Prevalence of diabetic retinopathy in type 2 diabetes mellitus patients attending medicine out-patient department of a tertiary care hospital in Alappuzha, Kerala, India

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ABSTRACT

Background: Diabetic retinopathy is a microvascular complication affecting the eyes of both Type 1 and Type 2 diabetes mellitus due to long-term hyperglycaemia. Diabetic retinopathy is the leading cause of blindness among working aged adults around the world. There are various factors leading to the development of diabetic retinopathy namely duration of diabetes, glycaemic control, age at onset of diabetes, uncontrolled hypertension. This is a hospital based cross-sectional study which aimed to study the prevalence of diabetic retinopathy in type 2 diabetes mellitus patients attending Medicine out-patient department of Government T. D. Medical College, Alappuzha, Kerala, India. The factors contributing to the development of retinopathy was also studied.

Methods: 200 already diagnosed type 2 diabetic subjects were included in the study. Subjects were explained about the study and once the consent was received, data regarding age, gender, age at onset of diabetes, duration of diabetes, history of smoking, alcohol intake, and socio-economic status was documented. Height and weight was measured. Blood pressure was recorded with mercury sphygmomanometer. Then the subjects were evaluated for diabetic retinopathy by fundus examination after dilating the eyes. Findings were noted and subjects were categorized as no retinopathy, nonproliferative and proliferative diabetic retinopathy using the ETDRS classification.

Results: In present study, out of 200 subjects, 63 subjects (31.5%) were affected with diabetic retinopathy (nonproliferative retinopathy=22.5%, proliferative retinopathy=9%). Prevalence of mild, moderate and severe nonproliferative retinopathy was 7.5% each. Significant association was found between diabetic retinopathy and duration of diabetes.

Conclusions: Therefore, periodic screening of diabetic patients should be carried out for early detection and prevention of loss of vision.

Keywords: Diabetes mellitus, Diabetic retinopathy, Duration of diabetes

INTRODUCTION

Diabetic retinopathy is a microvascular complication affecting the eyes of both type 1 and type 2 diabetes mellitus. It is one of the leading causes of visual impairment in industrialized countries in the working age group and one of the frequent causes of blindness in developing countries like India. According to World Health Organisation; diabetic retinopathy is 4.8% of the 37 million cases of blindness throughout the world. In India harbours 31.7 million diabetics and the number is going to rise to an alarming 79.4 million by 2030. In India with the epidemic rise in type 2 diabetes mellitus as reported by the World Health Organization (WHO) diabetic retinopathy is fast becoming an important cause of visual disability. Although extensive studies have been

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carried out to find the prevalence of diabetic retinopathy in Type 1 diabetic subjects, relatively few studies have been attempted regarding the prevalence of diabetic retinopathy in Type 2 diabetes mellitus.

Again, type 2 diabetes is the commonest form of diabetes constituting 90% of the diabetic population of any country. So, the prevalence of retinopathy in type 2 diabetes is fast gaining importance in the field of research. In Kerala, India, there is paucity of literature regarding the prevalence of diabetic retinopathy in type 2 diabetes mellitus.

Prevalence studies of diabetic retinopathy among self-reported diabetics have been carried out in Palakkad district of Kerala but very few hospital-based studies have been conducted so far. Thus, this study will help us to ascertain the burden on the health services as well as estimate the risk factors leading to the development of retinopathy.

This study aimed to determine the prevalence of diabetic retinopathy in type 2 diabetes mellitus attending Medicine out-patient department of Government T. D. Medical College, Alappuzha, Kerala, India. The factors contributing to the development of diabetic retinopathy was also studied.

**METHODS**

This is a hospital- based observational cross-sectional study. The study was conducted in the department of medicine and department of ophthalmology, Govt. TDMC., Alappuzha, Kerala, India. 200 already diagnosed type 2 diabetic subjects were included in the study. Patients with hazy media whose fundi could not be examined and patients with any other eye disease were excluded from the study.

The study was explained to the subject and once the consent was received data regarding age, gender, age at onset of diabetes, duration of diabetes, history of smoking, history of alcohol intake, mode of treatment was documented. Height and weight was measured. Blood pressure was recorded with mercury sphygmomanometer.

Then the subjects were evaluated for diabetic retinopathy by fundus examination after dilating the eyes. Direct and indirect ophthalmoscopy was done. Findings were noted and subjects were categorized as no retinopathy (No DR), non-proliferative (NPDR) and proliferative diabetic retinopathy (PDR) using the ETDRS classification.

