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RESEARCH ARTICLE

Assessment of Levels of knowledge, attitude and practice about diabetes mellitus (DM), its complications and self-management of diabetic patients in AlKharj city, Saudi Arabia

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Abstract

Background: Levels of knowledge, attitude and practice about diabetes mellitus (DM), its complications and self-management in AlKharj city are unknown despite the high prevalence of DM in Saudi Arabia.

Objectives: To assess type 2 diabetic patients' knowledge, attitude and practice regarding diabetes and its complications, particularly ocular and self-management.

Methods: A cross-sectional study was conducted included diabetic patients (type 2) over 20 years old,who attended the outpatient clinics at selected primary health care centers,king khalid and university hospitals at Al-Kharj throughout the period from September 1st to November 30, 2013. A questionnaire included questions designed to assess patients' general understanding of DM, its complications and management options as well as their attitude towards diabetes and its management and their practices in this regard was used.

Results: The study included 393 type 2 diabetic patients. One-hundred sixty three patients (41.5%) were in the age group (40-59) years. Slightly more than half of them (51.9%) were males. More than half of respondents (57%) had average knowledge while only 17% had poor knowledge and 26% had good knowledge regarding fundamental aspects of DM and its management. Almost a fifth (19.1%) of type 2 diabetic patients never been examined by ophthalmologist.

Conclusion: In this study, type 2 diabetic subjects in AlKharj city had a significant knowledge of DM and its management. However, there was a clear gap between their knowledge and practice regarding ocular complications. These results highlight the need for educational and awareness programmes that reinforces the need for regular eye examinations

INTRODUCTION

Diabetes is defined as "a chronic metabolic disorder in which the body cannot metabolize carbohydrates, fats, and proteins, because of a defect in insulin secretion and/or action" (Florez et al.,2003)·It represents a worldwide epidemic(Setacci et al .,2009).Approximately one-hundred and seventy one million people worldwide suffer from diabetes mellitus with almost four million deaths reported annually from its complications (Levin ,2008).It is expected that the number of patients with DM will rise to 366 million by the year 2030 (Wild et al., 2004). Factors

leading to this rise include urbanization, population aging as well as increase in the prevalence of physical activity and obesity (Bushe et al.,2004). The Arabic gulf countries have relatively one of the highest prevalence rates of diabetes.Qatar reported a rate of 16.7 %. (Bener et al.,2009).Moreover,United Arab Emirates reported higher rate 29% (Saadi et al .,2007) whereas, another high rate 23.7% has been reported in the The Kingdom of Saudi Arabia (KSA)(Al-Nozha et al.,2004).Diabetes mellitus has three main types, Type 1 Diabetes, is a result of auto immune disorder as the body`s immune system destroys the beta cells in the pancrease that produce insulin leading to no or suboptimal production of the needed insulin by the pancrease. The second type of diabetes (type 2) is a result of improper function of the beta cells themselves.This improper function includes non-production of insulin or a status called insulin resistance. In insulin resistance, the fats, muscles and other cells fail to respond to the produced insulin. This type of diabetes is the most prevalent, and represents almost 90% of diabetic cases (American Diabetic Association et al., 2007) it may diminish the quality as well as the length of diabetics as a result of its complications (Bruce et al.,2009).The third type (Type 3) is known as gestational diabetes and only exists during pregnancy.

Many co-morbid conditions usually increase morbidity and mortality of diabetes in the general population (Ciulla et al., 2003).Amongst them, obesity and hypertension.These two health problems are important predisposing factors that contribute to further diabetic complications (Sachdev et al., 2010).

A study of diabetic patients' knowledge of the disease and its ocular complications in a Western Cape diabetic population (N=98) demonstrated that 42% of the respondents were aware of the presence of two types of diabetes (Cheng et al., 2009).Although the majority of the participants felt that it was essential to check their eyes regularly, only 30% claimed that they had actually had ocular checking every year (Clarke-Farr et al., 2006).

