

An Assessment of Awareness regarding Diabetic Retinopathy among patients with Diabetes mellitus attending a medical college hospital in southern India.

Dr.Chintapatla Naveena¹, Dr.B.Sravani², Dr.Venigalla Yamini Prathyusha*³

¹Senior resident , Department of ophthalmology, Apollo institute of medical sciences and research ,Chittoor, Andhra Pradesh .

²Senior Resident , Department of ophthalmology, Apollo institute of medical sciences and research, Chittoor, Andhra Pradesh .

³Assistant Professor, department of ophthalmology, Apollo institute of medical sciences and research Chittoor, Andhra

Pradesh.yamini.prathyusha11@gmail.com

ABSTRACT

Background and Objectives- Diabetic Retinopathy has emerged as a major cause of visual disability leading to irreversible blindness among adults due to progressive damage to the retinal microvasculature. A large percentage of DR-related visual impairment can be avoided with early intervention. Thus, increasing awareness among high-risk individuals, diabetic patients, and their families is essential for advancing early DR screening and diagnosis. To evaluate the level of awareness regarding diabetic retinopathy among patients diagnosed with diabetes mellitus.

Methodology: This single-centre, cross-sectional, questionnaire-based study was conducted from August 2024 to December 2024 in a medical college hospital. A customized questionnaire was created. The questions were read aloud to patients in their primary dialect, and their responses were noted, and then eye examination was done.

Results: Out of the 265 patients screened, 47.1% are aware that diabetes can impact eye health, 44% recognize the necessity for regular eye exams for diabetics, and 29.4% are familiar with dilated eye examinations and 27.1% have heard about diabetic retinopathy, while 24.9% understand that diabetic retinopathy can lead to vision loss. Regarding awareness of the prevention and treatment of diabetic retinopathy, 22.3% know that reduced vision caused by diabetic retinopathy is treatable, and 20% believe that timely intervention can prevent or postpone damage resulting from diabetic retinopathy.

Conclusion: There is a critical need to enhance awareness regarding diabetic retinopathy (DR) and the significance of retinal screening within our community to mitigate visual impairment resulting from diabetes.

KEYWORDS: Diabetic Retinopathy, Awareness, Diabetes Mellitus, Visual Impairment, Screening and Prevention, Cross-Sectional Study.

How to Cite: Dr.Chintapatla Naveena, Dr.B.Sravani, Dr.Venigalla Yamini Prathyusha, (2025) An Assessment of Awareness regarding Diabetic Retinopathy among patients with Diabetes mellitus attending a medical college hospital in southern India., Vascular and Endovascular Review, Vol.8, No.4s, 29-34.

INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by elevated blood sugar levels due to defect in either insulin secretion, insulin action, or both [1].

International Diabetes Federation estimates that 537 million individuals (9.8%) between the ages of 20 and 79 worldwide and 74 million Indians (9.6%) suffer from diabetes mellitus in 2021. In India, this number is expected to increase to 134 million by 2045. One in six adults with diabetes worldwide is from India, making it the nation with the second-highest prevalence of the disease [2].

Diabetic Retinopathy, a complication of diabetic mellitus has emerged as a major cause of visual disability leading to irreversible blindness among adults due to progressive damage to the retinal microvasculature [3]. According to the latest meta-analysis, the prevalence of DR in India was 14% in rural regions and 17.44% in urban areas and the prevalence of DR-related vision impairment and blindness in India is 21.1% and 2.4%, respectively [4,5]

Risk factors that increase Diabetic Retinopathy complications include age, uncontrolled blood sugar, smoking, high blood pressure, hypercholesterolemia, and prolonged duration of diabetes mellitus. [6]

However, DR may not cause any symptoms until there is a noticeable loss of vision so early identification is crucial in avoiding DR-related blindness. [7]

Routine comprehensive eye examination helps to detect early treatable stages of DR [8]

A large percentage of DR-related visual impairment can be avoided with early intervention, which includes diabetes screening and treatment. Awareness of DR and its effect on vision is an important prerequisite for attendance in screening [9]. With the available cost-effective screening techniques, appropriate strategies can be made to diagnose DR early. [10] Therefore, in addition

to promptly diagnosing and treating diabetes mellitus, early screening for preventable ocular complications of diabetes, such as DR, is crucial. This will enhance the patient's health and well-being and help with long-term care management [11]. Thus, increasing awareness among high-risk individuals, diabetic patients, and their families is essential for advancing early DR screening and diagnosis [10].

