RESEARCH ARTICLE

PRACTICE AND PERCEPTION OF SELF-MANAGEMENT AMONG DIABETICS IN TAIF, KSA: IMPACT OF DEMOGRAPHIC FACTORS

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ABSTRACT

Background: Diabetes is a chronic disease that can be treated but not cured. The medications can help to improve symptoms and to slow down the progression of this disease and it complications. Effective self-management of diabetes has long been acknowledged as essential in the maintenance of good glycemic control and prevention of diabetic complications.

Aims & Objective: To assess practice of diabetic patients regarding self-Management in Taif region as well as to collaret specific demographic characteristics associated with practice that may affect patients' perceptions regarding diabetes self-management.

Material and Methods: A cross-sectional study was conducted including diabetic patients, who attended the Family Medicine and Endocrinology clinics during regular day working hours (from 8:00 am – 4:00 pm) throughout January, 2011. They were recruited from four hospitals, belonging to Ministry of Defence and Aviation and Ministry of Health by stratified random sampling. An interview was conducted to determine subject's practice, regarding self-management, and potential factors influencing this practice and these practices of self-management using the SDSCA questionnaire.

Results: A total of 386 respondents were interviewed in the current study. Their age ranged between 20 and 70 years with a mean of 49.03±13.05. More than half of them were males (56.7%) with a male to female ratio of 1.3:1. The duration of diabetes mellitus was more than 8 years in 46.1% of the participants. More than one-third of participated diabetic patients were aware of their type of diabetes (38.9%) while less than one-third of them were aware of Haemoglobin A1c (29.3%). The highest level of practice was observed regarding compliance with medication (94.7%), while the lowest level of practice was detected regarding blood glucose testing (22.4%). Their practice regarding specific diabetic diet, practicing physical exercise and foot care were 41.7%, 41.2% and 53.4% respectively.

Conclusion: This study reflects the poor practice about the management plan of diabetic care particularly the non-pharmacological component of the plan. As, it has been observed that compliance is better with medical aspects of the regimen (e.g. medications) than with life style aspects of the regimen (diet and physical exercise).

Key-Words: Self-Monitoring; Practice; Compliance, Diabetes Mellitus; Haemoglobin A1c

Introduction

One of the greatest challenges faced by the modern world is Diabetes mellitus (DM). The physical, social and economic factors involved in the management of diabetes are continuous strain for the health sector and the government Organization.[1] It is expected that approximately 366 million people will be affected by Diabetes mellitus by the year 2030.[2] Saudi Arabia is estimated to spend between 620 and 1,142 million International dollars. According to WHO records, almost one Saudi diabetes mellitus person is costing the government about $800 per month. The annual cost of treating diabetes in Saudi Arabia is about $9.6 billion.[3]

Diabetes mellitus is by far the most common metabolic disorder; it is due to insulin deficiency or inefficiency, which results in a state of hyperglycemia. The benefits of tight blood glucose control in decreasing the incidence and progression of microvascular and macrovascular complications in type I and type II diabetes had been well established in the last two decades. So, the disease contributes to the development of peripheral neuropathy and nephropathy and is the leading cause of new blindness. In addition, patients with diabetes are two to four times as likely as non-diabetics to have heart disease or stroke.[4] However Stringent glycemic control reduces complications and health care costs for people with diabetes.[5]

The prevalence of diabetes varying widely worldwide. It has been shown that the prevalence of diabetes is constantly on the rise and this is believed to result from urbanization and socioeconomic developments, which are associated with rapid changes in lifestyle.[6] The global prevalence of diabetes has reached 5%, with type 2 diabetes contributing 85-95% of all cases. In the Kingdom of Saudi Arabia (KSA), overall prevalence of DM in adults is 23.7%.[7] With the increasing demand for better management of type 2 diabetes, attention has focused on the potential benefits of self-management of diabetes.[8]

Unfortunately, diabetes-specific disease management support occurs inconsistently during outpatient visits, and information that patients receive is often poorly understood or does not take into account their values and

life circumstances.[9] Despite the initial successful impact of oral medication, patients find it difficult to implement and sustain the treatment and lifestyle advice given by healthcare professionals. This may in part relate to traditional approaches to management in which patients are passive recipients of care.[10]

