

## A study of awareness of diabetic retinopathy, knowledge about its effect on vision & treatment options among the diabetic patients visiting the ophthalmology department

Shruti P Hegde<sup>1,\*</sup>, Machireddy R Shekarreddy<sup>2</sup>, Mohan Ram Kumar<sup>3</sup>, Vijay Kautilya D<sup>4</sup>

<sup>1</sup>Associate professor, <sup>2</sup>Post Graduate Student, <sup>3</sup>Senior Resident, <sup>4</sup>Associate Professor, <sup>1,2,3</sup>Dept. of Ophthalmology, <sup>4</sup>Dept. of Forensic Medicine & Toxicology, Shri Sathya Sai Medical College & Research Institute

**\*Corresponding Author:**

Email: docshruti@gmail.com

### Abstract

**Introduction:** Diabetic retinopathy is an important microvascular complication of diabetes mellitus & to prevent the vision loss resulting from it, regular screening & timely diagnosis are very important. This study attempts to measure the level of awareness about eye complications of diabetes among patients with type II diabetes mellitus & their knowledge about its effect on vision and the available treatment options.

**Methods:** A cross-sectional hospital based study was carried over a period of 6 months at ophthalmology OPD of a medical college hospital. The data collected was tabulated and is presented here as descriptive statistics, frequencies and ratios.

**Results and Discussion:** Among 100 patients included in this study only 36 patients were aware of eye involvement in Diabetes mellitus. Only 17 patients knew the need for eye checkup even when sugar levels are controlled. 68 patients were getting their eyes tested for the first time. The commonest cause for not getting regular eye checkups, other than lack of awareness, was difficulty in reaching the hospital & time constraints.

**Conclusion:** In spite of increase in incidence of DM in India, the awareness about eye complications & retinopathy remains poor among the affected patients. There is a clear cut difference in perception, between the general diabetic care & eye care, among these patients. Physicians play an important role in referring the patients for eye checkup.

**Keywords:** Awareness, Complications, Diabetic retinopathy, Eye screening.

### Introduction

India is said to have maximum number of diabetic patients in the world with the latest update showing about 62 millions of people to be affected with diabetes mellitus (DM) in India.<sup>(1)</sup> Diabetic retinopathy which is a microvascular complication of DM is said to be present in about one third of patients with DM in the world.<sup>(2)</sup> Two studies from India show its incidence to be 18% & 21% respectively.<sup>(3,4)</sup> Visual loss resulting from diabetic retinopathy is largely preventable. Regular screening & early diagnosis are key factors which could influence the prevention of visual loss in diabetic retinopathy. Screening for retinopathy & laser photocoagulation in DM patients at risk are said to be beneficial.<sup>(5)</sup>

For regular screening & timely diagnosis of diabetic retinopathy it is very important that patients with DM visit the ophthalmologist for regular eye checkups. This indeed is possible only when diabetic patients have a thorough knowledge about retinopathy screening & available treatment options.

We undertook this study among all the diabetic patients visiting our ophthalmology OPD over a period of 6 months to assess the level of awareness towards complications of diabetic retinopathy, their effect on vision and the available treatment options. This in turn will help us understand the nature of choices made by the patients with diabetes.

### Methods

A cross-sectional hospital based study was conducted at ophthalmic OPD at a medical college hospital for a period of 6 months from August 2016 to January 2017. Institutional ethical committee clearance was obtained prior to the beginning of the study. All the diabetic patients visiting the ophthalmology OPD with eye complaints or referred by other departments for fundus examination were included in the study. An informed consent was taken from the participants. Number of patients getting the eye examination done for the first time was noted down. A detailed history was taken from all the patients by administering a predesigned questionnaire (Table 1). As a routine, a detailed ocular examination was done which included examination of the anterior segment, dry eye evaluation, intra ocular pressure measurement & dilated fundus examination with indirect ophthalmoscope & 90 D lens with slit lamp biomicroscope, for all the patients.

