Original Research Article

Prevalence of diabetic retinopathy: A tertiary care centre based study

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ABSTRACT

Introduction: Diabetes has become a global epidemic. Diabetic retinopathy (DR) is a leading cause of loss of vision in diabetics. Since the global prevalence of diabetes is estimated to rise exponentially, the prevalence of DR is also bound to rise. Consequently, a large population will be at risk by DR in near future.

Materials and Methods: A cross sectional observational study was conducted on eligible diabetic patients. Demographic data and history was noted. A complete ophthalmic examination in which fundus was examined by +90 D and +20D lenses. Statistical analysis was performed.

Results: Out of 291 eligible patients, 159 (55%)were males. 76 (26.11%) had DR of which 43 (27.04%)were males. For duration of diabetes (years) <5, 5-10 and >10, DR was found in 5 (6.57%), 30 (39.47%) and 41 (53.94%) respectively. DR in age groups (years) of <40,40-60,60-80 and >80,was 1(2%),32(25%),44(30%) and 9(100%) respectively. Mild, moderate, severe NPDR and PDR were found in 39(51.31%), 17(22.36%), 13 (17.1%) and 7 (9.2%) patients respectively.

Conclusion: The prevalence of DR is very high in Indian population. Diabetic patients are unaware of development of DR in early stages. The severity of DR rises with increase in duration of diabetes.

1. Introduction

The number of people affected by diabetes all over the world was 424.9 million in the year 2017.[1] It is estimated to increase to a huge 628 million by the year 2045.[2] Diabetes is a multisystem metabolic disorder that affects not only heart, kidney and brain but also eyes.[3,4] While diabetes can affect different structures within the eye such as cornea, lens, extraocular muscles and optic nerve, the most severe and debilitating visual disorder is caused by retinal involvement.[5] The involvement of retina in diabetes is called diabetic retinopathy (DR). DR is a leading cause of blindness across the globe.[6,7] DR is known to inflict the eye in a wide spectrum from clinically significant macular oedema to vitreous hemorrhage and retinal detachment. These complications of DR are progressive in nature and if not treated on time can lead to irreversible blindness.[8]

Since the global prevalence of diabetes is estimated to rise exponentially, the prevalence of DR is also bound to rise. Consequently, a large population will be at risk by DR in near future. Therefore we conducted a study to find out the current prevalence of DR amongst the people suffering from diabetes.

2. Materials and Methods

A cross sectional observational study was conducted at Geetanjali Medical College and Hospital, Udaipur, from July 2018 to June 2019. Permission for this study was taken from the institutional ethics committee and informed consent was obtained from all the patients.

2.1. Inclusion criteria

All the consenting patients attending the outdoor at department of medicine and diagnosed with diabetes were enrolled for the study.

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2.2. Exclusion criteria

Patients with corneal opacity and /or cataract which obscured the detailed examination of fundus view were excluded.

After taking demographic details of age and gender, clinical history, duration of diabetes and details of treatment, all eligible patients underwent a complete ophthalmic examination which included visual acuity by Snellen's chart and slit lamp biomicroscopy. Fundus was examined by an ophthalmologist with more than 15 years of experience (RM). Indirect ophthalmoscopy was done by +90D and +20 D lenses. Fundus drawing was recorded diagrammatically. The DR was classified into Non –Proliferative DR (NPDR) and Proliferative DR (PDR) according to Early Treatment Diabetic Retinopathy Study (ETDRS) criteria.[9] NPDR was further classified into mild, moderate, severe and very severe according to ETDRS criteria.

The data was entered in MS excel sheet and statistical analysis was done by Statistical Program for Social Sciences (SPSS) version 21.0.0.0. The association with age, sex and duration of diabetes was analysed by Chi –square test and considered significant for $p < 0.05$.

3. Results

A total of 314 patients with diabetes were enrolled for the study. Of them 23 were found to have media opacity of such a density so as to obscure the fundus views which were excluded. Of them 11 were having cataract and 12 were having corneal opacity. Finally 291 patients were found to be eligible for the study. Of the 291 patients 159 (55%) were males. The age of males ranged from 29 to 86 years (mean =59.36 years). The age of females ranged from 33 to 82 years (mean=58.23 years).

The number of patients affected by DR among 291 patients was 76 (26.11%) of which 43 were males.

Table 1: Distribution of diabetes according to gender

	Patients with Diabetes	Percentage
Male	159	55%
Female	132	45%
Total	291	

(p>0.05)

Table 2: Distribution of diabetes with age

	Duration of Diabetes		
	< 5 year	5-10 years	>10 years
Male	53	67	39
Female	46	59	27
Total	99	126	66

(p<0.05)

Prevalence of DR for duration less than 5 years was 5% (p <0.05), for a duration of 5-10 years was 23.8% (p <0.05),

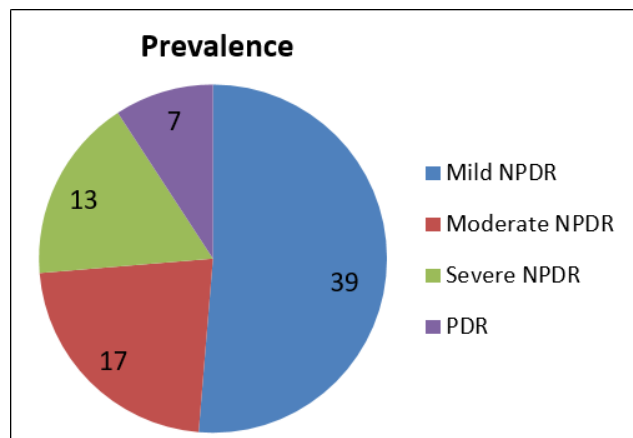and for a duration of >10 years was 62.12% (p <0.05).

