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Prevalence of Diabetic Retinopathy among Diabetic Patients Visiting a Tertiary Care Hospitalin the State of Goa

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Abstract: *Objective: To estimate the prevalence ofdiabetic retinopathy in patients visiting the Ophthalmology OPD of Goa Medical College and to find its association with age, sex, type of diabetes and duration of diabetes. Methods: Retrospective case notes of 3130 Type 1 and 2 diabetic patients visiting the OPDover a period of 1 Year were screened for Diabetic Retinopathy and graded based on the Early Treatment DiabeticRetinopathy Study (ETDRS) scale. Census sampling method was used.*
Results:Prevalence of DR was found to be 19.11%, Males were affected more (55.01%).176 (32.35%) had mild, 211 (38.79%) had moderate and 157 (28.86%) had severe NPDR. 54 patients had PDR. The prevalence of DR in age group 0-20 was 0, 21-40 was 10.13%, 41-60 was 20.84%, 61-80 was 24.02% and >80 was 19.8%. Prevalence of NPDR in patients with duration of diabetes less than 1 year was 0.9%, 2-5 years was 1.5%, 6-10 years was 7%, 11-15 years was 16.1% and >15 years was 21%. Prevalence of PDR in patients with duration of diabetes less than 1 year was 0%, 2-5 years was 0.5%, 6-10 years was 1.3%, 11-15 years was 2.2% and >15 years was 12%. 18 patients with Type 1 DM were screened and 2 had PDR, 6 had Severe NPDR and 10 had no DR.
Conclusion: Duration of DMis a key factor in progression of DR. Routine fundus examination is important for early detection of DR as it is a leading cause of blindness in working population.

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I.Introduction

Diabetes mellitus (DM) is the metabolic disorder, mainly affecting the carbohydrate metabolism but also with associated changes in the protein and fat metabolism.

Diabetic retinopathy is a major cause of blindness among the working population, it was found to be the foremost cause of loss of vision in adults (20–74 years)[(1)]. In a study done in 2010, 285 million people were estimated to be suffering from DM in the world, about one-third were found to have signs of DR, about one-third among them were found to have vision-threatening diabetic retinopathy[(2)]

Among patients with Type 1 DM, PDR is the leading cause of vision loss whereas diabetic macular edema (DME) is the leading cause in Type 2 DM. Since Type 2 is more prevalent and DME is almost always present along with PDR, DME becomes the most common cause of vision loss in DM.

India is one of the major hubs of diabetics in the world and according to the World Health Organization, during the next 2 decades; the number of cases of adult-onset diabetes mellitus will grow to nearly 80 million in 2030. A further rise in these estimated values is expected with the increasing prevalence of DM, as well as the increasing expectancy of life of those with DM. The rate of progression of DR is associated with the duration and severity of hyperglycemia, hypertension and cardiovascular factors.

In Indian, very limited data is available on the prevalence of DR in the general population.

Since diabetes and its complications are a major public health issue, data on the prevalence of DR in diabetics will help in formulating primordial, primary and secondary prevention programs for DR as well as for other complications associated with it like DM neuropathy, DM vasculopathy, and DM nephropathy.

II. Materials and Methods

All patients having diabetes mellitus attending the Ophthalmology OPD of Goa Medical College and those referred from all other departments of Goa Medical College as well as from various district hospitals and health centers in the state of Goa for diabetic retinopathy screening including those already receiving OPD level services because of retinopathy between 1st January 2017 to 31st December 2017 were included in the study.

Upon approval of the Institutional Ethical Committee, demographic data along with type of diabetes, duration of diabetes, best corrected visual acuity (by Snellen's chart) and fundus findings were collected from retrospective

case notes of patients. Retinopathy was classified according to the Early Treatment Diabetic Retinopathy Study (ETDRS) classification.

Inclusion Criteria:

1. All patients with Type 1 and Type 2 diabetes of all age groups

Exclusion Criteria:

1. Patients with Advanced immature cataract or Mature cataract limiting fundus evaluation
2. Patients with Corneal opacity limiting fundus examination
3. Patients not willing for dilated fundus examination

Study Design: Retrospective study

Sampling Method: Census sampling

Data were anonymized before undergoing statistical analysis.

