Diabetic patients' awareness of diabetic retinopathy symptoms and complications

Abdullah Eid Abdulaal[1], Omar Majed Alobaid[1], Abdulaziz Gassam Alotaibi[1], Khalid Abdulaziz Aldihan[1], Abdulmalik Yousef Alnasyan[1], Abdullah Abdulrahman Albassam[1], Mesaed Ibrahim AlSenani[1], Abdulrahman Alnasyan[2]

[1]College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, [2]Department of Family Medicine, Prince Sultan Primary Health Care, Riyadh, Saudi Arabia

ABSTRACT

Background: Diabetes is a very common chronic endocrinological disease. A total of 8.8% of the adult population worldwide was diabetics. Diabetic retinopathy is a silent disease, early detection and intervention is essential for its management and prognosis. **Aim:** To assess the diabetic patients' awareness of diabetic retinopathy symptoms and complications. **Methods:** This is a cross-sectional community-based study which was conducted in Saudi Arabia using a survey from the period between June and September 2018 on all diabetic Saudi participants between 15 and 75 years of age. **Results:** This study involved 385 participants. The average age of the participants was 47.82 ± 14.49. The study only involved patients who were diagnosed with type 1 diabetes mellites (DM) or 2 DM. And 81% of the samples were diagnosed with type 2 DM. A total of 311 participants were aware of the DM effect on the eye. There was a significant difference between gender regarding the effect of DM on the retina in good control patients. On the subject of the source of participants' knowledge of DM and its complication, there was a notable difference between groups. **Conclusion:** An acceptable level of knowledgewas noted among patients. However, some points of knowledge should be increased.

Keywords: Complications, DM, retinopathy, symptoms

Introduction

Diabetes is a very common chronic endocrinological disease which is characterized by hyperglycemia.[1,2] In 2017, estimated 8.8% of the adult population worldwide were diabetics.[3] Most patients were aged above 60 years and prominent in countries classified high-income countries. However, in low- and middle-income countries, most patients were at age 40–60 years old. Whiting *et al.* expected that there will be a rise to 522 million people with diabetes in 2030.[4] The Middle East and North Africa appear to have the highest comparative prevalence of diabetes at 11%. A total of 6

Arabic countries are in the top 10 countries with highest prevalence of diabetes: Kuwait (21.1%), UAE (19.2%) Saudi Arabia (20%), Bahrain (19.9%), and Qatar (20.2%). For 20 Arabic countries, there are more than 20.5 million people are diabetic, and 13.7 million have impaired glucose tolerance, prediabetic. Diabetes attribute to about 170,000 deaths, which represent 10% of all death in the Arabic region.[5] Diabetic retinopathy is a common complication of diabetes. Itconstitutes 4.8% of the global causes of blindness. Diabetic retinopathy is a silent disease, early detection and intervention is essential for its management and prognosis.[6]

Despite the high literacy levels and various health programs for diabetes, there is a continuous increase in diabetes prevalence

Address for correspondence: Dr. Abdullah Eid Abdulaal, College of Medicine, King Saud Bin Abdulaziz University For Health Sciences, Riyadh, Saudi Arabia.
E-mail: Abdullah.aal@hotmail.com

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and its complications. It is recognized that more than 77% of patients who survive for over 20 years with diabetes are affected by retinopathy.[7] It is estimated that 10.2 million US adults 40 years and older known to have diabetes, the estimated prevalence rate for developing diabetic retinopathy was 40.3%.[8] The prevalence of diabetic retinopathy in different regions of Saudi Arabia: Riyadh (31%), Madinah (36.8%), Taif (36.1%), and Al-Hassa (30%).[7] In 2007, a study conducted in Oman to assess the perception and the awareness of population showed that the knew of diabetes was suboptimal, only 57% knew the classic symptoms, and 55% know the complications of diabetes.[9] In 2012, a cross-sectional survey study conducted in Riyadh, Saudi Arabia showed that the awareness of diabetes complications was suboptimal, diabetic nephropathy the most frequently mentioned complications. Only 44%, 43%, 42%, and 31% recognized blindness, stroke, diabetic neuropathy, and gangrene, respectively, as a complication of diabetes.[10] This study aims to assess the level of awareness for diabetic eye disease among diabetic patients.

