

ORIGINAL PAPER

Awareness of Diabetic Retinopathy among Adult Population Attending Rural Health Care Center, Uttar Pradesh

Pragati GARG¹, Mahrukh KHAN¹

Abstract

Purpose: To study the awareness of diabetes and its multisystem involvement like diabetic retinopathy among population attending the rural health care center of a tertiary care hospital.

Methods: A cross sectional study over a period of 2 years was conducted amongst 6000 general adult population attending rural health care center of a tertiary care hospital in Uttar Pradesh. All the patients were subjected to random blood sugar testing and a self-made questionnaire. Data obtained was statistically analyzed using SPSS software version 15.0. ($P < 0.05$) was taken as significant value.

Results: In our study, we enrolled 6000 participants of mean age 56.4 years \pm 10 years with male: female ratio of 3:5. Based on the questionnaire, we observed that 71.05% of the enrolled participants were unaware about the complications of diabetes. 85.03% did not know that diabetes could affect the eyes per se. While more than 92.18% were particularly unaware about diabetic retinopathy or its treatment modalities. 93.3% of the general adult population said that they would get an eye checkup when their vision is significantly reduced. The awareness about diabetic eye disease was significantly less in females. ($p < 0.05$)

Conclusions: As per our study, more than half of the individuals lacked any knowledge about multi system involvement in diabetes. They were particularly unaware about the importance of eye screening in diabetes.

Keywords: diabetic retinopathy, awareness.

¹ Department of Ophthalmology, Era's Lucknow Medical College and Hospital, Lucknow, India

Corresponding author:

Pragati GARG, Department of Ophthalmology, ALL India Institute of Medical College and Hospital Raebareli, Uttar Pradesh, India.
E-mail: mahrukh92khan@gmail.com

INTRODUCTION

Diabetes is a multi-factorial disease which is of major public health concern. It is gravitating to epidemic levels expected to affect 642 million people worldwide by 2040 as reported by International Diabetes Federation¹. According to the latest data by World Health Organization, an estimated 422 million adults are living with type 2 diabetes, globally².

The prevalence of diabetes is more in developed countries than the developing ones³. However, there is a rapid increase in prevalence in low- and middle-income countries including in Asia and Africa¹. It is also fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease^{4,5}.

India currently faces an uncertain future in relation to the potential burden that diabetes may impose upon the country⁶. Diabetic eye disease is the most common complication of diabetes mellitus resulting from microvascular abnormalities due to raised blood sugar levels. Diabetic retinopathy is the leading cause of vision loss in working age adults⁷.

A recent study reported that the burden of visual impairment due to diabetic retinopathy is estimated to rise to 3.2 million worldwide⁸. Various studies have also shown a major co-relation of diabetes mellitus with the duration of diabetes⁹. It has been reported that approximately 2% of people become blind after 15 years of diabetes and 10% develop severe visual impairments¹⁰. They are also more prone to other vision threatening ocular diseases like glaucoma and cataract.

The major risk factors for developing diabetic retinopathy are the duration of diabetes and severity of hyperglycemia¹¹. The visual loss or impairment due to diabetic retinopathy can be delayed with early detection, treatment, and intervention¹².

Diabetes mellitus is well recognized as a public health problem of 21 century. Many educational programs have been formulated for early prevention and control of the disease but they fail to fulfill the desired results of increasing awareness of diabetes and its complications in developing countries. Indeed, several studies have consistently shown that awareness of the diabetes mellitus in the general population seems to be considerably low¹³.

Considering the various data on lack of knowledge about vision threatening complications of diabetes in particularly the low socio-economic strata, it was im-

portant to know the awareness of diabetic retinopathy among the general adult population attending the rural health care centre of our hospital.

MATERIAL AND METHODS

A cross sectional study was conducted in the rural health care center of a tertiary care hospital in Lucknow. 6886 general adult population attended the center over a span of 3 years. Out of the 6889 subjects 530 refused to participate in the study. 359 subjects did not visit for follow up with test results. Hence 6000 general adult population were included as the study participants.

