

Original Research Article

Evaluation of diabetic retinopathy screening rates among patients with diabetes: a clinical audit

Gurvinder Kaur*, Aastha Agarwal

Department of Ophthalmology, Dayanand Medical College and Hospital, Ludhiana, Punjab, India

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*Correspondence:

Dr. Gurvinder Kaur,

E-mail: gurvinder.eyec@gmail.com

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ABSTRACT

Background: Diabetic retinopathy (DR) is the most common microvascular ocular complication of diabetes. The sight threatening DR which can be prevented by timely screening, thus highlighting the importance of DR screening.

Methods: A prospective observational study was conducted to evaluate the percentage of patients with diabetes undergoing screening for diabetic retinopathy. The study was done in 2 cycles with time for remedial measures in between the cycles. All the patients who presented to the OPD with known diabetes on treatment, history of pre-existing diabetes, history of gestational diabetes, RBS more than 200 mg/dl and HbA1c more than 6.5% were included in the study.

Results: In the first cycle, 78.2% underwent dilated fundus examination. The main reasons for not doing the fundus examination were the patient was within the follow-up period, the patient refused due to various reasons or that the doctor didn't perform. In the second cycle, the percentage of patients undergone dilated fundus examination rose up to 88.9%.

Conclusions: There was a significant lag in the number of patients who undergo dilated fundus examination for dilated retinopathy screening. With the help of educating the healthcare personnel and stressing on the counselling of the patients, the number of screening cases can be improved. But there is a need for continuous efforts for the gap to be fully covered.

Keywords: Diabetes, Diabetic retinopathy, Fundus examination, Screening

INTRODUCTION

India is reported to have the second-highest number of people with diabetes in the world.¹ It is predicted that by 2025, India will be the world's "diabetes capital", with 69.9 million diabetics which will increase to 130 million diabetics in 2045.^{2,3} Currently, the highest prevalence of diabetes affecting at least one in every 10 adults is observed in Chandigarh, Tamil Nadu, Punjab, and Kerala.⁴

Diabetic retinopathy (DR) is the most common microvascular ocular complication of diabetes. Known risk factors associated with DR such as uncontrolled

hyperglycemia, hypertension, and dyslipidemia are highly prevalent in India. Longer duration of diabetes and uncontrolled diabetic status carries a higher risk of development of DR. The overall prevalence of DR in India in 2022 was 16.10%.³ Approximately 5-10% of people have sight threatening DR which can be prevented by timely screening, thus highlighting the importance of DR screening.

Treating physicians are responsible for counselling the patients regarding screening of eyes for diabetic retinopathy. Once the patient reaches the ophthalmologist, then it is his duty to perform fundus examination and other relevant investigations and also

counsel the patient regarding proper follow ups. The most common reasons given by participants for not getting a regular retinal examination for DR screening are the absence of visual symptoms, lack of knowledge about DR screening, lack of time, blurring of vision post dilatation for fundus examination and financial issues. Thus, patient education and awareness about diabetic retinopathy plays a pivotal role in preventing this cause of preventable blindness.⁵ Thus, we conducted this clinical audit to assess the screening rate of diabetic retinopathy among diabetic patients visiting a tertiary care hospital.

METHODS

This prospective observational study was conducted in the outpatient department of ophthalmology in Dayanand Medical College and Hospital, Ludhiana. This was conducted as a part of clinical audit done in the hospital as an essential part of NABH protocols, after proper approval from the hospital clinical audit committee.

The inclusion criteria were as follows: patients with known diabetes on treatment, history of pre-existing diabetes, history of gestational diabetes, RBS more than 200 mg/dl, HbA1c more than 6.5%

The number of patients (meeting the inclusion criteria) who have undergone dilated fundus examination of both the eyes for screening for DR was noted on daily basis. Both new and revisit patients were included. Data was

collected over a period of 1 month from 15th April 2024 to 14th May 2024. This constituted the first cycle of the study.

From the results of the first cycle, the remedial measures were taken over a period of next 2 weeks and the implemented changes were incorporated.

The study was repeated for a period of 1 month again. This constituted the second cycle of the study.