Health providers developed formal programs to teach patients with chronic disorders what they need to know and do to make their health as good as it can be. These programs are called "self-management programs" because patients are taught to manage more of their health themselves.[7] Self-management interventions defined as programs that helped patients actively participate in monitoring their conditions or in decisions related to managing their conditions[7] (i.e., the nutritional management, describing the diabetes disease process and treatment options, physical activity into lifestyle, Utilizing medications blood sugar mentoring, foot care, etc.).[8]

The importance of self-management skills in diabetes care has been stressed by the American Diabetes Association (ADA) and the Veterans Health Administration (VHA). Patients' ability to understand and carry out their individual treatment regimens is critical to the control of diabetes mellitus. To promote self-management, the treating institution should develop a statement of short-term and long-term goals specific to each patient's needs. These goals should include the patient's medication use, nutrition plan, lifestyle, monitoring requirements, annual comprehensive dilated visual examination, and podiatry care.[6] Effective self-management is considered the cornerstone of successful diabetic control, and self-monitoring of blood glucose may have a role in this.[11,12] So, there is a need for all health professionals to rethink current approaches to the concept of self-management in chronic disease management including diabetes.[1]

Guidelines on the recommended frequency and timing of self-management vary among international diabetes associations, and patients are often unaware of actions they should take in response to SMBG.[13] ADA recommends that patients' knowledge of the self-management responsibility be assessed annually.[6] Despite the lack of conclusive evidence of an association between self-monitoring of blood glucose and glycaemic control (even in large scale observational studies with heterogeneous groups of patients and findings that self-monitoring may lead to anxiety), clinical practice guidelines often promote self-monitoring by patients with type 2 diabetes. They stress that it can be useful in preventing hypoglycemia and adjusting medications, medical nutritional therapy, and physical activity. They often refer to research that supports self-monitoring.[12]

This study aimed to assess practice and perception of diabetic patients regarding self-Management in Taif region as well as to collaret specific demographic characteristics associated with practice that may affect patients' perceptions regarding diabetes self-management.

Materials and Methods

A cross-sectional study was conducted at Al Hada Armed Forces Hospital, Prince Mansour community Hospital, which are belonging to Ministry of Defense and Aviation as well as King AbdulAziz and King Faisal Hospitals, which are belong to Ministry of Health. Taif Region, Saudi Arabia. Taif is a city in the Makkah Province of Saudi Arabia at an elevation of 1700 meters above sea level, on the slopes of the Al-Sarawat Mountains. It has a population of 987914 (2010 census).[14] It has 11 hospitals that provide both secondary and tertiary care services.

This study included Saudi diabetic patients Types 1 and 2), who attended the Family Medicine and Endocrinology clinics during regular day working hours (from 8:00 am – 4:00 pm) throughout January, 2011 provided that their age ranged between 20 and 70 years. Total number of Saudi diabetic patients in Taif city was estimated to be about 200000, This figure was calculated based on findings of Al-Nozha, et al (2004), who reported that prevalence of diabetes among Saudi population was about 24%.[8] Sample size of the current study was calculated assuming that 70% of diabetic patients are not adherent to any self-management approach.[15-17] At 95% confidence interval and 5% worst acceptable limit, the estimated sample size was 323 using Epi-Info version (3.3.2). The number was increased to 400 to compensate for drop outs.

Using Stratified random sampling technique (proportional allocation) was used to select study participants. Hospitals at Taif city were stratified according to level of health care service they are providing. Taif city includes 2 tertiary care hospitals (i.e., AlHada belongs to Ministry of Defence and King AbdulAziz belongs to Ministry of Health) and 2 other hospitals providing secondary health care services (i.e., Prince Mansour belongs to Ministry of Defence and King Faisal belongs to Ministry of Health) in addition to several primary health care centers/clinics and private hospitals and polyclinics. Diabetes clinics at tertiary and secondary health care hospitals were selected as study sites. Proportional allocation method was applied to determine number of study participants based on number of diabetes

clinics at each site and estimated number of patients attending these clinics. There was only one clinic at Al Hada, King AbdulAziz and Prince Mansour hospitals. However, there are 2 diabetes clinics at King Faisal Hospital. Accordingly, the required sample from each studied hospital was as follows: (Al-Hada = 88 patients, Prince Mansour= 88 patients, King Abdulaziz = 88 patients and King Faisal= 136 patients. At each site, patients were selected by systematic random sampling technique, where every 3rd eligible patient was asked to voluntarily participate in the study till the required sample was reached. At the study sites (i.e., clinics of Armed Forces Hospital and King Abdul-Aziz Specialist Hospital), during regular day hours from 8.00 am-4.00 pm and during four weeks period were asked to participate in the study.

