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Research Paper

Level of Awareness about Diabetic Retinopathy and Eye Checkup Practice among Type 2 Diabetic Patients Attending Baghdad Teaching Hospital 2023

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ABSTRACT:

BACKGROUND:

Diabetic retinopathy is a common and serious complication of diabetes that can lead to vision loss or even blindness if not detected and treated early. However, some people may not have any symptoms until the condition is advanced. Therefore, regular eye exams with dilated pupils are recommended for people with diabetes to check for signs of diabetic retinopathy and other eye problems regardless of the symptoms.

OBJECTIVE:

To measure patients' awareness and practices regarding diabetic retinopathy, to detect the barriers for eye screening and receiving eye check-up, and to find if there is any association between level of awareness with sociodemographic and diabetic variables.

PATIENTS AND MMETHODS:

A cross-sectional study was carried out at the Internal Medicine Outpatient Clinic in Baghdad Teaching Hospital/Medical City Complex, Iraq, from 1st February 2023 to the 30th of July 2023, among patients with type 2 diabetes mellitus, interview questionnaire was used to measure the awareness of diabetic retinopathy and practices of periodic eye examination, this questionnaire was adapted from previous study.

RESULTS:

The overall awareness of participants regarding diabetic retinopathy was good among 249 (61.6%). There were 336 (83.2%) participants who didn't practice regular eye examination. The biggest barriers of not getting regular eye examination was cost 120 (35.7%), there is significant association between high socioeconomic state, family history of diabetes, long duration of diabetes, type of treatment for diabetes with good level of awareness, there is significant association between age , socioeconomic state with practice of periodic eye examination.

CONCLUSION:

Despite that the overall awareness of diabetic retinopathy is considered good, the practice of regular eye examination is poor. The biggest barriers for not having periodic eye examination were cost.

KEY WORDS: Diabetic Retinopathy, Eye Checkup Practice, Level of awareness.

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INTRODUCTION:

Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. The metabolic dysregulation associated with DM causes secondary pathophysiologic changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on the health care system [(1)].

Diabetes Prevalence is on the rise. In 2019, 9.3% of adults (20-79 years old) had diabetes, and this number is projected to keep growing.

In 2019, there were an estimated 463 million adults with diabetes, and this is projected to reach 700 million by 2045.

Mortality rate, while the number of diabetic patients increases, is also expected to rise but at a slower pace (38% increase by 2030 compared to 54% increase in patients). This might be due to improvements in diabetes management.

Living Longer with Diabetes: Better management could be a double-edged sword. While it allows diabetic patients to live longer and have a better quality of life, it also contributes to a higher overall prevalence of the disease in the long run [(2, 3)].

High-income (10.4%) and middle-income (9.5%) countries currently have a higher prevalence of diabetes compared to low-income countries

(4.0%). The prevalence is expected to rise in all income groups by 2045, reaching 11.9%, 11.8%, and 4.7% for high-, middle-, and low-income countries respectively [4].

The standardized prevalence of diabetes in Kuwait at 15.3%, the UAE at 13.2%, Saudi Arabia 10.5% and Oman 8.5%. According to national survey in 2015 Iraq 13.9% of adults live with diabetes, and many do not know that they have the disease [5, 6].

Diabetic Retinopathy:

Globally, Diabetic Retinopathy (DR) is the commonest cause of blindness in working-age populations. The number of people suffering from blindness and vision impairment due to diabetic retinopathy has significantly increased, especially in low- and middle-income countries [7-9].

The rise in type 2 diabetes is a major factor behind this increase; the situation is projected to worsen in Europe as well, with a significant rise in the number of people with diabetic eye disease,

A substantial portion of those affected will require close monitoring or treatment for diabetic eye disease. This information highlights the importance of Diabetes Management Effectively. Managing diabetes can help prevent or slow the progression of diabetic retinopathy ensuring access to quality eye care, especially in developing countries. It is crucial for early detection and treatment of diabetic retinopathy.

Public Awareness: Raising awareness about diabetic retinopathy and the importance of regular eye exams for people with diabetes is essential. Approximately 2.6% of global blindness is attributed to DR. In 2020, DR accounted for approximately 3.2 million visually impaired and blind people globally [9-12].

