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EVALUATION OF PREVALANCE AND RISK FACTORS ASSOCIATED WITH THE SEVERITY OF DIABETIC RETINOPATHY IN A TERTIARY CARE HOSPITAL

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Abstract
Background: Diabetic retinopathy (DR) is an increasingly significant major public health problem, especially in many middle-to-low income countries where access to trained eye-care professionals and secondary and tertiary eye-care services may be suboptimal.
Aim: Our study aimed to estimate the prevalence of retinopathy and evaluate the associated risk factors of DR in patients with diabetes mellitus.
Materials and methods: An institutional based cross-sectional study. A total of 400 Diabetic patients attending ophthalmology OPD were screened for presence of retinopathy Data were collected by utilizing a semi-structured questionnaire. DR grade and risk factors were analysed in all the study subjects.
Results: The overall prevalence of DR was 27.5%. The mean age was 52.36±8.92 years. Majority of the patients (35.5%) had minimal non-proliferative retinopathy followed by (28.1%) moderate non-proliferative retinopathy. Most of the DR patients (65.5%) were non insulin dependent DM and 34.5% had insulin dependent DM. The risk factors showing significant association with DR were longer diabetes duration, older age, family history of diabetes, higher HbA1c level, higher BMI, associated hypertension, diabetic neuropathy and diabetic nephropathy.
Conclusion: Duration of diabetes, obesity, HbA1c level, associated hypertension, nephropathy and neuropathy were significantly correlated with progression of DR, Therefore, strict glycemic control and regular screening for DR are recommended to reduce the risk of DR.

Keywords Diabetic Mellitus, Prevalence, Risk factors, Diabetic retinopathy.

INTRODUCTION

Diabetic retinopathy (DR) is the most common microvascular complication of diabetes and it is the leading cause of visual impairment [1]. DR is a specific microvascular complication of DM, remains the leading cause of acquired vision loss worldwide in middle-aged and therefore economically active people [2]. Patients with diabetes are at higher risk of visual impairment than non-diabetic ones [3]. Yet, DR continues to be one of the leading causes of preventable blindness in developed countries. This visual impairment is due to the presence of proliferative diabetic retinopathy (PDR) and clinically significant macular edema (CSME) [4]. The major risk factors contributing to development and severity of DR among patients with diabetes are duration of diabetes, glycemic control, co-existing diabetic complications, and other associated conditions: Hypertension, carotid artery occlusive disease, anemia, pregnancy, and family history of retinopathy [5-6]. Diabetic retinopathy is characterized by varying degrees of micro aneurysm, hemorrhage, hard exudates, cotton-wool spots, venous changes, and new vessel formation involved in the peripheral retina, macula, or both [7]. Over the past few decades, there have been major advances made in understanding the epidemiology of DR, systemic control of DM to prevent DR development and progression, clinical assessment, diagnosis and management of DR and VTDR. There is widespread knowledge that screening, early detection and prompt treatment of VTDR allow prevention of diabetes-related visual impairment [8]. Prevalence of retinopathy at diagnosis of T2D has been used as a surrogate marker for late detected T2D in several other studies [9]. Despite the tremendous advances in medicine, medical technology, and devices, we cannot definitively prevent the visual impairment of DR because its diagnosis and management are often delayed. This

delay is linked to the absence of visual symptoms during the early stages of the disease, hence the importance of screening [10].

Aims and objectives: Our study aims to estimate the prevalence of retinopathy in patients with DM and evaluate the associated risk factors with the severity of the DR in our population.

MATERIAL AND METHODS

This was a cross-sectional observational hospital based study carried out in department of ophthalmology in a tertiary care center, central India. The study population was all known diabetes patients who attended ophthalmology out patients department in our hospital during the study period.

Inclusion criteria

- Diabetes patients who came to eye check up
- Age group of20–70 years with both genders
- Patients who provided consent for the study

Exclusion criteria

- Patients <20 0r >70 years of age
- Hypertensive retinopathy, retinal vascular occlusion, traumatic macular edema, age-related macular degeneration, choroidal neovascularization and media opacity etc
- Patients who not provided consent for the study

Operational definition:

Diabetic retinopathy: on retinal camera examination the presence of micro aneurysms, hemorrhages, exudation, cotton wool spot, and/or new vessels [11].

Pre-proliferative DR:—on retinal camera examination the presence of 5 or more cotton wool spots, large blot hemorrhages, intra-retinal micro vascular abnormalities (IRMAs), and/or venous abnormalities [12].