Rationale:

The Diabetes Charter indicates that it is the right of every diabetic patient to be seen by an ophthalmologist or an optometrist, and to have information about diabetes, its complications and its treatment (International Diabetes Federation et al .,2004).

- The Kingdom of Saudi Arabia (KSA) has one of the highest prevalence rates of diabetes mellitus all over the world, reaching 23.7%.
- Up to our knowledge,very few studies conducted in Saudi Arabia assessing patient`s knowledge and practice regarding diabetes and its management despite its importance as a major public health problem.

Aim of the study:

This study aimed to assess type 2 diabetic patients' knowledge, attitude and practice regarding diabetes and its complications and self-management.

Specific objectives:

- To determine the level of knowledge of diabetes, its ocular complications and self-management among type 2 diabetic patients in AlKharj city.
- To define the attitude of type 2 diabetic patients in AlKharj city towards diabetes, its ocular complications and self-management.
- To evaluate the practice of diabetic patients regarding management of the disease with emphasis on ocular complications.

SUBJECTS AND METHODS

Study design: Cross-sectional study
Study setting: Primary health care centers (n=10), outpatient clinics of King Khalid and Prince Sattam Bin Abdulaziz University hospitals at Alkharj city, KSA.
Study period: September 1st to November 30, 2013.

Study participants: This study included diabetic patients (type 2) over 20 years old, who attended the outpatient clinics at selected primary health care centers, king khalid and university hospitals at Al-Kharj throughout the study period.We excluded females with gestational diabetes.

Sample size and sampling technique: Total Saudi population in AlKharj city according to 2010 census data was 275562. Thus the total number of Saudi diabetic patients registered in Alkharj city was estimated to be about 66135, This figure was estimated based on findings of(Al-Nozha et al .,2004), who reported that prevalence of diabetes among Saudi population was about 24% .

Sample size of the current study was calculated assuming that 60% of diabetic patients have an average basic knowledge and practice of diabetes and its self-management (Saleh et al., 2012). At 95% confidence interval and 5% worst acceptable limit, the estimated sample size was 367 using Epi-Info version 7. The number was increased to 400 to compensate for drop outs.

Two primary health care centers out of 10 were randomly selected by simple random technique.At the study sites (i.e., two primary health care centers, outpatients clinics of King Khalid and Prince Sattam bin Abdulaziz university hospitals), during regular day hours from 8.00 am - 4.00 pm, all eligible diabetic patients during the study period were asked to voluntary participate in the study till the sample size was reached.

Data collection tool: A questionnaire modified from a previous study
(Mashige et al., 2008) was used to collect data for this study. Permission to use a questionnaire was obtained from the corresponding author through an e-mail.

The questionnaire included questions designed to assess patients' general understanding of DM, its complications and management options as well as their attitude towards diabetes and its management and their practices in this regard. To overcome language barriers, the questionnaire was translated-retranslated from English to Arabic by a qualified bilingual translator. The Arabic version was used for data collection. The questionnaires were pilot tested among twenty diabetic patients who were not part of the study population before the data collection. Its validity was ascertained by three consultants in the fields of Family Medicine, Internal Medicine and Endocrinology. Test-retest reliability was applied and an average correlation coefficient of 0.91 has been obtained. All queries from the pilot study were addressed to before the study was carried out.

Data collection technique: The questionnaires were distributed by the researchers to the participants and collected after completion. Illiterate participants were assisted by verbal interviews based on the questions in the questionnaire and the appropriate responses were recorded.

Ethical considerations: Prior to the commencement of the study, written permission was obtained from the directors of the selected primary health care centers, department heads of Internal Medicine in King Khalid and Prince Sattam bin Abdulaziz hospitals. Verbal consent to participate in this study was obtained from all participants.

Data entry and statistical analysis:

-Data entry and analysis was performed using the Statistical Package for Social Sciences (SPSS version 20.0) software.

-Descriptive statistics were computed in the form of frequency and percentage for categorical data and in the form of measures of central tendency (median and mean rank) and measures of dispersion (inter-quartile range "IQR") for continuous variables.

