

Diabetes-care practices and related awareness amongst type-2 diabetes patients attending diabetes OPD at a tertiary care hospital in southwestern Saudi Arabia

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ABSTRACT

Background: Diabetes is the most prevalent disease in Saudi Arabia having vast health and economic implications. Hence, it is important that all measures must be undertaken to prevent and control the disease. **Objectives:** This study was performed to assess the diabetes-care practice and related awareness of patients of type 2 diabetes attending the outpatient department of a diabetes care center at a tertiary care hospital in southwestern Saudi Arabia. **Methods:** A descriptive cross-sectional approach was used wherein patients attending the outpatient department of the diabetes treatment center of a tertiary hospital in the southern region of the Kingdom of Saudi Arabia were surveyed, using a predesigned pretested questionnaire covering the study variables. **Results:** The study included 287 individuals with type 2 diabetes in the age range 25 years to 90 years (mean age = 55.5 years). Around 57% of the participants were females while the rest were males. **Conclusion:** The present study showed that awareness about diabetic complications among the study population is good, especially among young educated patients who adhere to regular medical follow-up. Attending physicians were a major source of awareness for the patients.

Keywords: Behavior, complications, diabetes-care, diabetes complications, knowledge, prevention, type 2 diabetes mellitus

Introduction

With changing lifestyles the prevalence of diabetes mellitus (DM) has been rising worldwide over the past few decades. According to a recent estimate by the International Diabetes Federation, the age-adjusted prevalence of diabetes in Saudi Arabia is 17.7%.^[1]

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In another study conducted by Al-Daghri,^[2] the prevalence of T2DM was found to be 31.6%. According to a report by the Ministry of Health, Saudi Arabia, there has been a 2.7 times rise in the incidence rate of diabetes in the two decades between 1990 and 2010.^[3] This rapid rise in the burden of diabetes has been largely attributed to the rising obesity rate as well as an aging population.^[4] Diabetes is the most prevalent disease in the Kingdom of Saudi Arabia and has vast human resources and economic implications for the government. Hence, it is imperative that all measures must be undertaken for the prevention and control of the disease.^[5]

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DM is a potentially debilitating chronic disease that is characterized by a lack of insulin secretion or an anomaly in insulin action. Based on the underlying pathology, diabetes has been classified into three types, namely, type 1 diabetes mellitus (T1DM), type 2 diabetes mellitus (T2DM), and gestational diabetes mellitus (GDM). T1DM is due to the autoimmune destruction of insulin-producing beta cells in islets of Langerhans leading to low levels of insulin and its consequences. T2DM, on the other hand, is due to increased resistance of body tissues to insulin which results in diminished metabolic action of insulin. GDM is defined as any degree of hyperglycemia, which occurs during pregnancy.^[6,7]

Poorly controlled diabetes can lead to many complications ranging from microvascular to macrovascular complications such as coronary artery disease, renal failure, stroke, blindness, skin ulcers especially in foot, and so on which can lead to serious morbidity and mortality.^[8,9]

The quality of life of patients with diabetes can be improved if complications of the disease are detected early. Thus, training of the individual is an integral part of the self-management of diabetes.^[10] Optimum management of the problem requires an individual to be aware of the nature and consequence of the disease, its risk factors, treatment, and its complications. Hence, an attempt has been made to study the knowledge of complications of diabetes in patients with diabetes attending tertiary care center. Knowledge and awareness of diabetes care and lifestyle management are an essential component of the strategy to prevent diabetes complications. Worldwide different studies have assessed awareness among diabetic patients regarding the complications of diabetes.^[11-19]

Due to the paucity of studies in southern Saudi Arabia regarding awareness and diabetes care practices amongst diabetes patients, this study was conducted amongst type 2 diabetic patients attending the outpatient's department in Aseer Central Hospital (ACH), which is one of the largest tertiary care centers in southern Saudi Arabia.

In the majority of times, diabetic care especially types -2. DM is provided by family physicians in most countries. Diabetic patients care plans are usually followed and subjected to changes by primary healthcare practitioners.

Methodology

A descriptive cross-sectional approach was used in which patients with type 2 DM attending the outpatient department of the diabetes center of Aseer Central Hospital were requested to provide information based on a predesigned and pretested questionnaire. The study was conducted from November 2017 to December 2018.

