

Research Article

Assessment of Awareness of Diabetic Retinopathy among Type 2 Diabetes Mellitus- Cross-sectional Study from Central India

Sumita Chaturvedi¹, Karthik Iyer¹, Ulka Srivastava², Khalid Khan³, Priyanka^{4*}

¹Junior Resident, Chirayu Medical College and Hospital, Bhopal, India

²Professor and Head of Department, Department of Ophthalmology, Chirayu Medical College and Hospital, Bhopal, India

³Professor, Chirayu Medical College and Hospital, Bhopal, India

⁴Associate Professor, Department of Ophthalmology, AIIMS, Bhopal, India

*Correspondence author: Priyanka, Associate Professor, Department of Ophthalmology, AIIMS, Bhopal, India; Email: priyankapmch1@gmail.com

Citation: Priyanka, et al. Assessment of Awareness of Diabetic Retinopathy among Type 2 Diabetes Mellitus- Cross-sectional Study from Central India. J Ophthalmol Adv Res. 2024;5(1):1-7.

<https://doi.org/10.46889/JOAR.2024.5101>

Received Date: 09-12-2023

Accepted Date: 08-01-2024

Published Date: 16-01-2024



Copyright: © 2024 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CCBY) license (<https://creativecommons.org/licenses/by/4.0/>).

Abstract

Purpose: To assess the awareness of diabetic retinopathy among Type 2 diabetes mellitus from central India.

Method: A cross-sectional study involving 350 patients with type 2 diabetes mellitus was conducted between August 2022 and January 2023. Participants completed a 21-point questionnaire on diabetic retinopathy awareness and knowledge. Results were expressed in frequencies and percentages.

Results: 54.3% (190 participants) had awareness about diabetic retinopathy. Education significantly influenced awareness, with 72% of educated participants showing higher awareness. 66% of urban residents were more aware than 47.1% of rural residents. No significant gender difference was observed. Younger participants demonstrated better awareness (63.9%) than older individuals (17.3%).

Conclusion: About 54.2% of the participants were aware of Diabetic Retinopathy (DR). Younger patients, patients from urban areas and the group with a higher level of education were found to be more aware of DR. Effective health education and regular eye screenings are essential to improve awareness about DR, aiding in its prevention and better disease management among individuals with type 2 diabetes.

Keywords: Awareness; Diabetes Mellitus; Diabetic Retinopathy

Introduction

Diabetes Mellitus (DM) and its related blindness are reaching alarming proportions in developing countries. The global prevalence of DM was reported to be 8% in 2011. However, it is expected to increase to 10% by 2030 [1]. The World Health Organisation has predicted that the number of diabetes patients will increase from 19 million (1995) to 80 million (2030) in India, accounting for the highest globally. According to the WHO-NPCB surveys, diabetes has emerged as a common cause of ocular morbidity and blindness in India over the last 20 years, becoming number 6 (2001-02 survey report) from 17 (1986-89 survey report) among the causes for blindness in India. About one-fifth of individuals with diabetes are estimated to have diabetic retinopathy and one-third of the diabetic population never undergo an ocular examination [2]. Among diabetic patients, several risk factors like long duration of DM, uncontrolled DM, older age and the presence of additive systematic diseases such as hypertension, dyslipidemia and obesity have been reported for diabetic retinopathy [3-5].

Knowledge is essential in early detection and prevention of future disease development [6]. Positive Knowledge, Attitude and Practice (KAP) are essential for diabetic patients and are interrelated and dependent on each other. If the level of one element is higher, the other two factors should be affected positively. Cataracts, especially sight-threatening diabetic retinopathy,

significantly impact the psychological well-being and quality of life of the diabetic patient [7,8]. Information can help people assess their risk of diabetes, motivate them to seek proper treatment and care and inspire them to take care of their disease for the rest of their lives. Therefore, there is a need for an increased level of awareness about risk factors for ocular involvement and its sight-threatening complications of diabetes in the community.