-Analytic statistics were computed Kolomongrove-Smironove (K-S test) test was performed for knowledge score to test its normal distribution. The date was abnormally distributed as evidenced by significant K-S test. Therefore, non-parametric statistical tests were applied. Mann Whitney statistical test was utilized for comparison of two groups and Kruskal-Wallis test for comparison of more than two groups. Differences were considered as statistically significant when the p-value is less than 0.05.

Poor knowledge was considered if the score was (< Mean – 1 SD); average knowledge and practice was considered with a score ranged between (Mean ± 1 SD) whereas good knowledge and practice was considered with a score of (>Mean + 1 SD). (Priyanka et al .,1968)

RESULTS

The study included 393 type 2 diabetic patients out of 400 invited to participate in the study giving a response rate of 98.3%. Their baseline characteristics are presented in table 1.One-hundred sixty three patients (41.5%) were in the age group 40-59 years whereas seventy five patients (19.1%) were over 60 years. Slightly more than half of them (51.9%) were males. More than a third of them (39.7% were governmental employees and 28.8% were house wives.

Table 1: Baseline characteristics of the participants (n=393)

	Number	Percentage (%)
Age (years)		
20-39	155	39.4
40-59	163	41.5
≥ 60	75	19.1
Gender		
Male	204	51.9
Female	189	48.1
Job status		
Governmental employee	156	39.7
Retired	72	18.3
Unemployed	13	3.3
House wife	111	28.2
Student	33	8.4
Others	8	2.1

Most of the type 2 diabetic patients (79.9%) cited that they were first diagnosed by general practitioners while only 5.9% were first diagnosed by either ophthalmologist or nurse. Duration of diabetes ranged between one and five years among 42.2% of them while it was over 20 years among 9.7% of patients. Almost a fifth (19.1%) of type 2 diabetic patients never been examined by ophthalmologist while more than half of them (54.5%) were examined since a period ranged between one and five years.

Table 2: Diabetic history of the participants (n=393)

	Number	Percentage (%)
Fist person diagnosed DM		
General practitioner	**314**	**79.9**
Ophthalmologist	**23**	**5.9**
Nurse	**23**	**5.9**
Others	**33**	**8.3**
Duration of diabetes (years)		
1-5	**166**	**42.2**
6-10	**101**	**25.7**
11-15	**62**	**15.8**
16-20	**26**	**6.6**
>20	**38**	**9.7**
Last time of retinal examination		
Never	**75**	**19.1**
<one year	**47**	**12.0**
1-5 years	**214**	**54.5**
Don`t know	**57**	**14.5**

The knowledge distribution of the subjects regarding diabetes and its fundamental components of management is shown in Figure 1. More than half of respondents (57%) had average (3.8–9) knowledge regarding diabetes and its management. Only 17% had poor (< 3.8) knowledge regarding fundamental aspects of DM and its management, and 26% had good (> 9) knowledge.