The first part of the questionnaire contained items dealing with the sociodemographic characteristics of the patients, namely, age, gender, educational status, occupation, and socioeconomic

status. The second part of the questionnaire contained items to assess the awareness about common diabetic complications and diabetes care practices of the patients.

After data were collected it was coded and fed to statistical software IBM SPSS version 20. Graphs were made using Microsoft Excel software. All statistical analysis was done using two-tailed tests (alpha error of 0.05). A *P* value less than or equal to 0.05 was considered to be statistically significant. Chi-square/Mont Carlo exact test and Fishers exact test were used to test for the association between different patients' factors with their knowledge level. Exact tests were used in case of small frequencies where Chi-square was invalid. The research was approved from the ethics committee of King Khalid university number: (REC#2018-02-51), date of approval: 19-3-2018 and from the research committee of Aseer central hospital booth copies attached.

Results

The study included 287 diabetics with ages ranged from 25 years to 90 years old (mean age = 55.5 years). Around 57% of the participants were females, rest males. Rural residence was found in 41.5% of the patients and the rest resided in urban areas. Education status was recorded and it was found that 23.3% had attended university, while 33.8% of the patients did not have any formal education, rest had obtained education ranging from primary to secondary school level. Most of the subjects (76.3%) were not in any full-time employment. Based on BMI figures, 74.2% of the patients were classified as obese, 18.1% overweight,

Table 1: Biodemographic characteristics of the study patients, Aseer, Saudi Arabia

Biodemographic data	No	Percentage	
Age in years	<50 years	78	27.2%
	50-	109	38.0%
	60-	63	22.0%
	70+	37	12.9%
Gender	Male	123	43%
	Female	164	57%
Education	Noneducated	97	33.8%
	Primary school	39	13.6%
	Intermediate school	35	12.2%
	Secondary school	49	17.1%
	University graduated	67	23.3%
Residence area	Rural	119	41.5%
	Urban	168	58.5%
Career	Professional work	34	11.84%
	Nonprofessional	34	11.84%
	Not working	219	76.32%
Body mass index	Normal	22	7.7%
	Overweight	52	18.1%
	Obese	213	74.2%
Smokers	Yes	38	13.2%
	No	249	86.8%
A family member with DM	yes	217	75.6%
	no	70	24.4%

Table 2: Diabetes data of the study patients, Aseer, Saudi Arabia

Diabetes data		No	Percentage
Duration of DM	less than 1 year	21	7.3%
	1-4 years	49	17.1%
	5-10 years	85	29.6%
	more than 10 years	132	46.0%
Last time measuring HbA1C	before 1 month	123	42.9%
	before 3 month	68	23.7%
	before 6 months	23	8.0%
	before 1 year	15	5.2%
	not remember	58	20.2%
Measured diabetic control	Excellent	30	10.5%
	Good	71	24.7%
	Poor	186	64.8%
Regular hospital visiting	yes	236	82.23%
	no	51	17.77%
Perceived Control of DM	Poor	82	28.57%
	Good	178	62.02%
	Excellent	27	9.41%

and 7.7% normal. Smoking history was elicited 13.2% of subjects reported being smokers. Three quarters (75.6%) of the participants reported the presence of at least one another family member with diabetes [Table 1].

Nearly 46% of the subjects reported having suffered from diabetes for more than 10 years, while only 7.3% had the disease for less than a year [Table 2]. With regard to diabetes control, 42.9% mentioned that their HbA1c was measured within the past 1 month while 5.2% recalled having had it measured around a year back. Poor diabetic control was recorded among 64.8% of the patients even though 82.1% of the patients reported that they visit the hospital regularly.

Information measuring the subjects' knowledge about diabetes and its complications was sought and it was found that [Table 3], 41.8% of the patients were aware of the neurological complications of diabetes, while the awareness regarding renal complications, cardiac complication, stroke, and dermatological complications was seen in 45.6%, 42.9%, 39.7%, and 36.9%, respectively. Regarding patient practices for diabetes control, 86.8% of the participants have glucose meter at their homes for a periodic checkup, while 44.9% follow a specified dietary routine. Moreover, 57% of the subject perform daily care of their foot and 38.7% reported practicing sports daily. Around 57% of the respondents reported getting their triglyceride level measured in the past 5 years [Table 4]. Overall, a high level of awareness was observed in 50.5% of the participants while 9.8% had poor awareness [Figure 1].