An interview administered questionnaire was utilized for data collection. Data collected by the researcher in each hospital. The questionnaire included the following information: sociodemographic characteristics of the patients and their practice and perceptions regarding self-management, diet, exercise, blood sugar mentoring, foot care and taking medications. The SDSCA questionnaire (Appendix 1) developed by Toobert et al. (2000)[18] measured diabetes self-care behavior of participants. The SDSCA is a brief self-report questionnaire of diabetes self-care management assessing the following aspects of the diabetes regimen: general diet, specific diet (e.g. fruits, vegetables...etc), exercise, blood glucose testing, foot care, medication and smoking. The scale includes 11 core items. Respondents reported on the frequency with which they have completed these activities over the preceding 7 days. The instrument used an 8-point Likert scale (0-7) which represents the number of days per week. Scores were calculated separately for each of the regimen areas. A sample item was "On how many of the last 7 days did you test your blood sugar?" The SDSCA assessed personal levels of self-care and did not measure adherence or compliance to the diabetes regimen. The SDSCA is probably the most widely used self-report instrument for measuring diabetes self-management in adults.[18] The questionnaire was proved to be reliable and valid. Approval of the Research and Ethics Committee at Taif Armed Forces Administration to conduct the study was obtained. Written informed consent have been obtained from every patient.

Data were collected and analyzed using SPSS version 16. The following statistics were applied: Descriptive statistics: number, percent, mean, median and standard deviation. Analytic statistics: Since the variables were abnormally distributed, non-parametric statistical tests were applies. Mann-Whitney test was applied to compare 2 independent quantitative variables and Kruskal-Wallis test to compare more than 2 independent quantitative variables. Significance was determined at p value ≤ 0.05.

Results

The study included 386 diabetic patients. Table 1 presents their demographic characteristics. Their age ranged between 20 and 70 years with a mean of 49.03 ± 13.05. More than half of them were males (56.7%) with a male to female ratio of 1.3:1 The majority of them were married (82.9%), have enough income (80.1%) and private house (76.7%). Almost one-quarter of patients were illiterate (23.3%) while 18.7% were university graduated. Forty-two percent were unemployed and 26.2% were retired.

Table-1: Demographic characteristics of the participated diabetic patients (n=386)

Socio-Demographic Variables		No.	%
Age (Years)	≤50	200	51.8
	>50	186	48.2
	Range	20-70	
	Mean ± SD	49.03 ± 13.05	
Gender	Male	219	56.7
	Female	167	43.3
Marital Status	Single	66	17.1
	Married	320	82.9
Educational Level	Illiterate	90	23.3
	Elementary	92	23.8
	Intermediate/secondary	132	34.2
	University	72	18.7
Job	Civil servant	58	15.0
	Military	42	10.9
	Private sector	4	1.0
	Student	19	4.9
	Retired	101	26.2
	Unemployed	162	42.0
Housing	Private	296	76.7
	Rent	90	23.3
Income	Enough	309	80.1
	Not enough	77	19.9

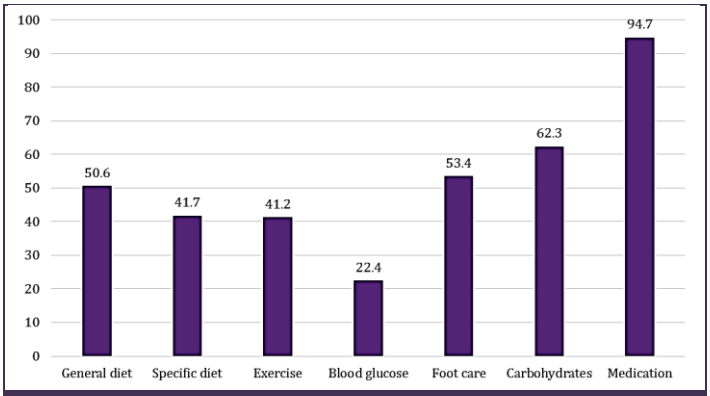

Figure-1: The mean percentage of practice of diabetic patients regarding different aspects of DM

Practice of diabetic patients: Figure 1 illustrates the mean percentage of practice of diabetic patients regarding different desired self-care behaviour. The highest level of practice was observed regarding compliance with

medication (94.7%) while the lowest level of practice was detected regarding blood glucose testing (22.4%). Their practice regarding specific diabetic diet, practicing physical exercise and foot care were 41.7%, 41.2% and 53.4% respectively.

