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**Original article**

# Epidemiological profile of patients with diabetic retinopathy in a rural tertiary care center of Western Maharashtra, India

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**ABSTRACT:**

**INTRODUCTION:** Diabetic retinopathy is one of the major complication of Diabetes Mellitus. It is the leading cause of blindness in diabetic population. Although diabetic retinopathy has become a global threat, the epidemiological data pertaining to developing countries like India is scarce. In view of the growing trend of diabetes, it was thought prudent to study the epidemiological profile of patients with diabetic retinopathy in a rural tertiary care hospital of Western Maharashtra.

**MATERIAL AND METHODS:** The study design was of observational cross sectional type, conducted in a rural tertiary care hospital of western Maharashtra. Patients with known history of type 2 Diabetes Mellitus were included in the study. The epidemiological data including age, gender, religion, occupation, marital status, socioeconomic status was collected. All patients were subjected to Direct and indirect Ophthalmoscopy after dilatation of pupils with 1% Tropicamide eye drops. Presence of diabetic retinopathy was ascertained according to the standard diabetic retinopathy study ETDRS classification.

**RESULTS:** In the present study, a total of 1377 of patients of diabetes mellitus were included. On examination, 318 patients (23.09 %) were diagnosed to have Diabetic Retinopathy. Out of these patients with diabetic retinopathy, 179 (56.3%) were males and 139 (43.7%) were females. Most of the patients belonged to age group of 61-75 years (161, 50.6%) followed by 46-60 years (104, 32.7%). With respect to occupation, most of the patients were farmers (187, 58.8%), skilled workers (33, 10.4%) and homemakers (28, 8.8%). As per BG Prasad classification, most patients belonged to Lower middle (147, 46.2%) and Middle (111, 34.9%) class of socioeconomic status. Uneducated (134, 42.1%), primary (88, 27.7%) and middle school education (55, 17.3%) were the educational levels in majority of the population.

**CONCLUSION:** The prevalence of diabetic retinopathy was 23% among the diabetic patients of rural area of western Maharashtra. Irrespective of the age, gender, religion, majority of patients being of lower and lower middle socioeconomic scale with poor educational background, need special attention. There is a need to educate all the diabetic patients regarding the importance of screening and regular ophthalmic examination.

**KEYWORDS:** Epidemiology, prevalence, diabetic retinopathy, diabetes mellitus, socioeconomic status.

## INTRODUCTION

Diabetic retinopathy is a micro vascular complication of diabetes mellitus and is the leading cause of blindness globally, especially in developed nations[1].It affects about 80 % diabetics with history of the disease for more than 20 years.[2] The chances of retinopathy increases with duration of diabetes.[3] It has been reported that at least 90% of the new cases can be prevented from occurring with appropriate treatment and monitoring.[4] The longer a person has diabetes, the higher his or her chances of developing diabetic retinopathy.

WHO estimated 31.7 million diabetic subjects in India which are expected to grow to 79.4 million in 2030[5]. Few populations based studies have been conducted in south India to estimate the prevalence of diabetic retinopathy at different times. There is variation in the prevalence of diabetic retinopathy in studies conducted in India ranging from 18 to 28.9% in patients with type 2 Diabetes Mellitus[6,7]. Epidemiological studies are important to know the burden of the disease and plan accordingly the prevention and management strategies. Since it is a vision threatening complication, it has led diabetic retinopathy to be considered as one of the priority in vision 2020 national plans posing major challenge to vision 2020 in india.

There is paucity of data related to epidemiological studies of diabetic retinopathy in rural population of Maharashtra. In view of growing trend of patients with diabetes, it was thought prudent to study the epidemiology of diabetic retinopathy in a rural tertiary care hospital of Western Maharashtra.

## MATERIAL AND METHODS

The study design was of observational cross sectional type, which was initiated after receiving institutional ethics committee approval. The study was conducted in a rural tertiary care hospital of western Maharashtra. Patients with known history of DM were included in the study after taking the written informed consent.