Our study aims to assess the awareness about diabetic retinopathy in type 2 diabetes patients undergoing ocular examination in tertiary care centres in central India. To the best of our knowledge, it is the first cross-sectional study to assess the awareness of diabetic retinopathy among Type 2 diabetes mellitus from central India.

Material and Methods

A cross-sectional study was conducted at the tertiary care centre between August 2022 and January 2023. A total of 350 patients were enrolled in this duration of study. All patients who attended OPD during the study were included in this study, whereas type 1 or gestational diabetes, physically or mentally challenged subjects were excluded. The study was performed after ethical approval. An informed consent was obtained and confidentiality was maintained for all the participants. The basic demographic data, duration of DM, type of medication, risk factors for DR, education level and self or family history of eye diseases were recorded. They were then asked to respond to a 21-point questionnaire, which comprised questions relating to awareness about diabetic retinopathy (Table 1, Fig. 1). The questionnaire was prepared after a thorough literature search on previous studies on awareness and knowledge of diabetic retinopathy [9,10]. Patients were asked to answer yes or no to questions. The same interviewer in English administered the questionnaire and those who were not conversed in English were translated into Hindi languages.

Patients scoring more than 60 per cent in the above questionnaires are considered to be aware of diabetic changes in the eye. Statistical analyses were performed using Statistical Package for the Social Sciences software (Version SPSS 22.0/ IBM, Chicago, USA). Frequencies and percentages were produced to summaries the results. The chi-square test was used to establish the association between categorical data. The P values less than 0.05 were considered to be statistically significant.

Results

350 patients with type 2 Diabetes Mellitus (DM) were enrolled in this study. 174 (49.7%) were males and 176 (50.3%) were females. The mean age of study participants was computed to be 48.6 ± 09 years. Regarding the medical history of DM, i.e., duration of diabetes, 140 (40.1%) of the patients were diagnosed with the disease < 5 years ago, 113 (32.2%) >10 years ago and 97 (27.7%) of the patients within 5-10 years ago. Regarding the history of comorbidity, 112 patients (32.2%) had hypertension, 91 patients (26%) had a history of dyslipidemia, 47 patients (13.4%) had cardiac diseases and 12 (3.6%) had renal impairment (Table 2). Among the 169 (48%) who were aware of diabetic retinopathy, 11 (12%) had signs of diabetic retinopathy. 111 (32%) of the respondents thought retinopathy would not occur if diabetes were controlled, while 239 (68%) thought they could develop retinopathy changes even with controlled diabetes. 140 patients (40%) were active smokers and 115 (33%) did not exercise regularly. 169 (48%) of the participating patients involved in this study were aware of diabetic retinopathy. The results showed that 255 (73%) patients stated that DM may lead to blindness and 87 (25%) knew that retinopathy could be treated. 87 (25%) of diabetic patients were examined by ophthalmologists after diagnosis of diabetes (Table 3). The overall awareness was among 190 (54.2%) participants and 160 (45.8%) were not aware of DR (Table 4).

Further analysis was conducted to explore the potential factors that might influence the awareness levels among the participants. Our study found a significant association between age and awareness levels. Participants aged <40 (72) had awareness in 46 and 26 were unaware. Participants aged 41-50 (84) had awareness in 61 and 23 needed to be made aware. Participants aged 51-60 (119) had awareness and 70 and 49 were unaware. Lastly, participants aged above 60 (75) had awareness in 13 and 62 were not aware (chi-square = 56.3075, p-value < 0.00001). The results indicate that younger participants generally had better awareness of diabetic retinopathy than older participants. Gender did not show a significant association with awareness levels about diabetic retinopathy. Among male participants (174), 92 were aware and 82 were unaware. Among female participants (176), 98 were aware and 78 were unaware (chi-square = 0.2781, p-value = 0.597979).