Level of prevention of Diabetic Retinopathy and treatment:

Lifestyle Modifications: Encouraging people with diabetes to adopt healthy habits like regular exercise and a balanced diet can significantly reduce the risk of DR

Pharmacological Interventions medications for managing blood sugar (glycemic control) and blood pressure are crucial to prevent damage to blood vessels in the eye.

Systematic Screening: regularly screening diabetic patients for early signs of DR allows for early intervention and treatment to prevent vision loss.

These strategies implemented at a "systems level" can have a significant impact on the overall diabetic population. [1].

Secondary Prevention: This focuses on stopping the progression of DR in people who already have it. It involves Continued Risk Factor Control Maintaining healthy habits and taking medications to manage blood sugar and blood pressure.

Regular Monitoring: Regular eye exams are essential to detect any worsening of DR and allow for timely intervention. Evidence-based guidelines implementing standardized protocols based on research ensures consistent and effective management of DR.

Tertiary Prevention: This is the traditional approach that focuses on treating advanced stages of DR to prevent blindness. It involves Laser Photocoagulation. This treatment uses lasers to destroy abnormal blood vessels in the retina, preventing further bleeding and vision loss

Ocular Surgery: In severe cases, surgery may be necessary to remove scar tissue or treat other complications of DR.

Anti-VEGF Therapy: This is a newer treatment that uses drugs to target a protein involved in abnormal blood vessel growth in the eye.

It's interesting to see the increasing use of anti-VEGF therapy for vision-threatening DR. This highlights the ongoing advancements in treatment options for this eye disease. [13].

Importance of Periodic Eye Examination as Screening and Preventive Measure:

Regular, comprehensive eye examinations are essential for all individuals with DM. Screening is particularly important in those with risk factors. Most diabetic eye diseases can be successfully treated if detected early, as the disease is asymptomatic in the early stages, when treatment is most effective. Routine, non-dilated eye examinations by the primary care provider or diabetes specialist are inadequate to detect diabetic eye disease, which requires an ophthalmologist for optimal care of these disorders [1, 14].

No DR. or Mild NPDR Exams every 1-2 years or annually, Moderate NPDR Exams every 6-9 months, Severe NPDR Exams every 3-6 months, PDR Exams every 2-4 months (depending on severity), or every 3 months.

These recommendations highlight the importance of regular eye exams for people with diabetes, especially those with more advanced stages of DR. Early detection and treatment are crucial to prevent vision loss [15, 16].

Laser photocoagulation is a successful treatment for preserving vision loss in DR patients. Pan retinal Photocoagulation (PRP). This targets the

peripheral retina and is typically used for proliferative DR, a more advanced stage.

Focal Laser Photocoagulation targets specific areas of the macula, the central part of the retina, and is used for macular edema, another complication of DR.

Anti-VEGF Therapy is a newer treatment involving injections into the eye with drugs that target vascular endothelial growth factor (VEGF), a protein that promotes abnormal blood vessel growth in DR. It is often used in conjunction with focal laser therapy for macular edema.

Aspirin therapy at the dosage mentioned (650mg/day) does not appear to have a significant impact on the progression of DR [1].

Awareness about diabetic retinopathy and its role in prevention and control: DR often progresses without noticeable symptoms in the early stages. By understanding the risks and importance of regular eye exams, diabetic patients can get screened before vision is affected.

When patients are aware of the complications of diabetes, including DR, they are more likely to actively manage their blood sugar and blood pressure. This reduces the risk of developing DR or slows its progression.

Understanding the current level of public awareness allows educators to tailor their programs. For instance, if people are unaware of DR altogether, the focus might be on basic disease knowledge. If some awareness exists, the program could target deeper into early detection methods and treatment options [17].

Al-Yahya et al. concluded that when patients understand the nature of DR, its risks, and the importance of early detection, they are more likely to take charge of their health. This includes adhering to regular eye screening schedules [18].

OBJECTIVES OF THE STUDY:

1-To measure patients' awareness and practices regarding diabetic retinopathy.

2- to detect the barriers for eye screening and receiving eye check-up.

3- to find if there is any association between level of awareness about diabetic retinopathy with sociodemographic and diabetes variables.

