also facing a drastic change in lifestyle with a shift towards urbanization. The high prevalence of diabetes in the country is a reflection of this drastic shift in lifestyle [3,4]. The high prevalence of diabetes not only imparts economic constraints on individuals, but on the overall society. The cost of diabetes is 1145 USD per individual [1].

Addressing this high prevalence will require commitment to self-management on the part of individual patients. As emphasized by American Association of Clinical Endocrinologists, it is important for diabetic patients to become active and knowledgeable about their disease. Self-care in diabetes has been defined as "an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of the diabetes in a social context" [5,6].

Self-management will not only help to maintain good glycemic control, prevent the debilitating complications, improvement in quality of life, but also minimize the expenses that might occur in case of complications [7]. Management of diabetes involves pharmacological and non-pharmacological assessment. Pharmacological assessment consists of regular and timely intake of medications. Non-pharmacological assessment includes dietary modifications, physical activity, tobacco cessation, foot care and regular follow-up [8]. A reliable measure for self-management of diabetes is needed since day-to-day care is handled by patients and their families [9].

American Association of Diabetes educators have reported that the seven essential self-care behaviors that predict good outcomes in individuals are healthy eating, being physically active, monitoring of blood sugar, being compliant with medications, having good problem-solving skills, healthy coping skills and risk-reduction behaviors. Several national reports showing that the majority of adults in Saudi Arabia with type 2 diabetes took their medications as required, but were less likely to adhere to other diabetes self-care activities [10,11].

Sociodemographic and cultural barriers such as poor access to drugs, high cost, patient satisfaction with their medical care, patient provider relationship, degree of symptoms, and unequal distribution of health providers between urban and rural areas have restricted self-care activities in developing countries [12-16].

Previous studies in Saudi Arabia on the assessment of self-care management have reported low self-efficacy and low scores for self-care behaviors. What is needed are the means to identify patients who are prone to non-compliance so that educational systems can be designed to meet their needs. Multiple demographic, socio-economic and social support factors are considered positive contributors in facilitating self-care activities in diabetic patients [11].

Our study examined existing self-care behavior and factors influencing self-care behaviors among adult diabetic patients in the National Guard medical care system in Riyadh, one of the best health care systems in Saudi Arabia. Our goal was to build upon the findings of previous studies for initiating good self-management programs.

PATIENTS AND METHODS

We conducted this cross-sectional study at the diabetic center at the National Guard Housing Compound and family medicine clinics associated with King Abdu-Aziz Medical City in Riyadh in the Khashm El Aan area in eastern Riyadh.

The researcher and research assistant invited patients in the waiting room to participate. Information about the study was given verbally in detail and patients who agreed to participate were instructed to record their responses directly on the questionnaire or allow the researcher/research assistant to record responses. The data were collected within 2 weeks in April 2016 on daily visits to these centers. Eligible participants were of Saudi nationality, aged ≥20 to 79 years old, who had been diagnosed with type 2 diabetes mellitus at least one year previously. They had to be without cognitive impairment or a physical disability that might affect self care. We used a validated version of the Summary of Diabetes Self-Care Activities Arabic questionnaire (SDSCA-Arabic) [11].

In addition to this questionnaire, demographic data was added such as age, gender, marital status, educational level, employment status, and monthly income. Sociodemographic and cultural barriers such as poor access to drugs, high cost, patient satisfaction with their medical care, patient provider relationship, degree of symptoms, and unequal distribution of health providers between urban and rural areas have restricted self-care activities in developing countries [12-16].

To determine the socioeconomic status of the study participants, 5000 Saudi Riyal (SR) was identified through national reports as equivalent to the poverty line in Saudi Arabia [17]. The SDSCA questionnaire included eight questions with four subscales, in which the respondents were requested to identify how many days in the past 7 days that a specific self-care activity was performed. The participants answered the eight questions by choosing from 0 to 7 days, with 0 indicating "not at all" and 7 representing "every day". The scale had a reported test–retest reliability of $r = 0.912$ and internal consistency (Cronbach's $\alpha = 0.76$). The subscales were also found to have internal consistency: diet, $\alpha = 0.89$; exercise, $\alpha = 0.83$; blood-glucose monitoring, $\alpha = 0.92$; and foot care, $\alpha = 0.77$.