The study also observed a significant association between residence and awareness levels. Among participants from rural areas

(207), 97 were aware and 110 were unaware. In contrast, among participants from urban areas (143), 93 were aware and 50 were unaware, which was statistically significant (chi-square = 11.2578, p-value = 0.000793). The results indicate that individuals from urban areas are more aware of diabetic retinopathy than those from rural areas.

Our study found a significant association between education and awareness levels about diabetic retinopathy. Among the educated participants (261), 178 were aware and 83 were unaware. On the other hand, among the uneducated participants (89), only 12 had awareness and 77 were not aware, which was statistically highly significant (chi-square = 80.0673, p-value < 0.00001). The results suggest that higher education levels positively impact the awareness of diabetic retinopathy.

1. Do you know about DM?	Yes	No
2. Do you know diabetes is a common health problem?	Yes	No
3. Is diabetes a genetic disease?	Yes	No
4. Does sugar consumption affect diabetes?	Yes	No
5. Do you know what food should be avoided in diabetes?	Yes	No
6. Do you smoke?	Yes	No
7. Does smoking affect diabetes?	Yes	No
8. Do you exercise daily?	Yes	No
9. Does exercise affect diabetes?	Yes	No
10. Does diabetes affect eye?	Yes	No
11. Have your eyes been examined by a doctor after diagnosing your diabetes?	Yes	No
12. Are diabetic patient more prone for developing cataract?	Yes	No
13. Does diabetes affect Retina?	Yes	No
14. If both eyes are having good vision, involvement of Retina is not possible?	Yes	No
15. Is visiting to optometrist or optician adequate for diabetic person?	Yes	No
16. Ocular involvement can be avoided by controlling diabetes?	Yes	No
17. Can involvement of Retina be treated?	Yes	No
18. Is Blindness caused by diabetes?	Yes	No
19. Do you know how to measure diabetes?	Yes	No
20. Can Diabetes be prevented?	Yes	No
21. Does diabetes affect other body organs?	Yes	No

Table 1: Awareness questionnaire of diabetic retinopathy.

Variables	Number(percentage)
Age (in years)	
Mean SD	48.6± 09
Range	34- 78
Gender	
Male	174 (49.7%)
Female	176 (50.3%)
Duration of Diabetes	
<5 year	140 (40.1%)
5-10 year	97 (27.7%)
>10 year	113 (32.2%)
Hypertension	112 (32.2%)

Dyslipidemia	91 (26%)
Renal impairment	12 (3.6%)
Cardiac problem	47 (13.4%)
Residence	
Rural	207 (59.1%)
Urban	143(40.8%)

Table 2: Demographic profile.

Awareness Questionnaire	Correct Answer	Number (%)
Do you know about DM?	Yes	280 (80%)
Do you know diabetes is a common health problem?	Yes	273 (78%)
Is diabetes a genetic disease?	Yes	248 (71%)
Does sugar consumption affect diabetes?	Yes	263 (75%)
Do you know what food should be avoided in diabetes?	Yes	273 (78%)
Do you smoke?	No	210 (60%)
Does smoking affect diabetes?	Yes	203 (58%)
Do you exercise daily?	Yes	210 (60%)
Does exercise affect diabetes?	Yes	269 (77%)
Does diabetes affect eye?	Yes	168 (48%)
Have your eyes been examined by a doctor after diagnosing your diabetes?	Yes	87 (25%)
Are diabetic patient more prone for developing cataract?	Yes	161 (46%)
Does diabetes affect Retina?	Yes	115 (33%)
If both eyes are having good vision, involvement of Retina is not possible?	No	129 (37%)
Is visiting to optometrist or optician adequate for diabetic person?	No	241 (69%)
Ocular involvement can be avoided by controlling diabetes?	Yes	112 (32%)
Can involvement of Retina be treated?	Yes	87 (25%)
Is Blindness caused by diabetes?	Yes	255 (73%)
Do you know how to measure diabetes?	Yes	260 (74%)
Can Diabetes be prevented?	Yes	263 (75%)
Does diabetes affect other body organs?	Yes	226 (65%)

Table 3: Patient awareness of diabetic retinopathy (n = 350).