PATIENTS AND METHOD:

Study design: cross sectional study was carried out at the Internal Medicine Outpatient Clinic in Baghdad Teaching Hospital/Medical City Complex, Iraq, from 1st February 2023 to the 30th of July 2023.

Study population:

Diagnosed Type 2 diabetic patients who attended the internal medicine outpatients' clinic represented the study population.

Inclusion criteria: All diagnosed type 2 diabetic patients of both genders aged 18-65-year-old who attended the internal medicine outpatients' clinic and accepted to participate in the study.

Exclusion criteria: Women with gestational diabetes, patient with other chronic disease include (hypertension, rheumatological disease, and renal disease), and patients with mental or cognitive impairment.

Exposure variables: Socio-demographic and diabetic variables include duration of diabetes, type of treatment, family history of diabetes, adherence to diet and exercise, adherence to medication, regular checkup of HbA1c.

Outcome variables: awareness of diabetic retinopathy among diabetic patients, practice of regular eye checkup, barriers of not getting regular eye checkup and source of information about diabetic retinopathy.

Sampling and sample size:

The required sample size for this study was calculated by using the standard equation for calculation of sample size of cross-sectional studies [19].

$$n = \frac{(Z_{1-\alpha/2})^2 P(1-P)}{d^2}$$

Where:

- n is the sample size.
- $Z_{1-\alpha/2}$ is the standard deviation at a confidence level 95% which is 1.96.
- P is the estimated percentage of probability for the event to be measured; P= 0.5
- 1-p is the probability for the event not to occur.
- d is the percentage of acceptable error which is equal to 0.05.

The sample size was calculated by applying the following assumption:

$$N = \frac{(1.96)^2 0.5(1-0.5)}{0.05^2} = \frac{(3.84)(0.5)(0.5)}{0.0025} = 384$$

The minimally needed sample is expected to be of 384 subjects. By adding 5% of the calculated sample size to compensate the non-response [20]; the sample size became 404.

Data Collection: Type 2 diabetic patients who attended to the internal medicine outpatients' clinic were invited to participate in the study; the researcher filled a structured questionnaire from the target population by direct interview; which was adapted from previous study. The reliability of questions was assessed using the alpha Cronbach coefficient which was 0.6 which is considered acceptable [21].

The questionnaire consists of:

1- Basic Sociodemographic characteristics:

1. *Age*
2. *Sex*
3. *Smoking*
4. *Socioeconomic status: using Tariq Al-Hadithi equation {SES = Education + Occupation + House ownership * 0.5 + Car ownership * 0.1 + (age-20)/100 – Retired/unemployed/ deceased}* [22]

The minimum score would be 0 and the maximum 14.05. The calculated SES score can be divided into equal parts (3: high, middle, and low socioeconomic levels).

2- Diabetes data and related eye disease

1. *Family history of diabetes*
2. *Duration of diabetes*
3. *Type of treatment for diabetes*
4. *Frequency of check of sugar level at home*
5. *Adherence to diabetes medication (daily intake of medications)*
6. *Adherence to diet and physical exercise (regular exercise at least five times per week for 20-30 minutes)*
7. *Regular HbA1c checking (regular check every 3 months)*
8. *Do you have eye disease?*

a. **If yes what are the disease*

3- Question regarding knowledge and awareness of diabetic retinopathy: [21]

1. *Do you think that diabetes can affect the retina of the eye?*
2. *Do you think that diabetes can lead to blindness?*
3. *Do you think that good control of diabetes can reduce risk of eye complication?*
4. *Do you think that diabetic patient has to have an eye checkup regardless of blood sugar level?*
5. *Do you think that diabetic patients need to have their eyes checkup only when they have symptoms?*
6. *Can diabetic patients have eye problems at time of diagnosis?*
7. *How frequently should a person with diabetes undergo an eye checkup?*
8. *When you have diabetes for the first time you must screen your eye?*
9. *Do you think that retinopathy is a treatable condition?*
10. *Do you think that seeing an optometrist (regular eye glass store) is enough for people with diabetes?*

4- Question about source of information regarding awareness of diabetic retinopathy

**What is your source of information about diabetic eye complications?*

5- Question related to practice of regular eye examination

1. *Do you go for periodic eye examination?*

**If yes: How often do you go for periodic eye examination*

2. *What made you do your first eye check?*

**If No: What do you think was the biggest barrier of not getting regular eye examination?*

Scoring:

For the correct answer one point was given, while for incorrect or uncertain answer zero point was given.