III. Results

Overall prevalence and sex distribution of DR is represented in Table 1 and Figure 1.1, 1.2. In our study, out of the 3130 patients with Diabetes, 19.11% had DR and 1.72% had PDR among which males were affected more than females (55.01% with DR and 69.26% with PDR)

Among the 598 patients with DR, 544 had NPDR, which on further classification, had 176 (32.35%) with mild, 211 (38.79%) with moderate and 157 (28.86%) with severe NPDR. 54 patients had PDR.

The prevalence of DR in age group 0-20 years was 0, 21-40 years was 10.13%, 41-60 years was 20.84%, 61-80 years was 24.02% and >80 years was 19.8%. The age wise distribution of DR is depicted in Table 2.1, 2.2 and Figure 2.1, 2.2

Prevalence of NPDR in patients with duration of diabetes less than 1 year was 0.9%, 2-5 years was 1.5%, 6-10 years was 7%, 11-15 years was 16.1% and >15 years was 21%.

Prevalence of PDR in patients with duration of diabetes less than 1 year was 0%, 2-5 years was 0.5%, 6-10 years was 1.3%, 11-15 years was 2.2% and >15 years was 12%.

The prevalence of DR increases with the duration of diabetes with the prevalence of PDR rising exponentially as duration of diabetes increases. Table 3 and Figure 3 shows prevalence of NPDR and that of PDR based on duration of diabetes.

18 patients with Type 1 DM were screened and 2 were found to have PDR, 6 were found to have Severe NPDR and 10 were found to have no DR

Table 1. Frequency distribution of DR and PDR among patients:

	Total	With DR	With PDR
Males	1611 (51.47%)	329 (55.01%)	32 (59.26%)
Females	1619 (48.53%)	269 (44.99%)	22 (40.74%)
Total	3130	598	54

Table 2.1 - Age distribution of patients with DR:

Age in Years	Mild NPDR	Moderate NPDR	Severe NPDR	PDR	Total
0-20	0	0	0	0	0
21-40	55	28	7	0	90
41-60	44	80	35	8	167
61-80	65	100	120	36	321
>80	2	3	5	10	20
Total	176	211	157	54	598

Table 2.2 – Age wise prevalence of DR

Age Group	Population	Mild NPDR	Moderate NPDR	Severe NPDR	PDR	Total Prevalence of DR
0-20	4	0	0	0	0	0
21-40	888	6.19	3.15	0.79	0	10.13
41-60	801	5.49	9.99	4.36	0.99	20.84
61-80	1336	4.86	7.48	8.98	2.69	24.02
>80	101	1.98	2.97	4.95	9.9	19.8

Table 3 – Prevalence of NPDR and PDR based on duration of Diabetes

Duration Of Diabetes	Prevalence of NPDR	Prevalence of PDR
<1 Year	0.9	0
2-5 Years	1.5	0.5
6-10 Years	7	1.3
11-15 Years	16.1	2.2
>15 Years	21	12