84% assessed by Saikumar et al. in Kerala [10]. The rates of awareness were higher in Myanmar and Nigeria, where the awareness rates were 86% and 84.3%, respectively [12,13]. The variation in the level of awareness between different studies and our study can be attributed to the resources of each community, the physician's advice, the variation in the level of education of each population and the information they provide. 25% knew they should get their eyes examined despite reasonable blood sugar control, much lower than a study by Saikumar, et al., conducted in south India, which showed 50.8% of the patients the importance of regular eye examination [10].

Our study revealed a significant association between age and awareness levels. Younger participants demonstrated better awareness compared to older participants. This highlights the need for targeted educational interventions for older diabetic patients to enhance their understanding of diabetic retinopathy and the importance of regular eye examinations by healthcare providers. Our study did not find a significant difference in awareness levels between male and female participants.

Educated participants demonstrated a significantly higher level of awareness regarding diabetic retinopathy than uneducated participants. Similar to our findings, a significant association of awareness with a higher education level was reported by Bakkar, et al., and Almalki et al., [14,15]. This finding emphasizes the importance of health education programs and campaigns targeted at diabetic patients, particularly those with lower education levels.

Our study identified a significant difference in awareness levels between rural and urban residents. Rural participants exhibited lower awareness compared to urban participants. This difference could be attributed to disparities in access to healthcare facilities, health education and awareness programs in rural areas. To address this gap, mobile health initiatives and community health workers should implement targeted interventions in rural communities.

The study identified some misconceptions among participants, such as the belief that retinal involvement is impossible if both eyes have good vision. Healthcare professionals should communicate effectively with patients to clarify misunderstandings and dispel myths about diabetes and its complications. Implementing regular eye screening programs and encouraging comprehensive eye examinations by ophthalmologists can help in early detection and timely management of diabetic retinopathy, thus potentially reducing the burden of diabetes-related blindness [16,17].

To bridge knowledge gaps, healthcare professionals should adopt patient-centred communication strategies and use accessible language to convey complex medical information effectively, motivating them to adopt healthier lifestyles and adhere to prescribed treatments. Collaborative efforts between healthcare institutions, non-governmental organizations and governmental agencies can be instrumental in implementing such programs and creating a sustainable impact.

Our cross-sectional design study limits the establishment of causal relationships between awareness levels and various factors. Secondly, the hospital-based study might not fully represent the entire population of individuals with type 2 diabetes in central India. Therefore, caution should be exercised when generalizing the findings to other regions.

Conclusion

The study provides valuable insights into the awareness of diabetic retinopathy among individuals with type 2 diabetes in central India. While some participants demonstrated more awareness, others exhibited awareness gaps and misconceptions. The study highlights the need for targeted health education programs, especially for individuals with lower education levels and those residing in rural areas. By addressing these knowledge gaps and implementing comprehensive eye screening programs, healthcare providers can contribute to the early detection and effective management of diabetic retinopathy, ultimately reducing the burden of diabetes-related blindness and improving the quality of life for individuals with type 2 diabetes.

Conflict of Interests

The authors have no conflict of interest to declare.

