

# Awareness and Referral Patterns of Diabetic Retinopathy: A Hospital Based Study

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## ABSTRACT

**Introduction:** Diabetic Retinopathy (DR) has emerged as an important cause of ocular morbidity and blindness in past 20 years. About one fifth of known diabetics are projected to have DR in their lifetime. Thus awareness about DR is an important determinant in reducing the burden of blindness due to DR.

**Aim:** To identify the factors that accounts for poor awareness about DR among patients with Diabetes Mellitus (DM).

**Materials and Methods:** Three hundred thirty cases of DM who were undergoing screening for the first time were subjected to questionnaire to assess their awareness about DR. On the basis of awareness about visual blurring caused by diabetes the cases were divided into two groups, Group I included aware cases and Group II unaware cases. Various factors were then compared between these two groups like demographic profile, literacy level, Socioeconomic Class (SEC), family history, type

and duration of DM. All cases were under treatment for DM and majority was on oral hypoglycaemic agents.

**Results:** The study included 330 cases undergoing retinal screening for the first time. The mean age of the study group was 52.8±11.3 years with 54.5% male and 45.5% female cases. Overall, 226 cases (68.5%) were aware that DM could lead to visual impairment (Group I) and 104 (31.5%) cases were unaware of the condition (Group II). Awareness was more in male patients (54.5%), with positive family history (23%), with higher educational qualification (70%) and those belonging to a high SEC (55.8%). The rate of referral by the first contact physician for routine DR screening was 21.2%. The source of information for most of the cases was print media.

**Conclusion:** Literacy and SEC are important factors for awareness of DR. Practice pattern among primary care physician also affects the awareness of DR.

**Keywords:** Blindness, Diabetes, Diabetic screening, Visual impairment

## INTRODUCTION

DM is fast gaining the status of an epidemic in India [1]. World Health Organization (WHO) has predicted that in India, the number of adults with diabetes will be the highest in the world: from 19 million in 1995 to 80 million in 2030 [2]. DR is an important complication of DM which can cause significant visual impairment. DR is an important cause of ocular morbidity and blindness [3]. About one fifth of known diabetics are projected to have DR in their lifetime [4,5].

There are two major approaches for the prevention of visual impairment due to DR that is modification of risk factors and early diagnosis and treatment. Early detection of DR requires effective screening. As per Early Treatment of Diabetic Retinopathy Study Research Group (ETDRS) and Diabetic Retinopathy Study Research Group (DRS) timely intervention by laser photocoagulation can reduce severe vision loss by 90% [6,7]. However, the problem is half of the people with diabetes are unaware that they have the disease and a third of diabetics never undergo eye examination [8]. Effective screening depends upon the awareness of patients as well as the practice pattern of Primary Care Physician (PCP).

The focus in the treatment of diabetes has largely been on anti-Vascular Endothelial Growth Factors (VEGF), newer methods of laser delivery and other agents for the prevention of DR [7,8]. The situation in India is no different from other part of the world. However in developing countries like India majority of patients cannot afford the financial burden of anti-VEGF. Early diagnosis and laser photocoagulation remains the best possible way to prevent the vision loss due to DR [9]. For early diagnosis, patient's awareness of the disease is extremely vital. In addition, the PCP plays an important role in early referral of cases for screening of DR

[9]. The aim of this study was to identify the factors that accounts for poor awareness about DR among DM patients in central India.

## MATERIALS AND METHODS

This observational study was conducted in the Department of Ophthalmology at a tertiary care hospital in central India. Approval from the local Ethics Committee/Institutional Review Board (EC/IRB), All India Institute of Medical Sciences, Bhopal, India was obtained. The study adhered to the tenets of declaration of Helsinki.

The cases with DM attending ophthalmology OPD for DR screening during the period August 2014 to April 2015 were evaluated for inclusion in the study. Patients undergoing screening for the first time and willing to participate in the study were enrolled. Cases that were already diagnosed with DR or had undergone some intervention for DR were excluded from the study. Cases were subjected to a questionnaire as given in [Table/Fig-1]. The questionnaire was designed based on the review of literature done on previous studies published in the same domain [10-14]. The face validity of the questionnaire was established by a group of 6 ophthalmologists from three tertiary care institutes. The questionnaire included questions as mentioned in [Table/Fig-1] was pilot tested amongst 30 patients, who had proficiency in English language, and revised in accordance with the findings of the pilot study. The questionnaire was self-administered to patients having knowledge of either English or Hindi. The answers were taken in yes or no. According to the response by the study subjects, the following observations were made. Cases who replied positively to question number two to four were included in group I.