The data thus collected with the help of the questionnaire was tabulated and analyzed using SPSS statistical software version 23. The data was analyzed and presented as frequencies, rates and ratios.

**Table 1: Questionnaire used to interview the participants**

Questionnaire		
<b>Title:</b> A prospective study of awareness about diabetic retinopathy, its effect on vision & available treatment options among the diabetic patients visiting our tertiary care hospital, Kancheepuram district.		
Name:	Age:	Gender: M/F/TG
Place:	Contact No:	Duration of Diabetes :
Latest FBS/HbA1C report:	Is it the first visit? <input type="checkbox"/> Yes <input type="checkbox"/> No	
If no how many eye checkups done previously:		
Are you aware that diabetes can affect the eye? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know		
If yes, how did you come to know? <input type="checkbox"/> Doctor <input type="checkbox"/> Paramedical personnel <input type="checkbox"/>		
<input type="checkbox"/> Friends & relatives		
Did your treating physician or diabetologists ever mention to you about eye complications? Yes <input type="checkbox"/> No <input type="checkbox"/>		
Did your treating physician or diabetologists ever mention to you about getting the eyes checked? <input type="checkbox"/> Yes <input type="checkbox"/> No		
If your DM is well controlled, do you think you should still get your eyes checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know		
What prevented you from seeking eye examination before? <input type="checkbox"/> Lack of knowledge <input type="checkbox"/> Difficulty in reaching the hospital <input type="checkbox"/> Inability to afford <input type="checkbox"/> Time constraints <input type="checkbox"/> Anxiety that something may turn wrong		
How frequently should a person with diabetes undergo an eye checkup? <input type="checkbox"/> Once in a year <input type="checkbox"/> Once in 6 months <input type="checkbox"/> Once in 1 month <input type="checkbox"/> Once in 2 years <input type="checkbox"/> When visual acuity is diminished <input type="checkbox"/> Does not know		
What are the symptoms DM can cause in the eye? <input type="checkbox"/> Redness <input type="checkbox"/> Watery <input type="checkbox"/> Dryness <input type="checkbox"/> Reduced vision <input type="checkbox"/> Repeated infections <input type="checkbox"/> Floaters & Flashes of light <input type="checkbox"/> Double vision <input type="checkbox"/> Does not know		
What is the reason for coming to ophthalmologist now? <input type="checkbox"/> Eye symptoms <input type="checkbox"/> Self-awareness <input type="checkbox"/> Doctor's referral		
Is there any family h/o diabetic retinopathy? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Do you think diabetic retinopathy is curable? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Do not know		
What are the treatment options available? <input type="checkbox"/> Tablets <input type="checkbox"/> Eye drops <input type="checkbox"/> Injections <input type="checkbox"/> Surgery <input type="checkbox"/> herapy <input type="checkbox"/> Does not know		

**Results**

A Total number of 100 diabetic patients were included in the study. The total number of female patients (66) participating in the study was more than that of male (34) patients. The age distribution is shown in the following table (Table 2).

**Table 2: Age distribution of diabetic patients visiting the ophthalmology OPD**

Age group	Frequency
<40yrs	9
41-50 yrs	27
51-60yrs	39
61-70yrs	18
>70 yrs	7

Microvascular complications of diabetes increase directly in proportion to the duration of the disease. Thus the duration of DM in these patients was obtained & is presented in Table 3.

**Table 3: Duration of DM in patients coming for eye check up**

Duration of DM in years	Number of patients
< 1 year	12
1-2 years	21
2-5 years	22
5-10 years	31
>10 years	14

Among 100 patients included in this study 68 patients were getting their eye checkup done for the first time. When asked about if they were aware of the fact that eyes could get affected because of DM only 36 (n=36) patients answered 'Yes'. 60% (n=60) patients were unaware of the ocular complications of diabetes mellitus. These 60 patients had come to ophthalmology department either because they had some eye complaints or they were simply asked to go to the eye department by the treating physician. Remaining 4% (n=4) patients were not sure about eye complications of diabetes. The patients were asked specifically about what lead them to come to the eye clinic. The following Table 4 depicts the reason for patients to visit our ophthalmology department.