Proliferative DR:—on retinal camera examination the presence of new vessel elsewhere, new vessel on disc and/ or pre-retinal/vitreous hemorrhage [13].

Data was collected using semi-structured questionnaire based predestined proforma. Data were collected Sociodemographic variables like Age, Sex, Education status, Place of Residency, Occupation, BMI and socio-economic class. Clinical factors such as Hypertension, Blood glucose HbA1C, Duration of illness and treatment modality. Relevant investigation was done.

The ophthalmic evaluation consisted of corrected visual acuity and intraocular pressure measurements followed by fundus examination done in all patients.

Statistical analysis: Data were analyzed using statistical package for social sciences version 22.0 (IBM Corporation). Continuous data were analyzed using the student t-test, while Chi-square(x2) test and Fischer's exact test was used for categorical data. A p value <0.05 was considered to be statistically significant.

RESULTS

A total of 400 participants suspected with diabetic retinopathy were enrolled and examined in this study. The prevalence of Diabetic retinopathy was 27.5% (110/400). The majority of the patients (41.8%) were from above 50 years of age with Mean±SD =52.36±8.92 years. With regard to gender distribution more than half (56.4%) of were male. Maximum participants (59.1%) resided at urban area and 42.7% belongs to middle socio-economic class. Majority of the subjects (39.1%) had educated up to secondary school.

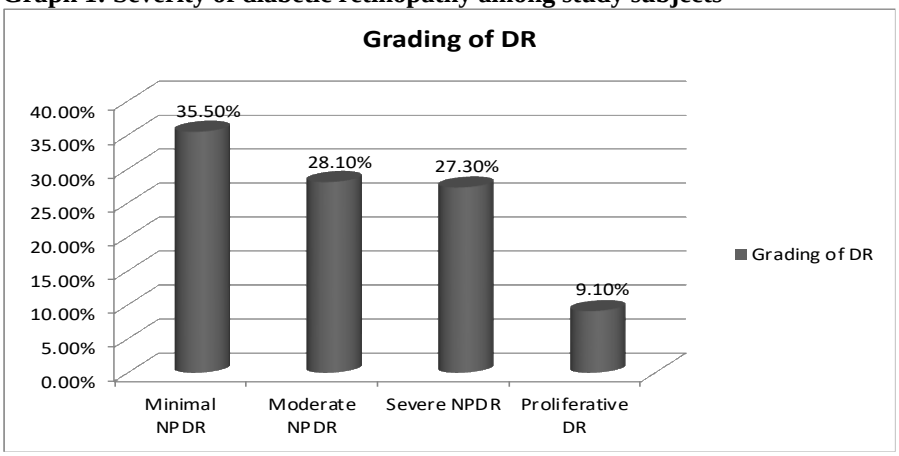
Table 1: Socio-demographic characteristics of the study participants

Socio-demographic variables		Frequency (n=110)	Percentage
Age (In year)	20-30	16	14.5%
	31-40	25	22.7%
	41-50	33	30%

	>50	46	41.8%
Gender	Male	62	56.4%
	Female	48	43.6%
Area of Residence	Rural	45	40.9%
	Urban	65	59.1%
Educational status	Primary education	29	26.4%
	Secondary education	43	39.1%
	Graduate	38	34.5%
Socio-economic class	Lower	23	20.9%
	Middle	47	42.7%
	Upper	40	36.3%

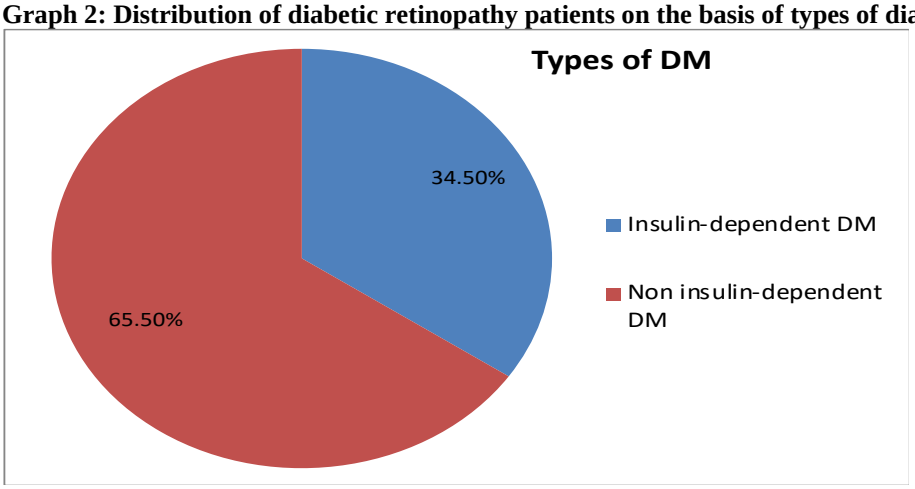
On the basis of DR grading; 35.5% had minimal non-proliferative retinopathy, 28.1% had moderate non proliferative retinopathy, 27.3% had severe non-proliferative retinopathy and 9.1% had proliferative retinopathy [Figure 1].