Ethical approval for this study was obtained from King Abdullah international Medical Research Center (SP16/042), National

Guard Health Affairs. The approval to use the Summary of Diabetes Self-Care Activities Arabic (SDSCA-Arabic) questionnaire was obtained from the author by email [11]. Sample size was estimated using a calculator for online surveys. The sample size for a 6% margin of error was estimated as 96 to 170; depending on the response distribution (a high proportion of responses that strongly favor one direction reduce the required sample size).

SPSS version 20 was used for data analysis. Descriptive analyses along with mean differences were assessed. Values are described as mean and standard deviation. A P value of 0.05 or less was considered statistically significant. The main SDSCA-Arabic instrument was scored by calculating the mean for each item, then by calculating the mean for each subscale and computing the mean of the total SDSCA-Arabic scale. Cut-off variables were also derived to identify the proportion of participants whose self-care management was within recommended self-care management practices according to American Diabetes Association(ADA) guidelines (2008) [18].

A bivariate analysis using t-tests was used to assess whether variance in self-management activities (diet, exercise, blood glucose monitoring and foot care) was based on sociodemographic characteristics. A multivariate linear regression was performed to assess the relationship between patient characteristics and the total self-care management score.

RESULTS

One hundred fifty-three patients agreed to participate. About half (52.9%) of participants were of age 20-50 years and 51.6% were females (Table-1). Most (93.0%) were married, 88.9% were educated (not illiterate) and 51.6% had private or government jobs or were self-employed. Nearly all (98.0%) were earning more than 5000 SR. All participants asked the researcher/ researcher assistant to record responses.

Table 1: Baseline characteristics of study participants (n=153)

Sociodemographic Characteristics	N	%
Age in years		
20-50	81	52.9
>50	72	47.1
Gender		
Male	74	48.4
Female	79	51.6
Marital Status		
Not married (Single, widow, divorced)	25	16.3
Married	127	93.0
Education		
Illiterate	16	10.5
Educated	136	88.9
- Primary school or less	35	
- Secondary	52	
- University	49	
***Working Status**		
Working (Gov/ Private/business)	79	51.6
Not working	73	47.7
****Monthly income**		
<5000	53	34.6
>5000	97	98.0

<5000 poor income group>5000 non-poor income group

- 2 participants no data

**3 participants no data

The mean scores for each item and for each subscales and the binary outcome are presented in (Table-2). The total mean scores of 2.27 indicates a low level of self-care management (2 days / week); the standard deviation of around 2.0 or more indicated a considerable variation in the number of days per week these activities were undertaken. Diet had the highest reported level of adherence to diabetes self-care activities (3 days/week), and foot care had the lowest level (1–2 days/week).

Table 2: Frequencies and mean scores for subscales and for binary outcome for self-care activity items of the Arabic version of the Summary of Diabetes Self-care Activities questionnaire

Subscales/items	Binary outcome			Item scores		Subscale scores	
	No of days per week activity performed	Number	%	Mean	SD	Mean	SD
Diet						3.23	2.11
Q1. Follow a healthful eating plan	≤2	73	47.7	2.97	2.34		
Q2. Follow eating plan over the past month	≥3	107	69.9	3.49	2.12		
Exercise						2.25	2.18
Q3. Participate in at least 30 min exercise	≤2	87	56.9	2.67	2.50		
Q4. Participate in specific exercise session	≥3	52	34.0	1.82	2.25		
Blood glucose test						2.20	2.51
Q5. Test your blood sugar	≤4	124	76.5	2.42	2.61		
Q6. Test your blood sugar as recommended	≥5	31	20.3	1.96	2.61		
Foot care						1.44	2.06
Q7. Check your feet	≤2	111	72.5	1.75	2.53		
Q8. Inspect the inside of your shoes	≥3	27	17.6	1.14	2.33		
Total						2.27	1.46

Furthermore, the binary outcomes show the proportion of self-care management as per ADA guidelines. For diet, 47.7% of individuals were unable to follow a healthful eating plan. Moreover, 56.9% were not doing enough exercise, 76.5% were not checking their blood glucose level, and 72.5% checked their feet 2 days or less per week.