With regard to treatment methods, 43.9% of the patients know that diabetes medicines are effective, 14.98% mentioned that insulin was the best treatment for diabetes while 35.5% mentioned dietary control as the best way to control diabetes. Just 1.05% believed that herbal medicines are effective for

Table 3: Knowledge regarding DM and its complications of the study patients, Aseer, Saudi Arabia

Domain	Knowledge items	No	Percentage
DM complications	DM is a chronic disease	268	93.4%
	Know about HbA1c	163	56.8%
	Diabetes causes cardiac complications	123	42.9%
	Diabetes causes strokes	114	39.7%
	Diabetes causes vascular diseases	108	37.6%
	Diabetes causes renal diseases	131	45.6%
	Diabetes causes neurological diseases	120	41.8%
	Diabetes causes ophthalmological complications	134	46.7%
	Dermatological and genital complications	106	36.9%
	DM may cause amputation	209	72.8%
Treatment of DM	Know about medication for DM	126	43.90%
	Insulin is one of the medications	111	38.68%
	Dietary system is important in DM	43	14.98%
	Herbal medication is useful in DM	3	1.05%
	DM may cause amputation	209	72.8%
Complications preventive measures	Dietary system prevents DM complications	147	51.22%
	Exercises prevents DM complications	145	50.52%
	Adherence to medication	150	52.26%
	Herbal use	42	14.63%

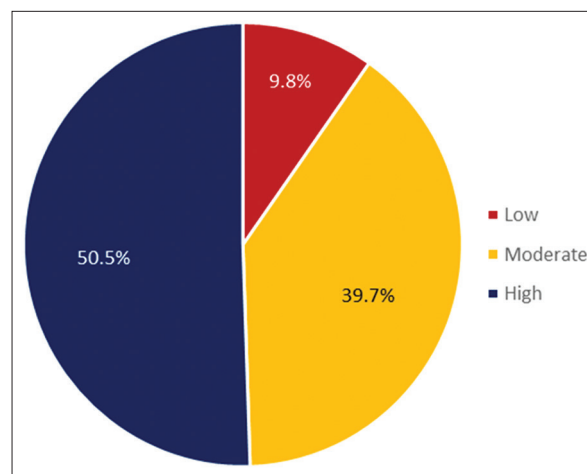


Figure 1: Overall awareness of sampled patients regarding DM and its complications

diabetes treatment. On the issue of preventive methods against complications, 51.2% of the patients knew about the importance of medication adherence while 50.52% responded that regular exercise is important for protection against complications. The subjects were asked about the source of knowledge regarding DM and its complications; 90.2% of the

patients responded that the treating physicians were the main source, followed by internet (33%), social media (31.5%), and television (24.5%) [Figure 2].

It was observed that [Table 5], 60.6% of those aged below 50 years had a good awareness level compared to 32.4% of those who were aged 70 years or more. However, this was not found to be significant. ($P = 0.015$). With regard to education, 73.1% of university graduated patients had a good level of awareness compared to 28.9% of those who received no formal education ($P = 0.001$). Considering the residence area, residents of urban areas had better knowledge; 59.5% compared to 37.8% amongst those living in rural areas ($P = .001$). Patients with regular hospital visits recorded a high level of awareness in 56.8% of the subjects as compared to 23.5% in those not visiting the hospital regularly ($P = .001$). Gender, career, and family member with DM or DM duration not significantly related to diabetes-related awareness.

Discussion

This study was conducted to assess diabetes-related awareness and practices of patients suffering from diabetes. This is the first such study conducted in the Aseer region. Hopefully, this study would serve as a guide for physicians and public health practitioners to deal with the public health problem of diabetes in a more effective manner.