Fig. 1: Prevalence of DR according to its severity

4. Discussion

Several studies have found the prevalence of DR in India to vary from 17.6% to 28.2%.[10–13] this huge variation of the figure in different studies is very confusing. The prevalence of DR in our study was found to be 26.11% (Table 4) which is on the higher side as compared to other studies. This difference in the figures could be due to different types of lifestyles, dietary habits and access to health care across the globe. One of the major confounding factors can be the different kind of design of each study thereby inducing sampling errors. We have tried to keep our study simple and precise, thereby leading to easy and straightforward interpretation of the data.

In our study, DR was found in 43 (56.57%) males and 33 (32.89%) females. This distribution was not found to be statistically significant (p>0.05).

The prevalence of DR was found to be increasing with the duration of diabetes. The prevalence of DR increased from just 5% for duration of diabetes less than 5 years to 62% for duration of more than 10 years (Table 3) This association was found to be significant (p<0.05). It is in concurrence with other studies which also found the same.[14–16]

The prevalence of DR increases with age from just 2% below 40 years of age to 100% in more than 80 years of age in our study (Table 4). This association was found to be strongly linked (p <0.05). The severity of DR also increased with age from nil PDR under age of 40 years to 7 cases above the age of 40 years (Table 8). The finding of age as a risk factor is in concurrence with other studies.[11–14]

An important observation in this study has been that not all patients found to have DR had loss of visual acuity. Out of 76 patients who were found to have DR, 24 (31.57%) patients had visual acuity of more than 6/12(Table 5). It indicated that the visual acuity could be normal despite

Table 3: Duration wise distribution of prevalence of DR

| | Duration of Diabetes | | | |
	< 5 year (n=99)	5-10 years (n=126)	>10 years(n=66)	Total (%)
Male	3	16	24	43 (56.57)
Female	2	14	17	33(32.89%)
Total	5 (5%)	30 (23.8%)	41(62.12%)	76 (100%)

(p<0.05)

Table 4: Age wise distribution of prevalence of DR

| Age (years) | DR | | Total | Prevalence (%) |
	Present	Absent		
<40	1	41	42	2%
40-60	32	94	126	25%
60-80	34	80	114	30%
>80	9	0	9	100%
Total	76	215	291	26.11%

(p <0.05)

Table 5: Prevalence of DR according to visual acuity

| | DR | | Total | Prevalence (%) |
	Present	Absent		
>6/12	24	64	88	27%
6/24-6/12	25	69	94	27%
6/60- 6/24	21	79	100	21%
<6/60	6	3	9	67%
Total	76	215	291	

(p< 0.05)

Table 6: Prevalence of DR according severity of DR (n=76)

Severity of DR	Prevalence	(%)
Mild NPDR	39	51.31
Moderate NPDR	17	22.36
Severe NPDR	13	17.1
PDR	7	9.2
Total	76	

Table 7: Prevalence of severity DR according to duration of Diabetes (n=76)

| | Duration of Diabetes | | | |
	< 5 year	5-10 years	>10 years(n=76)	Total
Mild NPDR	5	30	4	39
Moderate NPDR	0	0	17	17
Severe NPDR	0	0	13	13
PDR	0	0	7	7
Total	5 (6.57%)	30 (39.47%)	41(53.94%)	76 (100%)

(p <0.01)

Table 8: Prevalence of severity DR according to age of diabetics (n=76)

| | Age (Years) | | | | |
	<40	40-60	60-80	>80	Total
Mild NPDR	1	20	18	0	39
Moderate NPDR	0	6	7	4	17
Severe NPDR	0	4	7	2	13
PDR	0	2	2	3	7
Total	1(1%)	32 (42.1%)	34(44.73%)	9(11.8%)	76

(p <0.05)

the patients developing DR. It also implied that patients with diabetes may remain unaware of development of DR because visual acuity is not affected in all cases. It underlines the importance for regular examination of all the patients with diabetes. The necessity for regular fundus examinations in diabetic patients has also been mention in other studies. [12–15]

Our study found that the severity of DR increased with the duration of diabetes. In diabetics of duration of less than 5 years, only 5(6.57%) patients had DR (Table 3). Moreover, all of them had only mild NPDR (Table 7). In diabetics of duration of more than 10 years 41(53.94%) cases of DR were found. Moreover, 13 had severe NPDR and 7 had PDR. This association of severity of DR with duration was found to be strongly linked (p<0.01). Longer duration of diabetes leads to higher metabolic derangement, thereby increasing the severity of DR. [16–18] It further underlines the importance of regular fundus examinations in diabetic patients.

The limitation of this study is small sample size and hospital based. Therefore the prevalence derived from this study cannot be accurately extrapolated to entire population of the country. Hence, a large population based study with randomized sampling is recommended.

5. Conclusion

The prevalence of DR is very high in Indian population. DR patients can have normal visual acuity in early stages. The severity of DR rises with increase in duration of diabetes. Therefore regular ophthalmic examination of all diabetics is recommended to diagnose DR at early stages.

6. Source of Funding

None.

7. Conflict of Interest

None.

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