Materials and Methods

This is a cross-sectional community-based study was conducted in Saudi Arabia from the period between June and September 2018 to assess the awareness level of diabetic Saudi citizens about diabetic retinopathy and its complications. The study included all diabetic Saudi participants between 15 and 75 years of age, regardless of their type of diabetes and the duration of the disease.

The population is almost 2 million according to Saudi General Authority for Statistics. The minimal sample size that can represent the population is 385, by considering the margin of error of 5% and confidence level is 95%. A total of 400 surveys were distributed and the overall response rate was 96%.

A previously validated questionnaire was used in the study.[11] The questionnaire was distributed directly to the participants in Riyadh, Saudi Arabia public facilities. The questionnaire included informed consent, demographic data, health status, the type of DM, the duration of the disease, and their level of control. The second part included several questions to assess the participants' awareness of diabetes retinopathy complications and treatment.

Statistical analysis

Microsoft Excel was used for data entry, and SPSS version 22.0 (Armonk, NY: IBM Corp) was used for data analysis. Descriptive statistics was used to assess the baseline demographics, participants' diabetic control which was presented as frequencies and percentages. Mean and the standard deviation were calculated for participants' age only. Chi-square was used to assess and to compare between genders and between participants control level. Any test with *P* value was less than 0.05 was considered statistically significant.

Results

This study involved 385 Saudi participants with an average age of the participants was 47.82 ± 14.49. The ratio between male and female participants was almost equal (190 males, 195 females). The study only involved patients who were diagnosed with type 1 DM or 2 DM. And 81% of the sample was diagnosed with type 2 DM. Regarding the disease duration, 173 (44.9%) were diagnosed with diabetes mellitus <5 years, 122 (31.7%) between 6 and 10 years and 90 (23.4%) for more than 11 years. The participants' baseline characteristics were presented in Table 1.

The participant response according to their gender was presented in Table 2. There were no significant differences between male and female in almost all variables. However, when it comes to the treatment of diabetic retinopathy, female participants were more likely to choose good control of blood glucose and photocoagulation as the main treatment (*P* = 0.01). The participant response according to their blood glucose control was shown in Table 3. There was a remarkable variation between groups regarding the participants' opinion toward the need for eye screening in diabetic patients with good control.

Moreover, 59% of the participant with good controlled blood glucose believed in the necessity of diabetic retinopathy screening even with controlled blood glucose. Whereas only 29.7% of the poorly controlled group, think there is a need to screen the eye with good control (*P* < 0.0001). When patients were asked about the reason for not screening, the majority chose poor knowledge and lack of awareness as the main factor (*P* = 0.98). On the subject of the source of participants' knowledge of DM and its complication, there was a notable difference between groups. For instance, 38% of the intermediate controlled group considered the doctor as the main source, while 25% of the same group obtained their information from the media. However, 53% of the well-controlled group received their information from their physician, and 20% assume the family member as the primary source.

Table 1: Baseline of the participants		
Age	Mean±SD	47.82±14.49
Gender	Male	190 (49.4)
	Female	195 (50.6)
Level of education	Illiterate	8 (2.1)
	Low education	96 (24.9)
	University	248 (64.4)
	High education	33 (8.6)
Type of DM	Type 1	72 (18.7)
	Type 2	313 (81.3)
DM control	Good	99 (25.5)
	Intermediate	186 (48.3)
	Poor	101 (26.2)
Duration of DM	Less than 5 years	173 (44.9)
	6-10 years	122 (31.7)
	11-20 years	64 (16.6)
	More than 20 years	26 (6.8)
Health state	Dyslipidemia	182 (47.3)
	HTN	100 (26)
	MI	29 (7.5)