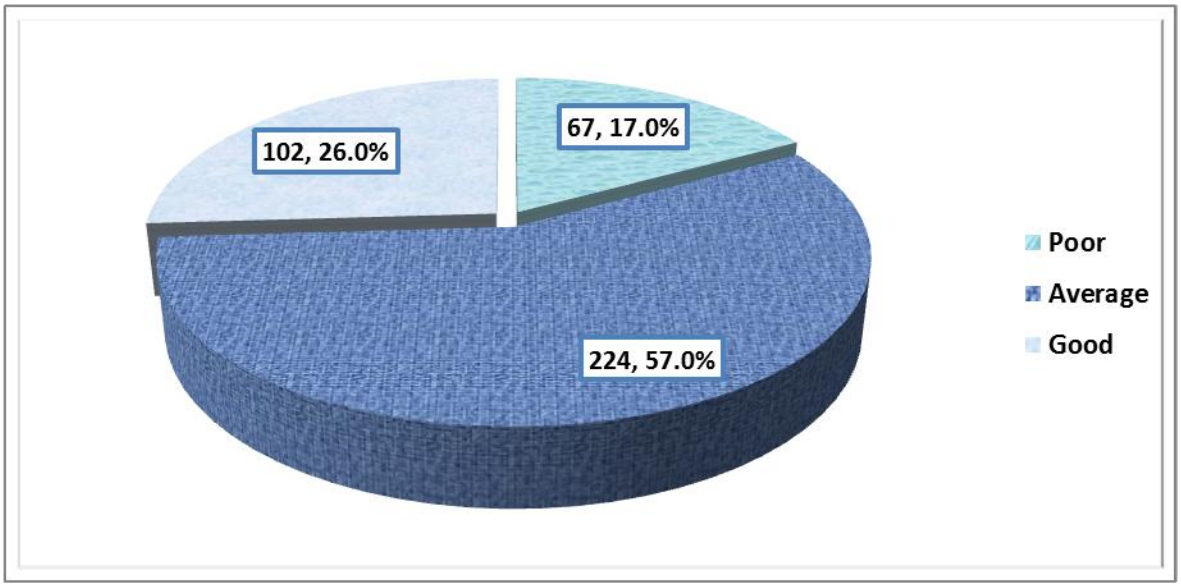

Figure 1: Distribution of study subjects according to the level of knowledge regarding DM (N = 393).

As evident from table 3, diabetic patients with duration of more than 20 years reported the highest level of knowledge regarding the diseases, its complications and self-management while the lowest level was reported among those with duration of diabetes ranged between one and five years (mean ranks were 225.4 and 176.4, respectively). This difference was statistically significant, p=0.016. Patient`s age, gender and job status were not significantly associated with their knowledge about diabetes, its complications and self-management.

Figure 2 illustrated the most common information needed by type 2 diabetic patients. Information about the disease itself (48.9%), precautions required to avoid complications (46.6%), and information about diet of diabetic patients were the commonest areas of information needed by patients. Regarding the best method that type 2 diabetic patients would like to get information, SMS was the commonest reported one (66.9%) followed by handout or pamphlets (37.2%) and internet medical websites (20.1%).

Table 3: Factors associated with diabetes`s knowledge among type 2 diabetic patients.

	Knowledge score (0-10)			p-value
	Median	IQR	Mean rank	
Age (years)				
20-39 (n=155)	7	5-9	200.2	
40-59 (n=163	7	4-9	205.3	0.103**
≥60 (n=75)	6	3-8	172.4	
Gender				
Male (n=204)	7	4-9	203.6	
Female (n=189)	6	4.5-8	189.9	0.228*
Specialty				
Governmental employee (n=156)	7	4-9	205.6	
Retired (n=72)	7	4-9	98.3	0.492**
Unemployed (n=13)	6	2.5-8.5	167.6	
House wife (n=111)	6	4-8	185.8	
Student (n=33)	6	5-8	191.3	
Others (n=8)	8	6.25-9	244.9	
Duration of diabetes (years)				
1-5 (n=166)	6	4-8	176.4	
6-10 (n=101)	7	5-9	213.9	
11-15 (n=62)	8	4-9	214.0	0.016**
16-20 (n=26)	6	4-8	180.7	
>20 (n=38)	8	5-9	225.4	