Graph 1: Severity of diabetic retinopathy among study subjects



Most of the Retinopathy patients (65.5%) were non insulin dependent (Type 2) DM and 34.5% had insulin dependent DM.

Graph 2: Distribution of diabetic retinopathy patients on the basis of types of diabetes



Among risk factors of DR, majority of the patients (48.2%) had longer duration of diabetes (>10 years). Most of the (66.4%) patients whose glycemic level (HbA1c) were more than 7. About one third of patients (31.8%) were hypertensive, 30% of the patient had neuropathy and 17.3% had diabetic nephropathy. Majority of the patients (41.8%) had obese category (BMI>30kg/ m2) and 31.8% were smokers. Most of them (35.5%) had used insulin and 33.6% of them used oral hypoglycemic agents (OHA).

Table 2: Risk factors associated with the diabetic retinopathy

Risk factors		**Frequency (n=110)**	**Percentage**
Duration of diabetes mellitus	<5 years	15	13.6%
	5-10 years	42	38.25
	>10 years	53	48.2%
HbA1c level	≤7	37	33.6%
	>7	73	66.4%
Hypertension	Yes	35	31.8%
	No	75	68.2%
Diabetic Nephropathy	Yes	19	17.3%
	No	91	82.7%
Diabetic Neuropathy	Yes	33	30%
	No	77	70%
BMI (Kg/m^2)	Normal	28	25.5%
	Overweight	36	32.7%
	Obese	46	41.8%
Smoking	Yes	35	31.8%
	No	75	68.2%
Treatment	OHA	37	33.6%
	Insulin	39	35.5%
	OHA+Insulin	34	30.9%

DISCUSSION

Diabetic retinopathy (DR) is a well-known micro vascular complication of diabetes mellitus (DM) and it is one of major global health concern, which places a huge burden on the health care system.

In our study, the prevalence of Diabetic Retinopathy was 27.5%, our results were comparable with the Yau and Associates, et al [14] and Singh HV, et al [15] reported prevalence of DR were 34% and 30% respectively.

Present study observed that chances of DR were increases with the age and it was more frequent among males then females, in agreement with the a study performed by Parameswarappa, et al [16].

Most of the patients had minimal non-proliferative Retinopathy followed by moderate non-proliferative retinopathy, severe non-proliferative retinopathy and proliferative retinopathy found in current research, concordance with the Jammal H,,et al [17].

We have found that majority of DR patients have less education and lower socio-economic status, concordance to the, study done by Emoto N, et al [18]. The possible explanation might be Individuals with less educational levels and lower socioeconomic status have limited income, poor occupational opportunities, and reduced access to healthcare services and information, lead to higher prevalence of retinopathy.

In the present study duration of diabetes mellitus were an major risk factors of the DR, chances of DR was increases with the duration of DM, similar finding reported by Raman R,et al [19].

Elevated HbA1c was associated with a greater risk of diabetic retinopathy. In fact, every one-point increase in HbA1c increases the risk of developing diabetic retinopathy in the current study, consistent observation seen by Chew EY, et al [20] and Sofizadeh S, et al [21].

Hypertension is one among the potential risk factors for the occurrence and progression of DR in this study, accordance to the Srivastava BK, et al [22] and Zegeye et al [23]. Elevated BP affects hemodynamic and vascular endothelial growth factor (VEGF) induced pathways in DR.

In our study a significant association was shown between DR and clinical diabetic nephropathy, which was consistently correlated with the study conducted by Cheung N, et al [24].

The common risk Factors related to diabetic retinopathy include: duration of the disease, elevated glycosylated hemoglobin (HbA1c)), nephropathy, hypertension and obesity, our results similar to the Sivaprasad S, et al [25].

CONCLUSION

We have concluded that the prevalence of diabetic retinopathy were increases with the increasing age. Patient's educational level and socio-economic status were significantly associated with the DR. HbA1c level, obesity and associated condition like hypertension, diabetic nephropathy were found to have significantly associated with progression of diabetic retinopathy.

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Conflicts of interest: none

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