



ORIGINAL ARTICLE

Evaluation of T2DM related knowledge and practices of Omani patients



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KEYWORDS

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Abstract *Background:* The prevalence of diabetes mellitus (DM) has increased alarmingly mainly due to the life style changes and obesity factor. Approximately 10% of the Omani population is suffering from this chronic disease and according to World Health Organization, number of subjects living with diabetes in Oman will rise from 75,000 in 2000 to 217,000 in 2025. It has been well established that data on KP of diabetic patients reveal aspects of education that need to be reinforced and addressed in order to improve diabetes management.

Objective: The aim of this cross sectional study was to assess the diabetes mellitus type 2 related knowledge and practices (KP) of Omani adult patients.

Materials and methods: Diabetic patients were recruited using the convenient sampling method from Outpatient diabetes clinic of various primary health care centers and private hospitals in Muscat region of Sultanate of Oman. KP of patients who agreed to participate in the study were assessed by administering a self designed questionnaire containing 15 close ended or multiple choice type questions in face-to face interviews. The collected data were analyzed by SPSS software.

Results and discussion: 106 patients with T2DM participated in this study (42 men and 64 women). Majority of them were; married (83%), above 50 years (64.2%), on oral hypoglycemic (56.6%), having family history of diabetes (66%). The mean \pm SD knowledge score of participants was found to be 4.92 ± 1.22 out of maximum possible score of 8.

Conclusion: Omani patients seemed aware and displayed satisfactory diabetes knowledge and good practices except adherence to regular exercise. We recommend to design and develop diabetes educational programs that could help Omani patients in diabetes management and improvement of quality of life.

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1. Introduction

Diabetes mellitus, a chronic metabolic disorder requires a significant amount of money for its management and thus puts considerable burden on healthcare services (Zimmet et al., 2001). Its prevalence is increasing worldwide at an alarming rate especially in low and middle income nations. The total

number of diabetics is projected to rise from 285 million in 2010 to 438 million in 2030, while in developing countries the prevalence is projected to double between 2000 and 2030 (Shaw et al., 2010).

Sultanate of Oman is located in the Southeastern portion of the Arabian Peninsula. It has undergone tremendous socio-economic development over the past four decades but alongside diabetes has emerged as one of the most prevalent and growing health problems in the Sultanate of Oman that may be due to life style changes and obesity factor (Ministry of Health, 2003). Approximately 10% of the Omani population is currently living with diabetes and as per WHO estimates, number of diabetics in Oman will rise from 75,000 in 2000 to 217,000 in 2025 (Dunia et al., 2013). Patients of type 2 diabetes mellitus (T2DM) are at higher risk of developing cardiovascular and other secondary complications if the disease is not well controlled (Mooradian, 2003). Generally these patients experience a high incidence of morbidity and mortality as compared to non diabetics.

Many studies conducted elsewhere in the world have shown that the knowledge and awareness about the disease can have positive influence on attitude and practices of patients that could lead to better management of diabetes and eventually good quality of life. A patient when involved in self management of disease through guidance, education and awareness programs becomes more compliant toward life style changes and drug therapy which help both the practitioner and patient to achieve the treatment goals. However, a knowledge, attitude and practice gap exists in type 2 diabetes mellitus management that does not allow patients and healthcare professionals to implement life style changes that could reduce the morbidity and mortality associated with diabetes (Serrano and Jacob, 2010).

A study conducted by Badrudin et al. in 2002, highlighted the importance of proper education and awareness program in changing the attitude of the public toward diabetes (Badrudin et al., 2002). McMurray et al. have clearly showed that diabetes education and care management can significantly improve the patient outcomes, glycemic control and quality of life in diabetic patients (McMurray et al., 2002). Kheir et al. in 2011 evaluated the knowledge, attitude, practice (KAP) and psychological status of adult Qatari patients with type 2 diabetes mellitus to study the role of these factors on the ability of the patients to manage their diabetes and to achieve desirable health outcomes (Kheir et al., 2011). They found significant differences in the attitude and knowledge between educational levels and therefore, concluded that providing education and other support programs to diabetics could be more effective if the KAP of the patients are understood before conducting these programs.

This study was conducted to assess the knowledge and practices of selected adult Omani patients with T2DM in Muscat region. The findings of this study could help in identifying population knowledge gap and their behavior toward diabetes which might help in designing effective educational program for prevention and progression of this dreaded disease in the country.

2. Methodology

This cross sectional study was conducted during Oct 2011–June 2012 at the Outpatient diabetes clinic of various primary

health centers and private hospitals in Muscat region of Sultanate of Oman to evaluate the knowledge and general practices of Omani patients diagnosed with T2DM.

