

## A STUDY ON DIABETIC RETINOPATHY AND TYPE II DIABETES MELLITUS AMONG PATIENTS ATTENDING A TERTIARY CARE HOSPITAL OF BIHAR

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### Abstract

**Background:** This study was conducted among the patients attending a medical college in Bihar. Due to a sizeable proportion of slum dwellers, large migrant population from other states and rapidly changing lifestyle among the residents of the catchment area of this hospital, the population forms a ‘high risk’ group for DM. This study therefore aims to provide a baseline data to plan the DR services to achieve better blindness prevention. **Materials and Methods:** An observational study with cross-sectional design was conducted by the department of ophthalmology of Darbhanga Medical College and Hospital, Darbhanga, Bihar. The study period was 6 months, from October 2022 to March 2023. A total of 100 patients were examined during this time scale. Rapid assessment of avoidable blindness (RAAB) is a survey methodology designed for assessment of prevalence and causes of blindness and VI in population over 50 years of age. [17, 18] Later DR module was added to the original RAAB methodology [19] which allows estimation of prevalence of DM and DR in a high risk population. **Result:** A total of 100 patients were selected for participation in the study. The age and gender distribution of the study participants has been given in the Table 1. On history taking on DR screening coverage, it was found that most diabetics (77/100), never had a screening for DR in the past. Prevalence of any retinopathy/maculopathy among diabetics was 21%. Sight threatening DR (R4 and/or M2) was noted among 6%. Laser scars were noted among 4 patients. **Conclusion:** Targeting diabetes clinics and use of telemedicine will improve coverage of DR screening. Referral linkages need to be established between diabetes clinics and DR treatment centres. There is need of DR survey among larger population.

## INTRODUCTION

India is home to over 74 million diabetics, and the number is estimated to exceed 123 million by 2040.<sup>[1]</sup> Increasing longevity, changing lifestyle and dietary habits contribute to increasing prevalence of diabetes mellitus (DM) in India and all over the world.<sup>[2]</sup> Largest increase in the disease burden (among all non-communicable diseases) between the year 1996 and 2016 was noted for DM at 80%.<sup>[3]</sup> Diabetes and its complications are now an area of focus for prevention of mortality and morbidity. Absence of acute symptoms and lack of awareness are the main barriers for detection of DM and its complications.<sup>[4,5]</sup> Prevalence of DM in India has been reported to be between 10.2% and 36% in various population-based surveys.<sup>[6-9]</sup> However, there was a variation in the age group included and

the methodology used in these surveys. A multi state survey to establish prevalence of DM published in 2010 reported age-specific prevalence of DM.

Diabetic retinopathy (DR) is a microvascular complication of DM and can cause blindness or visual impairment (VI). Although cataract remains a principal cause of blindness in India, other retinal causes (especially DR) are emerging as priority diseases for national program for control of blindness (NPCB) as well as vision 2020 India.<sup>[10,11]</sup> Prevalence of DR among diabetics has been reported to be 9.6%–21.7% in various studies conducted across India over the last decade.<sup>[12-16]</sup> Previous DR surveys have been conducted largely in south and central India. Also, the age groups included and the methodology used was widely variable making direct comparison impossible. Moreover, there is likely to be a variation in the

prevalence across states of India due to differences in levels of urbanization which can affect lifestyle of the population. This study was conducted among the patients attending a medical college in Bihar. Due to a sizeable proportion of slum dwellers, large migrant population from other states and rapidly changing lifestyle among the residents of the catchment area of this hospital, the population forms a ‘high risk’ group for DM. There is no available data guiding the implementation of DR services from most part of the country. This study therefore aims to provide a baseline data to plan the DR services to achieve better blindness prevention.

## MATERIALS AND METHODS

An observational study with cross-sectional design was conducted by the department of ophthalmology of Darbhanga Medical College and Hospital, Darbhanga, Bihar. The study period was 6 months, from October 2022 to March 2023. A total of 100 patients were examined during this time scale. Rapid assessment of avoidable blindness (RAAB) is a survey methodology designed for assessment of prevalence and causes of blindness and VI in population over 50 years of age.<sup>[17,18]</sup> Later DR module was added to the original RAAB methodology which allows estimation of prevalence of DM and DR in a high risk population.<sup>[19]</sup> Hence the DR module segment was used for the current research work to satisfy the objective of finding prevalence of DR among DM patients.