Table-3 shows a significant relationship between age and foot care. Participants of age 20-50 years on average spent less time for their foot care compared with the participants of age >50 years (difference, -2.6, p<0.001). Gender was also significantly associated with exercise and blood sugar, with females on average exercising more than males (2.03, P<0.01), while males were spending more time on checking their blood sugar level (difference, 2.08, p<0.01). Marital status, education and working status were not related significantly with any of these subscales, but income was associated with blood glucose testing and foot care. Those earning more than 5000 SR were on average spending more time on blood glucose testing and foot care than for those earning 5000 SR or less (differences, -2.25, -2.13, p<0.01 respectively)

Table-4 presents a linear model on the relationship of sociodemographic factors with the total self-management scores. The final model with age, gender, marital status, education and income, accounted for 18.3% of variability in total self-care scores (R^2 = 0.183). Participants of age >50 years were more likely to undertake appropriate self-care compared with those aged 20-50 years (β=0.194 and P =.003). Females were more likely to undertake appropriate self-care compared with males (β =0.256

and P=.054). Educated participants were more likely to undertake appropriate self-care compared with illiterate participants (β=2.06 and P=.041). Participants earning more than 5000 Riyals were more likely to undertake appropriate self-care compared with those who were earning less (β=3.10 and P=.002).

Table 3: Bivariate relationship between sociodemographic characteristics and subscales for self-care and differences in mean self-care scores between groups

Sociodemographic characteristics	Diet	Exercise	Blood glucose testing	Foot care
Age group	-1.21	1.65	-1.91	-2.60*
Gender	-0.58	-2.03*	2.08*	1.26
Marital Status	-0.80	0.86	-0.84	0.59
Education	-1.58	-1.84	-0.64	-1.79
Working Status	-1.13	0.62	-1.12	1.10
Salary	-1.77	-1.49	-2.25*	-2.13*

*P value <0.001. Values are differences in mean scores on the self-care subscales. Differences were assessed by the t-test.

Table 4: Linear regression model for sociodemographic factors and total management scores

Sociodemographic characteristics	B	SE B	β	P value
Age >50 years	0.575	0.296	0.194	0.003
Female	0.759	0.251	0.256	0.054
Married	-0.336	0.321	-0.084	0.297
Educated	0.872	0.183	2.06	0.041
Salary of >5000	1.02	0.33	3.10	0.002

F: 4.51, p=.001, R^2: 0.183

DISCUSSION

Diabetes, which results from unhealthy dietary habits, lack of exercise and obesity, is highly prevalent in Saudi Arabia [19]. As the shift towards urbanization has resulted in dietary changes, sedentary life along with physical inactivity has resulted in a substantial increase in the prevalence of many chronic diseases, particularly diabetes [20]. The Ministry of Health in Saudi Arabia directs resources not only to the provision of treatment, but also into preventive measures and mass education. Proper management of diabetes depends not only on medical care, but also requires equal participation from patients in terms of self-management. Likewise, modern diabetes self-management programs have reflected a movement away from usual care to a goal of empowerment [3]. Through this study we aimed to understand and evaluate four self-care behavior factors among adults with diabetes in Riyadh.

The main findings of the current study indicate that about half of participants (47.7%) were not able to follow a healthful eating plan for two days or less but about two-thirds were not able to follow a healthful eating plan over the past month. The overall mean score for diet management (3.23, Table 2) Indicated that people was not able to manage their diet strictly (3 days per week). These findings are consistent with the findings of the previous study conducted in Saudi Arabia that indicated that it is very hard to follow a healthy diet.