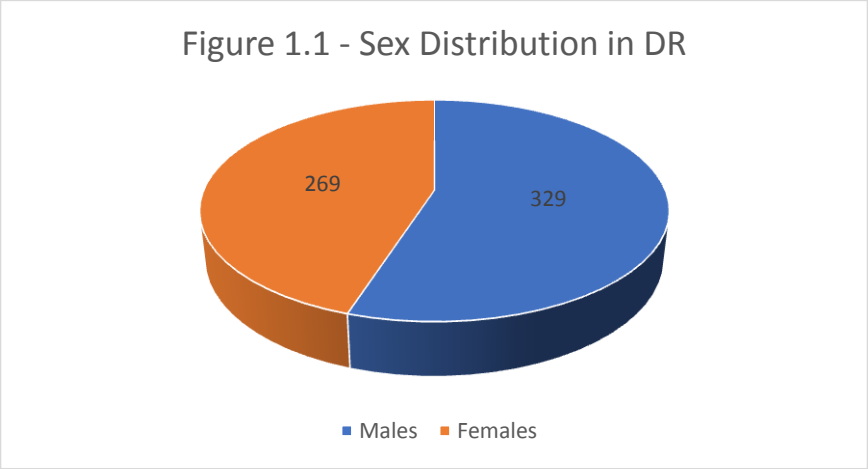


Figure 1.1 - Sex Distribution in DR
269
329
Males
Females

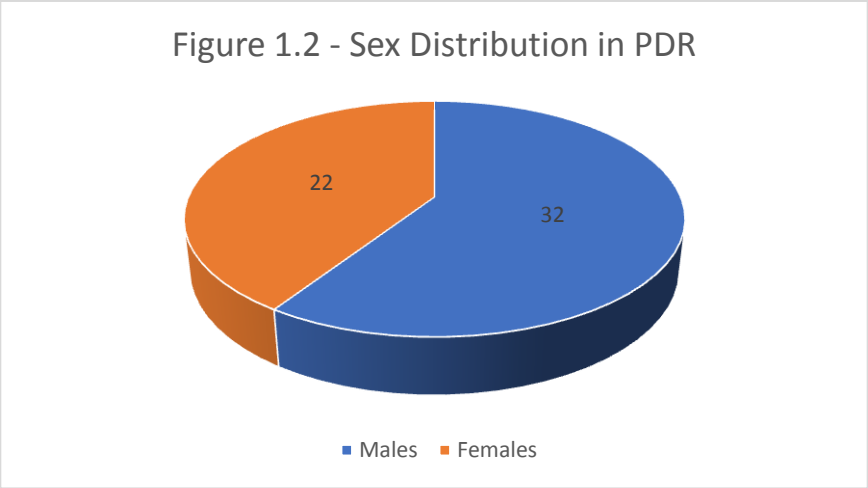


Figure 1.2 - Sex Distribution in PDR