**Table 4: Primary reason for visiting the ophthalmology department**

Reason for visiting the ophthalmology department	Number of patients (n=100)
eye symptoms	47
doctor referral	47
self-visit	6

The 36 patients who were already aware of the eye complications of DM were asked about the source of their knowledge regarding eye complications of DM. 28 patients told that their treating physicians had advised them to undergo regular eye checkups. 6 patients had come to know through paramedical staff & 2 patients were told by friends about getting eye checkup done. Among these 36 patients 5 patients knew that diabetes affects the nervous part of the eye. Only 7 patients were visiting ophthalmologists with some regularity. Remaining 29 patients had very irregular eye checkups in the past. The reason for not getting eye checkups done regularly is given in the table below.

**Table 5: Reasons for not getting regular eye checkups in the past**

Reason for not getting regular eye checkups	Number of patients
Lack of knowledge	64
Difficulty to reach hospital	13
Time constraints	13
Inability to afford	03

When asked about the frequency of required eye checkups patients gave various answers. The responses received from the patients are presented in Table 6.

**Table 6: Frequency of eye checkups received by the participants**

Frequency of eye checkups	Number of patients
Once in 2 years	2
Once in a year	18
Once in 6 months	8
Once in a month	2
Do not know the frequency	70

All the patients were asked about what eye symptoms could result from diabetes mellitus. The responses are given in the Table 7.

**Table 7: Patients perception of prominent eye symptom resulting from diabetes mellitus**

Symptoms	Frequency
Redness	2
Watering	3
Dryness of the eyes	2
decreased vision	11
don't know	82

Patients who were aware of the need for eye checkups were further asked if eye checkups are needed even when the sugar levels are well controlled. The opinion was divided, 17(47.2%) patients told that it's needed & 19(52.8%) patients told that eye checkups should be done only if sugar levels are not under control.

We also made an attempt to check the awareness of the patients about the treatment options available for diabetic retinopathy. The following Table 8 denotes the responses given by the patients.

**Table 8: Awareness about the Treatment options for diabetic retinopathy**

Treatment options	Number of patients
Tablets	49
Injections	23
Eye drops	5
Laser therapy	1
Surgery	1
Don't know	21

## Discussion

Being part of a medical college hospital located in the suburbs of Chennai city, we encounter a large number of diabetic patients who are referred from other departments, mainly the department of General medicine. Some patients also come on their own with some eye related complaints. With this study we wanted to assess the awareness level among these patients about the eye complications of diabetes in general & diabetic retinopathy in particular. Patients' awareness about the effect of retinopathy on vision & available treatment options were also assessed.

The patients who participated in this study belonged to different age groups with the youngest patient being 34 years old. More than one third patients belonged to the age group of 51 to 60 years. About one third of all the patients were known diabetics for 5 to 10 years. Among 100 patients only 32 patients had an eye checkup done in the past & remaining 68 patients were visiting the ophthalmologist for the first time. All of these patients were visiting physicians, taking their medications & getting their blood glucose tested regularly. This discrepancy of general care & eye care among diabetic patients reflects the need for stepping up the level of eye care among diabetics, especially in rural & suburban regions of our country. This fact has also been mentioned in a brief communication to the editor by Verma et al.<sup>(6)</sup>

The percentage of patients who knew that DM can affect the eyes was only 36%. A similar study done at a medical college hospital in the state of Karnataka in 2015 found this percentage to be 45.3% which is marginally higher than that in our study.<sup>(7)</sup> Saikumar et al reported that 84% of diabetic patients attending an eye hospital in a south Indian city were aware of this need for eye care.<sup>(8)</sup> Compared to these studies the awareness level was lower in our study. This could be attributed to the fact that our hospital is located in the suburban region of Chennai city & most of the patients attending the hospital are from the surrounding villages & also belonging to low socioeconomic status. Two more large scale population studies from India found the awareness to be 27% & 37% but strictly speaking these results cannot be compared to that in our study as these studies were conducted among general population unlike our study which was done among diabetic patients.<sup>(9,10)</sup>