Difficulty of adhering to health dietary habits could be linked to the lake of adherence with dietary recommendation or to the lack of clear, comprehensible resources and guidelines. In Arabic culture, most patients live and eat with their extended family; usually their family members and social circle are involved in dietary consultation. Also, because social connections are unavoidable and people are expected to attend all social gatherings where rice and sugary foods are the main type of foods served [11,21]. Further research is needed to understand the notion of the cultural construction of clinical reality in Saudi community in order to minimize unhealthy cultural beliefs influences.

In terms of resources, in our setting, the main sources of dietary knowledge were generally treating physicians and there are few qualified diabetes dieticians who see patients on appointment. There were only two dieticians and two health educators in the diabetic center. Also, in comprehensive specialties clinics,

like the family medicine clinics in the Khashm El Aan area some patients are followed up by primary care physicians. Unfortunately, the current primary health care system there is not based on continuity of care; there are two systems of walk-in clinics that depend on rapid access without appointment and limited secluded clinics. Many patients might not see their treating physician and also might not be referred by family physicians to see dieticians.

Making the right daily choices of healthy food is challenging and needs individualized dietary prescription best delivered by a dedicated diabetes dietician. An integrated multidisciplinary team and standardized clinical protocol to follow diabetic patients in any setting is the best solution to improve low level of self-care.

Another important finding was that about 56.9% of participants did not exercise enough while about a third were doing a specific form of exercise three times or more per week. The overall mean score for participation in exercise was 2.25 (Table-2), which indicated that adherence to recommendations involving exercise frequently poses significant difficulties for patients. This finding is also consistent with a recent study by Albargawi [10]. In her study, exercise was the least frequent self care activity (1–2d/wk). Our finding is considerably low (34%) compared to a previous study conducted in Saudi Arabia that reported that 52% were able to participate in specific type of exercise [11]. Al Johani reported that 18% of participants were not participating in exercise because they were of age 65 and older. In our study, only 15% were of age 61-79 years and yet the proportion participating in exercise was low. Studies in China and Korea also reported a comparably high percentage when compared to the findings of our study [22,23]. Shah (2009) noted that the hot climate might restrict outdoor activities and also that individual preferences towards a sedentary life could be the reason for this finding [24]. Adherence to exercise programs is reported to be more successful in supervised rather than home-based programs [25].

Self-monitoring of blood glucose provides important information about current glycemic status that enables the patient to assess therapy and guide adjustments in diet, exercise and medication in order to achieve optimal glycemic control [26]. A major finding in our study was poor glycaemic control. Only 20% of participants monitored blood glucose and had good glycemic control. This is similar to previous research findings in Saudi Arabia (Azab and Al-Hussein) [27-28]. This is reported nationally and in neighboring countries as being related to a lack of awareness of the importance of self monitoring of blood glucose in the management of diabetes. A review of diabetes self-management education shows that education is successful in lowering glycosylated hemoglobin levels [12,29]. Another explanation is that there might be financial barriers. In our setting, the health care providers used to ensure that glucometers, test strips, lancets and swabs were free of charge for the patients, yet this support was suspended in the last three years and was only being provided for pregnant diabetic women.

In Albargawi's study, a vast majority (93%) of participants believed that their doctor influenced their diabetes management [10]. Training of physicians in the management of diabetes, and public education is a national requirement. The role of physicians in promoting self-care is vital and has to be emphasized. A clinician should be able to recognize patients who are prone to non-compliance and need special attention. Some researchers have suggested that health professionals should tailor their patient self-care support based on the degree of personal responsibility the patient is willing to assume towards their diabetes self-care management [30].

Also, engagement of family members in dietary consultation and diabetic education in general is suggested by many researchers, and several studies reported that involvement of the family in patient care was strongly associated with diet, exercise and medication compliance [31-34].