All our 287 study subjects comprised of patients of diabetes attending the Diabetes Clinic at Aseer Central Hospital. Patients were well represented from rural as well as urban areas, both males and females

Table 4: Patients practice regarding DM of the study patients, Aseer, Saudi Arabia

Patients practice items	No	Percentage
Have glucose meter	249	86.8%
Have a prespecified dietary system	129	44.9%
Practice sports daily	111	38.7%
Daily caring of foot and nails	164	57.1%
Measuring LDL triglyceride in the last 5 years	163	57.0%

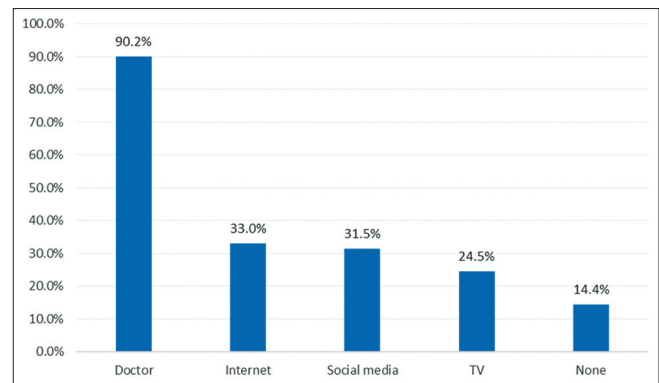


Figure 2: Source of knowledge regarding DM and its complications among the sampled population

Table 5: Relation between patients' biodemographic characteristics and their DM awareness level

Factor	Awareness regarding DM complications						P	
	Low		Moderate		High			
	No	Percentage	No	Percentage	No	Percentage		
Age in years	<50 years	9	11.5%	27	34.6%	42	53.8%	0.015*
	50-	6	5.5%	37	33.9%	66	60.6%	
	60-	6	9.5%	32	50.8%	25	39.7%	
	70+	7	18.9%	18	48.6%	12	32.4%	
Gender	Male	10	8.13%	47	38.21%	66	53.6%	0.815
	Female	16	9.76%	67	40.85%	81	49.4%	
Education	Noneducated	15	15.5%	54	55.7%	28	28.9%	0.001*
	Primary school	1	2.6%	16	41.0%	22	56.4%	
	Intermediate school	2	5.7%	10	28.6%	23	65.7%	
	Secondary school	7	14.3%	19	38.8%	23	46.9%	
Residence area	University graduated	3	4.5%	15	22.4%	49	73.1%	0.001*
	Rural	13	10.9%	61	51.3%	45	37.8%	
Career	Urban	15	8.9%	53	31.5%	100	59.5%	0.282
	Professional work	1	2.9%	11	32.4%	22	64.7%	
	Nonprofessional	4	11.8%	11	32.4%	19	55.9%	
Family member with DM	Not working	23	10.5%	92	42.0%	104	47.5%	0.247
	yes	21	9.7%	92	42.4%	104	47.9%	
Duration of DM	no	7	10.0%	22	31.4%	41	58.6%	0.059
	less than 1 year	1	4.8%	11	52.4%	9	42.9%	
	1-4 years	5	10.2%	7	14.3%	37	75.5%	
	5-10 years	6	7.1%	36	42.4%	43	50.6%	
Regular hospital visits	more than 10 years	16	12.1%	60	45.5%	56	42.4%	0.001*
	Yes	18	7.63%	83	35.17%	135	57.2%	
	No	10	19.61%	29	56.86%	12	23.5%	

P: P value of χ^2 test * $P < 0.05$ (significant)

were represented in a proportionate manner. We had a good mix of subjects ranging from university-educated to those not formally educated. Different age-groups were well represented in our study.

Obesity which is one of the major risk factors for diabetes was present in 74.2% of the patients as per their BMI figures. A similar study conducted in Tabuk found that high BMI and fast food consumption were found more frequent diabetes patients ($P < 0.05$).^[20] Our survey also found that around 50% of the patients were aware that exercise is a good way to prevent diabetic complications. Our survey also found that just 38.7% of the patients practiced sports daily. This is one area in which more awareness needs to be cultivated among diabetics as well as the general population. In a study conducted in KSA by Midhet *et al.*^[21] it was found that lack of exercise and bad dietary practices were significantly related to the development of diabetes.

Based on BMI figures, 74.2% of the patients in our study were classified as obese. Obesity has been closely linked to diabetes in studies around the world.^[22-24] A study by Daousi *et al.* found that obesity was present in 80 to 90% of type 2 diabetes patients.^[25] Further in our study, it was found that 37.8% of the subject reported practicing sports on a daily basis while 44.9% of the subjects followed a prescribed dietary routine [Table 4] Hence, efforts to ensure exercise and healthy eating could be a major intervention for prevention and control of diabetes in our setting as well.