This hospital-based study was conducted in the medical college hospital in South India, to determine the awareness regarding Diabetic Retinopathy among patients with diabetes mellitus.

MATERIALS AND METHODS

This is a single-centre cross-sectional questionnaire-based study conducted from January 2024 to December 2024. The study was performed on patients attending ophthalmology OPD at the medical college hospital.

Inclusion Criteria:

1. The patients aged >20 years diagnosed with type I or type II diabetes > 1 year duration
2. The patients willing to participate in the study

Exclusion Criteria:

1. The patients with congenital eye disorders, ocular trauma, media opacities.
2. Patients <20 years
3. The patients not willing to give consent were excluded.

The study was conducted after the approval of institutional ethics clearance, and informed consent was obtained from each participant before the study. Considering the overall prevalence of 21.7% [12] and absolute allowable error of 5%, the sample size was calculated using the following formula: $N = (Z_{\alpha/2})^2 PQ/D^2$, the minimum required sample size was 262, so the final sample size taken for the study was 265.

After reviewing and compiling the questions from previous studies on diabetic retinopathy, a customized questionnaire was created. The questionnaire was composed of 11 questions: 3 of them about diabetes, 3 questions about knowledge of diabetic retinopathy, 2 of them about prevention and treatment and the last 3 questions about screening. The questionnaire was translated into Telugu, the primary dialect used in this region. The questions were read aloud to patients, and their responses were noted and then eye examination was done.

Awareness Questionnaire of Diabetic Retinopathy	
1. How long have you been suffering from diabetes?	
a) ≤ 5 years b) 6-9 years c) 10-14 years d) ≥ 15 years	
2. Do you have any family history of diabetes? Yes/No	
3. Do you know what the normal blood sugar level is? Yes/No	
4. Are you aware that diabetes can affect your eyes? Yes/No	
5. Have you heard of diabetic retinopathy? Yes/No	
6. Do you think that diabetic retinopathy can lead to blindness? Yes/ No	
7. Is decreased vision caused by diabetic retinopathy treatable? Yes/ No	
8. Can timely treatment prevent, or delay damage caused by diabetic retinopathy? Yes/ No	
9. Are you aware that people with diabetes need regular eye checkups? Yes/ No	
10. Have you heard of dilated eye examination? Yes/No	
11. When was your last eye checkup?	
a) <6 months b) 6-12 months c) 1-2 years d) >2 years	

Best corrected visual acuity was assessed by Snellen's chart, anterior segment examination was done by slit lamp and pupil reactions were noted.

Dilated fundus examination done by slit lamp using 90D lens and grading of retinopathy noted.

The data collected from the participants were systematically entered into a Microsoft Excel spreadsheet. The study results underwent statistical analysis utilizing the Chi-square test. Discontinuous or categorical data were represented as percentages. P-values were reported and interpreted at a significance level of 0.05%.

RESULTS

Table 1- Socio-Demographic profile of study participants

Socio-demographic indicators	n=265
<u>Age (years)</u>	
20-34	11(4.1%)
35-49	76(28.6%)

50-64	153(57.7%)
>65	25(9.4%)
<u>Gender</u>	
Male	157(59.2%)
Female	108 (40.8%)
<u>Educational level</u>	
Illiterate	42(15.8%)
Primary	113(42.7%)
Secondary	72(27.2%)
Graduate or higher	38(14.3%)
<u>Duration of diabetes</u>	
≤5years	118(44.5%)
6-9 years	87(32.8%)
10-14 years	46(17.3%)
>15 years	14(5.8%)
<u>Family history of diabetes</u>	
Yes	88(33.2%)
No	177(66.8%)
<u>Diabetic retinopathy severity</u>	
No retinopathy	209(79%)
NPDR	45(17%)
PDR	11(4%)
<u>Last eye checkup</u>	
<6 months	42(16%)
6-12 months	30(11.3%)
1-2 years	86(32.4%)
>2 years	107(40.3%)

Most participants in our study were aged 35-64 years, accounting for 86.3% with mean age of 52.9 years. Majority of patients were males (59.2%) with primary level education (42.7%). All individuals in the study had previously been diagnosed with Type I / Type II diabetes. Among the sample size, 118 (44.5%) were identified with the condition for less than 5 years, 87 (32.8%) for 6-9 years, 46 (17.3%) for 10-14 years, and 14 (5.8%) for more than 15 years.

