Diabetics Retinopathy Knowledge and Awareness Assessment among the Type 2 Diabetics

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Abstract

INTRODUCTION: Diabetic retinopathy (DR) is a leading cause of blindness worldwide. In Saudi Arabia and other Arab countries, several studies estimated the prevalence of DR ranging from 30 - 40%.

AIM: To assess the DR knowledge and its association with diabetes control among Type 2 diabetic patients.

METHODS: A cross-sectional study of patients with Type II diabetes (T2D) who had a routine visit to the endocrine clinic to assess the DR knowledge and its relation to the glycemic control. We used a questionnaire that was used in previously published studies, and the reliability was assessed using the alpha Cronbach coefficient. Patients who answered correctly > 60% were considered to have good knowledge about DR.

RESULTS: Total of 253 patients participated, 43.4% has diabetes > 10 years and 30.7% have it for 5 - 10 years, 36.4% did college degree or higher, 40.8% considered having low income. 37.7% of participants were not screened for the DR in the past year. 28.4% of participants think that seeing optometrist is enough for DR diagnosis. Diabetics with good knowledge who have T2D > 10 years were 46.3% compared to 38.6% (p = 0.04). Diabetics with good knowledge have mean A1c of 8.55 vs. 8.59 (p = 0.32), mean BMI 30.4 vs. 30.2 (p = 0.46), mean diastolic pressure was 77.12% vs. 79.48% (p = 0.03).

CONCLUSION: Almost two-thirds of screened T2D were considered to have good knowledge about DR. The good knowledge group tends to have a longer duration of T2D, more likely to have a college degree, and tend to have non -significantly better A1c control.

Introduction

The Diabetic Retinopathy (DR) is a leading cause of blindness that affects 34 million worldwide; it was estimated that it is accounting 4% of blindness cases [1]. There are several factors increase the risk of DR, the long duration of the disease, glycemic control, hypertension, hyperlipidemia, renal failure, anaemia, age, puberty and pregnancy. Furthermore, diabetic retinopathy knowledge level increases the incident of DR in young women [2]. In addition to that, some patients didn't visit the ophthalmologist for the routine annual eye exam in the past year [3][4] All of this indeed will increase the demand for better diabetes education to make T2D patients more aware about their conditions and related complication.

Patient awareness to DR will be the key to further improvements in DR management and prevention. Patients should be informed that they play an integral role in their glycemic control and eye care. There is a lack of studies to assess the level of knowledge about DR among T2D patients and find associated factors with low DR awareness in Saudi Arabia.

The primary goal of this study is to assess the DR knowledge and its association with diabetes control among Type 2 diabetic patients.

Material and Method

A cross-sectional study was conducted between August 2014 until September 2015 at King Abdulaziz Specialized Hospital, Division of Endocrinology, Taif city, Saudi Arabia. The minimum recommended sample size is 280 for 95% confidence level with 5% margin error. It is calculated based on diabetic retinopathy awareness prevalence from the previous study that shows 76% of diabetic patients aware of poorly controlled diabetes lead to retinopathy

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and the diabetic population in Taif city approximately is 66797.

The study included 253 male and female with T2D who were 18 years or older and who were willing to participate. We excluded patients with type I diabetes and patients with gestational diabetes. Data were collected through a formal interview and help educated patients to obtain self - report survey. The socioeconomic data; duration of diabetes, type of medication, marital status, education level, income, smoking, physical exercise, T2D duration and Education level eye problem due to diabetes, family history of eye disease related to diabetes were self - reported. Baseline characteristics and measurements such as blood pressure, height and body weight were obtained at the time of visit. Laboratory data were collected from patient's Electronic Medical Record (EMR).

