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ORIGINAL ARTICLE

PREVALENCE OF DIABETIC RETINOPATHY IN RIMS SRIKAKULAM, INDIA: A HOSPITAL BASED STUDY

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ABSTRACT: OBJECTIVE: assessment of the prevalence of diabetic retinopathy among people staying in Srikakulam **MATERIAL AND METHODS:** A cross-sectional hospital based study was done for 500 patients with established diabetes who came to eye OPD at Rajiv Gandhi Institute of medical Sciences, Srikakulam. They were evaluated for the presence or absence of retinopathy caused by the underlying Diabetes. Necessary clinical examination was done and the findings were noted separately. No follow-up was done in this study. Indirect Ophthalmoscope, Direct Ophthalmoscope 90D Lens, slit lamp bio-microscope and Fundus Photography were used for examination. Statistical package for Social Sciences (SPSS) was taken for statistical analysis. $p<0.05$ was taken as significant. **OBSERVATIONS** Out of 500 patients with established diabetes, 42.4% were male and 57.6% were female. Majority of these patients were found in the age group of 40-60 yrs. NIDDM was mainly seen in patients (97.2%) with IDDM in 2.8% only. Out of 500 patients 153 patients had Diabetic Retinopathy showing prevalence as 30.6%. 64.7% patients with DR were>60 yrs of age and 49 patients (32.03%) were between 40-60 yrs of age. 51 (33.33%) were males and 102 (66.67%) were females. Mild DR was present in 154 (15.4%) eyes, moderate to severe DR in 94 (9.4%) eyes, proliferative DR in 17(1.7%) eyes and diabetic maculopathy in 41(4.1%) eyes. 38 patients (24.8%) with diabetes of <5 yrs duration had DR. 24.2% had a duration of 5-9 yrs, 38.6% had 10-14 yrs duration, 12.4% with DR had a duration of >= 15 yr. Patients who were on irregular or inadequate treatment with OHA, insulin or both and with improper adherence to medication had more prevalence of DR. **CONCLUSION:** The study concluded that Diabetic Retinopathy is highly prevalent in Srikakulam district Andhra Pradesh and necessary steps should be taken for early detection of the disease and appropriate treatment to prevent blindness which can be caused by this disease.

KEYWORDS: Diabetic Retinopathy(DR), Mild to Moderate DR (NPDR), Proliferative DR (PDR), Diabetic Maculopathy (DM), insulin dependent diabetes mellitus (IDDM), Non-insulin dependent Diabetes mellitus (NIDDM).

INTRODUCTION: Diabetic Diabetes Mellitus is one of the leading disease in India which affects 15 to 20 % of Indian population. Diabetic retinopathy is one of the common complication of diabetes mellitus and it has the high threat of blindness. Development of diabetes depends on duration of diabetes and patient adherence to treatment. Diabetic Retinopathy develops in more than 75% of diabetic patients within 15-20 yrs of diagnosis of diabetes in India. In western and developed countries several epidemiological studies have been done provided valuable information on the prevalence of DR. Even in India though few, but somewhere also conducted in India. Such studies are useful in assessing the individuals at risk and can help in focusing on ways to decrease the visual impairment caused by this complication by proper understanding of the disease

According to latest WHO report, India has 31.7 million diabetics and the number is expected to increase to a 79.4 million by 2030 making India world capital for diabetes. Andhra Pradesh state is no

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exception to the rising trend of diabetes in general and Diabetic Retinopathy in particular. A large number of cases of Diabetic Retinopathy are being evaluated in the Department of Ophthalmology, Rajiv Gandhi Institute of Medical Sciences Srikakulam. It's very prevalent in this region of Andhra Pradesh and responsible for blindness in huge number of patients attending daily OPD especially patients from urban area. Thus the need for the present study to assess the burden of this sight threatening complication of diabetes to understand and prevent the condition.

MATERIALS AND METHODS: This cross sectional study was conducted in the Dept. of Ophthalmology, Rajiv Gandhi Institute of Medical Sciences Srikakulam Andhra Pradesh from Mar. 2013- Feb. 2015. This institution is a tertiary level of the eye care centre and caters to all the referred patients of the district. Total of 1000 eyes of 500 consecutive patients with established Diabetes who attended eye OPD at RIMS Srikakulam or referred from the Department of Medicine were subjected to detailed clinical study.

All the necessary informations were first gathered regarding the name, age, gender, occupation, residence, duration of symptoms, and history of drug intake.

Complete ocular examination was done. Visual acuity was recorded using Snellen chart in Literate patients and E- chart for illiterate patients. Detailed torch lamp examination and slit lamp examination was done. Presence of diabetic retinopathy was assessed by direct ophthalmoscopy under full mydriasis. Fundus was examined for retinal micro-aneurysms, haemorrhages (Flame shaped or dot and blot), cotton wool spots, hard exudates, venous beading, proliferative diabetic retinopathy and diabetic maculopathy. Fundus photography were taken for all the patients with Diabetic Retinopathy. Diabetic retinopathy was graded according to the signs found in the eyes with the early treatment of diabetic retinopathy study research group grading system.