The most common source of awareness was the treating physician, followed by paramedical personnel (28 & 6 among 36 respectively). The most common reason for visiting the Ophthalmology OPD was reference by the treating physician (47) for eye symptoms. Physician recommendation was the most significant influencing factor in a similar study done in Ireland.<sup>11</sup> This fact highlights the important role played by physicians & health care team in educating & referring the diabetic patients for eye checkup. None of the patients in our study had come to know about eye involvement in diabetes through mass media. This shows

that mass media like newspapers, TV & radio have not been very affectively used for spreading awareness regarding diabetic retinopathy. A study done in UK has mentioned the need for a structured & documented approach to provide information to diabetic patients.<sup>(12)</sup>

Most of the patients who were aware of eye involvement thought that diabetes affects the vision (11 out of 36). Only 5 patients knew specifically about diabetic retinopathy. Even among the 36 patients who had some awareness about eyes getting involved in diabetes only 7 patients had a regular eye checkup & this proves that awareness alone is not enough to change the attitude & practice of the patients. This could be because, even those patients who are aware of the eye complications may not have an in depth knowledge about diabetic retinopathy. This difference between awareness & knowledge has also been discussed in a previous study.<sup>(8)</sup> The commonest cause for not getting regular eye checkups, other than lack of awareness, was difficulty in reaching the hospital & time constraints. As discussed earlier, a large number of patients from rural area visit our department. Non availability of eye services in nearby places is an important obstacle between rural patients & an optimal eye care. Only 18% of the patients knew that the eye checkup has to be done annually.

Nearly half of the patients who had awareness thought that they need not get their eyes checked if their blood sugar levels are well controlled. Only 17 out of 36 patients correctly told that eye checkup is a must even in well controlled diabetes mellitus. This fact further shows that along with making patient aware of the eye complications it is very important to explain the need for regular eye checkups even if their diabetes is kept under control.

Most of the patients in our study were not aware of the treatment modalities available for diabetic retinopathy. Half the diabetic patients thought that tablets could be used to treat the eye disease & another one fourth felt injections were an option to treat the eye involvement in diabetes. Probably since all the patients were taking regular treatment for DM in the form of oral hypoglycemic agents or insulin injections, they thought the same could be useful in treating eye disease as well. The most useful treatment modality in the form laser photocoagulation is still unknown to many as only a single patient in our study had heard about this previously before coming for eye checkup. A study done in a tertiary medical centre in Malaysia found that despite a high percentage of awareness level (86%) among the diabetic patients about eye complications, majority (72.3%) were not aware of the available treatment options.<sup>(13)</sup>

The results of our study show that we need to go a long way as far as creating awareness among diabetic patients & bringing them for a detailed eye examination is concerned. As ophthalmologists do not directly come in contact with diabetic patients, persons directly

involved with these patients have to play an active role in educating the patients. This not only includes physicians & diabetologists but also general practitioners, medical officers in rural health centers, optometrists, nursing staff & lab technicians who are involved in blood glucose testing. In fact in rural & suburban regions the latter play a bigger role in managing patients with type II DM & thus have to be trained to educate & convince the patients to go for eye checkup. Newspapers, television & radio have to be put for better use in creating awareness among the patients as currently they are not contributing much in this direction. Simple posters in regional languages can be displayed in ophthalmology departments to educate the general public so that they can advise their friends & relatives with diabetes to go for an eye checkup. Finally whenever diabetic patients visit the ophthalmology department every attempt has to be made to counsel them for a lifelong, regular follow up for early diagnosis of diabetic retinopathy. It is the responsibility of the ophthalmologists to educate the patients about the importance of timely Laser photocoagulation when needed so as to prevent blinding complications of diabetic retinopathy.