References

1. World Health Organization. (2016). Global Report on diabetes.
2. Rani PK, Raman R. Knowledge and diabetes awareness in urban and rural India: The Indian Council of Medical Research India Diabetes Study (Phase I): Indian Council of Medical Research India Diabetes. *Indian J Endocrinol and Metabolism*. 2016;20(1):51-8.
3. Chatziralli IP, Sergentanis TN, Keryttopoulos P, Vatkalis N, Agorastos A, Papazisis L. Risk factors associated with diabetic retinopathy in patients with diabetes mellitus type 2. *BMC Res Notes*. 2010;3:153.
4. Liu L, Wu J, Yue S, Geng J, Lian J, Teng W, et al. Incidence density and risk factors of diabetic retinopathy within type 2 diabetes: A five year cohort study in China (Report 1). *Int J Environ Res Public Health*. 2015;12:7899-909.
5. Al Ghamdi A, Rabiou M, Al Qurashi AM, Al Zaydi M, Al Ghamdi AH, Gumaa SA, et al. Knowledge, attitude and practice pattern among general health practitioners regarding diabetic retinopathy Taif, Kingdom of Saudi Arabia. *Saudi J Health Sci*. 2017;6:44.
6. Shrestha BK, Ghimire RH. Knowledge, attitude and practice on diabetes and diabetic retinopathy among diabetic patients attending outpatient department of Nepal eye hospital. *J Institute of Med*. 2020;42(3):48-55.
7. Muecke J, Newland H, Ryan P, Ramsey E, Aung M, Myint S, et al. Awareness of diabetic eye disease among general practitioners and diabetic patients in Yangon, Myanmar. *Clinical and Experimental Ophthalmol*. 2008;36(3):265-73.
8. Wong TY, Sabanayagam C. Strategies to tackle the global burden of diabetic retinopathy: From epidemiology to artificial intelligence. *Ophthalmologica*. 2020;243:9-20.
9. Rani PK, Raman R, Subramani S, Perumal G, Sharma T. Knowledge of diabetes and diabetic retinopathy among rural populations in India, the influence of knowledge of diabetic retinopathy on attitude and practice. *Rural and Remote Health*. 2008;8:838.
10. Saikumar SJ, Giridhar A, Mahesh G, Elias A, Bhat S. Awareness about eye diseases among diabetics-A survey in south India. *Community Eye Health J*. 2005;18:97.
11. Dandona R, Dandona L, John RK, McCarty CA, Rao GN. Awareness of eye diseases in an urban population in southern India. *Bulletin of World health Organisation*. 2001;79(2):96-102.
12. Muecke JS, Newland HS, Ryan P, Ramsay E, Aung M, Myint S, et al. Awareness of diabetic eye disease among general practitioners and diabetic patients in Yangon, Myanmar. *Clin Exp Ophthalmol*. 2008;36:265-73.
13. Mohammed I, Waziri AM. Awareness of diabetic retinopathy amongst diabetic patients at the murtala mohammed hospital, Kano, Nigeria. *Niger Med J*. 2009;50:38-41.
14. Bakkar MM, Haddad MF, Gammoh YS. Awareness of diabetic retinopathy among patients with type 2 diabetes mellitus in Jordan. *Diabetes Metab Syndr Obes* 2017;10:435-41.
15. Almalki NR, Almalki TM, Alswat K. Diabetics retinopathy knowledge and awareness assessment among the type 2 diabetics. *Open Access Maced J Med Sci*. 2018;6:574
16. Venugopal D, Lal B, Fernandes S, Gavde D. Awareness and knowledge of diabetic retinopathy and associated factors in Goa: A hospital-based cross-sectional study. *Indian J Ophthalmol*. 2020;68:383-90.
17. Singh A, Tripathi A, Kharya P, Agarwal P. Awareness of diabetic retinopathy among diabetes mellitus patients visiting a hospital of north India. *J Family Med Prim Care* 2022;11:1292-8.

Journal of Ophthalmology and Advance Research



Publish your work in this journal

Journal of Ophthalmology and Advance Research is an international, peer-reviewed, open access journal publishing original research, reports, editorials, reviews and commentaries. All aspects of eye care health maintenance, preventative measures and disease treatment interventions are addressed within the journal. Ophthalmologists and other researchers are invited to submit their work in the journal. The manuscript submission system is online and journal follows a fair peer-review practices.

Submit your manuscript here: <https://athenaeumpub.com/submit-manuscript/>