All the patients were subjected to random blood sugar testing after an informed consent. Based on the blood sugar levels they were further divided into three groups.

Group 1 were subjects with normal blood sugar levels. Group 2 were known cases of diabetes with raised or normal random blood sugar levels. And group 3 subjects were newly diagnosed with diabetes. After obtaining a written informed consent from the study participants, they were interviewed with a self-made questionnaire.

RESULTS

The study included a total of 6000 participants out of which 2256 were males and 3744 were females. The mean age of enrolled patients was 56.4 years +/- 10 years (Table 1). 52% of all the patients belonged to class 5 of socioeconomic class according to modified B.J Prasad classification (Table 2).

Table 1. Age-wise distribution of subjects

AGE	Number	%Age
<40	480	8
41-50	1482	24.7
51-60	1998	33.3
>60	2040	34

All enrolled participants were subjected to random blood sugar testing. Based on the test results it was found that 2209 patients were non diabetic (GROUP 1), 1845 patients were a known case diabe-

tes (GROUP 2) and 1937 were newly diagnosed with diabetes (GROUP3). The patients were divided into three groups respectively. All the groups were subjected to a self made questionnaire (Table 4).

Table 2. Socio economic distribution of participants

Socioeconomic status *	Number	%Age
Class 1	0	0
Class 2	120	2
Class 3	360	6
Class 4	2400	40
Class 5	3120	52

Table 3. Gender wise distribution according to awareness of diabetic eye disease

	Male		Female		P-value
	No	%	No	%	
Aware	617	27.34	531	14.18	$\chi^2=158;$ $p<0.001$
Unaware	1639	72.65	3213	85.81	
Total	2256		3744		

Comparative analysis of the level of awareness about diabetic eye disease among males and females was done. The percentage of awareness was more in males in comparison to females and it was statistically significant. Even though the females outnumbered the males, but the awareness levels were very low accounting to 14.18% only.

Table 4. Group wise distribution of participants according to awareness about diabetic eye disease

Groups n=6000	Group 1 non diabetic		Group 2 diabetic		Group 3 newly diagnosed		P value
	No.	%	No.	%	No	%	
Aware	157	7.1%	769	37.4%	262	13.5%	$\chi^2=772;$ $p<0.001$
Non aware	2052	92.8%	1085	41.47%	1675	86.47%	
Total	2209		1854		1937		

Comparative analysis of awareness was also done in between the three groups. We found that among the three groups ,92.8% of non-diabetics were particularly unaware about diabetic eye disease followed by 86.4% of the newly diagnosed cases. 41.47% of the diabetics were also unaware about complications of diabetes in eyes. The values were statistically significant.

Table 5. Questionnaire

S.no.	QUESTIONS	YES		NO	
		N	%	N	%
Q1	Did you know that diabetes has multi-system involvement?	1737	28.95	4263	71.05
Q2	Can uncontrolled blood sugar levels have harmful effects?	960	16	5040	84
Q3	Does diabetes effect your vision?	898	14.96	4939	85.03%
Q4	Should a diabetic get an eye checkup when blood sugar is controlled?	840	14	5160	86
Q5	Do you know that diabetes affects the retina (diabetic retinopathy)?	469	7.81	5531	92.18
Q6	Do you know its treatment modalities?	300	5	5700	95
Q7	When should a diabetic get an eye checkup?				
	When vision is affected?	5598	93.3		
	Yearly	330	5.5		
	6 monthly	72	1.2		
Q8	Are you aware about eye screening programs ?	360	6	5640	94

Based on the questionnaire it was found that more than half of the subjects were not aware about diabetic eye disease. We observed that 71.05% of the enrolled participants were unaware about the complications of diabetes in our body .85.03% did not know that diabetes could affect the eyes per say. While more than 92.18%

were particularly unaware about diabetic retinopathy or its treatment modalities. 93.3% of the general adult population said that they would get an eye checkup when their vision is significantly reduced. They felt that they are unaware about diabetes and its complications which leads to the delay in seeking treatment.

