

Determinants of Awareness and Knowledge About Diabetic Retinopathy In Long-Standing Type 2 Diabetes Mellitus

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Abstract: Background: Diabetic retinopathy (DR) is a complication of diabetes that affects the eye and is asymptomatic till it reaches advanced stages. The present study was designed to assess the determinants of awareness and knowledge of DR in type 2 diabetic patients. Objectives: To assess the determinants of awareness and knowledge about diabetic retinopathy (DR) in long-standing type 2 diabetes mellitus (DM) patients. Material & Methods: A cross-sectional study was conducted on patients with type 2 DM for two months in a rural-based hospital in Central India. A brief structured open-ended questionnaire was used to collect information about the subjects' awareness and knowledge about DR. A detailed history of the subjects including demographic details, BMI, socioeconomic status and treatment modalities were also obtained. The ocular examination in detail was performed by a retina consultant to diagnose the stage of DR. Results: Out of 328 participants, there were 181 male (55.18%) and 147 female subjects (44.81%) in the study. 71.30% of patients were being treated with oral hypoglycemic drugs, 14% with insulin and 9.5% with both. Only 21.7% were aware of the involvement of retina in Diabetes. More than half of the type 2 DM patients (52.4%) were not advised eye examination by the physician. Conclusion: Awareness and knowledge regarding DR are poor. There is a need to spread awareness about DR in the community to avoid blinding complications. [Sthapak A Natl J Integr Res Med, 2020; 11(6):1-6]

Key Words: Awareness, Diabetic retinopathy, Knowledge

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Introduction: Diabetic retinopathy is a complication of diabetes that affects the eye. Diabetic retinopathy [DR] is asymptomatic until it reaches advanced stages. Previous researchers have shown that not even half of the diabetic patients were aware of the major risk factors of diabetic retinopathy and even a lesser percentage knew the treatment that is available for it. A trend of increasing awareness with increasing severity of retinopathy has been reported in previous studies demonstrating that a lack of utilization of ophthalmic services is largely due to the disease being asymptomatic¹. A study reported that while awareness about cataract and night blindness was moderate, less than one third had awareness about diabetic retinopathy².

Previous studies have stated that poor knowledge and awareness regarding diabetic retinopathy are the major reasons for the morbidity associated with diabetic retinopathy. Prevention of non-communicable disease through increased awareness needs to be the thrust of the effort in resource-poor contexts, where the treatment can be prohibitively costly³. Previous research has shown that more than half of the diabetic population in rural areas has never had an eye examination⁴. The treatment options available for DR are expensive whereas the prophylaxis at earlier stages is economically preferable for patients of the suburban and rural populations. With the above context, the present

study was designed to assess the determinants of awareness and knowledge of diabetic retinopathy in patients with long-standing type 2 DM

Materials and Methods: A hospital-based cross-sectional study was conducted on type 2 DM patients in a rural-based tertiary care hospital of a single academic institute in India. After the institutional ethics committee approval, written informed consent was obtained from all patients. Adults aged ≥ 40 years, reporting from the peripheral outreach camps and the out-patient department who were referred to retina clinic for two months were included. All patients with long-standing Type 2 diabetes mellitus (minimum 5 years) were included. The demographic data, socio-economic information, medical and ophthalmic history was recorded.

A detailed history regarding the duration of diabetes, previous treatment for retinopathy and treatment for diabetes was recorded. Body mass index was calculated in each subject after noting down weight and height. Ophthalmic examination included recording the best-corrected visual acuity on presentation using Snellen's chart at 6m. Slit-lamp biomicroscopy (Topcon, Oakland, NJ, USA) and fundus evaluation (+90D and indirect ophthalmoscopy) were done by the retina consultant to diagnose the stage of diabetic retinopathy and other ocular

co-morbidities. All the patient education material related to diabetic retinopathy was concealed from the study area before starting this study.

Definitions: A patient was defined as having long-standing diabetes mellitus (DM) if he or she had a history of diabetes or being treated for diabetes for the past 5 years. Type 2 DM - defined if the participant was 40 years or older when diagnosed with DM.

A brief structured, pre-tested, open-ended questionnaire was used to collect information about the subject's awareness and knowledge about diabetic retinopathy. Demographic details and literacy levels of all subjects were also obtained.