* Mann-Whitney test
IQR: Inter-quartile range ** Kruskal-Wallis test

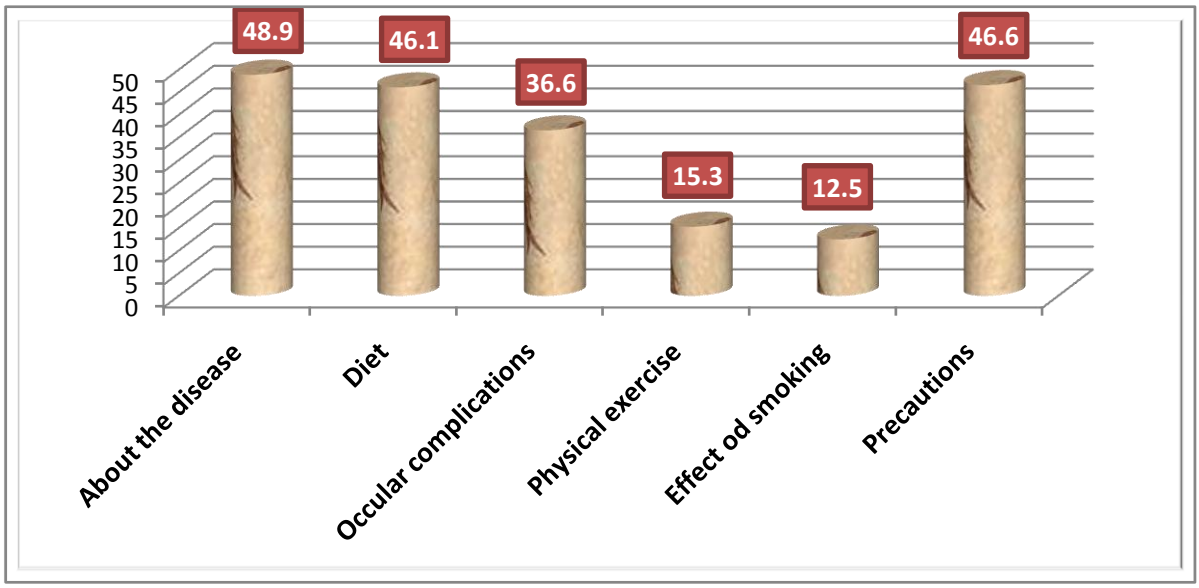

Figure 2: Information that type 2 diabetic patients would like to get from clinicians.

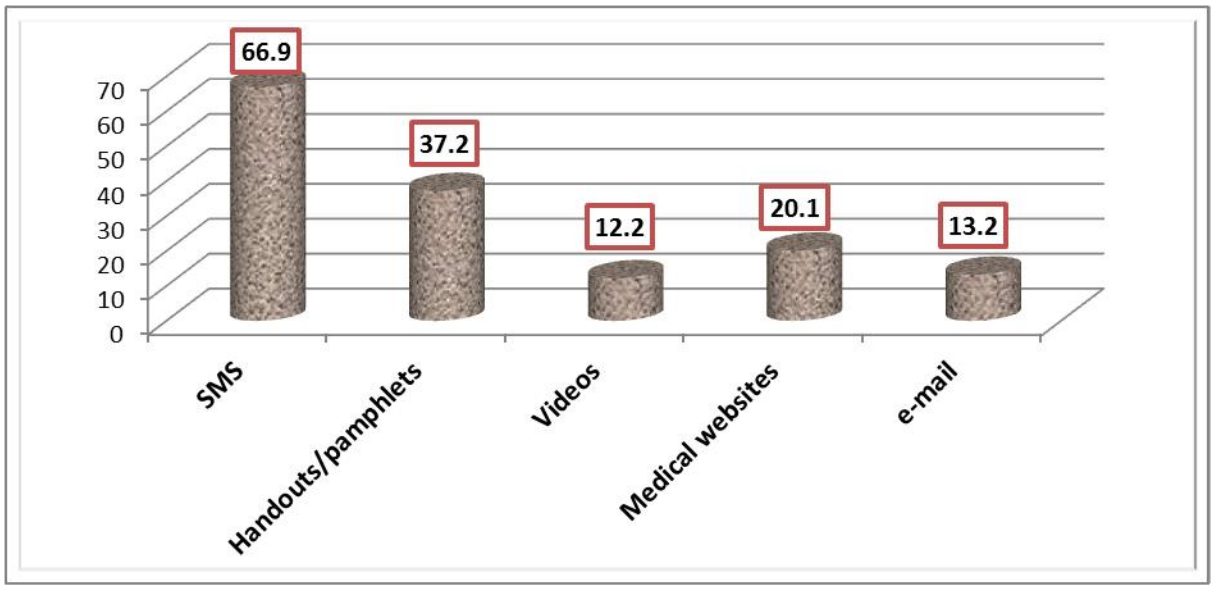

Figure 3: The best method that type 2 diabetic patients would like to get information.