DISCUSSION

Diabetes mellitus (DM) is reaching epidemic proportions in many countries, including India. People with diabetes are more likely to develop blinding eye diseases, such as diabetic retinopathy, glaucoma, and cataracts. Currently, there are 171 million diabetic patients worldwide. By 2030, this figure is projected to increase to 366 million people, 79 million of whom will be in India^{4,5}.

Increasing the level of awareness of diabetic retinopathy among individuals with type 2 diabetes mellitus is considered an important factor for early diagnosis and management of diabetic retinopathy¹⁴. Yet recent studies have revealed low awareness of the issue among those at high risk for diabetes.

We conducted a survey using a 8-point questionnaire among 6000 diabetic patients who attended our out-patient department over a period of 3 years. We assessed awareness about the eye complications of diabetes and asked patients how awareness could be increased.

In our study, we observed that even though patients were aware about diabetes, a significantly high percentage of subjects were particularly unaware about the complications of diabetes. An alarmingly high percentage of participants lacked any knowledge about diabetic retinopathy, eye screening in diabetes and other vision threatening complications of diabetes.

Studies done in Tamil Nadu¹⁵ and Bagalkot reported similar data that only 37.1% were and 45.7% were aware about diabetic eye disease¹⁶. But our results were alarmingly low in comparison to the studies conducted in Vellore (71.9%)¹⁷. Nepal (63.3%)¹⁸ and Jordan (98.3%)¹⁹. In contrary, the studies conducted among a rural population in Karnataka by Manu A s et al who reported that more than half of the patients, 88 (58.7%), were seen to be aware that diabetes can affect the eye²⁰.

We also reported that majority of the patients would get an eye checkup only when the vision is affected (93.3%). Subjects aware about the eye involvement in diabetes believed that individuals will have no eye

problem if the blood sugar levels are controlled (14%). Further, looking on to the gender wise distribution, the males outnumbered females in awareness about diabetes and its eye related complications.

The most common barrier for undergoing eye screening was the lack of knowledge (94%) about the importance of eye screening followed by lack of access to eye care and time limitations. As no similar studies were previously done in our setting, this provides information toward an understanding of health seeking behavior of diabetics regarding one of the major causes of blindness in this populace

The lack of awareness about DR is considered a major health problem that could interfere with proper management and prevention of possible visual impairment. There seems to be a worldwide trend of a lack of awareness of DM in the population. This is likely to have major implications for India, which is estimated to be home to a quarter of the world's blind population. Awareness about the eye complications of diabetes can play an important role in encouraging people to seek timely eye care.

This emphasizes the need to adopt strategies for health education about the disease and complication to be implemented at primary, secondary, and tertiary levels of health care. The emphasis of creating awareness about diabetes mellitus control and complications is to be laid not only among diabetic patients but also among the family members of the patients as they can motivate the patients about it and also help in early care seeking.

Our study highlights the most common barrier being the lack of knowledge about the importance of undergoing eye screening, so awareness needs to be spread among the patients about regular eye checkup as this a potentially serious complication and also treating physician should motivate the patients to undergo screening for retinopathy.

Diabetes education tool can be designed to empower diabetic patients; focusing on self-management, and possible complications of uncontrolled blood sugar. Counselling sessions with family members of patients who present or referred to the diabetic retinopathy clinic will help in educating them regarding diabetes

CONCLUSION

As per our study results, an alarming number of participants lacked knowledge about diabetic retinopathy. There is significant lack in proper information providing sources especially in rural areas. This emphasizes the need for increasing awareness and information providing modalities about diabetes, its complications and treatment options. We need more awareness camps, eye screening centers for early referral, prevention and diagnosis of vision threatening complications of diabetes.