To calculate the total score; the following equation was used:

$$\frac{\text{(sumation of the scores of all items)}}{\text{highest possible score}} \times 100$$

The total score was divided into the:

1. <50% score/ is considered as poor awareness.
2. 50-75% score/ is considered as average awareness.
3. >75% score/ is considered as good awareness.

Statistical analysis:

IBM SPSS Statistics version 26 was employed for data entry and analysis. The following procedures were adopted: Descriptive analysis to summarize data and presenting it in tables and figures and Chi-square tests (or Fisher's exact test for small samples) to analyze relationships between categorical variables in data. Additionally, an independent samples t-test to compare the means (averages) of a continuous variable (likely age) between two independent groups. P value$\leq$0.05 was considered as statistically significant.

Ethical approval:

The ethical approval was obtained from the Center of Training and Human Resources Development. Permission was obtained from Baghdad teaching hospital. The study was approved by ethical committee at Iraqi board for medical specializations. Moreover, verbal consent was obtained from all participants. The data used for this research and all personal information will be confidential. The interview was carried out in a separate room with the attendant of an assistant nurse.

Pilot study:

A pilot test was done on a sample of 10 patients to assess the reliability of the questionnaire and the time needed to complete the questions. Those people in the pilot study were excluded from the main study.

RESULTS:

A total of 404 participants were included in the study, with a mean age of 51.57±8.598 years. The most common age group among participants was 40-59 years, 270 (66.8%) then the age of ≥60 years, 99 (24.5%). There were 173 (42.8%) males and 231 (57.2%) females. Primary school (or barely can read and write) and semi-skilled craftsmanship were the most common education and occupation among participants, 153 (37.9%) and 215 (53.2%) respectively. Most of the study participants 278(71%) were with low SES, 74 (18.3%) of the participants were smokers. Table (1).

Table 1: Distribution of study sample according to sociodemographic data.

Sociodemographic data		Number	%
Age group/ years	<40	35	8.7
	40-59	270	66.8
	≥60	99	24.5
Sex	Male	173	42.8
	Female	231	57.2
Education	Illiterate	51	12.6
	Primary school (or can read and write)	153	37.9
	Intermediate school	68	16.8
	High school or vocational	54	13.4
	Diploma (institute)	23	5.7
	Bachelor degree (college)	55	13.6
	Master degree or equivalent, e.g. higher diploma	0	0.0
	Ph.D. or equivalent	0	0.0
Occupation	Unskilled manual occupations (e.g. cleaner, gardener, housekeeper, laborer, shoe mender, street vendor)	46	11.4
	Semi-skilled manual occupations	215	53.2
	Skilled manual and non-manual occupations	86	21.3
	Associate professional occupations	53	13.1
	Skilled professional or senior managerial occupations	4	1.0
	Highly skilled professional occupations (e.g. medical doctors, university professors)	0	0.0
SES	low	278	71
	middle	109	27
	high	8	2
Smoking		74	18.3
Total		404	10.0

Family history of diabetes was positive among 291 (72.0%) participants. Duration of diabetes was ≤5 years among 141 (34.9%), 6-10 years among 88 (21.8%), and >10 years among 175 (43.3%). Oral hypoglycemic drugs were the most common treatment among participants, 293 (72.5%). Out of the total, 246 (60.9%) check of sugar level at home when feel unwell, 289 (71.5%) adhere to diabetes medication (daily intake of medication), 119 (29.5%) adhere to diet and physical exercise (regular exercise at least five times per week for 20-30 minutes), 118 (29.2%) have regular HbA1c checking, 224 (55.4%) have an eye disease. There were 40 (17.9%) participants who have cataract, 7 (3.1%) have glaucoma, and 30 (13.4%) have diabetic retinopathy. Table (2).

Table 2: Distribution of study sample according to diabetes data and related eye disease.