This cross-sectional study used interview-administered questionnaires that were used in previously published studies [5]. The questionnaire composite of 10 questions: 3 of them about diabetic retinopathy knowledge, 5 questions about screening and 2 of them about prevention and treatment (Table 1). It was also translated into the Arabic language. The Arabic version of the questionnaires has been used to break the language barriers and understanding among some patients. In addition to that reliability of questions was assessed using the alpha Cronbach coefficient which was 0.6 which consider acceptable. Questions consist of 10 items that aim to assess the DR knowledge and awareness. The questions are listed in Table 1. Patients who answered > 60% of the questions correctly were considered to have good knowledge about DR.

Table 1: Knowledge and Awareness Questionnaire of Diabetic Retinopathy

Knowledge and Awareness Questionnaire		
Do you think there is a relationship between retinopathy and DM?	Yes	No
Do you think diabetes mellitus may lead to blindness?	Yes	No
Have your eyes been checked by a doctor last year?	Yes	No
No need for the regular screen for DR if both eyes are good.	Yes	No
Do you think a good control of Diabetes might prevent DR?	Yes	No
Can a diabetic patient have eye problems at the same time of Diabetes diagnosis?	Yes	No
How frequently should a person with diabetes undergo an eye checkup?	- Every 6 months - Yearly or every 2 years - Only when vision affected	
When you have diabetes at the first time, you must screen your eye.	- At the time of diabetes diagnosis - 5 years after diabetes diagnosis - only if there are eye symptoms	
Do you think retinopathy is a treatable condition?	Yes	No
Do you think seeing optometrist (regular eyeglass store) is enough for people with diabetes?	Yes	No

All data were collected and analysed using IBM SPSS Statistics version 20. We used frequency for categorical variables and mean and the standard deviation (SD) for continuous variables. The Chi-squared test was used to study the relationship between nominal variables and t-test and one-way ANOVA was used to compare means. Correlation bivariate was used to assess significant between two continuous variables.

Results

Total of 253 patients was enrolled in this study with127 (50.4%) were male, mean age 52.6 ± 12.9 years old, 109 (43.4%) have diabetes > 10 years, and 77 (30.7%) have it for 5 - 10 years. 96 (37.9%) were on oral medications alone, 103 (40.7%) were on insulin alone. 165 (83.8%) were married, 159 (63.3%) did high school or less, 102 (40.8%) considered to have low income. 34 (14.3%) were actively smoker, and 40 (16.8%) reports regular exercise.

The mean A1c was 8.5%, mean BMI of 30.3 kg/m^2, 169 (71%) were considered to have uncontrolled hypertension at baseline, 39 (16%) reports they have eye problem related to diabetes, and 89 (36.6%) reports family history of eye disease related to diabetes (Table 2).

Table 2: Baseline characteristics for the whole cohort

Variables	Category	
Mean Age year (SD)	52.61 (12.91)	
Gender (%)	Male	127 (50.4%)
	Female	12 (49.6%)
Duration of diabetes (%)	Less than 5 years	65 (25.9)
	In 5-10 years	77 (30.7)
	More than10 years	109 (43.4)
Type of medication (%)	Tablet	96 (37.9)
	Insulin	103 (40.7)
	Tablet and insulin	54 (21.3)
Mean BMI (SD)	30.3 (4.7)	
Mean HbA1c (SD)	8.5 (1.5)	
Mean Blood pressure systolic (SD)	142 (17)	
Mean Blood pressure diastolic (SD)	77.9 (8.8)	
Regular exercise (%)	40 (16.8)	
Smoking (%)	34 (14.3)	
Control of blood glucose	Controlled	69 (29)
Martial state (%)	- Single	- 18 (9.1)
	- Married	- 165 (83.8)
	- Divorced	- 4 (2)
	- Widow	- 10 (5.1)
Education level (%)	- Post graduated	- 9 (3.6)
	- Graduated	- 83 (32.8)
	- High school or less	- 159 (63.3)
Income (%)	- 5000 or below	- 102 (40.8)
	- 5000-15000	- 127 (50.8)
	- More than 15000	- 21 (8.4)
Eye problem due to diabetes (%)	39 (16)	
The family history of eye disease related to diabetes (%)	89 (36.9)	

A group of 160 (64%) of screened T2D patients considered as aware of retinopathy. The mean correctly answered questions were 5.98 out of ten. More than 75% believed that T2D could cause retinopathy, which may get complicated by blindness as well as that good control of blood glucose could prevent retinopathy.