The patients' socio-economic score on the modified Kuppuswamy scale was calculated. Respondents were asked questions about the risk factors for diabetic retinopathy and treatment options.

Good knowledge: A subject was considered to have good knowledge, if he/she was able to identify the risk factors for diabetic retinopathy such as duration and control of diabetes, family history, hypertension, obesity and further able to identify correctly the frequency and method of eye examination and treatment like adequate control of blood sugar and blood pressure, laser, and surgery.

Fair knowledge: If at least two of the risk factors and one of the treatment options was provided correctly.

Poor knowledge: Subjects were considered to have poor knowledge if they were unable to identify even a single risk factor or treatment option for diabetic retinopathy.

All patients were given a patient education leaflet in their vernacular language explaining about diabetic eye disorders, its follow up examination schedule and the available treatment options for awareness purposes.

Statistical Analysis: The distribution of participants according to levels of different characteristics was obtained in terms of frequencies and percentages. The socio-economic status for the urban category was obtained using a modified Kuppuswamy scale.

Also, the knowledge level of participants from the urban and rural sectors was obtained in terms of frequencies and percentages. The analysis was performed using Epi info software version 6.

Results: A total of 328 type 2 DM patients participated in this two-months study. There were 181 males (55.18%) and 147 female patients (44.81%). The demographic profile including socioeconomic status, Body Mass Index [BMI], family history of diabetes and frequency of hypertension is shown in Table 1.

Table 1: Demographic Profile Of Type 2 DM Patients (N=328)

Variant	Examined	Percentage (%)
Gender		
Male	181	55.18
Female	147	44.81
Total	328	100
Socioeconomic status Modified Kuppuswamy Scale		
Class I	14	4.30
Class II	84	25.60
Class III	122	37.20
Class IV	91	27.70
Class V	17	5.20
Body Mass Index		
Underweight	28	8.50
Normal	162	49.40
Overweight	96	29.30
Obese	42	12.80
Family History of Diabetes Mellitus		
Present	89	27.10
Absent	194	59.10
Don't Know	45	13.70
Hypertension		
Present	169	51.50
Absent	159	48.50

The mean fasting blood sugar was 144.81 mg/dL with a standard deviation of 56.689 and the mean post-meal blood sugar was 229.27 mg/dL with a standard deviation of 95.770 as shown in Table 2. Among the 328 patients of the study, 15.2% (72) had undergone a test for glycosylated hemoglobin in the blood (HbA1c test).

The remaining 256 patients had never been tested for the HbA1c levels in the blood.

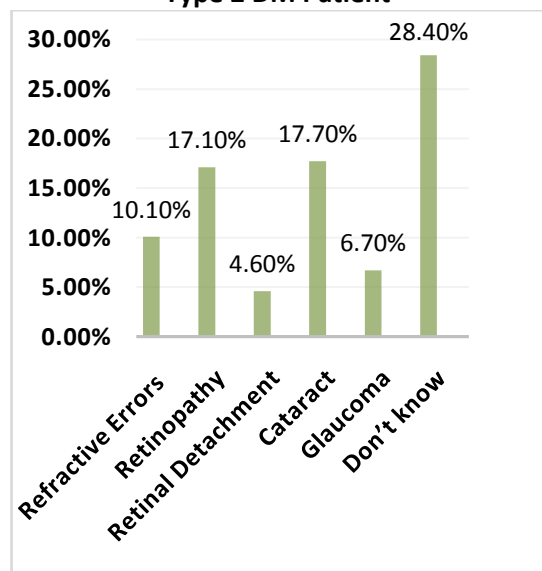
Table 2: Blood Glucose Level In Patients Of Type 2 DM Patients On Presentation

Blood Glucose	Minimum	Maximum	Mean	SD
FBS (mg/dL)	70	375	144.81	56.689
PMBS (mg/dL)	102	660	229.27	95.770

FBS: Fasting blood sugar; PMBS: Post-meal blood sugar; SD: Standard Deviation

Patients were interviewed for their awareness related to the ocular involvement in type 2DM; multiple answers were allowed and is represented in Figure 1. Diabetic retinopathy is an ocular complication of Type 2DM was known to only 17%.