Defined standards

The gold standard for detecting the DR is stereoscopic fundus examination done after dilatation of pupils. The grading of DR is done according to the guidelines established by the early treatment diabetic retinopathy study (ETDRS) group.⁶ Whom to screen: patients with known diabetes, history of pre-existing diabetes, history of gestational diabetes, RBS>200 mg/dl, HbA1c>6.5%. Screening model: Dilated fundus examination of both the eyes. Screening and follow-up guidelines for people with and without diabetic retinopathy are detailed in Table 1.

It is recommended that DR screening should be done for all people with known diabetes on treatment, pre-existing diabetes, gestational diabetes, a single record of random blood sugar (RBS) of ≥ 200 mg/dl (≥ 11.1 mmol/l) and/ or glycated hemoglobin (HbA1c) $> 6.5\%$ (48 mmol/l), when first notified to medical personnel.⁷

Table 1: Screening and follow up guidelines.

Status of retinopathy	Time of first screening	Follow-up
No Diabetic Retinopathy (DR)	Within 1 year	Every 1-2 years
Mild Non-Proliferative DR (NPDR)	Within 1 year	Every year
Moderate NPDR	Within 3-6 months	Every 6 months
Severe NPDR	Immediate	Every 3 months
Proliferative DR	Immediate	Every 3 months
No Diabetic macular edema (DME)	Within 1 year	Every year
Non-CIDME (non-center involving DME)	Immediate	Every 3 months
Centre involving DME (CIDME)	Immediate	Every 1-2 months

*VEGF- Vascular endothelial growth factor. †HRC-high risk characteristics.

The data was entered in Microsoft excel and was analysed using SPSS version 26. Frequency, proportion, mean, standard deviation and percentages were calculated as a part of descriptive study.

RESULTS

First cycle

The first cycle was conducted from 15th April 2024 to 14th May 2024. A total of 229 patients who met the inclusion criteria were screened. A total of 179 patients (78.2%) underwent dilated fundus examination for screening of

DR and remaining 50 patients (21.8%) didn't undergo dilated fundus examination (Table 2).

Table 2: Percentage of diabetic patients undergoing fundus examination.

Total number of diabetic patients included in the study: 229		
Dilated fundus examination	Number of patients	Percentage
Performed	179	78.2
Not performed	50	21.8

Table 3: Reasons for not performing dilated fundus examination.

Reasons for not performing dilated fundus examination for DR screening in 50 patients		
	Number of patients	Percentage
Doctor didn't perform	11	22
Patient refused	16	32
Within follow up period	23	46

Out of these 50 patients, in 11 patients (22%), the doctor didn't perform the examination, in 16 patients (32%), the patients refused examination and in 23 patients (46%), the patients were within the follow up period (Table 3).

Table 4: Reasons for refusal by patients.

Reasons for refusal by patients (n=16)		
Reason	Number of patients	Percentage
Patient had come driving on his/her own	5	31.2
Not willing to get the examination done	11	68.8
Total - 16		

Table 5: Percentage of diabetic patients undergoing fundus examination.

Total number of diabetic patients included in the study: 144		
Dilated fundus examination	Number of patients	Percentage
Performed	128	88.9
Not performed	16	11.1

Out of the 16 patients who refused fundus examination, 5 patients (31.2%) had come driving on their own, so couldn't get the procedure done. A total of 7 patients (43.8%) wanted to get the examination done at a later date, 1 patient (6.2%) had conjunctivitis and 3 patients (18.8%) were not willing to get the fundus examination done at all (Table 4).

Recommendations

The standard protocol suggests that the diabetic patients should under dilated fundus examination in 100% cases. The results of the clinical study showed that in our department, 78.2% diabetic patients underwent dilated fundus examination for DR screening and 21.8% didn't undergo examination. So, the following recommendations were suggested as a part of remedial measures to meet the standard protocol:

The personnel responsible for performing the fundus examination (consultants, senior resident and PG residents) were educated regarding the standard protocols

for dilated fundus examination for DR screening in diabetic patients.

The need for dilated fundus examination in diabetic patients were reinforced every alternate day for the next 2 weeks (15th May 2024 to 31st May 2024).