More than 60% reports had dilated eye examination, and they were significantly more likely to believe that there is a treatment for DR compared to those who had no eye examination. Around 50% were not aware of the recommendation for the DR annual screening and thought there is no need for it unless symptomatic. 71 (28.4%) of the participants thought that the optometrist visit for eyeglasses could replace the ophthalmologist visit (Table 3).

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Table 3: Knowledge and Awareness Questionnaire with the percentage of the correctly answered

Knowledge and Awareness Questionnaire	Correct answer	%
Do you know the relationship between retinopathy and DM?	Yes	79.5
Do you think diabetes mellitus may lead to blindness?	Yes	79.4
Have your eyes been checked by a doctor last year?	Yes	62.3
No need for the regular screen for DR if both eyes are good.	No	52
Do you think a good control of Diabetes might prevent DR?	Yes	78
Can a diabetic patient have eye problems at the same time of diabetes diagnosis?	Yes	52.3
How frequently should a person with diabetes undergo an eye checkup?	Every one or two years	24.3
When you have diabetes at the first time, you must screen your eye.	At the time of DM diagnosis	43.7
Do you think retinopathy is a treatable condition?	Yes	66.8
Do you think seeing optometrist (regular eyeglass store) is enough for people with diabetes?	No	71.6

The most likely reported barriers that prevent patients from going to the Ophthalmologist for the recommended annual DR screening were the difficulty to get an appointment and the unawareness about the possible eye complications from T2D (Figure 1).
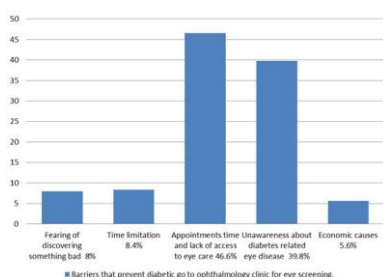

Figure 1: Barriers that may prevent people with diabetes from going to the Ophthalmology clinic for the recommended eye screening

People with diabetes with a low level of education were more likely to report that seeing the optometrist is enough for the regular eye examination (p = 0.03).

Table 4: Sociodemographic characteristic of the participants regarding awareness

Variable	Category	Aware	Not aware	P value
Mean Age year (SD)	-	52.5 (12.9)	52.7 (12.9)	.96
Gender	Male	85 (53.5)	41 (45.6)	.29
	female	74 (46.5)	49 (54.4)	
Duration of diabetes	Less than 5 years	45 (28.1)	20(22.7)	.04
	In 5- 10 years	41(25.6)	34 (38.6)	
	More than 10 years	74 (46.3)	34 (38.6)	
Type of medication	Tablet	63 (39.4)	33 (36.7)	.32
	Insulin	62 (38.8)	38 (42.2)	
	Tablet and insulin	35 (21.9)	19 (21.1)	
Mean BMI(SD)	-	30.4 (5)	30.2 (4.1)	.46
Mean HbA1c(SD)	-	8.55 (1.62)	8.59 (1.3)	.32
Mean Blood pressure systolic(SD)		141 (17.7)	143.8 (15)	.06
Mean Blood pressure diastolic(SD)	-	77.12 (8.8)	79.48 (8.8)	.03
Control of blood glucose.	Controlled	70 (49)	34 (40.5)	.16
Regular exercise	-	29 (19.3)	11 (12.9)	.09
Smoking	-	18 (112)	16 (18.8)	.15
Marital status	Single	11 (8)	7 (12.3)	.22
	Married	117 (85.4)	45(78.9)	
	Divorced	2 (1.5)	2 (3.5)	
	Widow	7 (5.1)	3 (5.3)	
Education level	Post graduated	9 (5.6)	0	.007
	Graduated	57 (35.6)	25(28.4)	
	High school or less	94 (58.8)	63 (71.6)	
Income	5000 or below	63 (39.6)	36 (40.9)	.07
	5000*15000	79 (49.7)	48 (54.5)	
	>15000	17 (10.7)	4 (4.5)	
Eye problem due to diabetes.	-	29 (18.6)	10 (11.8)	.18
Family history of eye disease related to diabetes.	-	56 (36.1)	33 (38.8)	.61