The other important finding was that many participants demonstrated low levels of compliance with other self -care management practices. The overall mean for self-care activities in our study was low (2.27 days per week) compared with previous studies in Saudi Arabia and Jordan, and in the United States [11,35-37].

All these studies used the same scale, but we assessed only four self-care behaviors. Yet, the results were not within a satisfactory range. In our study, 47.7% were not following a healthy diet, while in a AlJohani study 29% were not following a healthy diet [11]. Albargawi (2016) showed that adherence to general diet was 3-4 days a week [10]. In Jordan, investigators reported that 19% were not following a healthy diet for 3 or more days per week [35]. Successful communication between physicians and patients promotes greater patient satisfaction with medical care, which in turn fosters higher levels of adherence. For adherence to occur, healthcare providers need to explain the specific steps of the regimen, review the most important details, use written instructions, and encourage their patients to ask questions about the regimen [38-41].

Lastly, the regression model showed that the elderly, females, the better educated and participants with salary >5000 SR had better self-care management scores. In the linear regression analysis, elderly participants were more conscious of foot care. The relationship between older age and foot care is consistent with a previous study in Saudi Arabia [11]. For elderly people, their better adherence to foot-care recommendations may be explained by the common association of health care centers with social support providers for older people [42]. Moreover, male gender and blood sugar assessment was also consistent with this previous study [11].

Males spent more time checking their blood sugar level, while females exercised more. An international study indicated that the sense of cognitive appraisal of harm or loss and recognition of a potentially poorer life and work prospects appeared to motivate men to conduct healthy behavior to maintain their current lifestyle [42]. Risk preference is associated with

adherence to self-care behaviors; a study in Israel showed that risk-seeking patients reported lower general adherence, though identifying risk seekers is recommended as a way to identify these patients and design specific strategies to improve their adherence and save scarce healthcare resources [43].

In the linear regression analysis, those earning more than 5000 SR on average spent more time on blood sugar tests and foot care [11]. Likewise, females are more conscious than males of diet and maintaining good health because the dependent role of the female requires that they be capable of taking care of the family. Several studies have associated this submissive attitude with a greater adherence to self-care [11,17,24,42,44] .

As educated people are more aware and conscious of their health, it is not surprising that they are more aware of self-care management. Also, low income is a barrier to recommended practices for good self-care. Because of financial constraints the current healthcare system in Saudi does not provide a glucometer for all patients with type 2 diabetes. Several national studies report that for low-income people, it is a hardship to visit health centers regularly and spend quality time on themselves, while people with high income care better for themselves [45,46].

This study support previous national reports that claim the failure of the current health education approach in primary health care in Saudi Arabia to empower diabetic patients to practice self-management activities. Caution should be used in interpretation of the findings, because of the limited number of participants from a single center; thus, generalizability is questionable, but the study locations were representative of Saudi Arabia's population with diabetes under chronic disease management programs. In addition, only four diabetes self-care activities were studied while self-care behaviors include more activities. Nevertheless, this study attempts to highlight the compliance of adult diabetic population of Saudi Arabia.

CONCLUSION

In conclusion, in this cross-sectional study, we found that compliance with self-care behavior was not good in the adult diabetic population. Old age, female gender, education level and high income were predictors of appropriate self-care. Training of physicians in the management of diabetes, and public education is mandatory.

The role of clinicians in promoting self-care is vital and has to be emphasized. A clinician should be able to recognize patients who are prone to non-compliance and may require special attention. Patient educational programmers should be repeated periodically as reinforcement is necessary to achieve sustained change in behavior. Future research is needed in multicenter units that cater to a larger proportion of diabetic patients. Moreover, there is an immense need for extensive research in rural areas of our country.

Concurrently, research should focus more on perceptions of patients on the effectiveness of their self-care management so that resources for diabetes mellitus can be used efficiently. This study might be used as a baseline for initiating good self-management programs.

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