Demographic factors affecting practice of diabetic patients for general diet advice: Table 2 shows that mean percentage of adherence to general diet recommendations among female patients was significantly higher female compared to male patients (p=0.004). Similar findings were reported among university educated patients followed by illiterate (61.52% and 55.63%, respectively) compared to intermediate and secondary and elementary educated patients (48.54% and 40.22%, respectively) (p= 0.008). Students were the least adherent to general diet recommendations (20.30%) followed by military personnel (37.42%) (p=0.001). Non-smokers were more adherent (52.08%) compared to smokers (34.60%) (p=0.02). However, no statistical significant differences were detected related to age (less vs. more than 50 years), marital status (married vs. unmarried), housing (private vs. rent), or income (enough vs. not enough).

Table-2: Demographic factors affecting practice of diabetic patients for general diet advice

Variables		General Diet		Test of Significance	P Value
		Mean ± SD	Median%		
Age (Years)	≤50	39.48 ± 47.07	50.00	1.87	0.062*
	>50	41.39 ± 54.45	57.14		
Gender	Male	40.06 ± 45.89	42.86	2.92	0.004*
	Female	40.42 ± 56.84	64.285		
Marital Status	Single	40.48 ± 43.51	42.86	1.47	0.142*
	Married	40.45 ± 52.10	57.14		
Educational Level	Illiterate	42.54 ± 55.63	60.71	11.83	0.008**
	Elementary	41.08 ± 40.22	28.57		
	Intermediate/ secondary	38.90 ± 48.54	50.00		
	University	37.19 ± 61.51	71.43		
Job	Civil servant	35.17 ± 55.91	57.14	20.48	0.001**
	Military	38.22 ± 37.42	35.71		
	Private sector	57.74 ± 50.00	50.00		
	Student	30.14 ± 20.30	14.29		
	Retired	42.29 ± 47.60	50.00		
	Unemployed	40.31 ± 57.63	64.29		
Housing	Private	40.91 ± 50.31	75.14	0.20	0.841*
	Rent	39.44 ± 51.67	57.14		
Income	Enough	40.22 ± 51.06	57.14	0.19	0.847*
	Not enough	41.96 ± 48.89	50.00		
Smoking	No	40.59± 52.08	57.14	2.44	0.015*
	Yes	36.79 ± 34.60	28.57		

* Mann-Whitney test; ** Kruskal-Wallis test

Demographic factors affecting practice of diabetic patients for specific diet advice: Table 3 shows that the mean percentage of adherence to specific diet recommendations was significantly higher among university educated patients (49.80%) followed by illiterates (39.05%), intermediate and secondary educated patients (42.86) and elementary educated patients (36.41%) (p= 0.012). Civil working patients were significantly more adherent to specific diet recommendations followed by unemployed and private working patients, however, students were the lowest (p= 0.013). Patients with enough income and non-smokers were significantly more adherent to specific diet instructions compared to patients who reported not enough income and smokers (p= 0.007 and 0.03, respectively).

Table-3: Demographic factors affecting practice of diabetic patients for specific diet advice