Out of the 265 patients evaluated, 56 (22%) were found to have diabetic retinopathy (DR), of which 45 (17%) were diagnosed with non-proliferative diabetic retinopathy (NPDR), and 11 (4%) with proliferative diabetic retinopathy (PDR).

Out of 265 patients screened, 42 (16%) had their most recent eye checkup within the past 6 months, 30 (11.3%) had their checkup between 6 to 12 months, 86 (32.4%) had it within 1 to 2 years, and 107 (40.3%) had their last exam over 5 years ago

Table 2- Awareness of diabetic retinopathy among diabetic patients:

Sl.no	Item	Ans wer	Duration of diabetes in years				p-value between duration of DM	Total n (%)	Male 157	Female 108
			≤5	6-9	9-14	>15				
1	Are you aware that diabetes can affect your eyes?	Yes	48(46%)	40(46%)	26(56.5%)	11(78.5%)	0.02*	125(47.1%)	83(52.9%)	42(38.9%)
		No	70(59.4%)	47(54%)	20(43.5%)	3(21.5%)		140(52.9%)	74(47.1%)	66(61.1%)
		No	73(62%)	50(57.5%)	22(47.9%)	3(21.5%)		148(56%)	77(49%)	71(65.7%)
2	Have you heard of diabetic retinopathy	Yes	22(18.6%)	24(28%)	18(39%)	8(57.1%)	<0.002*	72(27.1%)	49(31.2%)	23(21.2%)
		No	96(81.4%)	63(72%)	28(61%)	6(42.9%)		193(72.9%)	108(68.8%)	85(78.8%)

3	Do you think that diabetic retinopathy Can lead to blindness?	Yes	18(15.2%)	22(25.2%)	20(43.4%)	6(42.9%)	<0.000*	66(24.9%)	42(26.8%)	24(22.2%)
		No	100(84.8%)	65(74.8%)	26(56.6%)	8(57.1%)		199(75.1%)	115(73.2%)	84(77.8%)
4	Is decreased vision caused by diabetic retinopathy treatable?	Yes	16(13.5%)	20(22.9%)	17(36.9%)	6(42.9%)	<0.003*	59(22.3%)	40(25.5%)	19(17.5%)
		No	102(86.5%)	70(80.5%)	31(67.4%)	8(57.1%)		206(77.7%)	117(74.5%)	89(82.5%)
5	Can timely treatment prevent, or delay Damage caused by diabetic retinopathy?	Yes	16(13.5%)	17(19.5%)	15(32.6%)	5(35.7%)	0.02*	53(20%)	38(24.2%)	15(13.9%)
		No	102(86.5%)	70(80.5%)	31(67.4%)	9(64.3%)		212(80%)	119(75.5%)	93(86.1%)
6	Are you aware that people with diabetes need regular eye checkups?	Yes	45(38%)	37(42.5%)	24(52.1%)	11(78.5%)	0.02*	117(44%)	80(51%)	37(34.2%)
		No	73(62%)	50(57.5%)	22(47.9%)	3(21.5%)		148(56%)	77(49%)	71(65.7%)
7	Have you heard of dilated eye examination?	Yes	24(20.3%)	26(29.8%)	20(43.4%)	8(57.1%)	<0.002*	78(29.4%)	52(33.1%)	26(24%)
		No	94(79.7%)	61(70.2%)	26(56.6%)	6(42.9%)		187(70.6%)	105(66.9%)	82(76%)

Out of the 265 patients screened, 47.1% are aware that diabetes can impact eye health, 44% recognize the necessity for regular eye exams for diabetics, and 29.4% are familiar with dilated eye examinations. Among the 265 patients evaluated, 27.1% have heard about diabetic retinopathy, while 24.9% understand that diabetic retinopathy can lead to vision loss.

Regarding awareness of the prevention and treatment of diabetic retinopathy, 22.3% know that reduced vision caused by diabetic retinopathy is treatable, and 20% believe that timely intervention can prevent or postpone damage resulting from diabetic retinopathy.