Diabetes data and related eye disease		Number	%
Family history of diabetes		291	72.0
Duration of diabetes/ years	≤5	141	34.9
	6-10	88	21.8
	>10	175	43.3
Type of treatment for diabetes	Diet and exercise	26	6.4
	Oral hypoglycemic drugs	293	72.5
	Insulin	85	21.0
Frequency of check of sugar level at home	When feel unwell	246	60.9
	Once per month	1	0.2
	Once per week	14	3.5
	Once a day	50	12.4
	More than once a day	93	23.0
Adherence to diabetes medication (daily intake of medication)		289	71.5
Adherence to diet and physical exercise (regular exercise at least five times per week for 20-30 minutes)		119	29.5
Regular HbA1c checking		118	29.2
Do you have an eye disease		224	55.4
If yes; what is the disease? No.=224	Cataract	40	17.9
	Glaucoma	7	3.1
	Diabetic retinopathy	30	13.4
	Unknown	147	65.6
Total		404	100.0

Tables (3) elucidate awareness questionnaires of diabetic retinopathy. The highest proportion of correct answers for awareness questionnaire was for the question (Do you think that seeing optometrist (regular eye glass store) is enough for people with diabetes? 374 (92.6%) then for question Do you think that retinopathy is treatable condition? 354 (87.6%).

While the lowest proportion of correct answers for awareness questionnaire was for the question (How frequently should person with diabetes undergo an eye checkup? 68 (16.8%) then for the question (When you have diabetes at first time you must screen your eye at time of diabetes diagnosis, 112 (27.7%).

Table 3: Distribution of study sample, according to the percentage of the correctly answered questions about diabetic retinopathy.

Question	Correct answer	Number	%
Do you think that diabetes can affect the retina of the eye?	Yes	323	80.0
Do you think that diabetes can lead to blindness?	Yes	301	74.5
Do you think that good control of diabetes can reduce risk of eye complications?	Yes	301	74.5
Do you think that diabetic patient has to have an eye checkup regardless of blood sugar level?	Yes	286	70.8
Do you think that diabetic patient needs to have their eyes checkup only when they have symptoms?	No	318	78.7
Can diabetic patients have eye problems at time of diagnosis?	Yes	311	77.0
Do you think that retinopathy is treatable condition?	Yes	354	87.6
Do you think that seeing optometrist (regular eye glass store) is enough for people with diabetes?	No	374	92.6
How frequently should person with diabetes undergo an eye checkup?	Yearly or every 2 years	68	16.8
When you have diabetes at first time you must screen your eye	At time of diabetes diagnosis	112	27.7

Awareness of participants regarding diabetic retinopathy was poor among 93 (23.0%), average among 62 (15.3%), and good among 249 (61.6%). Figure (1).

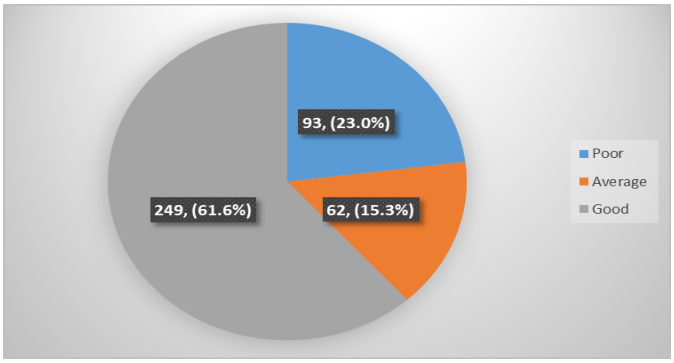

Figure 1: Awareness of participants regarding Diabetic Retinopathy.

There were 68 (16.8%) participants who go for periodic eye examination, and 336 (83.2%) didn't, as shown in figure (2).

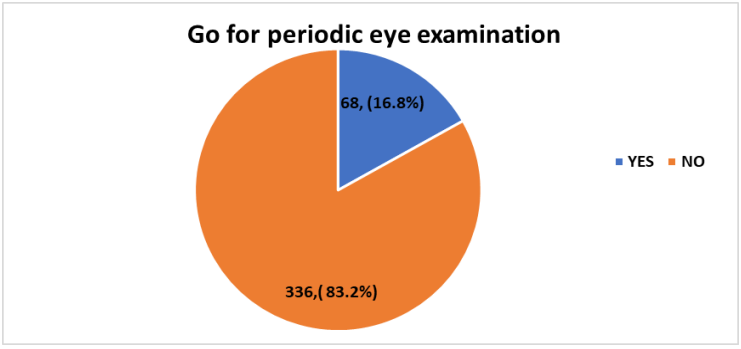

Figure 2: Participants' practice of regular eye examination.