Our study had the limitation of small sample size & inclusion of only those patients who visited the ophthalmology department. Also, it would have been ideal if the awareness level of the patients was compared with their literacy level & socioeconomic status. A similar study done among all the diabetic patients attending the diabetic clinic would throw more light on the pattern of awareness about diabetic eye complications.

## Conclusion

Awareness of eye complications of diabetes mellitus among patients with type II DM visiting the ophthalmology department is poor. The knowledge about diabetic retinopathy, the screening protocol, and the available treatment options is even poorer. There is a clear cut difference in perception, between the general diabetic care & eye care, among these patients. Physicians play an important role in referring the patients for eye checkup.

## References

1. Kaveeshwar SA, Cornwall J. The current state of diabetes mellitus in India. *AMJ* 2014;7,1,45-48. <http://dx.doi.org/10.4066/AMJ.2014.1979>.
2. Lee R, Wong TY, Sabanayagam C. Epidemiology of diabetic retinopathy, diabetic macular edema and related vision loss. *Eye and Vision*. 2015;2: 17. DOI 10.1186/s40662-015-0026-2.
3. Raman R, Rani KP, Racheppalle S, Gnanamoorthy P, Uthra S, Kumaramanickavel G et al. Prevalence of Diabetic Retinopathy in India: Sankara Nethralaya Diabetic Retinopathy Epidemiology and Molecular Genetics Study Report 2. *Ophthalmology*. 2009;116(2):311-316.
4. Gadkari SS, Maskati QB, Nayak BK. Prevalence of diabetic retinopathy in India: The All India

- Ophthalmological Society Diabetic Retinopathy Eye Screening Study 2014. *Indian J Ophthalmol*. 2016;64:38-44. Available from: <http://www.ijo.in/text.asp?2016/64/1/38/178144>.
5. Singer DE, Nathan DM, Fogel H, Schachat AP. Screening for Diabetic Retinopathy. *Annals of Internal Medicine*. 1992;116:660-671.
6. Verma L, Elankumaran P, Prakash G, Venkatesh P, Tewari HK. Awareness of diabetic retinopathy among diabetics. *Indian J Ophthalmol*. 2002;50:355.
7. Anupama C Shetgar, Brijesh Patil, Mallikarjun C Salagar, Nanditha A M. Assessment of awareness of diabetic retinopathy among diabetics: A Clinical Survey. *Indian Journal of Clinical and Experimental Ophthalmology*, October – December 2015;1(4):260-263.
8. S J Saikumar, A Giridhar, G Mahesh, A Elias, S Bhat. Awareness about eye diseases among diabetics – a survey in South India. *Community Eye Health Journal*. 2005;18(24):97.
9. Rakhi Dandona, Lalit Dandona, Rajesh K. John, Catherine A. McCarty, Gullapalli N. Rao. Awareness of eye diseases in an urban population in southern India *Bulletin of the World Health Organization*, 2001,79(2):96-102.
10. PK Rani, R Raman, S Subramani, G Perumal, G Kumaramanickavel, T Sharma. Knowledge of diabetes and diabetic retinopathy among rural populations in India, and the influence of knowledge of diabetic retinopathy on attitude and practice. *Rural and Remote Health*. 2008;8:838.
11. Dervan, E., Lillis, D., Flynn, L. et al. Factors that influence the patient uptake of diabetic retinopathy screening. *Ir J Med Sci*. 2008; 177: 303. <https://doi.org/10.1007/s11845-008-0192-5>.
12. L Robertson, S Akhtar, FJ Brown, GC Jones, CG Perry, KR Paterson, JR Petrie. How do people with diabetes access information? *Pract Diab Int*. 2005;22(6):207-213.
13. Tajunisah I, Wong PS, Tan LT, Rokiah P, Reddy SC. Awareness of eye complications and prevalence of retinopathy in the first visit to eye clinic among type 2 diabetic patients. *Int J Ophthalmol*. 2011;4(5):519-524.