2.1. Study sample

Eligibility for enrollment into the study was considered if the patient was an adult (30 years old or above), Omani national, diagnosed with T2DM at least two years before and willing to participate in the study. All the participants were ensured confidentiality. The objective and protocol of the study were explained to all participants and a verbal consent was obtained from 106 T2DM patients who agreed to participate in the study.

2.2. Data collection

A questionnaire containing 15 closed ended or multiple choice type questions on KP of patients (8 and 7, questions respectively) was developed to investigate the level and relationship between knowledge and general practices of T2DM patients. One point was awarded for each correct answer. The designed questionnaire was administered to 5 patients in a pilot study for the validity of the suitability of content, clarity and flow of questions. Necessary corrections and modifications were made based on the results of the pilot study. The questionnaire was prepared in English but prior to use in the study, was translated from its original English version to Arabic and was administered in face-to-face interviews to collect the data.

2.3. Ethical consideration

This study protocol and designed questionnaire were approved by the college research committee of Oman Medical College. Also all the enrolled patients were ensured confidentiality.

2.4. Statistical analysis

The collected data were analyzed by using SPSS- ver. 20 software. One way Analysis of variance (ANOVA) was used for determining significant differences between groups. Pearson chi square test was done to evaluate and compare knowledge between educational levels and genders, age groups with variables such as use of herbal drugs, missed dose and diet control. P values < 0.05 were considered as significant.

3. Results

A total of 106 type 2 diabetic patients were enrolled in the study. Sixty-four (60.4%) were women and forty-two (39.6%) were men. Majority of them were; married (83%), above 50 years (64.2%), on oral hypoglycemic (57.5%) and having family history of diabetes (66%). Of the 106 patients, 44.3% (male = 4; female = 43) had received no formal education and for all educational levels, men had a higher overall percentage than women. Oral hypoglycemic agents were used by 61 patients to manage their disease followed by insulin use (26.4%). However, eleven subjects were using both oral hypoglycemic agents and insulin while only seven (6.6%) followed the controlled diet to maintain their blood sugar level.

Table 1 Demographic characteristics of diabetic patients ($N = 106$).

Characteristic	Number of participants	Percent (%)
<i>Age (in years)</i>		
< 40	14	13.2
40–49	24	22.6
50–59	26	24.5
60–69	27	25.5
> 70	15	14.2
<i>Gender</i>		
Male	42	39.6
Female	64	60.4
<i>Marital status</i>		
Single	18	17.0
Married	88	83.0
<i>Educational level</i>		
Illiterate	47	44.3
Primary	23	21.7
Secondary	18	17.0
Diploma/Bachelors	14	13.2
Masters)	4	3.8
<i>Types of medications using</i>		
Oral hypoglycemics	61	57.5
Insulin injection	27	25.5
Both insulin and oral drugs	11	10.4
No medication, just diet control	7	6.6
<i>Family history</i>		
Yes	70	66.0
No	36	34.0

The demographic characteristics of the participants are presented in [Table 1](#).

3.1. Diabetes related knowledge of participants

Awareness, knowledge of diabetes and its complications can help both the prescriber and the patients in achieving the therapeutic goal of the therapy. Most of the participants displayed satisfactory knowledge of diabetes as their mean \pm SD knowledge score was found to be 4.92 ± 1.22 out of 8 (61.4%) ([Table 2](#)).

With respect to knowledge about what happens in diabetes, just above one third of patients (38.7%) correctly answered that in diabetes body contains a higher level of sugar in the blood than normal. Knowledge of normal glucose level is important and desirable as it can lead to self care and involvement of patient in management of DM. When participants were asked about the normal blood glucose levels, we observed that only 45 patients (42.5%) did not know the normal blood glucose value i.e. 70–110 mg/dl. A total of 86 patients correctly indicated that checking the blood glucose level is the most accurate method of monitoring diabetes as most of them were daily monitoring their blood glucose level. Around 69 respondents (65.1%) knew that diabetes could affect other body organs and lead to multiple complications. Most of them were able to identify the acute and chronic complications of diabetes such as kidney disease, eye disease, heart disease, foot ulcer etc. More than 60% of the participants were aware that diabetic patients should get their blood pressure and eyes checked at regular intervals to rule out the development of eye or cardiovascular diseases. Only 7.5% and 5.7% of study population incorrectly stated that there is no need for either blood pressure or eye check up respectively in diabetes.

A majority of them (67%) were aware of blood sugar levels falling below normal when on antidiabetic drugs while only 42% had poor knowledge regarding discontinuation of therapy upon control of blood sugar level ([Table 2](#)).

Table 2 Patients' knowledge of diabetes.

