International Journal of Medical and Health Research
ISSN: 2454-9142
Received: 01-07-2019; Accepted: 03-08-2019
www.medicalsciencejournal.com
Volume 5; Issue 10; October 2019; Page No. 01-03

Prevalence of diabetic retinopathy in western India

Neha Shilpy
Senior Resident Ophthalmology, C.H. Nagri Eye Hospital, Ahmedabad, Gujarat, India

Abstract
Purpose: To estimate the prevalence of DR (diabetic retinopathy) at a tertiary care hospital in western India and to find its association with age, gender and duration of DM (diabetes mellitus).
Methods: This was a cross-sectional study conducted at a tertiary care center in western India from December 2018 to May 2019. The study population consisted of patients with DM. Demographic details and detail fundus examination to diagnose DR was done for all subjects. Prevalence of DR and its distribution with age, gender and duration of DM was calculated.
Results: Of the 520 DM patients, 115 (22.12%) had DR. Males were more commonly affected (57.39%). Most patients belonged to the age group of 41-60 years but the prevalence increased with age and patients >80 years had prevalence of 27.27%. Longer duration of DM was also directly associated and the prevalence was as high as 61.84% in patients with DM for >20 years.
Conclusion: The prevalence of DR in western India is 22.12%. The disease was more common in males. The prevalence of DR increased with increasing age and duration of DM.

Keywords: diabetic retinopathy, prevalence, duration of diabetes

1. Introduction
Diabetes mellitus (DM) is a global epidemic. The world health organization (WHO) had reported 422 million patients affected worldwide in 2014 [1]. The global prevalence of type II DM has almost doubled from 4.7% in 1980 to 8.5% in 2014 [1]. In India, the prevalence of DM was 31.7 million in 2000 which is expected to rise to 79.4 million by 2030 [2]. Gujarat is second only to Tamil Nadu among the Indian states worst affected by DM.
Diabetic retinopathy (DR) is one of the major causes of avoidable blindness affecting almost two-thirds of type II DM and all patients with type I DM over a period of time [3, 4] The retinal microvasculature is affected because of the prolonged hyperglycemia, which leads to DR [5] Timely detection and appropriate control measures are very important for its management and can reduce the disease morbidity as well the huge social and financial burden. This study was conducted to estimate the prevalence of DR at a tertiary care hospital in western India and to find its association with age, gender, severity and duration of DM.

2. Materials and Methods
This was a cross-sectional study conducted at a tertiary care hospital in Gujarat from December 2018 to May 2019. All patients with DM were included in the study. Patients with mature cataract or significant media haze were excluded.
Demographic details of the included subjects were noted. The duration of DM was also noted. A single doctor examined all the patients. Clinical examination included indirect ophthalmoscopy with 20 D lens and slit lamp bio microscopy with 90 D lens. DR was classified as non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR) based on International Classification of Diabetic Retinopathy [5] NPDR was further graded as mild, moderate or severe [5]. The presence of macular edema was also noted.
The prevalence of DR was calculated. Percentage distribution of DR patients based on age, gender, severity and duration of DM was also calculated.

3. Results
A total of 520 DM patients were included in the study. Of them, there were 268 (51.54%) males and 252 (48.46%) females. DR was present in 115 (22.12%) patients, of whom 66 (57.39%) were males and 49 (42.61%) were females. Table 1 shows the age distribution of patients with DM and DR. Though 41-60 years was the most common age group of both DM and DR, but the percentage of patients affected with DR increased with age. We did not find any DR in younger age group of 0-20 years while 27.27% of patients > 80 years had developed DR changes.
Table 2 shows the distribution of DR patients based on duration of DM. We found that as the duration of DM increased, the percentage of patients with DR also increased. Prevalence of DR was 5.79% in patients who had DM for less than 5 years while 38.16% of patients who had DM for >20 years developed DR changes.
The severity grading of DR patients showed that 56 (48.70%) patients had mild NPDR, 33 (28.70%) had moderate NPDR, 14 (12.17%) had severe NPDR and 12 (10.43%) had PDR. 21 (18.26%) patients had macular edema on clinical examination.

Table 1: Age distribution of patients with DR

Age group in years	Number of patients with DM	Number of patients with DR	Percentage of patients with DR (%)
0-20	10	0	0
21-40	42	7	16.67
41-60	335	76	22.69
61-80	122	29	23.77
>80	11	3	27.27
Total	520	115	22.12

Table 2: Distribution of DR patients based on duration of DM

Duration of DM in years	Number of patients with DM	Number of patients with DR	Percentage of patients with DR
≤ 5	121	3	1.7
6-10	120	10	8.33
11-15	111	19	17.12
16-20	92	36	39.13
>20	76	47	61.84
Total	520	115	

4. Discussion

DM is a multi-organ disease which affects the blood vessels and nerves all over the body. The worldwide prevalence of DM is increasing, with India emerging as the diabetes capital of the world. Therefore, increased awareness is needed for its prevention and management. Uncontrolled or fluctuating blood sugar levels along with co-existing illnesses like hypertension and hypercholesterolemia lead to rapid progression of disease and increase chances of complications like DR. Even with good control, long duration of DM leads to DR. Therefore, routine screening of DM patients for early diagnosis of DR changes is warranted.