Participants' practice of regular eye examination is shown in table (4). There were 11 (16.2%) participants who go for periodic eye examination each 6 months, 36 (52.9%) participants go for periodic eye examination yearly, and 21 (30.9%) go for periodic eye examination every 2 years. Doctor referral 8 (11.8%), having a symptom 30 (44.1%), or knowing about diabetic eye complications 30 (44.1%) made participants do their first eye check.

Table 4: Distribution of study sample according to the practice of regular eye examination.

		No.	%
How often do you go for periodic eye examination	Every 6 months	11	16.2
	Yearly	36	52.9
	Every 2 years	21	30.9
What made you do your first eye check?	Doctor Referral	8	11.8
	Having a symptom	30	44.1
	I know about diabetic eye complication	30	44.1
Total		68	100.0

Barriers that prevent participants from going for regular eye examination were shown in table (5). The biggest barrier of not getting regular eye examinations was cost 120 (35.7%).

Table 5: Distribution of study sample, according to the barriers that prevent the participants from going for regular eye examination.

Barriers		Number	%
What do you think was the biggest barrier of not getting regular eye examinations?	Time limitation	49	14.6
	Cost	120	35.7
	Fear of discovering something bad	59	17.6
	Not having a symptom	81	24.1
	Living in remote area	27	8.0
Total		336	100.0

Good awareness regarding diabetic retinopathy was significantly higher among participants with skilled professional or senior managerial occupations; P=0.036. Table (6).

Table 6: Association between sociodemographic characteristics of study participant, and level of awareness regarding diabetic retinopathy.

Sociodemographic characteristics		Awareness regarding diabetic retinopathy						P value
		Poor		Average		Good		
		No.	%	No.	%	No.	%	
Age group/ years	<40	9	25.7	2	5.7	24	68.6	0.12
	40-59	69	25.6	43	15.9	158	58.5	
	≥60	15	15.2	17	17.2	67	67.7	
Gender	Male	40	23.1	21	12.1	112	64.7	0.28
	Female	53	22.9	41	17.7	137	59.3	
Education	Illiterate	14	27.5	6	11.8	31	60.8	0.09
	Primary school (or can read and write)	44	28.8	21	13.7	88	57.5	
	Intermediate school	16	23.5	15	22.1	37	54.4	
	High school or vocational	8	14.8	12	22.2	34	63.0	
	Diploma (institute)	3	13.0	3	13.0	17	73.9	
	Bachelor degree (college)	8	14.5	5	9.1	42	76.4	
Occupation	Unskilled manual occupations	18	39.1	7	15.2	21	45.7	**0.036**
	Semi-skilled manual occupations	53	24.7	35	16.3	127	59.1	
	Skilled manual and non-manual	13	15.1	15	17.4	58	67.4	
	Associate professional	9	17.0	5	9.4	39	73.6	
	Skilled professional	0	0.0	0	0.0	4	100.0	
Smoking	Yes	19	25.7	12	16.2	43	58.1	0.77
	No	74	22.4	50	15.2	206	62.4	

Good awareness regarding diabetic retinopathy was significantly higher among participants with family history of diabetes, duration of diabetes 6-10 years, participants who treated diabetes with diet and exercise, and participants with cataract; (P=0.018, P<0.001, P=0.02, and P=0.004) respectively. Table (7).

Table 7: Association between diabetes data, and related eye with level of awareness regarding diabetic retinopathy.