Knowledge questions	Number of patients answering correctly ($N = 106$)	Percent (%)
Diabetes is a condition in which the body contains a higher level of sugar in the blood than normal	41	38.7
The normal level of glucose in the blood is 4.4–6.1 mmol/L (79.2–110 mg/dL)	61	57.5
The most accurate method of monitoring diabetes is by checking the blood glucose level	86	81.1
A diabetic patient needs not to measure his/her blood pressure	67	63.2
A diabetic patient should have his/her eyes checked once every six months	65	61.3
Can blood sugar level fall below normal when you are taking drugs?	71	67.0
Diabetes if not treated can lead to complications	69	65.1
Upon control of diabetes, the medicines can be stopped immediately	61	57.5
Knowledge score (mean \pm SD)	4.92 ± 1.22	

Table 3 Effect of Gender and education level on knowledge score of participants.

Variable	df	F-value	Sig
Gender vs. knowledge score	1	0.602	0.440
Education level vs. knowledge score	5	3.221	0.010

Statistical analysis obtained by factorial ANOVA showed a significant effect of educational levels on knowledge score ($p = 0.01$). Low education level among participants is associated with poor knowledge as it limits the access to information resources mainly due to difficulty in reading, writing or understanding the disease. On the other hand no significant difference was observed in the diabetes knowledge of male and female participants (Table 3). It has been a well known fact

that knowledge corresponds with longevity of disease and educational level appeared to be the single most important factor associated with the level of knowledge among study participants.

3.2. Response of T2DM patients to practice questions

The response of the patients regarding the practice related questions is listed in Table 4. It was observed that only 11 (10.6%) participants were smokers as majority of the participants were women. Nevertheless it was interesting to note that 9 (81.81%) of them reduced the frequency or quit smoking after they were diagnosed with T2DM. A good number of participants admitted to practice self monitoring of blood pressure and around 76% got their blood pressure checked last month.

Approximately half of the patients (49.1%) never used herbs to control diabetes because they doubted the safety

Table 4 Response of the patients to the practice questions.

Practice questions	No. of patients	Percent (%)
Did you stop smoking since you knew about your diabetes?		
Yes, I stopped it	6	5.7
I just reduced the frequency	3	2.8
No, I didn't stop	2	1.9
I do not smoke	95	89.6
When was your blood pressure checked last?		
One month ago	80	75.5
Two months ago	19	17.9
6 months ago	7	6.6
How often you use herbal medicines to control diabetes?		
Always	2	1.9
Often	4	3.8
Sometimes	32	30.2
Rarely	16	15.1
Never	52	49.1
Do you exercise regularly?		
Yes	41	38.7
No	65	61.3
If yes, how often		
Everyday	27	25.5
Once weekly	11	10.4
Once monthly	3	2.8
Are you following a controlled and planned diet?		
Yes	60	56.6
No	46	43.4
If yes, how often?		
Always	24	22.6
Sometimes	26	24.5
Rarely	9	8.5
Do you miss taking the dose of your anti diabetic medications?		
Yes	42	39.6
No	64	60.4
If yes, how often?		
Occasionally	35	33.0
Once a week	1	.9
Once a month	6	5.7
How do you manage hypoglycemic symptoms?		
By taking sugar	64	60.4
By taking medicines	17	16.0
By taking insulin	9	8.5
I don't know	16	15.1

Table 5 Association of various age groups with some common practices of diabetic patients.

Variables	Age groups in years (% of total)					Total (%)	p-Value*
	< 40	40–49	50–59	60–69	> 70		
<i>Use of herbal drugs</i>							
Never	5 (4.7)	14 (13.2)	11 (10.4)	12 (11.3)	10 (9.4)	52 (49.1)	0.001**
Always	0	0	0	2 (1.9)	0	2 (1.9)	
Often	4 (3.8)	0	0	0	0	4 (3.8)	
Sometimes	2 (1.9)	5 (4.7)	10 (9.4)	11 (10.4)	4 (3.8)	32 (30.2)	
Rarely	3 (2.8)	5 (4.7)	5 (4.7)	2 (1.9)	1 (0.9)	16 (15.1)	
<i>Diet control</i>							
Never	1 (0.9)	13 (12.3)	7 (6.6)	15 (14.2)	10 (9.4)	46 (43.4)	< 0.001**
Always	5 (4.7)	4 (3.8)	6 (5.7)	8 (7.5)	2 (1.9)	25 (23.6)	
Sometimes	2 (1.9)	5 (4.7)	12 (11.3)	4 (3.8)	3 (2.8)	26 (24.5)	
Rarely	6 (5.7)	2 (1.9)	1 (0.9)	0	0	9 (8.5)	
<i>Missed dose</i>							
Never	7 (6.6)	9 (8.5)	16 (15.1)	19 (17.9)	13 (12.3)	64 (60.4)	0.05**
Occasionally	7 (6.6)	10 (9.4)	10 (9.4)	6 (5.7)	2 (1.9)	35 (33)	
Weekly	0	1 (0.9)	0	0	0	1 (0.9)	
Monthly	0	4 (3.8)	0	2 (1.9)	0	6 (5.7)	
Total	14	24	26	27	15	106	

* Pearson chi square test was used.