Compliance with ethics requirements: The authors declare no conflict of interest regarding this article. The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from all the patients included in the study.

Acknowledgement: We would like to thank the health care professional of the RHTC of ELMCH, as well as to the study participants involved in the survey.

References

- Karachaliou F, Simatos G, Simatou A. The Challenges in the Development of Diabetes Prevention and Care Models in Low-Income Settings. *Frontiers in Endocrinology*. 2020;11.
- Diabetes (who.int)
- Primary prevention of type-2 diabetes in developing countries. (nih.gov)
- Joshi SR, Parikh RM. India - diabetes capital of the world: now heading towards hypertension. *J Assoc Physicians India*. 2007;55:323-4.
- Kumar A, Goel MK, Jain RB, Khanna P, Chaudhary V. India towards diabetes control: Key issues. *Australas Med J*. 2013;6(10):524-31.
- National-NCD-White-Paper-2015.pdf (psi.org)
- Eye health (idf.org)
- Cheung N, Mitchell P, Wong TY. Diabetic retinopathy. *Lancet*. 2010;376(9735):124-36. doi: 10.1016/S0140-6736(09)62124-3.
- Davis WA, Davis TME. A systematic review of risk factors for cataract in type 2 diabetes. *Diabetes Metab Res Rev*. 2019;35:e3073.
- Dagogo-Jack S. Primary prevention of type-2 diabetes in developing countries. *J Natl Med Assoc*. 2006;98(3):415-419
- Diabetic Retinopathy Signs And Symptoms | MIMS India
- Andonegui J, Serrano L, Equzkiza A, Berástegui L, Jiménez-Lasanta L, Aliseda D & Gaminde I (2010): Diabetic retinopathy screening using tele-ophthalmology in a primary care setting. *J Telemed Telecare* 16: 429-432.)
- Maina WK, Njenga EW, Muchemi EW: Knowledge, attitude and practices related to diabetes among community members in four provinces in Kenya: a cross-sectional study. *Pan Afr Med J* 2010, 7(2):15-18. ISSN 1937-8688.
- Bakkar MM, Haddad MF, Gammoh YS. Awareness of diabetic retinopathy among patients with type 2 diabetes mellitus in Jordan. *Diabetes Metab Syndr Obes*. 2017;10:435-441. Published 2017 Oct 11. doi:10.2147/DMSO.S140841
- Rani PK, Raman R, Subramani S, Perumal G, Kumaramanickavel G, Sharma T. Knowledge of diabetes and diabetic retinopathy among rural populations in India and the influence of knowledge of diabetic retinopathy on attitude and practice. *Rural Remote Health* 2008;8:838.
- Shetgar AC, Patil B, Salagar MC, Nanditha A. Assessment of awareness of diabetic retinopathy among diabetics: A clinical survey. *Indian J Clin Exp Ophthalmol* 2015;1:260-3.
- Srinivasan NK, John D, Rebekah G, Kujur ES, Paul P, John SS, et al. Diabetes and diabetic retinopathy: Knowledge, attitude, practice (KAP) among diabetic patients in A tertiary eye care Centre. *J Clin Diagn Res* 2017;11:NC01-NC07.
- Thapa R, Paudyal G, Maharjan N, Bernstein PS. Demographics and awareness of diabetic retinopathy among diabetic patients attending the vitreo-retinal service at a tertiary eye care center in Nepal. *Nepal J Ophthalmol* 2012;4:10-6.
- El Khatib BA, AlHawari HH, Al Bdour MD. Assessment of awareness of diabetic retinopathy among patients with diabetes mellitus attending the endocrine clinic at Jordan university hospital. *Madrige J Ophthalmol* 2017;2:14-8.
- Manu AS, Davalgi SB, Aithal SS, Dilip B. Awareness of diabetic retinopathy and barriers for eye screening among adults with type 2 diabetes mellitus attending tertiary care teaching hospital, Davanagere, Karnataka. *Int J Med Sci Public Health* 2018;7(9):686-690.