Data collected was subjected to differential statistical tests using statistical package for social sciences (SPSS). $P<0.05$ was taken as significant.

RESULTS: Out of 500 patients male patients were 212(42.4%) and female patients were 288(57.6%). Our study included 43(8.6%)

Patients below 40 years of age, 300(60%) patients were between 40-60 years of age and 157(31.4%) were above 60 years of age.

Out of 500 patients 153(30.6%) showed features of Diabetic Retinopathy and 347(69.4%) patients had normal fundus. Among patients with Diabetic Retinopathy, male patients were 51(33.33%) and 102(66.67%) were females. Male female ratio was around 1:2 which is statistically significant. ($p<0.05$)

Types of Diabetes mellitus	Number	%
IDDM	14	2.8
NIDDM	486	97.2
Total	**500**	**100**

Table 1: Prevalence of Diabetes Mellitus by type

Gender	Patients with DR		Patients without DR		Results
Male	51	33.33%	161	46.4%	P<0.05 Significant
Female	102	66.67%	186	53.6%	
Total	**153**	**100**	347	**100**	

Table 2: Distribution of Diabetic Retinopathy patients by gender

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Age (years)	Patients with DR		Patients without DR		Results
	Number	%	Number	%	
<40	5	3.27%	38	10.95%	P<0.05 Significant
40-60	49	32.59%	269	72.33%	
>=60	89	65.93%	58	16.72%	
Total	**135**	**100**	**365**	**100**	

Table 3: Distribution of patients with diabetic retinopathy by age

99 patients (64.7%) with DR patients were above 60 years of age and 49 patients (32.03%) were between 40-60 years of age. 5 patients (3.27%) were below 40 years of age. From these findings its clear that DR is an age related disorder and highly prevalent at >60 years of age.

Visual acuity		Number	%
Right eye	6/6 – 6/18	85	55.56%
	6/18 – 6/36	36	23.5%
	6/36 – 6/60	23	15.04 %
	<= 6/60	9	5.9%
	Total	**153**	**100%**
Left eye	6/6 – 6/18	81	52.94%
	6/18 – 6/36	39	25.5%
	6/36 – 6/60	21	13.73%
	<= 6/60	12	7.83%
	Total	**153**	**100%**

Table 4: Visual acuity of the patients with established Diabetic Retinopathy at presentation

Eye	Fundus	Number	%
Right eye	Normal	347	69.4%
	Mild DR	78	15.6%
	Mod to severe DR	51	10.2%
	Proliferative DR	7	1.4%
	Diab. Maculopathy	17	3.4%
	Any DR	153	30.6%
	Total	**500**	**100**
Left eye	Normal	347	69.4%
	Mild DR	76	15.2%
	Mod to severe DR	43	8.6%
	Proliferative DR	10	2%
	Diab. Maculopathy	24	4.8%
	Any DR	153	30.6%
	Total	**500**	**100**

Table 5: Fundus picture of patients with established Diabetes mellitus

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Mild DR was present in 154(15.4%) eyes, moderate to severe DR in 94(9.4%) eyes, proliferative DR in 17(1.7%) eyes and diabetic maculopathy in 41(4.1%) eyes

Treatment	Total	Retinopathy	
		Number	%
Diet + E	42	4	2.6%
Diet + E + OHA	322	71	46.4%
Diet + E + Insulin	83	40	26.16%
Diet + E + I + OHA	53	38	24.84%

Table 6: Treatment modality and DR of established Diabetic Patients

E = Exercise, I=Insulin, OHA = Oral Hypoglycaemic Drugs

Patients who were managed with insulin either alone or with OHA had more prevalence of DR than those managed without insulin.

Duration of Diabetes (yrs)	Total	Retinopathy	
		Number	%
< 5	219	38	24.8%
5 - 9	128	37	24.2%
10 - 14	123	59	38.6%
>= 15	30	19	12.4%
Total	**500**	**153**	**100%**

Table 7: Prevalence of DR by duration of diabetes

38 patients (24.8%) with diabetes of <5 yrs duration had DR. 24.2% had a duration of 5-9 yrs, 38.6% had 10-14 yrs duration, 12.4% with DR had a duration of more than 15 yrs.

DISCUSSION: The current study showed the prevalence of any DR among known diabetics as 30.6%. Our results are consistent with those of pooled analysis using indivisual participant data from 34 population based studies (2012) whose study observed a prevalence of DR as 34.6%.[1] Foulds et al (1983) showed almost a similar prevalence percentage.[2] India being a developing country and still not proper awareness and treatment lack in some parts of india, rates will be higher than developed countries.

The type of DR which was most prevalent in our study was NPDR (15.4%) which is consistent with those of Fatima AlKharaj et al (1998)[3]who observed NPDR in 11.3%. Supapluksakul S et al (2008)[4] showed similar results. Moderate to severe NPDR, in our study, showed prevalence of 9.4%. Our results are in agreement with study conducted by Al-adsani, et al (2007) [5]

This study revealed low prevalence of PDR comprising of 1.7%. Our observation is in agreement with Seyoun et al[6] who did his study in Ethopia. And Tapp et al[7] also showed similar prevalence rate. Prevalence of diabetic maculopathy was found to be 4.1% .This is in accordance with other studies by Khandekar et al[8] and Wong et al.[9]

In other studies, prevalence of retinopathy at diagnosis varies from 20-60%. Reason being in other countries geographic, ethnicity, awareness of diabetes and DR, treatment and adherence will vary from place to place, Urban to rural and different parts of same country. Also socio-economic and cultural factors (Environmental) will also play a role.