**RESULTS**

Data was entered in Microsoft and Excel software using SPSS version 16. Mean, standard deviation, range and percentage were calculated. All confidence intervals were presented at 95% and all analyses was conducted at a <0.05 significance level. Pearson Chi-square test and Binary logistic regression analysis was used to find out statistically significance differences.

Table 1 shows age, gender and duration of diabetes in 200 already diagnosed patients who were studied. Duration of diabetes was slightly longer in the female participants.

<table>
<thead>
<tr>
<th>No. of participants (N=200)</th>
<th>Age in years (Mean±SD)</th>
<th>Duration of diabetes in years (Mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males (N=102)</td>
<td>59.92±7.48 (67-52)</td>
<td>12.83±7.73 (21-5)</td>
</tr>
<tr>
<td>Females (N=98)</td>
<td>61.69±8.313 (70-53)</td>
<td>13.91±9.22 (23-5)</td>
</tr>
</tbody>
</table>

Figure 1 shows that 63 subjects i.e. 31.5% were having diabetic retinopathy. 68.5% i.e. 137 subjects were having no retinopathy.

Figure 2 shows that out of 63 patients with DR, 45 patients had NPDR -22.5%, 18 patients had PDR -9.0%.
The present hospital-based, cross-sectional study showed that the prevalence of diabetic retinopathy (DR) was 31.5% (Figure 1) (NPDR- 22.5%, PDR- 9.0%, Figure 2) in type 2 DM patients. Overall, prevalence of DR in hospital based studies including present study was higher as compared to those in population based epidemiological studies. This may be due to the fact that there was a referral bias among the diabetic patients who were reported to tertiary care centres. Therefore, with larger number of diabetics reporting to the tertiary hospital, it is more likely that prevalence of complications may also be larger.

Overall, prevalence which was observed in present study was similar to that which was observed by Rema et al, and Agrawal RP et al, in spite of the fact that in present study, sample size is small. Prevalence of NPDR and PDR matched well with those which were observed by Agrawal RP et al. Present results are consistent with those of Ramchandran et al who observed retinopathy in 714 i.e. 23.7% cases out of 3010 patients of type 2
diabetes. Knuiman MW reported prevalence of retinopathy at 28% in Perth, Western Australia. Caird et al found a prevalence rate of 36.8% NPDR in a survey which involved 4076 diabetic patients with over ten years duration of diabetes.

In present study, we observed an association between duration of diabetes and diabetic retinopathy (p<0.05) (Table 3). Binary logistic regression analysis also showed an independent association between duration of diabetes and diabetic retinopathy (Table 4). This result supported the fact that duration of diabetes is the strongest predictor for development of DR. In the Wisconsin epidemiologic study of diabetic retinopathy (WESDR), the widest and most prolonged population based ophthalmologic survey, reported that higher prevalence of DR was associated with longer duration of diabetes.

According to present study, DR may appear as early as 1-5 years of having diabetes and more than 85% of patients develop DR after 25 years of having the disease. With the increasing duration of diabetes, the chance of PDR was higher. Association with duration of diabetes is well known. In India, virtually all studies have shown an increased prevalence of DR as the duration of diabetes increased. In the study conducted by Dandona et al in type 2 diabetes, it is reported that 87.5 per cent of those with >15 years duration of diabetes had DR compared with 18.9 per cent of those who had <15 years duration. In the CURES Eye study, 41.8 per cent had DR after 15 years of diabetes and severity of DR proportionally increased with longer duration of diabetes. Studies had also demonstrated that for every five-year increase in duration of diabetes, the risk for DR increased by 1.89 times.

In the present study, we found significant association between age of the patient and diabetic retinopathy (p<0.05) (Table 2). This further strengthens the fact that with increasing duration of diabetes, the risk of diabetic retinopathy increases, especially PDR. Studies have shown that the chance of developing retinopathy increases with the increase in age of the patient.

Limitations of the study
This was a hospital based study. So, there was a referral bias. Therefore, the actual prevalence of diabetic retinopathy may have been underestimated. No randomization was used for selection of patients in this study. Blood glucose control of the patients was not taken into account. Therefore, the glycaemic status of the patient is not known to us. Sample size of present study is small. Thus, the results of this study are difficult to extrapolate on to a larger population.

CONCLUSION
Thus, to conclude, diabetic retinopathy is a multifactorial disease. Duration of diabetes mellitus is a major risk factor for diabetic retinopathy. With increasing duration of diabetes mellitus, the chance of developing diabetic retinopathy increases. Therefore, this study highlights the need to conduct screening programmes as well as diabetic education programmes at the grass root level for diabetes mellitus patients.

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REFERENCES