DISCUSSION

Many individuals lack awareness of diabetic retinopathy (DR), which poses a significant challenge as it affects the treatment and prevention of vision loss related to diabetes [13]. This study examines the level of understanding of diabetic retinopathy among patients with diabetes mellitus at a hospital in South India.

The prevalence of diabetic retinopathy (DR) among diabetic patients in the present study was 21%. This is consistent with the study conducted by Salil S. Gadkari et al., which reported a prevalence of 21.7% [14]. In our study, 47.1% of participants were aware that diabetes could affect their eyes, and only 24.9% knew that diabetes could lead to blindness. In contrast, the study by Akansha Singh et al. found that 79% of subjects were aware of the potential impact of diabetes on eye health, and 69% knew that it could result in blindness [13]. This may be because a considerable number of patients in this study are from rural areas and have low literacy levels. Therefore, improving literacy rates should be regarded as a long-term strategy for addressing these challenges.

In this study, 47.1% of participants knew that diabetes can affect the eyes. However, only 27.1% had heard of diabetic retinopathy, and just 22.3% knew that diabetic retinopathy can be treated. These results indicate a need for further investigation into strategies aimed at improving awareness and understanding of diabetic retinopathy.

In this study, females have a lower awareness of diabetes and its ocular complications, which may be a consequence of their limited interaction with the outside world compared to males in familial settings. This finding emphasizes the critical need for targeted awareness initiatives to educate females on these important health issues.

Our findings indicate a statistically significant association between the duration of diabetes mellitus (DM) and awareness of diabetic retinopathy (DR). A study from Turkey revealed that patients with type 2 DM for more than 10 years exhibited a higher level of awareness regarding DR [15]. These results are consistent with a report from Saudi Arabia [16]. Additionally, research conducted by Alsaidan et al. demonstrates that the level of awareness about DR is influenced by the duration of diabetes [17]

It is recommended to annually check the eyes of diabetic patients for earlier diagnosis of DR and prevention of its complications as it has a silent course at the first stages.. Our research indicates that 44% of patients acknowledge the importance of regular eye check-ups for individuals with diabetes. However, only 24.9% know about dilated eye examinations and merely 16% attend regular eye examinations. Remarkably, even in regions with high awareness of diabetic retinopathy (DR), many individuals with diabetes do not visit ophthalmology clinics for the recommended routine examinations. For instance, a study conducted in Japan revealed that, although over 98% of patients were aware of DR, only 69.5% sought regular care from an ophthalmologist [18]. This highlights a notable gap between awareness and practice. Therefore, it is essential to not only enhance knowledge but also to encourage behavioural changes to improve patient compliance and self-care [19]. Primary care physicians should educate patients about the importance of screening and verify their compliance at follow-up appointments. Newly diagnosed diabetic patients should receive a fundus examination as soon as possible and are encouraged to have one at least annually thereafter [20]. Given that diabetic retinopathy (DR) complications worsen with a longer duration of diabetes, healthcare practitioners must promote awareness of DR in the early stages of diabetes mellitus (DM). Additionally, public health awareness campaigns should be strategically planned. Since some members of the community may have limited access to higher education, it is essential to revise school programs to enhance awareness of noncommunicable diseases, such as diabetes mellitus [20].

The limitation of this study is as it included patients from the Ophthalmology outpatient department of a single medical college hospital, which may limit the results to the broader population in India.

CONCLUSION

This study was conducted to evaluate the awareness of diabetic retinopathy (DR) among patients with diabetes mellitus. Nearly half of the participants knew that diabetes could affect the eyes, but they were not informed about diabetic retinopathy, its prevention, and screening procedures. The positive predictor of awareness of diabetic retinopathy in this study was the duration of diabetes.

There is a critical need to enhance awareness regarding diabetic retinopathy (DR) and the significance of retinal screening within our community to mitigate visual impairment resulting from diabetes. It is essential to train community healthcare workers, so they can advise and refer diabetics for regular ophthalmological screenings. Targeted awareness campaigns aimed specifically at rural populations should be developed and implemented. Furthermore, it would be beneficial to strengthen the screening services available at community health centres, and establishing regular diabetic retinopathy screening programs will ensure that these vital services are consistently accessible to the community.

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