Regarding attitude of type 2 diabetic patients toward modifications required in the management of diabetes mellitus. The majority of the respondents rated taking medications regularly (89.6%), eating healthy diet (86.8%) and regular blood checkup (79.7%) as very important factors. Table 4

Table 4: Attitude of diabetic patients toward modifications required for the management of diabetes mellitus.

	Very important	Slightly important	Not important	Do not know
Eating healthy diet	341 (86.8)	44 (11.2)	4 (1.0)	4 (1.0)
Practicing regular exercise	294 (74.8)	75 (19.1)	13 (3.3)	11 (2.8)
Regular blood check ups	314 (79.7)	58 (14.8)	14 (3.6)	7 (1.8)
Maintaining an ideal body weight	288 (73.3)	68 (17.3)	17 (4.3)	20 (5.1)
Taking medications regularly	352 (89.6)	30 (7.6)	5 (1.3)	6 (1.5)
Routine eye examinations	268 (68.2)	65 (16.5)	31 (7.9)	29 (7.4)
Having enough information about diabetes therapy	233 (59.3)	88 (22.4)	17 (4.3)	55 (14.0)
Routine medical check ups	297 (75.6)	57 (14.5)	17 (4.3)	22 (5.6)

Regarding practice of diabetic patients, 77.4% of them reported self-measurement of blood glucose at home while more than half of them (56.2%) reported following dietary modifications to control DM. Only a third of them (34.1%) reported practicing regular physical exercise.

Table 5: Practices of diabetic patients in the management of diabetes mellitus.

	Yes	No	Do not know
Self-measurement of blood glucose at home	304 (77.4)	60 (15.3)	29 (7.4)
Following dietary modifications to control DM	221 (56.2)	127 (32.3)	44 (11.2)
Practicing regular physical exercise	134 (34.1)	196 (49.9)	63 (16.0)

DISCUSSION

The diabetic patients require comprehensive continuous medical care and education. The available scientific knowledge concerning DM is an important tool to guide and educate diabetes patients regarding self-care. These self-care concepts that can benefit patients include physical activity, blood glucose monitoring, adherence to diet and regular taking medications.

Assessment of patient's knowledge and skills is a teaching tool in itself. (Deacon SR.,et al 1968) reported that patients with diabetes who were questioned on diabetes self-management and informed directly which of their answers were incorrect learned significantly more in the educational teaching program that followed than did patients who were not informed. Deacon also observed that the higher the degree of uncertainty of a response, the better the likelihood learning would obtained. This could be explained by an explanation reported by Festinger's Dissonance Theory, (Festinger L. A., et al 1957)which predicts that "subjects resist changing a response to which they are highly committed (have little uncertainty) and easily change a response to which they are not committed (high uncertainty)".

In the present study, it is observed that the more than half of respondents had average basic (57%) and almost a quarter (26% had good knowledge regarding diabetes mellitus (DM) and its self-management. This is could be attributed to the fact that there is an easy access to education in the medical institutions.

A study was conducted on members of the general public in Singapore to evaluate their level of knowledge about diabetes, and the results demonstrated that the respondents had a sufficient level of knowledge. (Wee HL., et al 2002). Another study was done on knowledge and perceptions of diabetes in a semi-urban Omani population; it found that subjects' level of knowledge was suboptimal. (Al-Shafaee AM., et al 2008) A study conducted on people with diabetes attending the Aga Khan University Hospital (AKUH) [Rafique G, et al 2000]in Pakistan found that 12%, 35%, and 53% of the patients had good, average and poor, respectively knowledge of the symptoms, treatments, and complications of diabetes. Another study conductd in Bangladesh reported that 16%, 66%, and 18% of respondents had good, average, and poor basic knowledge of DM. [Saleh F, et al 2012]