Figure 1: Awareness Of Ocular Involvement In Type 2 DM Patient



When interviewed to understand overall knowledge about DR, the participants were asked about questions related to risk factors for and treatment modality for DR as shown in Table 3.

The major risk factor identified was obesity by 53 (16.15%), while a family history of DM and uncontrolled blood sugar levels as risk factors were identified by only 38 (11.58%). Out of 328 patients, 112 (40.14%) knew about blood glucose control as the treatment modality but only 12 patients (4.30%) knew about laser treatment. Of all, 84 (30.10%) participants did not know about any treatment modality for DR. Overall knowledge levels of the participants are shown in table 3. Out of 328 patients, 14 patients (4.26%) had good, 191 (58.23%) had fair, while 123 (37.50%) had poor knowledge about DR.

Table 3: Knowledge About DR In Type 2DM Patients

Risk Factors Knowledge	Frequency	Percentage (%)
Uncontrolled Blood Sugar Levels	38	11.58
Family History Of Diabetes	38	11.58
Obesity	53	16.15
Hyperlipidemia	20	6.09
Hypertension	38	11.58
Don't Know	123	37.50
Treatment Modality Knowledge	Frequency	Percentage
Blood Glucose Control	112	40.14
Laser Therapy	12	4.30
Surgery	57	20.43
Injection In The Eye	14	5.01
Hyperlipidemia	20	6.09
Don't Know	84	30.10
Overall Grade Of Knowledge	Frequency	Percentage
Good	14	4.26%
Fair	191	58.23%
Poor	123	37.50%
Total	328	100%

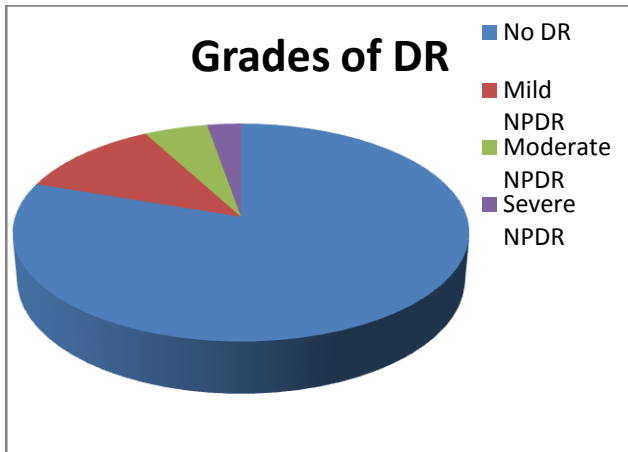
Table 4 shows the data regarding past advice by physicians for an eye checkup. 172 out of 328 patients (52.4%) said that they were never advised by their physician to visit an ophthalmologist for an eye examination when they were diagnosed with DM. 30.2% stated that they had received advice for an eye exam while 17.4% couldn't remember any physician mentioning it. More than half (55.2%) of the patients never had an eye examination in the past.

Table 4 : Past Advice (By The Physician) For Eye Checkup After Detection Of Diabetic Retinopathy

Response	Frequency	Percentage (%)
Yes	99	30.2
No	172	52.4
Don't Remember	57	17.4
Total	328	100

Figure 2 shows the grading of DR in type of 2 DM patients. Mild non-proliferative diabetic retinopathy was seen in 11.8%, moderate NPDR was found in 5.3% and 2.6% had severe NPDR. Clinically Significant Macular Edema was seen in 9.6% of patients. Proliferative DR was seen in 6.8% of the patients and Retinal Detachment was observed in 2.1 % of the participants.

Figure 2: The Grading Of DR In Type Of 2 DM Patients.



Discussion: Diabetic retinopathy is a complication of diabetes that causes damage to the microvasculature of the retina. DR remains the leading cause of blindness among working-age adults in the world⁵. It is estimated that by 2025 the prevalence of diabetes in India will increase and approximately 57 million people will be affected by it and so the complications related to it will increase too^{6,7,8}. India has 31.7 million diabetic subjects, and the number is expected to increase to 79.4 million by 2030, as proposed by the World Health Organization (WHO) in its latest report^{9,10}. Diabetic retinopathy can be treated if screened at early stages. In our current study, 328 long-standing type 2 DM patients were interviewed and also examined to obtain the data regarding the knowledge and awareness of DR.

