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Original Research Article

PREVALENCE AND RISK FACTORS OF DIABETIC RETINOPATHY IN TYPE 2 DIABETIC PATIENTS: AN OBSERVATIONAL STUDY

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Abstract

Background: Diabetic retinopathy (DR) is the leading cause of blindness in the india and it is the leading cause of new cases of blindness in adults aged 30-80. India prevalence study in diabetics carried out at 194 centres by All India Ophthalmological Society reported the prevalence of diabetic retinopathy (DR) among diabetics as 21.8%. DR is of two types, non-proliferative diabetic retinopathy (NPDR), and proliferative diabetic retinopathy (PDR). The severity of NPDR depends on microaneurysms, hemorrhages, cotton wool spots, and beading of veins and can progress to PDR. **Aim and Objective:** The aim of this observational prevalence study is to study the prevalence of diabetic retinopathy in Type 2 diabetic patients attending diabetic clinic and to study the distribution of diabetic retinopathy with respect to age, sex, and duration of disease in a tertiary care hospital in southern India. **Materials and Methods**: This is a prospective observational study. Age above 20 years and patients diagnosed with Type 2 diabetes mellitus (DM) and examined by the ophthalmologist were included and others excluded. Data documented were analyzed using statistical software SPSS version 16. **Results:** 350 patients, 74.29% (260) of them had no DR, 9.71% (34) have non-proliferative retinopathy (NPDR), 13.14% (46) have proliferative retinopathy (PDR), and 2.86% (10) have complicated retinopathy. Among 15 patients with complicated DR, 9 of them had retinal detachment, 3 of them had severe maculopathy with blindness and 3 had vitreous haemorrhage. **Conclusion:** India being the diabetic capital of the world and DR being the most common cause for visual impairment and blindness and it becomes empirical to assess the factors for its rising prevalence, which will significantly contribute in reducing the progression of DR.

INTRODUCTION

Diabetic retinopathy (DR) is the most common microvascular complication of diabetes.[1] High blood glucose levels are a critical risk factor for DR, and the risk and severity of DR are directly related to glycatedhemoglobin A1c (HbA1c) level over time in both type 1 diabetes and type 2 diabetes (T2D).[2-4] Since DR typically develops over several years, individuals with DR at diagnosis of T2D generally have elevated blood glucose levels long before diagnosis.[5,6] Hypertension in conjunction with hyperglycemia is also a well-established risk factor for DR progression.[7,8] Other risk factors that have been associated with retinopathy in persons with T2D are body mass index (BMI), dyslipidemia, insulin treatment, and nephropathy.[9,10] DR is of two types, nonproliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR). The severity of NPDR depends on microaneurysms, hemorrhages, cotton wool spots, and the beading of veins, which can progress to PDR.[11,12]

PDR is neovascularization, its either PDR or diabetic maculopathy that is responsible for vision loss. Chronic hyperglycemia inflicts profound effects on the development and progression of DR by stimulating multiple mechanisms, such as the polyol pathway, enzymatic glycation, protein kinase C activation, hemodynamic changes, and the renin-angiotensin-aldosterone pathway,[13] and Type 2 DM accounts for more than 90% of the diabetic population worldwide.[14] Several other studies have used the prevalence of retinopathy at T2D diagnosis as a surrogate marker for late-detected T2D.

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The aim of the current observational prevalence study is to study the prevalence of DR in type 2 diabetic patient s attending a diabetic clinic and to study the distribution of DR with respect to age, sex, and duration of disease in a tertiary care hospital in South India.

MATERIALS AND METHODS

The medical records were studied either directly from the diabetes clinic after the patients consulted the doctors or from the patient medical record centre. The patients selected were DR outpatients, aged over 18 years, with active follow-up at the diabetic clinic. The exclusion criteria for this study all patients diagnosed of Type 2 DM and did not undergo ophthalmologist examination. Inclusion criteria were age above 20 years. The ophthalmologist examined all patients with DR diagnoses.

Study design: This is a prospective observational study. Institutional ethical clearance was obtained from Government Medical College, karimnagar.

Study duration: one year (January - December 2024) duration of study.

Data Collection: Data were collected and documented from medical records of patients fulfilling the inclusion criteria. Findings of ophthalmology examination as recorded by ophthalmologist were also documented: No retinopathy, NPDR, Proliferative retinopathy and Diabetic maculopathy or complicated with vitreous hemorrhage and retinal detachment.

Statistical Analysis

Statistical Package for the Social Sciences (SPSS) software version 16.0 (Chicago, IL, USA) was used for data analysis. The data obtained were analyzed using descriptive statistics to determine the prevalence of nephropathy among diabetic patients. Logistic regression analyses were performed to assess the independent effect on development retinopathy.