The prevalence of DR in our study was 22.12%. A larger study conducted by All India Ophthalmological Society mentioned a prevalence of 21.27% with a range of 12.27% in central zone and 34.06% in north zone.[6] They found a prevalence of 21.75% in the west zone which is similar to our study. The other Indian studies are performed in south India and have reported prevalence ranging from 7.3% by Rema *et al* to 26.2% by V Narendran *et al.* [7-12] The difference in prevalence can be explained by difference in sample size and different methods and observer bias to diagnose DR. The global prevalence of DR as reported in various studies range from 12.3% in Spain by Rodriguez-Poncelas *et al* to 39% in Hong Kong by Lian *et al*. [13-18]

In our study, we found that males are more commonly affected which is similar to previous studies [7]. A possible explanation of this could be the gender bias because males more often present to hospitals.

The prevalence was highest in patients >80 years with an increase in prevalence with increasing age. This implies that age has a positive correlation with development of DR. The duration of DM was also directly associated with development of DR with 61.84% patients developing DR after 20 years of having DM. This is also supported in previous studies which label the duration of DM as the strongest predictor of DR [19].

5. Conclusion

The prevalence of DR in western India is 22.12%. The disease is more common in males. The prevalence of DR increases with increasing age and duration of DM.

6. References

1. Sarwar N, Gao P, Seshasai SR, Gobin R, Kaptoge S, Di Angelantonio *et al*. Diabetes mellitus, fasting blood glucose concentration, and risk of vascular disease: a collaborative meta-analysis os 102 prospective studies. Emerging risk factors collaboration. Lancet. 2010; 26; 375:2215-2222.
2. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes, estimates for the year 2000 and projections for 2030. Diabetes Care. 2004; 27:1047-53.
3. Prevention of Blindness from Diabetic Retinopathy. Report of a WHO Consultation, Geneva November, 2005.
4. Guidelines for the Comprehensive Management of Diabetic Retinopathy in India. A VISION 2020 the Right to Sight India Publication; July, 2008.
5. Ryan SJ. Medical retina. 4th ed. Baltimore: Mosby; Chapter, 67:1276.
6. Gadkari SS, Maskati QB, Nayak BK. Prevalence of diabetic retinopathy in India The All India Ophthalmological Society Diabetic Retinopathy Eye Screening Study 2014. Indian J Ophthalmol. 2016; 64:38-44.
7. Raman R, Rani PK, Reddi Rachepalle S, Gnanamoorthy P, Uthra S, Kumaramanickavel G. *et al*. Prevalence of diabetic retinopathy in India: Sankara Nethralaya diabetic retinopathy epidemiology and molecular genetics study report 2. Ophthalmology. 2009; 116:311-8.
8. Rema M, Premkumar S, Anitha B, Deepa R, Pradeepa R, Mohan V. *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.
9. Namperumalsamy P, Kim R, Vignesh TP, Nithya N, Royes J, Gijo T. *et al*. Prevalence and risk factors for diabetic retinopathy: A population-based assessment from Theni District, South India. Postgrad Med J. 2009; 85:643-8.
10. Narendran V, John RK, Raghuram A, Ravindran RD, Nirmalan PK, Thulasiraj RD. *et al* Diabetic retinopathy among self-reported diabetics in Southern India: A population based assessment. Br J Ophthalmol. 2002; 86:1014-8.
11. Dandona L, Dandona R, Naduvilath TJ, McCarty CA, Rao GN. Population based assessment of diabetic retinopathy in an urban population in Southern India. Br J Ophthalmol. 1999; 83:937-40.
12. Pradeepa R, Anitha B, Mohan V, Ganesan A, Rema M.

Risk factors for diabetic retinopathy in a South Indian type 2 diabetic population – The Chennai urban rural epidemiology study (CURES) eye study 4. Diabet Med. 2008; 25:536-42.
13. Lian JX, Gangwani RA, McGhee SM, Chan CK, Lam CL. Primary Health Care Group, *et al*. Systematic screening for diabetic retinopathy (DR) in Hong Kong: Prevalence of DR and visual impairment among diabetic population. Br J Ophthalmol 2015. pii: Bjophthalmol-2015-307382.
14. Rodriguez-Poncelas A, Miravet-Jiménez S, Casellas A, Barrot-De La Puente JF, Franch-Nadal J, López-Simarro F. *et al*. Prevalence of diabetic retinopathy in individuals with type 2 diabetes who had recorded diabetic retinopathy from retinal photographs in Catalonia (Spain). Br J Ophthalmol. 2015; 99:1628-33.
15. Dawkins RC, Oliver GF, Sharma M, Pinto BM, Jeronimo B, Pereira B. *et al*. An estimation of the prevalence of diabetes mellitus and diabetic retinopathy in adults in Timor-Leste. BMC Res Notes. 2015; 8:249.
16. Huang OS, Tay WT, Ong PG, Sabanayagam C, Cheng CY, Tan GS. *et al*. Prevalence and determinants of undiagnosed diabetic retinopathy and vision-threatening retinopathy in a multiethnic Asian cohort: The Singapore epidemiology of eye diseases (SEED) study. Br J Ophthalmol. 2015; 99:1614-21.
17. Giloyan A, Harutyunyan T, Petrosyan V. The prevalence of and major risk factors associated with diabetic retinopathy in Gegharkunik province of Armenia: Cross-sectional study. BMC Ophthalmol. 2015; 15:46.
18. Hajar S, Al Hazmi A, Wasli M, Mousa A, Rabiu M. Prevalence and causes of blindness and diabetic retinopathy in Southern Saudi Arabia. Saudi Med J. 2015; 36:449-55.
19. Rani PK, Raman R, Chandrakantan A, Pal SS, Perumal GM, Sharma T, *et al.* Risk factors for diabetic retinopathy in self-reported rural population with diabetes. J Postgrad Med. 2009; 55:92-6.