Self-reported diabetics cases with a long-standing history of type II diabetes mellitus were examined for DR after pupillary dilatation. Those who refused to undergo pupillary dilatation were excluded from the study. Retinal examination was carried out with indirect ophthalmoscope (Appasamy Associates,

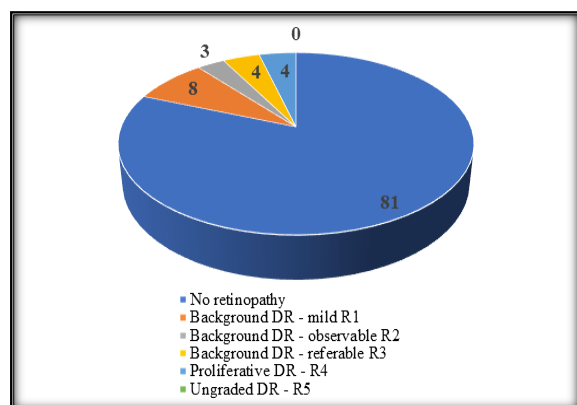
Chennai, India) and 20D lenses (Volk, Germany) after a minimum 30 min of dilatation. Assessment of DR was completed by a trained ophthalmologist. The Scottish classification was used for grading retinopathy and maculopathy.<sup>[20]</sup> Those with proliferative changes and macular oedema involving the centre were classified as having sight threatening DR (STDR). All self-reported diabetics were asked about the timing of last retina evaluation in order to determine DR screening coverage. All participants also then underwent presenting and pinhole visual acuity testing in each eye using Snellen’s tumbling E chart. Participants were labeled as having normal vision, early/moderate/severe VI or blindness as per WHO are convention and the RAAB survey methodology V.6.

## RESULTS

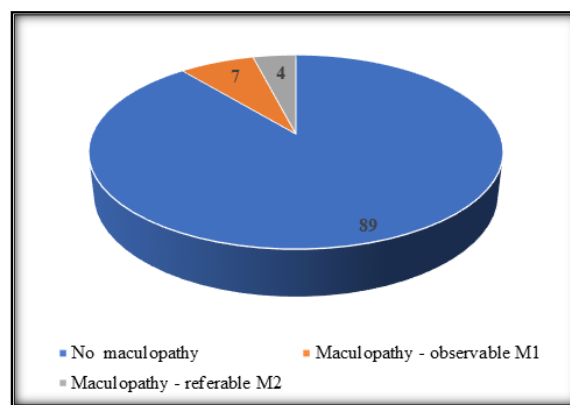
A total of 100 patients were selected for participation in the study. These patients were long standing known cases of Type II diabetes mellitus. The age and gender distribution of the study participants has been given in the Table 1. On history taking on DR screening coverage, it was found that most diabetics (77/100), never had a screening for DR in the past. Prevalence of any retinopathy/maculopathy among diabetics was 21%. Sight threatening DR (R4 and/or M2) was noted among 6%. Laser scars were noted among 4 patients. Prevalence by grades of DR among the study samples has been shown pictorially in figure 1A and 1B. Some grade of visual impairment (VI) was found among 27 out of all 100 patients examined. Out of this, most of the patients had early VI (16, 59.3%) followed by moderate VI (9, 33.3%) and severe VI (2, 7.4%). Complete blindness was not noted in the current study.

**Table 1: Age and gender distribution of the cases**

Age group	Number of total participants	Number of male participants	Number of female participants
< 40 years	2	2 (100%)	0
41-50 years	29	21 (72.4%)	8 (27.6%)
51-60 years	37	22 (59.5%)	15 (40.5%)
> 60 years	32	18 (56.3%)	14 (43.7%)
All ages	100	63	37



**Figure 1: Pie distribution of study participants based on their retinopathy grade**



**Figure 2: Pie distribution of study participants based on their maculopathy grade**

## DISCUSSION

India is one of the top two countries with high number of persons with DM.<sup>[1]</sup> Estimating prevalence of DM and DR is vital to planning, monitoring services and allocating resources for the same. Among known diabetics, coverage for treatment of DM was good but that for DR screening was very poor. Over two-thirds of the cases had never received any eye examination for DR. Indian guidelines recommend at least once a year retinal evaluation for all diabetics.<sup>[11]</sup> Many studies have found evidence that daily wage workers and uninsured persons were less likely to undergo DR screening. As the current study envisages population from lower socioeconomic strata and underprivileged section, knowledge as well as attitude towards screening services was poor. Screening for DR is a form of preventive health check-up available for a fees, hence persons belonging to lower socioeconomic strata were more likely to avoid it. Excellent coverage of treatment for DM indicates that people chose to receive medications for DM irrespective of socioeconomic status. This suggests that cost and lack of awareness could be important barriers for DR screening. Educating primary healthcare professionals such as physicians, general practitioners, pharmacists, laboratory personnel about the need and protocol for DR screening is perhaps the key to improve coverage of DR screening. Establishing DR screening programmes at diabetes clinics rather than at specialist eye hospitals might also help to improve screening coverage further. The current study has reported a prevalence of any form of maculopathy or retinopathy among patients of type II Dm to be around 21%. Flaxman et al,<sup>[27]</sup> have reported that globally crude prevalence (all age) of blindness due to all causes showed a declining trend except for DR which showed 7.7% increase. Complete blindness was not reported in this study. DR as a cause of VI was seen among 27% of diabetics. The causes of VI though could not be established.