The aware group was significantly more likely to have higher school educational level (p = 0.007), longer duration of diabetes (p = 0.04), and lower mean diastolic blood pressure (p = 0.03). There was no significant difference between both groups in regards to age, lifestyle habits, income, or the family or the personal history of eye disease related to diabetes (Table 4).

Discussion

The Global prevalence of DR among diabetic patients is estimated to be 34.6% [6]. In the Eastern region of Saudi, the prevalence of DR was 30% [7]. More than 12% of who is suffering from DR for 30 years or more are blind [1].The pathogenesis of DR is multifactorial but is primarily due to the metabolic effects of chronic hyperglycemia, which result in dramatic vascular changes and subsequently leads to retinal injury and ischemia [4]. The vast majority of patients who develop DR have no symptoms until the very late stages by which time it may be too late for effective treatment [8][9][10]. Proliferative retinopathy incident was more likely associated with less educated women. American Diabetes Association (ADA) guidelines recommend screening for retinopathy at the time of diagnosis T2D then annually after that [11].

In our study, 64% of the screened T2D found to be aware of DR. This awareness correlated with patient's educational level as most of our patients who report low education level have low DR awareness score. Some of the previously published studies reported that DR knowledge and awareness is poor among the T2D [10] [12] [13] [14]. However, it is difficult to compare our results with other as most of the published studies used different instruments to assess the DR knowledge among those patients. However, in Saudi Arabia and other Arab countries, several studies have estimated the prevalence of DR ranging from 30 - 40%, and there is a steady increase in the number of cases discovered which emphasise on the importance of awareness about diabetes and its complication [12] [13] [15].

It has been previously shown by different studies that diabetic control among type 2 diabetics are generally poor which ultimately resulting in a high rate of complications [14] [16] [14]. In our study, half of the patients were poorly controlled diabetics, and the mean A1c was 8.5, and poorly controlled HbA1c can contribute to the development of DR as well as the other complications. Interestingly, we noticed that patients with high HbA1c they were non - significantly less likely to be aware that those with more controlled HbA1c. Also BMI, age and gender were not

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significantly different between groups. A study conducted in Turkey showed that patients who had T2D for more than 10 years were more likely to be aware of diabetic retinopathy [17]. Similarly, in our study diabetics with T2D for more than 10 years were more likely to be aware and more likely to have a regular eyes check-up annually. In our study, we found that 28.4% of the participants think that seeing an optometrist is enough for diabetics and that was closely related to patient's level of education. Nonetheless, 37.7% of the participants do not attend a routine eye exam furthermore; one of the most reasons reported by participants for not attending regular eye examinations was appointment time then followed by lack of awareness about DR. Even in some countries where you find high level of awareness about diabetic retinopathy, people with diabetes still do not visit ophthalmology clinics for the recommended routine eye examinations on a regular basis. A Japanese study showed that more than 98% of patients were aware of DR, but only 69.5% of the patients visited the ophthalmologist routinely on a regular basis [18]. This could be explained by a gap between the level of awareness and practice among people with diabetes and that is why focusing in knowledge alone is not sufficient in health awareness, it should be along with behavioural practice to make dramatic changes in improving patient's compliance and self -care.

Our study limitations were that our study was a single centre and our sample size is slightly under recommended sample size. Study strengths, participants were interviewed and helped by our researchers at specialised Endocrinology clinic and using a score that represents a sum of questions related to DR rather than using the single question to decide awareness status.

In conclusion, almost two third of screened T2D were considered to have good knowledge about DR. The good knowledge group tends to have a longer duration of T2D, more likely to have a college degree, and tend to have non - significantly better A1c control.

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