22
32
Males
Females

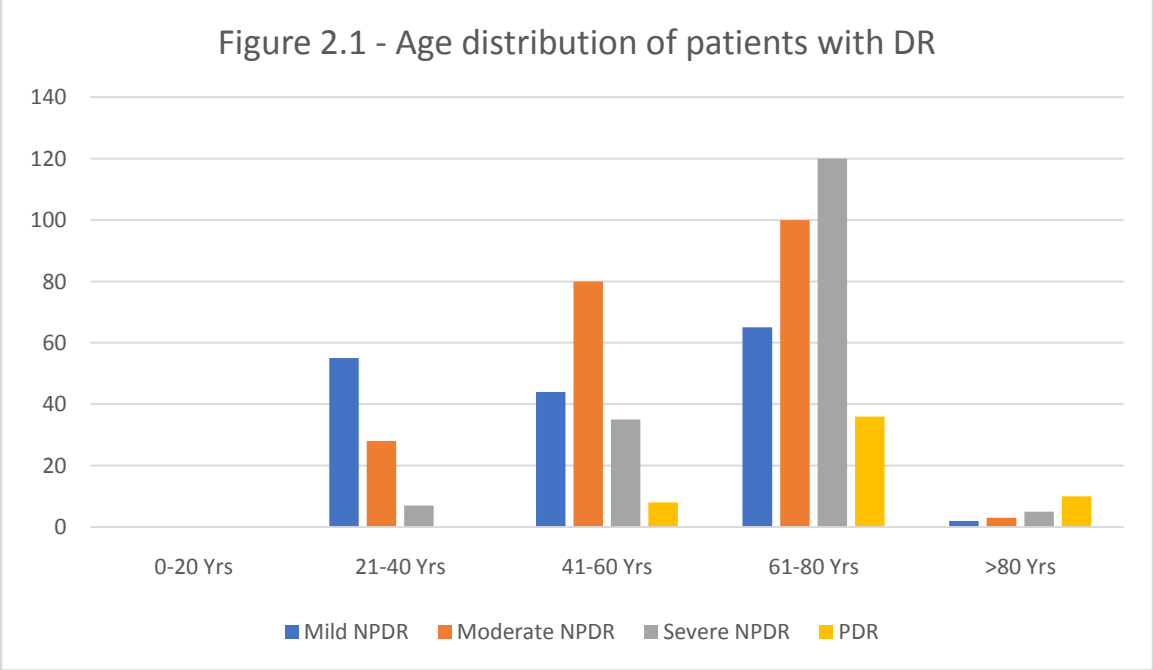
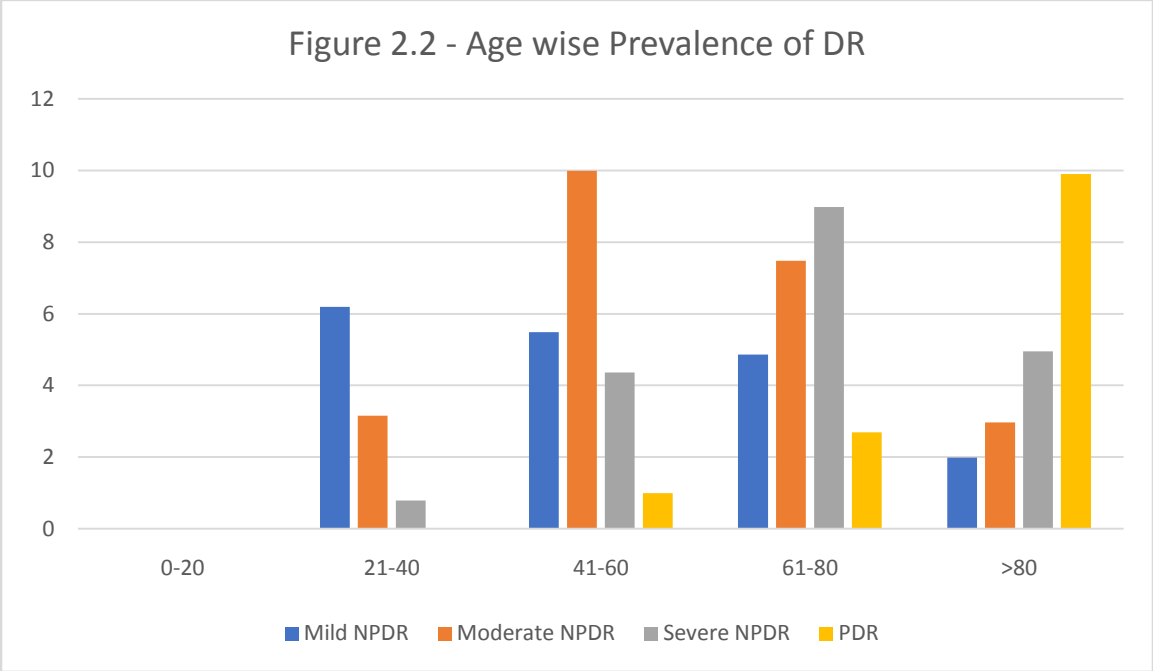
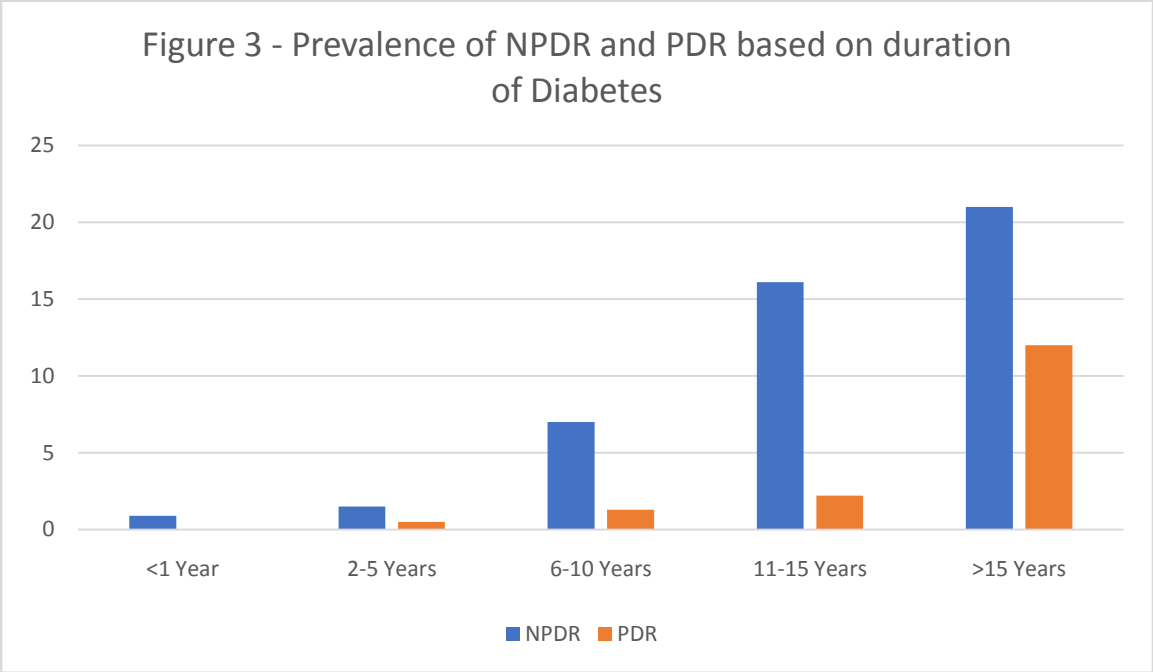