Variables		Awareness regarding diabetic retinopathy						P value
		Poor		Average		Good		
		No.	%	No.	%	No.	%	
Family history of diabetes	Yes	57	19.6	50	17.2	184	63.2	**0.018**
	No	36	31.9	12	10.6	65	57.5	
Duration of diabetes/ years	≤5	48	34.0	10	7.1	83	58.9	**<0.001**
	6-10	14	15.9	17	19.3	57	64.8	
	>10	31	17.7	35	20.0	109	62.3	
Type of treatment for diabetes	Diet and exercise	1	3.8	5	19.2	20	76.9	**0.02**
	Oral hypoglycemic drugs	65	22.2	41	14.0	187	63.8	
	Insulin	27	31.8	16	18.8	42	49.4	

	Oral and insulin	0	0.0	0	0.0	0	0.0	
Frequency of check of sugar level at home	When feel unwell	60	24.4	38	15.4	148	60.2	0.36
	Once per month	0	0.0	0	0.0	1	100.0	
	Once per week	3	21.4	0	0.0	11	78.6	
	Once a day	12	24.0	4	8.0	34	68.0	
	More than once a day	18	19.4	20	21.5	55	59.1	
Adherence to diabetes medication (daily intake of medication)	Yes	66	22.8	45	15.6	178	61.6	0.97
	No	27	23.5	17	14.8	71	61.7	
Adherence to diet and physical exercise (regular exercise at least five time per week for 20-30 minute)	Yes	25	21.0	23	19.3 %	71	59.7	0.34
	No	68	23.9	39	13.7	178	62.5	
Regular HbA1c checking	Yes	22	18.6	17	14.4	79	66.9	0.32
	No	71	24.8	45	15.7	170	59.4	
Do you have an eye disease?	Yes	54	24.1	27	12.1	143	63.8	0.12
	No	39	21.7	35	19.4	106	58.9	
Type of eye disease No.=224	Cataract	3	7.5	3	7.5	34	85.0	**0.004**
	Glaucoma	5	71.4	0	0.0	2	28.6	
	Diabetic retinopathy	6	20.0	3	10.0	21	70.0	
	Unknown	40	27.2	21	14.3	86	58.5	

Poor practice of regular eye examination was significantly higher among participants below 40 years, with primary school (or can read and write), and Unskilled manual occupations (e.g. cleaner, gardener, housekeeper, laborer, shoe mender, street vender); P<0.001.

Practice of regular eye examination was significantly higher among participants with skilled professional or senior managerial occupations; P<0.001. Table (8).

Table 8: Association between sociodemographic characteristics of the participant, and the practice of regular eye examination.

Variables		**Practice of regular eye examination: Do you go for periodic eye examination**				**P value**
		Yes		**No**		
		No.	**%**	**No.**	**%**	
Age group/ years	<40	2	5.7	33	94.3	**<0.001**
	40-59	36	13.3	234	86.7	
	≥60	30	30.3	69	69.7	
Sex	Male	36	20.8	137	79.2	0.064
	Female	32	13.9	199	86.1	
Education	Illiterate	6	11.8	45	88.2	**<0.001**
	Primary school	1	0.7	152	99.3	
	Intermediate school	6	8.8	62	91.2	
	High school or vocational	11	20.4	43	79.6	
	Diploma (institute)	15	65.2	8	34.8	
	Bachelor degree (college)	29	52.7	26	47.3	
Occupation	Unskilled manual	0	0.0	46	100.0	**<0.001**
	Semi-skilled manual	19	8.8	196	91.2	
	Skilled manual and non-manual	22	25.6	64	74.4	
	Associate professional	23	43.4	30	56.6	
	Skilled professional or senior managerial	4	100.0	0	0.0	
Smoking	Yes	7	9.5	67	90.5	0.061
	No	61	18.5	269	81.5	

DISCUSSION:

1-The clinical characteristics of diabetes and related eye disease in the study sample

The family history of diabetes type 2 among two third study participants. This finding agreed with Bakkar et al., study [17] conducted among 237 participants with type 2 diabetes mellitus from Jordan in 2017 to assess their awareness and knowledge of diabetes and diabetic retinopathy and reported that a family history of type 2 diabetes was among 174 (73.4%).

The present study reported that the highest proportion of the participants more than third were with diabetes duration of >10 years. This was comparable with El Khatib et al. study [23] from Jordan in 2017, where the proportion of patients visiting the endocrine clinic with a disease duration of >10 years was 40.9%. Other reports by Al Zarea et al., [24] and Alali et al., [25] from Saudi Arabia in 2016 and 2022 respectively, found that 42.3% and 37.6% of the participants with diabetes duration of >10 years. This long duration could be associated with poorer glycemia and developing complications that might reflect the higher need for diabetic patients to visit physicians and clinics to seek counselling and treatment.