With regard to diabetes control, 42.9% mentioned that their HBA1c was measured within the past 1 month while 5.2% recalled having had it measured around a year back.

Poor diabetic control was recorded among 64.8% of the patients and 82.1% of them visit the hospital regularly.

About 50.5% of the participants recorded a high level of awareness regarding DM and its complication while only 9.8% had poor awareness [Figure 1].

Self-management of diabetes which is based on regular monitoring of blood sugar is important for achieving successful outcomes. In our study, 86.8% of the participants reported owning a glucose meter at home for a periodic checkup of their blood glucose level [Table 4]. This was similar to another study in the USA, which found the glucose meter ownership of 85% amongst diabetes patients.^[26]

Foot-related complications are quite common in patients of diabetes. In a study conducted in Saudi Arabia, it was found that 11.4% of the patients of diabetes had diabetes foot complications.^[27] In our study, it was found that 57% of the subjects care for their foot and nail. This was higher than the findings of a study in Iran where 60% of the patients failed to inspect their feet and patients, in general, were found to have poor knowledge of foot self-care.^[28]

Diabetes management requires a high level of awareness and motivation on part of the patients regarding self-care. We compared the awareness level of patients with other characteristics. It was found that 73.1% of university graduated patients had a good level of awareness as compared to 28.9% for noneducated patients ($P = 0.001$). Similarly, residents of urban areas had a better knowledge-59.5%, compared to those who live in rural areas-37.8% ($P = 0.001$). In addition, it was found that 56% of those visiting the hospital regularly recorded a good level of awareness as compared to 23.5% for those who did not ($P = .001$). Gender, age, career, and family members with DM or DM duration were statistically insignificant [Table 5]. Hence, these findings underline the need for focused awareness efforts especially amongst lesser-educated, rural residents, having difficulty accessing healthcare services.

Knowledge regarding complications of diabetes is important to ensure that the patients are motivated to take care of their health and undertake preventive checks as advised. In our study, 45.6% of the subjects were aware of the renal complications of diabetes. Around 45.6% of the patients were aware of the renal complications of diabetes. The awareness was 42.9% for cardiac complications, 41.8% for renal complications, 39.7% for stroke, and 36.9% for dermatological complications [Table 3].

Trust in the therapy is important for maintaining compliance. Diabetes requirement a lifelong intake of medications and hence it is essential that the patient is informed enough to believe in the effectiveness of the therapy. It is also important to know whether the patients find the treatment effective or not. In our study, 43.9% of the patients believed that diabetes medicines are effective, 14.98% mentioned that insulin was the best treatment for diabetes while 35.5% mentioned dietary control as the best way to control diabetes. Around 1% believed that herbal medicines are effective for diabetes treatment. (There is some discrepancy with the headings in Table 3). A study^[29] conducted in Mecca found that 15.6% of the studied subjects believed that traditional medicines were safe and effective which is much higher as compared to our findings.

Responses were also elicited about the subjects' views on preventive measures for control of diabetes. We found that 51.2% of the patients knew about the importance of medication adherence while 50.52% responded that regular exercise is important for protection against complications. There appear some gaps in the knowledge of the subjects regarding the effectiveness of the diabetic medication. A detailed study may be able to guide in planning an effective campaign to remove these gaps.

We also asked about the source of the subjects' knowledge about diabetes and its care. Around 90% of the patients responded that the treating physicians were the main source of their information. This was followed by the internet (33%), social media (31.5%), and television (24.5%). In studies, healthcare staff including doctors have been found to have gaps in their

knowledge regarding diabetes.^[30,31] Hence there is a need for capacity building of the staff to make them more equipped to communicate essential information to promote diabetes care amongst the patients.

Conclusions and Recommendations

The present study showed that awareness about diabetic complications among the study population is good especially among young educated patients who adhere to regular medical follow-up. Healthcare providers' role in increasing awareness about diabetic complications need to be emphasized more. Health education sessions regarding the prevention of diabetic complications can be organized regularly in clinics and primary health centers to sensitize and create awareness among the general population. Mass media and other voluntary organizations can also be involved in creating awareness and screening for these diabetic complications can be held regularly at primary health centers to detect these complications earlier and provide optimal management to stop their progress.

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Conflicts of interest

There are no conflicts of interest.

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