Demographic data was collected including age, sex, literacy level and SEC. The SEC of the participants was determined according to modified Kuppaswamy's scale based on three variables: education,

occupation of the head of the family, and per capita income per month [5]. Detailed history of the disease such as onset, type, family history of diabetes and duration of DM was noted. All cases were under treatment for DM and majority was on oral hypoglycaemic agents. Cases were asked about the source of information about DR. A comprehensive examination of the eye was done including retinal screening. The cases were then divided into two groups; Group-I included those who were aware about DR and group-II those who were unaware about DR. Various factors were then compared between these two groups using appropriate statistical analysis.

## STATISTICAL ANALYSIS

The data was recorded on a predesigned proforma and managed on a spreadsheet (Excel; Microsoft Corp, Redmond, WA). Qualitative data were compared by Chi-square and Fischer-exact test and quantitative data was compared by ANOVA one-way test. Non-parametric tests were applied wherever the sample size was less. A  $p \leq 0.05$  were considered statistically significant.

## RESULTS

A total 458 patients were screened for DR, out of which 330 were undergoing screening for the first time. The mean age of the study group was  $52.8 \pm 11.3$  years (26 to 78 years) with 54.5% (180) male cases. Most of the cases 95.8% (316) were suffering from type II DM. The mean duration of DM was 6.5 years. [Table/Fig-1] shows the awareness level about various aspects of DR amongst the study subjects, along with the questionnaire.

[Table/Fig-2] shows number of cases in Group I and Group II according to gender, literacy, SEC, type of diabetes, duration of diabetes, referral rate by PCP and presence of DR. Overall 68.5% (226) of cases were aware about DR. When both the groups were compared, it was found that the awareness was more in male patients ( $p < 0.001$ ), patients with positive family history of DM ( $p < 0.001$ ), patients with higher educational qualification ( $p < 0.001$ ) and higher SEC ( $p < 0.001$ ) [Table/Fig-2].

The type and duration of DM had no significant association with awareness of DR ( $p = 0.351$  and  $p = 0.06$  respectively). At the time of screening DR was present in 3.5% (8) of cases belonging to Group I and 13.5% (14) of the cases in Group II had DR, this difference in the two groups was statistically significant ( $p < 0.001$ ). The rate of referral by the first contact physician for routine DR screening was 21.2% (70). The source of information about DR for most of the cases in our study was print media (newspaper). In Group I,

S. No.	Question from the questionnaire	Awareness Percentage amongst the subjects (%)
1.	Are you aware of the type of Diabetes Mellitus you have (Type I or II)?	24
2.	Are you aware of the involvement of eye and visual loss in diabetes mellitus?	68.5
3.	Are you aware that the eye complications of diabetes mellitus (diabetic retinopathy) can be prevented if diagnosed early by regular screening and treated appropriately	30
4.	Did your first contact physician who diagnosed diabetes mellitus advised you about the screening for diabetic retinopathy?	21.2
5.	Do you know strict blood sugar control can help to prevent the complications of diabetes?	23.5
6.	Do you know about the current available treatment (laser photocoagulation) for diabetic retinopathy?	11.5
7.	Are you aware of intravitreal anti of anti-Vascular Endothelial Growth Factor treatment for Diabetic Retinopathy?	None

[Table/Fig-1]: Questionnaire for the assessment of awareness about Diabetic Retinopathy and response by cases.

Parameters		Group-I (226)	Group-II (104)	p-value*
Gender	Male	140	40	$p < 0.001$
	Female	86	64	
Literacy	Illiterate	0	13	$p < 0.001$
	Completed primary schooling	12	24	
	Completed schooling	72	28	
	Graduate	72	24	
	Postgraduate	66	14	
Family history	Present	66	10	$p < 0.001$
	Absent	160	94	
Type of diabetes	Type 1	8	6	$p = 0.351$
	Type 2	218	98	
Duration of DM	<5yrs	76	55	$p = 0.06$
	5-10 years	78	23	
	10-20 years	56	14	
	>20 years	16	12	
Socioeconomic status	Upper	76	16	$p < 0.001$
	Upper middle	68	20	
	Lower middle	40	21	
	Upper lower	34	22	
	Lower	8	25	
Referral from PCP	Present	68	2	$p < 0.001$
	Absent	158	102	
Diabetic Retinopathy	Present	8	14	$p < 0.001$
	Absent	218	90	

[Table/Fig-2]: Comparison of different parameters between Group-I and Group-II for assessment of awareness about diabetic retinopathy.