**Inclusion criteria:**

1. Patients with known history of type 2 diabetes mellitus attending outpatient department of Ophthalmology, Pravara Rural Hospital, Loni
2. Patients irrespective of gender and age willing to participate in the study and give written informed consent

**Exclusion criteria:**

1. patients with history of retinopathy due to any other cause (radiation, sickle cell disease, hypertensive retinopathy in absence of diabetes mellitus)

All patients satisfying the inclusion exclusion criteria, were included in the study after taking the written informed consent. Considering the prevalence of diabetic retinopathy as29 % among the diabetic patients, the sample size of the study was 547 at 99% confidence level.

The epidemiological data including age, gender, religion, occupation, educational level, marital status, socioeconomic status was collected using a well structured data record form from both the record and interview with the patients. All patients were subjected to Direct and indirect Ophthalmoscopy after dilatation of pupils with 1% Tropicamide. Presence of diabetic retinopathy was ascertained according to the standard diabetic retinopathy study ETDRS classification[8,9].

## RESULTS:

In the present study, a total of 1377 of patients having diabetes mellitus were included. On examination, 318 patients (23.09 %) were detected to have Diabetic Retinopathy. Table no. 1 displays the epidemiological profile of patients with diabetic retinopathy.

Out of 318 patients with diabetic retinopathy, it was found that 179 (56.3%) patients were male

and 139 (43.7%) were females. Most of the patients belonged to age group of 61-75 years (161, 50.6%) followed by 46-60 years (104, 32.7%). It was observed that predominant population having diabetic retinopathy was from Hindu community (271, 85.2%) followed by Muslims (46, 14.5%). With respect to occupation, majority of the patients were farmers (187, 58.8%), skilled workers (33, 10.4%) and homemakers (28, 8.8%). As regards to marital status, 308 (96.6%) were married while 10 (3.1%) were either unmarried or widower.

As seen in Table no. 1, majority of patients belonged to Lower middle (147, 46.2%) and middle (111, 34.9%) class of socioeconomic status by applying BG Prasad classification. Educational status was alarming too. Most of them were uneducated (134, 42.1%), followed by having basic primary education (88, 27.7%) and middle school education (55, 17.3%)

**Table no. 1. Epidemiological profile of patients with diabetic retinopathy**

| Variable | | No. of patients (n=318) | Percentage % |
|---|---|---|---|
| **Age (years)** | 0-15 | 5 | 1.6 |
| | 16-30 | 7 | 2.2 |
| | 31-45 | 28 | 8.8 |
| | 46-60 | 104 | 32.7 |
| | 61-75 | 161 | 50.6 |
| | >75 | 13 | 4.1 |
| **Gender** | Males | 179 | 56.3 |
| | Females | 139 | 43.7 |
| **Religion** | Hindu | 271 | 85.2 |
| | Muslim | 46 | 14.5 |
| | Christian | 1 | 0.3 |
| **Occupation** | Homemaker | 28 | 8.8 |
| | Unskilled worker | 25 | 7.9 |
| | Student | 5 | 1.6 |
| | Skilled worker | 33 | 10.4 |
| | Farmer | 187 | 58.8 |
| | Professional | 20 | 6.3 |
| | Businessman | 18 | 5.7 |
| | Retired | 2 | 0.6 |
| **Marital Status** | Unmarried/Widow(er) | 10 | 3.1 |
| | Married | 308 | 96.9 |
| **Educational Status** | Uneducated | 134 | 42.1 |
| | Primary | 88 | 27.7 |
| | Middle School | 55 | 17.3 |
| | Secondary School | 22 | 6.9 |
| | Graduate | 19 | 6 |
| **Socioeconomic Status** | Lower | 31 | 9.7 |
| | Lower-middle | 147 | 46.2 |
| | Middle | 111 | 34.9 |
| | Upper-middle | 29 | 9.1 |

**DISCUSSION:**

Diabetic mellitus is a major public health problem. Diabetic retinopathy forms the leading cause of visual impairment among diabetic population. This problem being universal, every diabetic has potential lifetime risk of developing retinopathy irrespective whether it has rural or urban and rich or poor background. Although there have been advances in overall understanding of the problem, there is ever changing scenario from place to place as to its distribution and reasons, requiring constant time to time monitoring. It has direct and indirect impact on quality of life. This will pose a greater burden on the population and the health care systems as well.There have been studies of the variability of diabetic retinopathy in populations around the world with high prevalence of diabetic retinopathy.