HTN=Hypertension, MI=Myocardial infraction

Table 2: Participants response according to their gender		Male	Female	*P*
DM affect the eye with good control	Yes	80 (42.1)	62 (31.8)	0.05
	No	40 (21.1)	59 (30.2)	
	I don't know	70 (36.8)	74 (38)	
The need for eye screening in poor control	Yes	140 (73.7)	138 (70.8)	0.81
	No	9 (4.7)	10 (5.1)	
	I don't know	41 (21.6)	47 (24.1)	
CAD as complication of DM	Yes	85 (44.7)	90 (46.1)	0.95
	No	27 (14.2)	28 (14.4)	
	I don't know	78 (41.1)	77 (39.5)	
Stroke as complication of DM	Yes	83 (43.7)	89 (45.6)	0.91
	No	30 (15.8)	31 (15.9)	
	I don't know	77 (40.5)	75 (38.5)	
PAD as complication of DM	Yes	61 (32.1)	59 (30.3)	0.78
	No	32 (16.8)	38 (19.5)	
	I don't know	97 (51.1)	98 (50.3)	
Neuropathy as complication of DM	Yes	104 (54.7)	114 (58.5)	0.72
	No	31 (16.3)	31 (15.9)	
	I don't know	55 (29)	50 (25.6)	
Retinopathy as complication of DM	Yes	144 (75.8)	153 (78.5)	0.77
	No	18 (9.5)	15 (7.7)	
	I don't know	28 (14.7)	27 (13.8)	
Nephropathy as complication of DM	Yes	112 (58.9)	133 (68.2)	0.16
	No	26 (13.7)	22 (11.3)	
	I don't know	52 (27.4)	40 (20.5)	
Source of knowledge	Doctor	86 (45.3)	87 (44.6)	0.97
	Family	40 (21)	43 (22.1)	
	Media	33 (17.4)	36 (18.5)	
	Don't know	31 (16.3)	29 (14.9)	
Treatment of DM retinopathy	Good control	39 (20.5)	53 (27.2)	0.01*
	Laser	28 (14.7)	46 (23.6)	
	Surgery	26 (13.7)	14 (7.2)	
	Don't know	97 (51.1)	82 (42)	
Reason for not screening	Lack of knowledge	96 (50.5)	90 (46.1)	0.35
	Distance	51 (26.8)	53 (27.2)	
	Financial reasons	26 (13.7)	26 (13.3)	
	Lack of time	12 (6.3)	12 (6.2)	
	Afraid of the results	5 (2.6)	14 (7.2)	

DM=Diabetes mellitus, CAD=Coronary artery disease, Data presented as *n* (%), *P* < 0.05 is statistically significant

Discussion

In the present study, the mean age of patients was 47.82 years old, there were 50.6% females and the large majority 81.3% had type 2 DM, there were only 25.5% reported good control for diabetes and 6.8% reported having DM more than 20 years and the most reported health problem was dyslipidemia 47.3%. Regarding the knowledge of patients, there were 311 (80.8%) knew that DM affect the eyes, and only 99 (25.7%) denied that DM affect the eye with good control. There were 184 (48.8%) agree that eye screening is needed in good control, and 278 (72.2%) reported it is needed in poor control. There were 175 (45.5%) reported that coronary artery disease is a complication of DM, 172 (44.7%) reported stroke, 120 (31.2%) reported peripheral artery disease (PAD), 218 (56.6%) reported neuropathy, 297 (77.1%) reported retinopathy and 245 (63.6%) reported nephropathy.

A previous study from Saudi Arabia showed that 82.6% of patients were aware that DM could affect the eye.[12] Another study from Jordan[13] reported that 88.2% of patients knew that DM could affect the eye. Another Jordanian study[14] found that 98.3% of patients knew that DM could affect their eyes, and only 50.4% reported being familiar to retinopathy. A study from South Africa showed that 66.1% of participants were aware of visual threats caused by DM and 42% only knew that DM could result in diabetic retinopathy.[15] Regarding the source of information among our patients, the most reported source was a doctor 44.9% followed by family and media 21.6% and 17.9%, respectively. Regarding the treatment of DM retinopathy, there was bad knowledge where 23.9% reported good control, 19.2% reported laser, 10.4% reported surgery, and most of the 46.5% said they did not know. The most common sources of information reported by previous Saudi study[12] were physicians 37%, family members 11%, and someone with DM