RESULTS

A total of 450 medical records of patients visiting the specialty diabetic clinic were viewed. 100 were excluded as they did not undergo ophthalmology examination depict the prevalence of DR unadjusted to age and sex. A total of 350DR patients were involved in this study, demographic characteristics of DR patients were demonstrated in Table 1. [Table 1]

Table 1: Demographic characteristics of DR

Variable	n (%)
Gender	
Male	250 (71.42)
Female	100 (28.58)
Age (years)	
<35years	32 (9.14)
35–55 years	220 (62.85)
>55 years	98 (28)
Smoking history	
Current smoker	65 (18.57)
Previous smoker	89 (25.42)
Never smoked	196 (56)
Alcohol history	
Current drinker	69 (19.71)
Previous drinker	72 (20.57)
Never drink	209 (59.71)
Physical activity	
Active >150 min/wk	158 (45.15)
Non active <150 min/wk	192 (54.85)
Family history of diabetes	
Yes	120 (34.29)
No	230 (65.71)

Table 2 shows that out of 350 patients, 71.42% (260) of them had no DR, 9.71% (34) have non-proliferative retinopathy (NPDR), 13.14% (46) have proliferative retinopathy (PDR), and 2.85% (10) have complicated retinopathy. [Table 2]

Table 2: Prevalence of diabetic retinopathy in study population

Ophthalmoscopy examination	Total number of diabetics' retinopathy (%)
No retinopathy	260 (74.29)
NPDR	34 (9.71)
PDR	46 (13.14)
Complicated	10 (2.86)

NPDR: Non-proliferative diabetic retinopathy, PDR: Proliferative diabetic retinopathy

Total 250 males had diabetes out of which, 78.40% (196) had no retinopathy, 7.20% (18) had non-proliferative retinopathy, 11.20% (28) had proliferative retinopathy, and 3.2% (8) had

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complicated retinopathy and among 100 diabetic females, 64% (64) had no DR, 16% (16) had proliferative DR, 18% (18) had non-proliferative and 2% (2) had complicated retinopathy. [Table 3]

Table 3: Gender wise distribution of diabetic retinopathy

Ophthalmoscopy examination	Male (%) (N= 250)	Female (%) (N= 100)	P Value
No retinopathy	196 (78.40)	64(64)	<0.001
NPDR	18 (7.20)	16 (16)	NA
PDR	28 (11.20)	18 (18)	<0.001
Complicated	8 (3.2)	2 (2)	NA

Among 15 patients with complicated DR, 9 of them had retinal detachment, 3 of them had severe maculopathy with blindness and 3 had vitreous hemorrhage.

DISCUSSION

Diabetic retinopathy (DR) is one of the most common microvascular diabetic complications.[15] Diabetic retinopathy is a progressive disorder of the retinal microcirculation, and it is the most common cause of blindness among people aged 30–69 years old.[16,17]

The prevalence of diabetes and DR is continuously increasing. According to studies done in the South Indian urban population, the prevalence of DR ranges from 12% to 22.4%.[18-20] Other Asian countries, like Singapore and Japan, have lower rates of DR than India. This could be because the populations in these countries are healthier or because the disease lasts shorter in those places.[21,22] According to Gadkari et al,[23] and Ramachandran et al,[24] studies, the overall prevalence of DR in this diabetic population is 25%, which correlates with the 23.8% and 22% prevalences reported. Here, the population was not defined on the basis of socioeconomic status; therefore, the prevalence among urban and rural population cannot be determined. The prevalence of diabetes is higher among the patients aged >55 years (28%) compared to those aged between 35 and 55 years. From 35 to 70 years, the prevalence of DR increases and then tapers slightly, probably due to decreased life expectancy due to diabetes and other comorbidities.

In this study, the rate of DR is higher in men than in women. The reason for this difference in rates between men and women is unknown, but similar rates of DR in men have been seen in studies like the Chennai Urban Rural Study, the Andhra Pradesh Eye Disease Study, and the United Kingdom Prospective Diabetes Study.[20] One reason could be that males are genetically predisposed to non-communicable health disorders such as atherosclerosis, myocardial infarction, and cancer. People who had diabetes for 10 years or more were more likely to have DR than people who had diabetes for 5 years or less. This is in line with the AIOS study, which looked at 6418 patients and found that people who had diabetes for more than 5 years were 35% more likely to have DR than people who had diabetes for less than 5 years and 6 months.[23] Duration of the diabetes is a significant predictor for the prevalence of DR; risk increases with the increase in duration of the disease. There are many risk factors that contribute to the development of retinopathy. The prevalence of diabetes and DR is less in rural population compared to urban, educated and affluent population as observed in one study carried out in rural population of Chennai.[24] The reason for this is the reduced physical energy expenditure caused by a sedentary lifestyle and unhealthy dietary practices; therefore, socioeconomic status significantly influences the development of diabetes and its complications.[25] Furthermore, the lack of education, awareness, or instructions regarding complications of diabetes or routine screening adds to the burden of disease. Jessica et al. did a prevalence study of inpatients and found that age, length of disease, disability, lack of time, inability to pay for care, and other factors, along with transportation and financial issues, were important.[26] One problem with this study is that it didn't further divide the population by socioeconomic status, education level, comorbidities, etc. On the other hand, one of its strengths is that it showed that DR is becoming more common at a tertiary care hospital.

CONCLUSION

There are many prevalence studies in India signifying the prevalence of diabetes and DR among both urban and rural populations and also risk factors that strongly influence the development of DR. Aside from giving doctors important information about how common a disease is, prevalence studies are also useful because they show the problems that need to be solved in diagnosis, treatment, prognosis, and educating the patient. Screening and population-based studies in a hospital setting can provide additional information on how factors like existing comorbidities influence DR. India is the diabetic capital of the world, and DR is the most common cause of visual impairment and blindness. It becomes empirical to assess the factors for its rising prevalence, which will significantly contribute to reducing the progression of DR.

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