Variables		Specific Diet		Test of Significance	P Value
		Mean ± SD	Median%		
Age (Years)	≤50	26.88±41.14	42.86	0.35	0.725*
	>50	27.51± 42.36	42.86		
Gender	Male	27.14 ± 40.05	35.71	1.45	0.148*
	Female	27.10 ± 43.93	50.00		
Marital Status	Single	26.58 ± 37.01	39.29	1.56	0.120*
	Married	27.21± 42.70	42.86		
Educational Level	Illiterate	26.45 ±39.05	42.86	10.95	0.012**
	Elementary	25.31 ±36.41	28.57		
	Intermediate/ secondary	28.27 ±42.86	42.86		
	University	26.70 ±49.80	53.57		
Job	Civil servant	26.80 ±46.06	50.00	2.75	0.019**
	Military	29.43 ±35.71	32.14		
	Private sector	23.60±41.07	42.86		
	Student	22.66 ±22.93	14.29		
	Retired	27.17 ±42.29	35.71		
	Unemployed	26.47 ± 43.61	42.86		
Housing	Private	27.69 ± 42.28	42.86	0.61	0.544*
	Rent	25.40 ± 39.62	35.71		
Income	Enough	27.55 ± 43.60	42.86	2.68	0.007*
	Not enough	24.26 ± 34.23	28.57		
Smoking	No	27.27 ± 42.62	42.86	2.18	0.029*
	Yes	24.14 ± 31.92	28.57		

* Mann-Whitney test; ** Kruskal-Wallis test

Table-4: Demographic factors affecting practice of diabetic patients for physical exercise advice

Variables		Physical Exercise		Test of Significance	P Value
		Mean ± SD	Median%		
Age (Years)	≤50	32.62± 43.86	50.00	1.81	0.071*
	>50	34.66 ± 38.33	35.71		
Gender	Male	35.64± 44.16	50.00	1.59	0.111*
	Female	30.61 ± 37.30	50.00		
Marital Status	Single	38.50 ± 35.92	32.14	0.74	0.460*
	Married	32.57 ± 42.28	50.00		
Educational Level	Illiterate	35.33 ±35.56	35.71	12.12	0.007**
	Elementary	36.81 ±42.47	50.00		
	Intermediate/ secondary	31.05±38.20	46.43		
	University	29.91 ±52.80	50.00		
Job	Civil servant	30.24 ±50.25	50.00	7.99	0.157**
	Military	30.75 ±34.52	35.71		
	Private sector	47.51 ±30.36	10.71		
	Student	41.33 ±45.86	50.00		
	Retired	38.40±44.91	50.00		
	Unemployed	30.45±37.08	50.00		
Housing	Private	34.60 ± 40.23	50.00	1.20	0.231*
	Rent	30.50 ± 44.05	50.00		
Income	Enough	33.95± 41.01	50.00	0.65	0.516*
	Not enough	32.82 ± 41.93	50.00		
Smoking	No	40.84±33.52	50.00	0.58	0.562*
	Yes	33.52±45.09	50.00		

* Mann-Whitney test; ** Kruskal-Wallis test

Table-5: Demographic factors affecting practice of diabetic patients for blood glucose testing advice

Variables		Adherence to Blood Glucose Testing		Test of Significance	P Value
		Mean ± SD	Median%		
Age (Years)	≤50	28.14±35.33	14.29	3.79	<0.001*
	>50	16.21±27.67	0.00		
Gender	Male	16.93±26.56	0.00	2.91	0.004*
	Female	29.56 ±37.62	7.14		
Marital Status	Single	33.87±38.28	14.29	2.72	0.007*
	Married	20.02±30.57	7.14		
Educational Level	Illiterate	16.83±30.01	0.00	12.37	0.006**
	Elementary	22.67±34.55	7.10		
	Intermediate/ secondary	19.97±29.60	7.14		
	University	33.43±35.19	25.00		
Job	Civil servant	23.15±31.19	14.29	24.22	<0.001**
	Military	16.50±28.85	0.00		
	Private sector	41.07±43.01	32.14		
	Student	59.77±39.28	78.57		
	Retired	13.79±21.43	7.10		
	Unemployed	24.16±35.03	7.14		
Housing	Private	23.07±32.80	7.14	0.59	0.555*
	Rent	20.16±31.04	3.57		
Income	Enough	23.35 ±32.46	7.14	1.29	0.197*
	Not enough	18.55 ±31.91	0.00		
Smoking	No	22.92±32.80	7.14	1.06	0.288*
	Yes	16.52±27.12	0.00		

* Mann-Whitney test; ** Kruskal-Wallis test

Table-6: Demographic factors affecting practice of diabetic patients for medication advice