In the present study, a total of 1377 of patients of diabetes were screened for the presence of diabetic retinopathy. On examination, 318 patients (23.09 %) were diagnosed to have Diabetic retinopathy. The study by Ramavat etal[10]done in 2013, the prevalence of diabetic retinopathy was 33.92% of the total 168 patients studied. According to a study done by Rema etal[11] in 1996, the prevalence of diabetic retinopathy was 34.1% of 2319 diabetic patients. While in the study by the same author in 2005, the prevalence of diabetic retinopathy was 17.6% (n=1382)[12]. The prevalence in our study is lower as compared to that reported by Ramavat etal[10] and Rema etal (1996)[11], while higher than that reported by Rema etal (2005)[12]. According to a study by Gadkari SS[13], the prevalence of diabetic retinopathy was 21.7%. There have been very few studies reporting the prevalence of retinopathy in India. The variation in the prevalence in the above mentioned study may be due to geographical variation as well as the hospital based nature of the study. Studies conducted by Jonas et al.[14], Raman et al.[15] reported prevalence of 9.6% while Tanuja etal[16] reported it to be 18.5%. Thus, these studies community based studies indicate presence of one diabetic retinopathy patient of every five patients of type 2 diabetes mellitus patients. Our study was conducted among the rural population and had the prevalence similar to the above mentioned studies.

A larger community based study would provide better information on the magnitude of the problem. However, taking into account the growing number of patients with type 2 diabetes mellitus, the prevalence of diabetic retinopathy is alarming.

Of the patients diagnosed with retinopathy, 179 (56.3%) were males and 139 (43.7%) were females, respectively (Table no. 1). This finding of male predominance in our study can be correlated with Ramavat[10]etal, Gadkari SS[13] and studies done by Rema etal (1996, 2005)[11,12].

Most of the patients belonged to age group of 61-75 (161, 50.6%) followed by 46-60 (104, 32.7%) years. In the studies by Krishnaiah etal[17], Agrawal RP[7] and Rema M[12], the most common age groups having diabetic retinopathy were 50-59 (17 of 39, 43.6%), 51-60 (434 of 1176, 36.9%) and 40-49 (131 of 302, 43.4%). Gadkari SS[13] reported majority of patients with diabetic retinopathy in the age group of 41-80 years. However, the present study reported patients with older age group (61-75 years) as major population suffering from diabetic retinopathy followed by 46-60 years (104, 32.7%). This indicates late onset of diabetic retinopathy in rural population. Further studies on risk factors like duration of diabetes, control of blood sugar levels, coexisting diseases and rural life style related factors are required to ascertain the reason for delayed onset of diabetic retinopathy in our study.

In the present study, as shown in table no. 1, most of the patients were farmers (187, 58.8%), skilled workers (33, 10.4%) and homemakers (28, 8.8%) by occupation. As majority of the population was from rural area, the occupation of these people was farming. As depicted in the Table no. 1, uneducated (134, 42.1%), primary (88, 27.7%) and middle school education (55, 17.3%) were the educational level of most of the study population. Illiteracy is also a matter of concern in rural area. Educational level is more effective predictor of the disease risk, health behavior pattern and quality of diet in general. Higher the education, more is the inclination to receive nutritional information and healthy diet.[18] Higher education increases compliance towards treatment given, as compared to illiterate. In our study, most of the patients diagnosed to have retinopathy were illiterate. Importance of education is emphasized hereby.

In the present study, majority of patients belonged to Lower middle (147, 46.2%) and middle (111, 34.9%) class of socioeconomic status by applying BG Prasad classification. In the study by Krishnaiah etal.[17], based on monthly per capita income, middle class and upper class were the most commonly affected population with diabetic retinopathy. Our study supports findings of Krishnaiah etal[17]. It is of interest to know how the middle socioeconomic class has an impact on the occurrence of complication despite of affordability of treatment.

## CONCLUSION:

The prevalence of diabetic retinopathy was 23% in Type 2 DM patients of rural area of western Maharashtra. Diabetic retinopathy was diagnosed after screening of the patients. Hence, active screening of all diabetic patients is needed to prevent the progression of retinopathy in these patients. The majority of patients were in the older age group and from lower middle and middle socioeconomic scale, were illiterate and farmers by occupation. Epidemiologic data helps to understand the importance of health care and health education in prevention and treatment of diabetic retinopathy

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