## CONCLUSION

There is a definite need to increase awareness of DM among general population which will help in identifying early complications of diabetics. Targeting diabetes clinics and use of telemedicine will improve coverage of DR screening. Referral linkages need to be established between diabetes clinics and DR treatment centre's. There is need of DR survey among larger population.

## REFERENCES

1. International Diabetes Federation, 2015. Prevalence and magnitude of diabetes as per country/region. Available: <http://www.diabetesatlas.org/resources/2015-atlas.html>.
2. Goff LM, Duncan A. Diet and lifestyle in the prevention of the rising diabetes pandemic. *J Hum Nutr Diet* 2010; 23:333–5.
3. Department of Health Research Govt of India, 2017. India: Health of the Nation's states. Available: [http://www.healthdata.org/sites/default/files/files/policy\\_report/2017/India\\_Health\\_of\\_the\\_Nation%27s\\_States\\_Report\\_2017.pdf](http://www.healthdata.org/sites/default/files/files/policy_report/2017/India_Health_of_the_Nation%27s_States_Report_2017.pdf).
4. Lingam S, Rani PK, Sheeladevi S, et al. Knowledge, attitude and practices on diabetes, hypertension and diabetic retinopathy and the factors that motivate screening for diabetes and diabetic retinopathy in a pyramidal model of eye health care. *Rural Remote Health* 2018;18.
5. Hussain R, Rajesh B, Giridhar A, et al. Knowledge and awareness about diabetes mellitus and diabetic retinopathy in suburban population of a South Indian state and its practice among the patients with diabetes mellitus: a population-based study. *Indian J Ophthalmol* 2016; 64:272–6.
6. Anjana RM, Pradeepa R, Deepa M, et al. Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: phase I results of the Indian Council of medical Research-India diabetes (ICMR-INDIAB) study. *Diabetologia* 2011; 54:3022–7.
7. Prasad DS, Kabir Z, Dash AK, et al. Prevalence and risk factors for diabetes and impaired glucose tolerance in Asian Indians: a community survey from urban eastern India. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2012; 6:96–101.
8. Radhakrishnan S, Balamurugan S. Prevalence of diabetes and hypertension among geriatric population in a rural community of Tamilnadu. *Indian J Med Sci* 2013; 67:130–6.
9. Rajput R, Rajput M, Singh J, et al. Prevalence of diabetes mellitus among the adult population in rural blocks of Haryana, India: a community-based study. *Metab Syndr Relat Disord* 2012; 10:443–6.
10. Vemparala R, Gupta P. National Programme for control of blindness (NPCB) in the 12th five year plan: an overview. *DJO* 2017; 27:290–2.
11. Vision 2020 India, 2008. Guidelines for the comprehensive management of Dr in India. Available: <https://www.iapb.org/wp-content/uploads/Guidelines-for-the-Comprehensive-Management-of-DR-in-India.pdf>.
12. Jonas JB, Nangia V, Khare A, et al. Prevalence and associated factors of diabetic retinopathy in rural central India. *Diabetes Care* 2013; 36:e69.
13. Namperumalsamy P, Kim R, Vignesh TP, et al. Prevalence and risk factors for diabetic retinopathy: a population-based assessment from Theni district, South India. *Br J Ophthalmol* 2009; 93:429–34.
14. Raman R, Rani PK, Reddi Racheppalle S, et al. Prevalence of diabetic retinopathy in India: Sankara Nethralaya Diabetic Retinopathy Epidemiology and molecular Genetics study report 2. *Ophthalmology* 2009; 116:311–8.
15. Rema M, Premkumar S, Anitha B, et al. Prevalence of diabetic retinopathy in urban India: the Chennai urban rural epidemiology study (cures) eye study, I. *Invest Ophthalmol Vis Sci* 2005; 46:2328–33.
16. Gadkari S, Maskati Q, Nayak B. Prevalence of diabetic retinopathy in India: the All India Ophthalmological Society diabetic retinopathy eye screening study 2014. *Indian J Ophthalmol* 2016; 64:38–44.
17. Dineen B, Foster A, Faal H. A proposed rapid methodology to assess the prevalence and causes of blindness and visual impairment. *Ophthalmic Epidemiol* 2019; 13:31–4.
18. Kuper H, Limburg H, Polack S. Rapid assessment of avoidable blindness. *J Ceh* 2020;19.
19. Polack S, Yorston D, López-Ramos A , et al. Rapid assessment of avoidable blindness and diabetic retinopathy in Chiapas, Mexico. *Ophthalmology* 2022; 119:1033–40.
20. Scottish Diabetic Retinopathy Screening Collaborative, 2023. Scottish Diabetic Retinopathy grading scheme 2007 v1.1 [NHS Scotland website]. Available: <http://www.ndrs-wp.scot.nhs.uk/wp-content/uploads/2013/04/Grading-Scheme-2023-v1.1.pdf>