Variables		Medication		Test of Significance	P Value
		Mean ± SD	Median%		
Age (Years)	≤50	93.26 ±21.48	100.00	2.53	0.011*
	>50	96.31±18.36	100.00		
Gender	Male	94.19±20.34	100.00	0.89	0.371*
	Female	95.44 ±19.74	100.00		
Marital Status	Single	91.96±27.04	100.00	0.45	0.652*
	Married	95.30±18.32	100.00		
Educational Level	Illiterate	1.51±99.84	100.00	16.34	0.001**
	Elementary	31.73±87.27	100.00		
	Intermediate/ secondary	94.67 ±19.19	100.00		
	University	98.16 ±8.74	100.00		
Job	Civil servant	9.55±98.72	100.00	23.71	<0.001**
	Military	14.08±95.47	100.00		
	Private sector	7.15 ±96.43	100.00		
	Student	46.09±72.22	100.00		
	Retired	26.22 ±90.48	100.00		
	Unemployed	11.52 ±98.29	100.00		
Housing	Private	94.50 ±20.43	100.00	0.07	0.941
	Rent	95.51 ±18.89	100.00		
Income	Enough	95.80 ±18.98	100.00	4.04	<0.001*
	Not enough	90.35±23.66	100.00		
Smoking	No	20.62± 94.62	100.00	0.19	0.846*
	Yes	12.69± 95.98	100.00		

* Mann-Whitney test; ** Kruskal-Wallis test

Demographic factors affecting practice of diabetic patients for physical exercise advice: Table 4 shows that none of the reported determinants were statistically significantly associated with adherence to exercise recommendations among the studied patients. The only exception was the educational level, where mean percentage of adherence to exercise was significantly higher among elementary and university educated patients (52.8% and 42.5%, respectively) compared to illiterate and intermediate and secondary school educated patients (35.7% and 46.4%, respectively).

Table-7: Demographic factors affecting practice of diabetic patients about foot care

Variables		Foot Care		Test of Significance	P Value
		Mean ± SD	Median%		
Age (Years)	≤50	44.72 ± 54.25	50.00	0.43	0.665*
	>50	42.32 ± 52.53	50.00		
Gender	Male	44.86 ± 49.18	50.00	2.10	0.036*
	Female	41.20 ± 58.98	50.00		
Marital Status	Single	42.78 ± 55.41	50.00	0.40	0.692*
	Married	43.74 ± 53.01	50.00		
Educational Level	Illiterate	41.63± 56.03	50.00	7.56	0.056**
	Elementary	44.45 ±46.89	50.00		
	Intermediate/ secondary	43.72 ±50.27	50.00		
	University	42.92 ±64.29	100.00		
Job	Civil servant	43.04± 56.65	50.00	4.38	0.496**
	Military	47.98±45.58	25.00		
	Private sector	40.82±50.00	50.00		
	Student	47.91±42.11	0.00		
	Retired	45.20±50.64	50.00		
	Unemployed	40.95±57.45	50.00		
Housing	Private	43.61± 53.62	50.00	0.16	0.872*
	Rent	43.50 ± 52.78	50.00		
Income	Enough	43.61± 56.22	50.00	2.56	0.011*
	Not enough	41.67 ± 42.21	50.00		
Smoking	No	43.26± 54.86	50.00	2.16	0.031*
	Yes	43.99± 37.50	0.00		

* Mann-Whitney test; ** Kruskal-Wallis test

Table-8: Demographic factors affecting practice of diabetic patients about carbohydrate diet

Variables		Carbohydrate Diet		Test of Significance	P Value
		Mean ± SD	Median%		
Age (Years)	≤50	60.29±40.99	71.43	1.08	0.282*
	>50	64.44±40.41	85.71		
Gender	Male	58.84±41.15	71.43	1.95	0.051*
	Female	66.81±39.80	85.71		
Marital Status	Single	60.17±41.29	71.43	0.42	0.674*
	Married	62.72±40.64	85.71		
Educational Level	Illiterate	40.82 ±67.14	85.71	6.77	0.080**
	Elementary	43.39±55.90	71.43		
	Intermediate/ secondary	58.01±40.89	71.43		
	University	35.15 ±72.22	85.71		
Job	Civil servant	32.45±73.15	85.71	5.08	0.406**
	Military	44.26±55.78	71.43		
	Private sector	48.62±60.71	71.43		
	Student	47.82±53.38	57.14		
	Retired	42.07 ±56.01	71.43		
	Unemployed	65.08 ±39.96	85.71		
Housing	Private	62.11 ±40.91	85.71	0.06	0.950*
	Rent	62.86 ±40.28	71.43		
Income	Enough	62.74 ±40.60	85.71	0.30	0.767*
	Not enough	60.48 ±41.38	71.43		
Smoking	No	63.28±40.45	85.71	1.62	0.106*
	Yes	51.34±42.60	50.00		

