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Diabetic retinopathy among diabetic patients seen at tertiary care centre in Andaman and Nicobar Islands

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ABSTRACT

BACKGROUND: The objective of this study was to evaluate the presence of diabetic retinopathy (DR) in patients with diabetes mellitus (DM) in a tertiary health care centre in Andaman and Nicobar Islands and attempt to establish history-based risk factors.

MATERIAL AND METHODS: This cross-sectional study was conducted in a hospital over a year. Detailed ocular examinations for diabetic retinopathy were performed on 600 diabetes mellitus patients.

RESULTS: A total of 600 individuals with diabetes were screened. 40% were males, and 60% were females. DR prevalence in the entire data set was 18.67% (p = 0.001). Males (p = 0.011), patients with diabetes with a history of more 5 five years (p = 0.008), people aged 61 to 70 (p = 0.001), and those with poorly controlled diabetes with glycated haemoglobin (HbA_{1c}) values > 5 % (p = 0.001) all had a higher prevalence of DR.

CONCLUSIONS: The study identified the prevalence of DR in Andaman and Nicobar Islands, raising awareness among DM patients for the need of regular ocular examination.

KEY WORDS: diabetic retinopathy (DR); diabetes mellitus (DM); prevalence

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INTRODUCTION

India is on track to become the world's diabetes capital. Diabetes mellitus (DM) had impacted 31.7 million persons in India by 2000, according to the World Heath Organization (WHO). This population is expected to climb to 79.4 million by 2030, the highest of any country globally. Almost two-thirds patients with type 2 DM (T2DM) and nearly all with type 1 (T1DM) are likely to develop diabetic retinopathy (DR) over time [1–3]. Because retinopathy frequently goes undiscovered until vision loss occurs, early detection, timely treatment, and adequate care can protect or delay vision loss [4].

The widespread prevalence of DR also places a significant financial and public health burden on the national healthcare system. This highlights the importance of epidemiological research on diabetes-related complications in those with diabetes. Despite the ramifications of this condition

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and the rising prevalence of diabetes in India, there are few precise estimates of the prevalence of DR in India, and no such published statistics are currently available in the Andaman and Nicobar Islands. We want to know what the prevalence of diabetes is and how it relates to age, gender, diabetes duration, and diabetes control utilising HBA_{1c} levels. The initiative served as the first Island attempt to address the issue of DR blindness.

MATERIAL AND METHODS

This was a cross-sectional study conducted from January 2019 to January 2020 in a tertiary care hospital.

Six hundred DM patients from the eye outpatient department (OPD) were chosen. Prior clearance from the Institutional Ethics Committee (IEC) was obtained. Detailed history and ocular examination for DR were performed. Written informed consent was obtained from each patient before the study. A structured protocol was used for documenting the patient's assessment. All questions for eliciting history were asked of the patient in their native language. For clinical examination, standard techniques and equipment were employed; retinal evaluation was performed with a direct/indirect ophthalmoscope or a 90D lens on a slit lamp. The present study did not consider retinopathy grading or the presence of macular oedema.

Statistical methods

The prevalence of DR in the study population was calculated, and the Chi-Square test was used to analyse relationships with gender, age, diabetes duration, and diabetes control as measured by HBA_{1c} levels.

RESULTS

The overall prevalence of DR in our entire study data set was (18.67%; p = 0.001) as depicted in Table 1. Among 600 patients, 40% were males and 60% were females, and the prevalence of DR was higher in males (20%; p = 0.011) than in females (17.78%; p = 0.003) (Tab. 1). Table 2 depicts the proportion of DR patients by age group.

Approximately 84.5% of those screened were aged 40 to 70 (Tab. 2). Table 3 shows that the prevalence of DR was more in the duration of DM more than 10 years (26.80%; p = 0.008), and over half of patients had diabetes more than 10 years. The prevalence of DR was significantly more in patients with poor control of diabetes checked via HBA_{1c} levels of > 5 % (p = 0.001) (Tab. 4).