** Significant.

and effectiveness of herbal medicines. In contrast there were only 2 patients who always preferred and used alternative or traditional medicines to manage their symptoms. One third participants also reported to use these drugs occasionally. Less than 40% of the patients admitted to regular exercise and just above 56% adhered to the recommended controlled and planned diet. Our study participants (60.4%) seemed to be compliant toward drug therapy as they never missed the dose of their antidiabetic medications. A total of 64 patients reported to use table sugar to manage their hypoglycemic symptoms; however 15% of the participants had no idea of dealing with these symptoms.

The statistical results obtained (Table 5) show that age of the patients had a significant influence on some common practices of diabetic patients. A significant difference was observed between age groups and use of herbal drugs ($p = 0.001$), age groups and adherence to controlled diet ($p < 0.001$), age groups and compliance to drug therapy ($p = 0.05$) suggesting that participant practices change with the age.

4. Discussion

Diabetes mellitus is a major public health problem in Oman, causing significant morbidity and mortality. It is the second most common cause of morbidity in males and females above the age of 45 years and the fourth highest cause of death in Oman (Ministry of Health, 2008). It is well established that patient education and patient involvement can lead to better control over this disease (McClean et al., 2000; Suppaitiporn et al., 2005). American Diabetes Association (ADA) has also stressed upon the importance of clinical care, self care practices, patient education in the management and prevention of chronic complications of such a community health problem (American Diabetes Association, 2004).

A diabetic patient should have a working knowledge of the diabetes such as signs and symptoms, diabetic care, management etc. for reducing the risk of hospitalization due to

complications and for a better patient compliance. (Lockington et al., 1988; Majra and Acharya, 2009). Evaluation of knowledge and practices of diabetic patients has been used consistently in the past to assess the outcomes of educational programs and self care in the management of this disease (Fitzgerald et al., 1998).

Similar studies conducted in the past to assess the Knowledge, Attitude and Practice (KAP) of DM patients in Kuwait, Nepal and Saudi Arabia have reported poor KAP scores (Al-Adsani et al., 2009; Upadhyay et al., 2008; Saadia et al., 2010). While a study conducted by Shu et al. (2012) in Malaysia observed the good KAP scores among type 2 DM patients (Shu et al., 2012). But results of the current study showed good knowledge in the study participants. Majority of our participants displayed satisfactory knowledge related to the reliable glucose monitoring method, frequency of eye and blood pressure check up, complications of diabetes, management of hypoglycemic symptoms during therapy etc. Authors of the above studies concluded that knowledge deficit was due to low educational levels, low family income and low self care. We also found that educational status has a significant impact on the knowledge score of our study participants ($p = 0.01$), however no significant difference ($p = 0.44$) was observed in the knowledge of male and female participants which is in contrast to previous studies conducted elsewhere in the world where they found that men were significantly less knowledgeable about diabetes than women (Gonzalez et al., 2009; Moodley and Rambiritch, 2007).

Self care and good health practices can improve the duration and quality of life of diabetic patients. Slight modification in life style related to smoking, nutrition, physical activity etc. can enable diabetic patients to live a normal life. With regard to self care practices, the results were quite promising since the majority (89.6%) of the study participants were non smokers and another 8.5% either reduced or gave up smoking after being diagnosed with T2DM. In diabetes care, smoking cessation is important for glycemic control and limiting the

development of diabetic complications (Xi-tao et al., 2009). Our study participants seemed to be aware of the fact that blood pressure control, healthy dietary habits, compliance to drug therapy etc. can reduce macro and micro vascular complications in diabetes (Campbell et al., 2011; Nelson et al., 2002).

Regular physical activity is another important factor that improves metabolic control, reduces cardiovascular risks and lower overall mortality in people with diabetes (Wei et al., 2000). Boule et al. reported that on an average, moderate-intensity physical activity can reduce HbA_{1c} by 0.6% among individuals with type 2 diabetes (Boule et al., 2001). However, in our study less than 40% of participants admitted to exercise regularly. It is an area of concern and demands a prompt intervention from health care providers to develop public health programs for more awareness and to encourage an increase in physical activity in diabetic patients.

5. Limitations of this study

This study enrolled only 106 patients (small sample) from Muscat region only and hence findings of the study cannot be generalized to the diabetic population of Oman. Additionally, recruiting larger sample from inpatient and outpatient clinics will enhance the generalizability of the findings of future studies.

6. Conclusion

Majority of T2DM Omani patients displayed optimal level of diabetes knowledge. They also follow good health practices but these patients need to be encouraged to stick to regular exercise and dietary advice since they showed relatively poor adherence in these two domains. We strongly feel that there is a need to design and develop individualized diabetes educational program that could help in diabetes management and improvement of quality of life.

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