* Mann-Whitney test; ** Kruskal-Wallis test

Demographic factors affecting practice of diabetic patients for blood glucose testing advice: Table 5 shows that the mean percentage of adherence to blood glucose testing recommendations among the studied patients was generally low. The highest mean percentage was among students (59.77%) followed by those working in private

sector (41.07%). Only 28.14% among younger patients (<50 years) compared to 16.21% among older patients (>50 years). About 30% among females compared to 17% among male patients. Single patients were better (33.87%) compared to married patients (20.02%). University educated patients were better (33.43%) compared to non-educated (16.83%), elementary (22.67%) and intermediate and secondary educated patients (19.97%). Exceptionally, students showed relatively high mean percentage (59.77%) compared to other job categories (ranged from 13.79 – 41.07%). However, no statistical significant differences were reported regarding type of housing (private vs. rent). Patients with enough income were better (23.35%) compared to 18.55% among patients with no enough income. Non-smokers (22.92%) were also better compared to smokers (16.52%).

Demographic factors affecting practice of diabetic patients for medication advice: Table 6 shows that illiterates and university educated patients were significantly more adherent to medications (99.84 and 98.16%, respectively) compared to elementary (87.27%) and intermediate and secondary educated patients (94.67%) (p=0.001). Civil, military and private employees and unemployed patients were significantly more adherent to medications (98.72, 95.47, 96.43 and 98.29%, respectively) compared to retired and student patients (90.48 and 72.22%, respectively). Moreover, patients with enough income were more adherent to medications compared to those who reported non-enough income (p= 0.01). Other factors did not show any statistical significant difference.

Demographic factors affecting practice of diabetic patients about foot care: As shown in table 7, no statistical significant differences were detected regarding foot care recommendations based on age, marital status, education, job, housing and income. However, female patients reported higher mean percentage (58.98%) than male patients (49.18%). Patients with enough income were better than those reported non-enough income (56.22% and 42.21%, respectively). Non-smokers were also more adherent to foot care recommendations compared to smokers (54.86% and 37.50%, respectively).

Demographic factors affecting practice of diabetic patients about carbohydrate diet: As shown in table 8, no significant differences were reported between mean percentage of adherence to carbohydrate diet recommendations and other determinants (e.g., age, gender, marital status, education, job, income and smoking) (p > 0.05).

Discussion

The long-term complications of diabetes are a major health problem. All types of DM are associated with the development of diabetes specific microvascular pathology in the retina, glomeruli, and peripheral nerves.[19] Home monitoring of blood glucose and urine testing for glucose are considered major requirements for long-term glycemic control, thereby postponing, if not avoiding, long-term complications.[20,21]

It is documented that the best performance in self-management is achieved when patients with diabetes have a high degree of practice of diabetes management, positive attitudes toward diabetes, strong self-efficacy for self-management and perceptions of good social support.[22] In the present study, diabetic patients had insufficient level of practicing different desired self-care behavior such as testing blood glucose (22.4%), following special diet (41.7%), importance of physical exercise (41.2%) and foot care (53.7%). The high level of practice was reported only in compliance with medication (94.7%). These results were not consistent with Kamel and his colleagues (2003) in a study conducted in Egypt and concluded that almost all patients had high level of knowledge towards different desired self-care behavior.[23] The discrepancy between the two studied may be explained in the view of the difference in the tools used in measuring patients` practice about different items of self-care behavior. Similar to our findings, poor level of knowledge and self-care reported from Al-Qassim[24], the Eastern Province[25], and Najran[26] in KSA.