DISCUSSION

One of the most severe microvascular consequences of DM, DR, is a significant contributor to irreversible vision loss in working-age individ-

Table 1. Prevalence and frequency distribution of patients with diabetes and diabetic retinopathy (DR)

	Total	Percentage	With DR	Percentage	p-value
Total	600	100	112	18.67	0.001
Males	240	40	48	20	0.011
Females	360	60	64	17.78	0.003

Table 2. Diabetic retinopathy distribution according to age group

Age of the patient	No. of patients with diabetes	No. of patients with DR	Percentage (%) of patients with DR	p-value
21–30	15	1	6.67	0.062
31–40	29	3	10.34	0.001
41–50	133	18	13.53	0.001
51–60	178	37	20.79	0.001
61–70	196	46	23.47	0.001
≥ 71	49	7	14.29	0.001
Total	600	112	18.67	0.001

Table 3. Diabetic retinopathy (DR) distribution in relation to duration of diabetes mellitus (DM)

Duration of diabetes	Total patients	DR patients	Percentage (%)	p-value
< 5 years	70	5	7.14	0.481
5–10 years	224	25	11.16	0.030
> 10 years	306	82	26.80	0.008

Table 4. Diabetic retinopathy (DR) distribution in relation to control of diabetes mellitus (DM) checked via glycated haemoglobin (HbA_{1c}) levels

HbA_{1c} levels (%)	Percentage (%)	p-value
0–4	2.94	0.114
5–9	19.72	0.001
> 10	19.29	0.001

uals (20–74 years). The severity of hyperglycemia, the prevalence of hypertension, and the length of DM are all widely recognised as key risk factors for developing DR [5, 6]. In the present study, the prevalence of DR was 18.67% which was similar to that observed by Rema et al. (17.6%), Raman et al. (18.1%) studies done in the southern states of India and Gadkari et al. (21.7%) study conducted pan India [7–9]. We found a correlation between the length of DM and the emergence of DR and that the proportion of patients with DR increases as DM persists longer. Our research showed that DR emerged in 26.80% of patients after 10 years of DM, and in 7.14% of the population as early as 5 years of DM. This finding confirmed the notion that the most frequent predictor of the severity of DR is the duration of DM [10, 11]. In contrast to a study that indicated the overall age-standardized prevalence of DR to be 34.6% with a mean age of 58 years [12], our research discovered that 20.79% of patients with retinopathy fell into the 51–60 age range.

The prevalence of DR was found to considerably increase with an increase in glycated haemoglobin levels, based upon findings from the Chennai Urban, Rural Epidemiology Study (CURES) eye study [13]. In the present study, DR prevalence was significantly higher in patients with poor control of diabetes checked via HbA_{1c} levels of > 5 % ($p = 0.001$). Therefore, our findings are consistent with earlier reports that found a strong and significant link between DR and inadequate DM control. The number of patients with DR progressively grew along with the fraction of HbA_{1c}.

According to the UK Prospective Diabetes Study (UKPDS), the level of glycemic control was more crucial than anti-diabetic medication for preventing retinopathy [6].

In this study, we found that men were more impacted by DR than women were. The LALES study showed that men had a 50% higher chance of developing diabetes than women ($p = 0.006$) [14]. In a similar vein, the UKPDS 50 study found that women had a decreased relative risk of DR advancement ($p = 0.0016$) [15].

It was unable to distinguish between patients with T2DM and T1DM in the self-reported data set for both our study and those carried out by other ophthalmic facilities. Studies that had access to all of the patient's medical records could distinguish between those with T1DM and T2DM. The prevalence between the two subsets has been found to differ considerably. According to the UK National Diabetic Retinopathy Screening Service, those with T1DMs had a 56.0% prevalence of any DR, whereas people with T2DM had a 30.3% prevalence [16]. Most study participants had their retinas examined by a doctor; however, there was no photographic documentation. The National Diabetic Retinopathy Screening Service in the United Kingdom and the United States uses photographic documentation as a standard procedure. Retinal fundus imaging (photography) is considered to have advantages in improved standardisation, permanent keeping documentation, and accurate reporting by a reading centre; disadvantages include the expense of the image and related technology. According to research by Gadkari et al., low-cost options such a smartphone and portable retinal cameras that transmit data through cellular networks are efficient [17].

The critical merits of our study were the inclusion of both genders, the broad age range of patients seen, taking into account their HbA_{1c} levels, and the detailed examination of critical clinical data from the previous year. Notably, because the study was carried out in a tertiary care institution, our results may be very applicable to clinical practice. Through our study, we intended to educate people with diabetes on the benefits of routine and early ocular examination.

CONCLUSION

In the Andaman and Nicobar Islands, this was the first research of its kind. The study helped determine the prevalence of DR in the population and create awareness among diabetic patients of the need for regular ocular examination. This study helped to develop a bridge between medicine and ophthalmology in treating diabetic patients.

Conflict of interest

None declared.

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