These patients were screened for DR by an experienced retina specialist. Studies determining the awareness of eye diseases have reported a poor awareness regarding diabetic retinopathy. A study conducted in Andhra Pradesh stated that while awareness about cataract and night blindness was moderate, subjects had low awareness (27.0%) about diabetic retinopathy¹¹. In our current study, 42.58% of the patients were aware that diabetes can cause complications of the eyes while 33.49% did not know any organs being affected by diabetes. In a study conducted

in Kerala, 576 patients out of total 1096 were not aware that diabetes could result in blindness¹². Such poor knowledge regarding the vision-threatening complications of diabetes is alarming especially those who have long-standing diabetes. Only 17.10% of the patients in our study could identify retinopathy as a complication of diabetes. Retinal detachment as a blinding complication of diabetic retinopathy was identified by 4.6% patients only.

Obesity was identified as a major risk factor by the participants whereas hypertension, family history of DM, and uncontrolled blood sugar levels were identified as other risk factors in equal proportion. Awareness of diabetic retinopathy was found in 27.9% (182) of the patients in a research conducted in Karnataka. In this study, 66.5% (435) of the patients were advised eye checkups by the physicians but only 9% were aware about the treatment for diabetic retinopathy¹³.

More than half of the patients in our study stated that they were never advised by their doctors for an eye examination when they were diagnosed with DM. The physician or an endocrinologist sees a diabetic patient first, much before the ophthalmologist, hence there is a need to educate the diabetic patient about the effects of the disease and guide them to an ophthalmologist¹⁴.

In our study, 60.7% of the patients believed that patients with uncontrolled blood sugar levels must undergo an eye checkup. Also, 57.0% of patients stated that diabetics must undergo routine eye checkups even if their blood glucose levels are under control. And yet, 55.7% of the patients had never had an eye check-up in the past. This reveals the gap between the awareness, attitude and practice patterns of the patients. With effective management strategies, visual loss due to the disease can be controlled and further complications could be prevented¹⁵.

For the available treatment options, 34.1% of patients stated that controlling the blood glucose level is adequate to prevent retinopathy. However, 1/4th of the study population was unaware of any treatment modalities that are present. This rationalizes the observation that patients with retinopathy do not seek timely healthcare and present with advanced stages of retinopathy.

In our study, we found that 30% of the study population had diabetic retinopathy on presentation. The majority of these cases presented with mild NPDR and Clinically Significant Macular edema (CSME) was observed in 10% of the total patients. The prevalence of CSME was found to be more with the increasing age of diabetics. The incidence was as per the reference studies¹⁶.

New therapies, such as intraocular injection of steroids and anti-vascular endothelial growth factor agents, are less destructive to the retina than are older therapies and could be useful in patients who respond poorly to conventional therapy^{17,18}. Optimal measures need to be taken to educate the patients about the newer and safer treatment modalities that have emerged.

The results of our study reveal that there is a need to take steps towards increasing knowledge and awareness regarding diabetes and its ocular complications in the patients of diabetes. There are a few shortcomings in our study. The duration of our study was two months due to which fewer participants were included in the study.

Although the sample size was less but the results of our study point towards the lack of awareness about the blinding complications and guidelines about eye check-up in diabetic patients. Even though most of the diabetic patients attended diabetic clinics regularly, they did not know about the irreversible blindness due to end-stage diabetic eye disease. Through direct public education and mass media campaigns, awareness must be improved at the local level.

If similar efforts are implemented state-wise and nationally, prevention and control of non-communicable diseases, specifically diabetes, can be an achievable goal in India¹⁹. The present study revealed that although more than half of the diabetic patients were aware of diabetes affecting the eyes, very few diabetic patients were knowledgeable about the blindness due to diabetic retinopathy. The fact that diabetes is a systemic disease and affects both eyes, early screening can prevent the loss of sight and blindness.

As diabetes is a hereditary disease spreading awareness about it in one diabetic patient will help in preventing blindness in his next generation also.

Conclusion: Awareness and knowledge related to diabetic retinopathy and its management are very poor in developing countries like India. Also, there is a need to spread awareness about the modalities of treatment that are available for DR which can halt the progression of diabetic retinopathy and avoid blindness.

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