Diet is considered the backbone of any management plan for diabetes mellitus in its self-care component and the American Diabetic Association emphasizes this issue.[20] This study indicated that mean percentage of following a special diet was 41.7%. This study was not exception among other studies conducted by Kamel[29] and Muninarayana[27] in this regard that reported compliance to diet ranged from 59.7% -63%. These results were in agreement with Khattab and his colleagues in a study conducted in Saudi Arabia (2010)[15] and reported that compliance with appointments and drugs was much better than compliance with diet.

Physical exercise is another important part in managing patients with diabetes mellitus because it improves insulin action in both types of the disease.[28] In spite of the importance of physical exercise, it has a low score in the current study (41.2%). These results were in common with Khattab study (2010).[15] This also concurs with some eastern[21] and western studies of the world[19], where it

has been observed that compliance is better with medical aspects of the regimen (e.g. medications) than with life style aspects of the regimen (diet and physical exercise).

Kattab and his colleagues (2010) have emphasized an important issue on reporting that poor performance of diabetic patients in this aspect of the life style of Saudi population as a whole.[15] In agreement with that, the low results in the present study and the above mentioned studies denoting existing of barriers to follow the world-wide recommendations regarding life style modification that leads eventually to achieving favored self-care behavior and optimal outcome of diabetic program.

Regarding home testing of urine and blood sugar, the practice of diabetic patients was very low in the current study. (The mean percentage was 22.4%). These results were in consistent with others done in Saudi Arabia[26], where only 6% of patients were performing urine sugar testing (dipstick method) regularly at home. Although education regarding this is routinely given to all new diabetics admitted to the hospital. We found females performing the tests more significantly than males, possibly because most women in Saudi Arabia are housewives and have enough time to perform these types of tests, whereas most males are working away from home. Those of younger age and higher educated more significantly performed blood testing, probably due to technical difficulties encountered in using the glucometer at home.

Regarding the compliance with medications, in agreement with Kamel et al., (1999)[30] who reported that more than three quarters (78.3%) of the studied diabetic patients adhered well to the medical treatment prescribed, the obtained results of the current study concluded that the mean percentage of diabetic patients` practice about their medications was 94.7%. Also, the results of the present study were close to those obtained from a study conducted in Alexandria, Egypt (1997) by Shama[31] who found that 78.3% of diabetic patients were classified as having very good behavior regarding compliance with medications. In another study conducted in Ismailia city, Egypt (2003)[23], it was concluded that 89% of the diabetic patients have never forgot taking their medications or have forgot to take their medications sometimes.

These results almost go with Hussein (1999)[32] who stated that about 62.9% of studied diabetics were sticking to prescribed drug regimen. Also, the results were in agreement with Kravitz et al., (1993)[33] who reported that 91% of their patients took medications as prescribed. In addition, Anderson and Fitzgerald (1995)[34] reported an even higher rate of compliance with medication regimen. This considerable level of compliance with medications might be referred to diabetics` perception about drugs as the most important item in the diabetes management that might be on the expense of non-pharmacological items.

Among results of this study is the difference between educated and uneducated patients. Educated patients had higher scores for many of the questions compared with the uneducated group as we had expected. In Saudi Arabia, public education programs about general health care and special medical problems are very limited.[35] Simple efforts on the part of health care providers and patients can reduce the risk of diabetic foot disease. But most of these simple procedures are not being systematically applied by health care providers or patients.[35] Most of the diabetic patients do not routinely perform simple foot care assessments as well as they were not be aware of foot care procedures or how to do them.[17] On an individual basis, every diabetic patient needs to be informed about the causes, nature, and outcome of diabetic foot disease and about preventive self-foot care measures. They have to believe in what they do and should be encouraged by health care providers to continue.

Health education is one of the areas which needs to be addressed immediately.[6] DM has been cited as a model disease in which patient education makes a big difference.[35] Home monitoring of blood glucose and urine testing for glucose[13] are considered major requirements for long-term glycemic control, thereby postponing, if not avoiding, long-term complications. Diabetics have to make very important and crucial decisions daily.

Conclusion

This study reflects the poor knowledge and practice about the management plan of diabetic care particularly the non-pharmacological component of the plan. It has been observed that compliance is better with medical aspects of the regimen (e.g. medications) than with life style aspects of the regimen (diet and physical exercise). This predisposes them to the risk of development of complications in later life. In the light of our results, we recommended Immense need to direct more attention of physicians towards the non-pharmacological component of the management plan of diabetic care.

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