DM control	Response	Good (N.98)	Intermediate (N.186)	Poor (N.101)	*P*
DM affect the eye with good control	Yes	48 (49)	65 (35)	29 (28.7)	0.005*
	No	28 (28.6)	46 (24.7)	25 (24.8)	
	I don't know	22 (22.4)	75 (40.3)	47 (46.5)	
The need for eye screening in poor control	Yes	81 (82.7)	139 (74.7)	58 (57.4)	<0.0001*
	No	7 (7.1)	6 (3.3)	6 (5.9)	
	I don't know	10 (10.2)	41 (22)	37 (36.6)	
CAD as complication of DM	Yes	50 (51)	85 (45.7)	40 (39.6)	0.022*
	No	17 (17.4)	17 (9.1)	21 (20.8)	
	I don't know	31 (31.6)	84 (54.2)	40 (39.6)	
Stroke as complication of DM	Yes	46 (46.9)	87 (46.8)	39 (38.6)	0.34
	No	19 (19.4)	24 (12.9)	18 (17.8)	
	I don't know	33 (33.7)	75 (49.3)	44 (43.6)	
PAD as complication of DM	Yes	33 (33.7)	62 (33.3)	25 (24.8)	0.03*
	No	20 (20.4)	23 (32.9)	27 (26.7)	
	I don't know	45 (45.9)	101 (54.3)	49 (48.5)	
Neuropathy as complication of DM	Yes	63 (64.3)	110 (59.2)	45 (44.5)	0.61
	No	14 (14.3)	27 (14.5)	21 (20.8)	
	I don't know	21 (21.4)	49 (26.3)	35 (34.7)	
Retinopathy as complication of DM	Yes	80 (81.6)	152 (81.7)	65 (64.4)	0.004*
	No	10 (10.2)	11 (5.9)	12 (11.9)	
	I don't know	8 (8.2)	23 (12.4)	24 (23.8)	
Nephropathy as complication of DM	Yes	66 (67.4)	134 (72)	45 (44.5)	<0.0001*
	No	12 (12.2)	14 (7.5)	22 (21.8)	
	I don't know	20 (20.4)	38 (20.5)	34 (33.7)	
Source of knowledge	Doctor	52 (53.1)	72 (38.7)	49 (48.5)	<0.0001*
	Family	20 (20.4)	45 (24.2)	18 (17.8)	
	Media	15 (15.3)	47 (25.3)	7 (6.9)	
	Don't know	11 (11.2)	22 (11.8)	27 (26.8)	
Treatment of DM retinopathy	Good control	31 (31.6)	46 (24.7)	15 (14.8)	0.003*
	Laser	20 (20.4)	38 (20.4)	16 (15.8)	
	Surgery	16 (16.3)	14 (7.5)	10 (9.9)	
	Don't know	31 (31.6)	88 (47.3)	60 (59.4)	
Reason for not screening	Lack of knowledge	46 (46.9)	89 (47.9)	51 (50.5)	0.98
	Distance	28 (28.6)	50 (26.8)	26 (25.7)	
	Financial reasons	11 (11.2)	28 (15.1)	13 (12.9)	
	Lack of time	7 (7.1)	10 (5.4)	7 (6.9)	
	Afraid of the results	6 (6.1)	9 (4.8)	4 (4)	

DM=Diabetes mellitus, CAD=Coronary artery disease, Data presented as N (%), *P*<0.05 is statistically significant

9%, where as general practitioners 47.3% were the main source of knowledge in Jordanian study.[13] The most reported reason for first eye screening of our patients was doctor 74.8%, and the most common reason for not screening was lack of knowledge 48.3%, whereas in Jordanian study[13] it was demonstrated that lack of information about diabetic retinopathy was the most common barrier 44% for eye screening. Another study[14] demonstrated that 33.9% reported that the barrier prevents them from getting eye screening was lack of knowledge about diabetic retinopathy.

Conclusion

There was an acceptable level of knowledge among patients. However, some points of knowledge should be increased. Female patients and those with intermediate and good control tend to have more knowledge among the other patients.

Conflicts of interest

There are no conflicts of interest.

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