A high proportion (79.9%) of diabetic patients in this study had their initial diagnosis done by general practitioner and only 5.9% by ophthalmologists. Comparable findings have been reported by Mashige et al in South Africa. (Mashige KP., et al 2008)This result may be attributed to the fact that patients are usually prefer to consult a medical physician than ophthalmologist in dealing with symptoms and signs of medical conditions such as Diabetes. Optometrists are also more considered by patients as professionals who deal more with refractive disorders rather than medical problems, especially amongst the elderly population. However, the role of optometrists as part of primary health care in the screening and management of diabetic retinopathy has been documented and recognized in the National Service framework in Britain and the Strategy Implementation plan in Australia. (Layland B., 2001), (Verma L., et al 2003). In some countries like South Africa, there has been significant emphasis for all optometrists to become essential competent in the diagnosis and management of eye manifestations of systemic diseases such as hypertension and DM. (Mehta M, et al 2005).Although almost two thirds (66.2%) of respondents knew the importance of regular ocular examination by ophthalmologist, a significant proportion (19.1%) of subjects reported that they never do eye examinations. This may be due to oversight or negligence on the role of the clinicians or patients. Unfortunately, this does not augur well for diabetic patients as regular ocular examinations are one of the most important factors to prevent visual impairment caused by the diabetic complications. (Steele C., et al 2003), (Bloomgarden ZT. 2007).

A high percentage of the participants knew that diabetes could lead specific eye complications of diabetes such as diabetic retinopathy, glaucoma and cataracts in addition to visual impairment and blindness. Uncontrolled Diabetes and undiagnosed diabetic retinopathy can lead to severe loss of vision and blindness. (Klig JE. 2008) and (Shrestha S, et al 2007) .There is a high prevalence of glaucoma in diabetic victims. (Pasquate LR, et al 2006).Furthermore, diabetic patients have been reported to have a high prevalence rate of cataracts. (Robman L., et al 2005).In the light of these, it is essential that diabetic patients should have sufficient knowledge of eye complications of their condition. This may urge them to take self-management of the disease more seriously.

Diabetic patients who had longer duration of diabetes showed more knowledge of diabetes, its ocular complications and its self-management. This was found to be true as these subjects are taking a good experience in their condition, and that optimal information regarding diabetes management is being given to them. Most participants ranked issues of Diabetes management and control such as exercise, diet, regular blood sugar evaluation, maintaining optimal body weight, regular intake of therapeutic medication, medical and ocular examinations as very important in the management of Diabetes. This is possibly due to the fact that most of the subjects were diagnosed by physicians who would have advised them about the importance of self-management issues in DM.

Many respondents preferred awareness in the form of SMS and handouts. This suggest the need for educational and awareness programmes that reinforces the need for regular ocular examinations and complications, particularly ocular, of the disease. These programmes should be supported as a subject of provincial health policy, as it may lead to reduction in the utilization and fees of eye services associated with managing ocular complications of diabetes. Diabetes care is a lifelong responsibility and careful self-management and early therapeutic strategies may play an important role in reducing the risk of complications, some of which may be fatal.

Among study limitations of this study, it was conducted in one small city in the Kingdom of Saudi Arabia (AlKharj city) so, it can therefore not be generalized for the country with regards to diabetic patients' knowledge and self-management of the disease. Its cross-sectional design does not permit causal inferences about the results. Finally, the educational and socio-economic status of the subjects was not investigated. This might have influenced the knowledge of participants on issues relating to diabetes.

CONCLUSION

In this study, type 2 diabetic subjects in AlKharj city had a significant knowledge of DM and its management. However, there was a clear gap between their knowledge and practice regarding ocular complications as from one side, most of them were aware of the impact of DM on the eye and from the other side, only a small proportion of them examined by ophthalmologist their eye yearly

RECOMMENDATIONS

- These results highlight the need for educational and awareness programmes that reinforces the need for regular ocular examinations. In this regard, SMS service could be utilized as most of patients preferred this way.
- It is recommended that further studies should be done to assess diabetic knowledge in other governorates among the rural and urban population as well as on health care providers so that comparative conclusion can be drawn. This will assist in enforcing patients and health care workers with knowledge of DM and the importance of understanding therapy and management issues.
- A multidisciplinary strategy to manage DM which includes general practitioners, ophthalmologists, optometrists, dieticians and nurses is recommended.

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