In the current study, more than half of the participants have an eye disease. A study by Mohammed et al. [26] from Yamen 2015, reported a much higher proportion of diabetic patients with eye diseases 143 (78.6%). current study was the most recent, increasing the coverage screening program for early detection of diabetes, and developing effective strategies to prevent complications might explain the lower proportion of complications in the current study.

2-The awareness regarding diabetic retinopathy among the study participants:

In the current study, the overall awareness regarding diabetic retinopathy was good among more than half of the participants. These findings vary from the reports of other studies. Almalki et al., [21] reported that the overall awareness was 64% of the screened type 2 diabetes. Alali et al., [25] reported good awareness among the diabetic Saudi participants of 54.7%, and poor awareness of 45.3%. Allehibi et al. [27] reported the level of awareness among Saudi diabetic participants was high 21%, average 49%, and weak 30%. While in Buari et al. study [28] found that 49.4% of the study sample were aware. The level of awareness varies between studies due to differences in the definition and measurement of awareness by different criteria, methods, and tools of assessment. Moreover, clinical characteristics of the patients, such as age, sex, education, income, development of the health care services, duration of diabetes, glycemic control, comorbidities, and complications. These factors may influence the level of awareness of diabetic retinopathy among patients.

Good awareness regarding diabetic retinopathy appeared to be related significantly to a high socioeconomic state, with a family history of diabetes, duration of diabetes of 6-10 years, participants who treated diabetes with diet and exercise, and participants with diabetic retinopathy and cataracts. However, in the current study educational level was without significant association with the level of awareness. A study by Mohammed et al. [26] from Yemen, reported a significant association between educational level and awareness toward diabetic retinopathy (P=0.009), where a higher educational level had a higher proportion of awareness. The same study reported no significant association between age, sex, and duration of diabetes with awareness. A study by Fadil et al. [29] reported no significant association between the level of knowledge with the age, sex, educational level, and diabetes duration. A study by Allehibi et al. [27] found that age younger than 40, being female, having intermediate and above education, duration of more than 5 years, positive family history, and controlled blood glucose level were all the factors associated with higher level of awareness. The explanations behind current study findings can be explained by a high socioeconomic status may indicate a higher level of education, income, and access to health care services, which may enable patients to obtain more information and resources about diabetes and eye diseases and to afford regular eye examinations and treatments. A family history of diabetes may increase the awareness of the genetic risk and the importance of prevention and screening for diabetes and its complications, especially if the family members have experienced vision loss or other adverse outcomes due to diabetic retinopathy. A duration of diabetes of 6-10 years may reflect a moderate stage of diabetes, where patients have been diagnosed and treated for a sufficient period to learn about the disease and its management but have not yet developed severe or advanced complications that may impair their awareness or compliance. Participants who treated diabetes with diet and exercise may have better glycemic control and a lower risk of developing or worsening diabetic retinopathy, as well as higher motivation and self-efficacy to adopt healthy behaviours and prevent complications.

Participants with cataracts and diabetic retinopathy may have a higher awareness of diabetic retinopathy because they have experienced visual impairment and have sought eye care services, where they may have been informed or screened for diabetic retinopathy by ophthalmologists.

Moreover, the current study failed to achieve statistical significance between the level of awareness and educational level (P=0.09) despite reporting the proportions of participants with good awareness increased with higher educational level, and the proportion of participants with poor awareness increased with lower education, however, increasing the sample size may increase the statistical power of the study to achieve a more precise finding.

CONCLUSION:

The current study concluded the following:

1. The overall good awareness was among the majority of study participants.
2. Poor practice of periodic eye examination was among the majority.
3. Cost, not having a symptom, fear of discovering something bad were the main barriers of periodic eye examination.
4. The good awareness was significantly associated with positive family history of diabetes, duration more than 6 years of diabetes, those who treat diabetes with diet and exercise and middle and high SEI.
5. Attendance of periodic eye examination was significantly lower among participants below 40 years, with primary school (or can read and write), and unskilled manual occupations.

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