Figure 2.1 - Age distribution of patients with DR
140
120
100
80
60
40
20
0
0-20 Yrs
21-40 Yrs
41-60 Yrs
61-80 Yrs
>80 Yrs
Mild NPDR
Moderate NPDR
Severe NPDR
PDR





IV. Discussion:

In our study, the prevalence of DR was 19.11%, similar to that observed by multiple regional studies like Raman *et al.* (18.1%)[3], Rema *et al.* (17.6%)[4] , Namperumalsamy *et al.* (10.6%)[5] , Narendran *et al.* (26.2%)[6] and Dandona *et al.* (22.58%)[7] as well as the nationwide AIOS study conducted by Gadkari et al. (21.27%)[8]

Males were found to be affected more than females, this may be attributed to the social barriers in access to screening as well as treatment.

Duration of diabetes was found to be a key factor in progression of DR as the percentage of people affected with DR increases with the duration of DM with a 16.1 % prevalence in patients with DM for 11-15 years and 21% prevalence in patients with DM for more than 15 yrs. Prevalence of DR in newly detected diabetics (with duration of diabetes less than 1 Year) was found to be 0.9% which increased to 1.5% for diabetics with duration of 1–5 Years.

Prevalence of PDR was found to be insignificant (0.5%) in diabetics with duration of diabetics less than 5 Years, no newly detected diabetics were found to have PDR. Prevalence of PDR in patients with duration of diabetes >15 years was found to be 12%.

This further strengthens the fact that duration of DM is a key predictor of severity of DR and PDR.

On categorization of patients with NPDR, moderate NDPR (38.79) accounted for maximum number of patients followed by Mild NPDR (32.35%) and Severe NPDR (28.86%).

Diabetics in the age group of 21-40 had maximum prevalence of Mild NPDR, age group of 41-60 had maximum prevalence of Moderate NPDR, 61-80 had maximum prevalence of Severe NPDR whereas >80 had maximum prevalence of PDR. Highest prevalence of DR was found in diabetics of age 61-80.

V. Conclusion:

Ours was the first study of this kind to be conducted in the state of Goa which estimated the prevalence of DR (19.11%) in a tertiary care hospital-based population which also included diabetic patients specifically referred from periphery for fundus examination.This data can be useful for formulation of policies and screening programs conducted by the government authorities.

Our study created awareness towards routine fundus examination is diabetic patients. Most patients had evidence of DR despite having near normal best corrected visual acuity which further emphasized the importance of routine fundus examination.

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