Mean age of patients with DR in this study was 57.4 yrs with the highest number of patients in the age group between 40-60 yrs consistent with the study conducted by Shrestha et al in Nepal.[10]

The above observation suggested that DR is an age related condition. 66.67% of cases with DR in the present study were females. Similar observation was made by Jamaludin et al in their study conducted at Karachi Pakistan. Contrary to this, Mohan Rema et al (2005),[11] Dandona et al (1999)[12]

Showed increased susceptibility of males to DR. The reason for the sex preditection in our study appears to be lack of awareness of diabetes and regular treatment as compared to male population.

There was strong correlation between duration of diabetes and prevalence of DR. 63.33% of patients with diabetes of more than 15 yrs had DR. Ossame A W et al (1998)[13] and Robyn J Tapp et al (2002)[7] observed similar association of DR with prolonged duration of diabetes. In our study, prevalence of retinopathy was higher in those on insulin treatment (Either alone or with OHA) which is perhaps explained by the fact that subjects with retinopathy may have been preferentially treated with insulin. Similar observations were made by R P Agarwal et al (2003) India.

CONCLUSION:

1. Severity of Diabetic retinopathy is age related because DR was found mostly in patients above 60 yrs of age.
2. DR is strongly associated with duration of Diabetes and seen more prevalent in patients with prolonged duration of diabetes.
3. Prevalence of DR was higher among females in our study.
4. Prevalence of diabetic retinopathy was more in patients on insulin treatment.
5. Visual acuity of the patients with diabetic maculopathy was found to be more affected than the patients without diabetic maculopathy.

The study concluded that the prevalence of DR in our OPD based cross sectional study was found to be 30.6%. But our study being hospital based rather than population based survey with a low sample size, the actual prevalence in local population may be different. So, DR poses an enormous public health and economic burden with increasing chances of blindness caused by DR for the state and the district since number of diabetic patients are constantly increasing in number. future predictions about india say that a further increase in the number of diabetics making india world capital of Diabetes with maximum number of patients. In conclusion, there is a immediate need to consider disease seriously and to go for preventive rather than curative approach in controlling this disease which is causing blindness in very high number of population..

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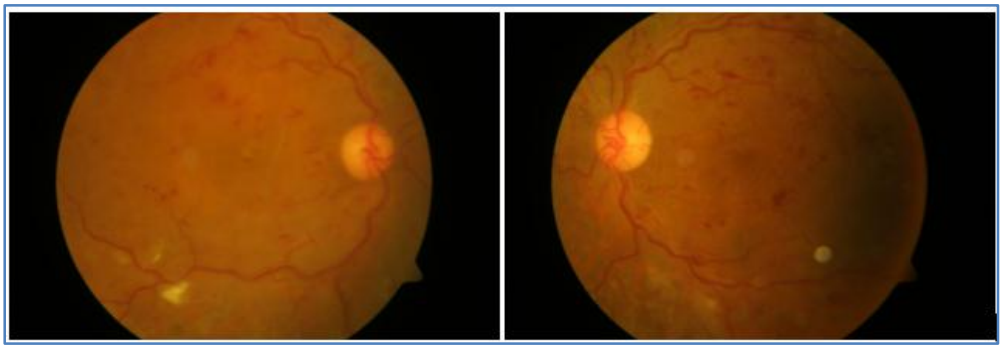

Fig. 1: Fundus Photos of NPDR

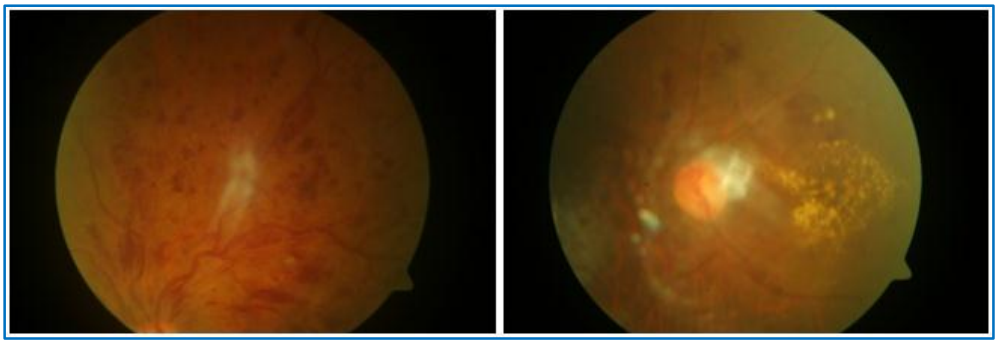

Fig. 2: Fundus Photos of PDR

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