Group-I- cases aware about diabetic retinopathy, Group-II- cases unaware about diabetic retinopathy, DM- Diabetes Mellitus, PCP- Primary Care Physician  
p-value \* - Chi-square and Fischer-exact test and ANOVA one-way test

23.5% (53) patients were aware that strict blood sugar control can prevent the visual impairment due to DR and only 11.5% (26) knew that early intervention (laser photocoagulation) can prevent the progression of vision loss. None of the cases were aware about intra-vitreous anti vascular endothelial growth factors (Anti-VEGF) as a treatment modality of DR.

## DISCUSSION

Prevention is better than cure. This age old teaching requires some degree of awareness among the general population about the concerned disease. The current study evaluated the awareness of DR among a population cohort from central India. In the present study, the awareness about DR among the patients of DM was poor. The type and duration of DM had no significant association with the level of awareness of DR. Awareness was more in male patients and those with positive family history, higher educational qualification and higher SEC.

There is evidence that DR begins to develop years before the clinical diagnosis of DM and is present in seven per cent of newly diagnosed subjects [11]. The prevalence of DR in south India has been reported to be 17.6%, significantly lower than age-matched western counterparts [11,12]. In the present study 3.5% cases among group I and 13.5% among group II were found to have DR. The sample size and composition in the current study may not be representative of entire population, thus it is difficult to calculate the prevalence of DR from the above data. The difference in group-I and II in this study can be attributed to a better glycaemic control in Group-I.

In the present study 68.5% of the cases were aware about the

sight threatening complication of DR. As per Dasbach EJ et al., the compliance for the screening program should be more than 80% for maximum gain [14]. Thus although good number of cases were aware but still there is a scope for betterment. The major factors associated with poor awareness in the present study were female gender, SEC and lack of education. Thus, appropriate measures must be taken to improve these factors. Previous studies have also emphasized over these factors [14-16]. Although, Raman R et al., in their study found that the difference in SEC did not influence the occurrence of DR the result of our study suggests this is important. The role of ophthalmologist starts once PCP refers the patient. The PCP is often the first contact of DM patients to the health care services. In the present study only 21.2% of the cases were advised for DR screening by the PCP. Majority of the patients are not referred probably due to the negligence on the part of PCP. This clearly highlights the need for the sensitisation of PCPs to encourage the DM patients for routine DR screening. Ensuring a regular interaction between the ophthalmologist and the PCP by means of organising seminars and conferences will help to improve the practice pattern of PCP. In addition in countries like India the SEC and literacy of people often influences the choice of first contact physician. At times the first contact physician may not be trained enough, or may not be well aware of the recent advances in the field of DR and its prevention. Thus the training of physicians as well as improving the health infrastructure so that it reaches to every patient in the lower SEC is an important step in reducing the burden of blindness in India. Also, the tools to spread the awareness about DR should be such that even illiterates can understand the message clearly. Vashist P et al., proposed the concept of opportunistic screening of DR [9]. Patients with DM may visit the ophthalmologists for other eye care needs. They also visit physicians for medical needs. These patients visiting the health care providers for other problems may be screened for DR [9]. Not only the ophthalmologist but the PCP must be aware of the concept of opportunistic screening.

In the present study the source of information about DR was print media in most of the cases, thus other channel for spreading awareness like audio visual media should also be utilized for spreading awareness as used for other diseases like polio, TB, malaria etc. This highlights the room for improvement in DR prevention through increasing awareness and screening. Thus the approach to reduce the prevalence of DR not only lies upon the health care providers but also the government must try improvement in this field.

## LIMITATION

The major limitations of this study is that it is a single center based study and includes patients of only one geographical area hence the sample may not represent the entire population. Prevalence of DM is increasing thus the sample size may be small to draw any conclusive results. Further population based multicentric studies with large number of subjects will be more conclusive.

## CONCLUSION

The outcome of this study helps us to pinpoint the factors which lead to poor awareness, so that targeted interventions can be formulated for increasing the awareness by modifying these factors. It highlights one of the important grey areas that is poor practice pattern of PCP. Improvement of the practice pattern of the PCP to increase the referral rate of DM cases for DR screening can improve the awareness level significantly. In present era of digital media, every effort must be made for the inclusion of all forms of mass communication along with improvement in the educational status and SEC for better prevention of DR. Lastly a coordinated approach by PCP and ophthalmologist is vital.

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