Stress was laid on the need for proper counselling of patients so that they get the dilated fundus examination done.

Second cycle

The second cycle was conducted from 9th July 2024 to 8th August 2024. A total of 144 patients who met the inclusion criteria were screened. A total of 128 patients (88.9%) underwent dilated fundus examination for screening of DR and remaining 16 patients (11.1%) didn't undergo dilated fundus examination (Table 5).

Table 6: Reasons for not performing dilated fundus examination.

Reasons for not performing dilated fundus examination for DR screening in 16 patients		
	Number of patients	Percentage
Doctor didn't perform	1	6.2
Patient refused	10	62.5
Within follow up period	5	31.3

Out of these 16 patients, in 1 patient (6.2%), the doctor didn't perform the examination, in 10 patients (62.5%), the patients refused examination and in 5 patients (31.3%), the patients were within the follow up period (Table 6).

Out of the 10 patients who refused fundus examination, 5 patients (50%) had come driving on their own, so couldn't get the procedure done. A total of 4 patients (40%) wanted to get the examination done at a later date, 1 patient (10%) was not willing to get the fundus examination done at all (Table 7).

Table 7: Reasons for refusal by patients.

Reason	Number of patients	Percentage
Patient had come driving on his/her own	5	50
Not willing to get the examination	5	50
Total- 10		

DISCUSSION

According to this study, the percentage of patients undergoing dilated fundus examination for the screening

of diabetic retinopathy was initially 78.2% initially which improved to 88.9% with the help of remedial measures. Similar results were observed during the English NHS Diabetic Eye Screening Programme where 82.8% people with diabetes were screened between 2015-16.⁸ Unfortunately, the figures were below 50% in the study done by Jani et al. in 2017. This study reported the mean rate of screening to be 25.6% which increased to 40.4% after implementation of remedial measures.⁹

The main reason for refusal of the patients to get the examination done was the unwillingness (68.8%) which decreased to 62.5% in the second cycle. This can be attributed to the unawareness regarding the disease and its early diagnosis, treatment and prevention. This was followed by the problem of transport as 31.2% of the patients were alone and couldn't return due to the deterrent effects of mydriatics.

According to a study done at a tertiary eyecare hospital in Saudi Arabia, the barriers were the distance from residence to an eyecare unit and nonreferral by family physician for an annual eye examination.¹⁰ Another study revealed lengthy appointments, navigating home after the mydriatic drops, lack of DRS awareness and psychological factors as the potential barriers.^{11,12}

Another reason for the lack of screening was the doctor's negligence which decreased significantly from 31.2% to 6.2%. The remedial measures taken in this study were aimed at educating the healthcare personnel about the standard protocols, and making the residents and the patients aware of the need for screening. According to a systemic literature review conducted of several bibliographic databases in 2007, interventions included increased awareness of DR among people with diabetes, and measures aimed to improve adherence to recommendations among patients and healthcare providers and reduce negligence of practices.¹³⁻¹⁷ Register, review, and recall were found to be powerful components of interventions to improve rates of retinal screening.^{16,18,19}

Since this study involved a small population and short time period, more studies are required involving a greater number of patients given the size of diabetic patients in our nation for a better interpretation of the problem. There is also a need to evaluate the demographic profile of the patient for a more patient centric approach to address the lack of screening.

CONCLUSION

This study showed that the uptake of screening practices is not at its peak. The factors affecting the uptake were mostly patient oriented including lack of awareness which resulted in unwillingness and transport issues. A small part of the problem was due to the negligence of healthcare providers. Increasing patient awareness of DR and improving provider performance can increase

screening attendance. Proper screening channels and a robust system for tracking the patients for follow ups can work wonders to cater to the problems. Training optometrists, ophthalmic assistants and eye technicians for diagnosing and grading DR in telescreening, including the use of nonmydriatic fundus cameras should be encouraged for screening in remote areas and to eliminate the problem of transport.²⁰ The images can then be sent to ophthalmologists for further consultations. The implementation of nationwide population based systemic diabetic screening programme can also address these factors in a cost-effective manner and improve the screening attendance like in other countries.^{21,22}

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