

## ORIGINAL ARTICLE

## FREQUENCY AND PATTERN OF RETINOPATHY IN NEWLY DIAGNOSED TYPE 2 DIABETIC PATIENTS AT TERTIARY CARE SETTINGS IN ABBOTTABAD

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**Background:** Retinopathy is one of the most frequent and serious complication of diabetes mellitus and leading cause of blindness worldwide. The objective of this study was to determine frequency and pattern of retinopathy in newly diagnosed type 2 diabetic patients at tertiary care settings in Abbottabad. **Methods:** This was a descriptive cross-sectional comparative study being conducted at Ayub Teaching Hospital and Northern Institute of Medical Sciences Abbottabad. It included 100 newly diagnosed type 2 diabetic patients who were attending diabetic clinics of these tertiary care hospitals. Already diagnosed type 2 patients taking anti-diabetic medication, type 1 diabetes mellitus, hypertension, retinal vasculitis, retinal vessel occlusion, and sickle cell retinopathy were excluded. After pupillary dilatation, detailed fundoscopic examination was carried out via direct ophthalmoscopy and further confirmed by an ophthalmologist. According to fundoscopic findings, retinopathy was graded into background, pre-proliferative and proliferative types. **Results:** Total 100 patients were included, with mean age  $45.1 \pm 3.2$  years, 60% of them were females. Overall, 17% of type 2 diabetic patients had retinopathy within one month of diagnosis. Background retinopathy was predominant (12%) followed by pre-proliferative (4%) and proliferative (1%) lesions. **Conclusion:** Frequency of retinopathy in newly diagnosed type 2 diabetic patients seems to be higher than previous reports and background lesions were predominant. Detailed fundoscopic examination of all newly type 2 diabetic patients at the time of diagnosis is of paramount importance.

**Keywords:** Frequency, type 2 diabetes mellitus, retinopathy, fundoscopic examination

### INTRODUCTION

Diabetes mellitus now becomes a major public health problem approaching epidemic proportions globally. Type 2 diabetes mellitus poses a major global health threat, especially in the developed as well as developing countries of the world.<sup>1</sup> Worldwide prevalence of type 2 diabetes mellitus has been estimated to rise from 150 million to 225 million by the end of 2010 and to as many as 300 million by 2025.<sup>2,3</sup> Retinopathy is one of the most frequent and serious complication of diabetes mellitus.<sup>4</sup> It is a major cause of blindness throughout the world in age group 20–60 years.<sup>5</sup> The prevalence of retinopathy in newly diagnosed type 2 diabetic patients ranges from 5 to 35%.<sup>6</sup> Blindness from diabetic retinopathy can be delayed with timely detection and appropriate therapy.<sup>7</sup> In a study from Pakistan<sup>8</sup>, the newly diagnosed diabetes mellitus has been reported in 5.1% men and 6.8% women in urban areas, and 5% men and 4.8% women in the rural areas. The aim of this study was to find out frequency and pattern of retinopathy in newly diagnosed type 2 diabetic patients at tertiary care settings in Abbottabad.

### MATERIAL AND METHODS

This descriptive cross-sectional comparative study was conducted at Ayub Teaching Hospital, and Northern Institute of Medical Sciences, Abbottabad from Nov 2009 to Jun 2010. One hundred consecutive patients

with newly diagnosed type 2 diabetes mellitus who were attending the diabetic clinics of these tertiary care hospitals were included in the study. Type 2 diabetes was diagnosed by WHO criteria on study participants. Patients 35 years and older, newly diagnosed type 2 diabetics within previous one month were included in the study. Already diagnosed type 2 patients who were taking anti-diabetic medication, type 1 diabetic mellitus, hypertension, retinal vasculitis, retinal vessel occlusion and sickle-cell retinopathy were excluded from the study. The protocol for this study was approved by Ethical Committee of the Institutes, and an informed written consent was taken from all study participants.

The data was collected on a pre-designed performa. General and systemic examinations were undertaken. Weight, body mass index (BMI), blood pressure and monofilament test for neuropathy results were recorded. Laboratory analysis included fasting and postprandial blood glucose estimation, HbA<sub>1c</sub>, urine examination for proteinuria, serum cholesterol and serum creatinine.

Patients were referred to consultant ophthalmologist for visual acuity and slit-lamp examination. According to fundoscopic findings, retinopathy was graded into background, pre-proliferative and proliferative types. The background retinopathy was characterised by micro-aneurysm, hard exudates, dot/blot haemorrhages and retinal oedema, while pre-proliferative retinopathy had cotton-wool

spots, venous loops/beading, and dark blot haemorrhages and intra-retinal vessel abnormalities. The proliferative lesions demonstrated neo-vascularization, vitreous haemorrhages and retinal detachment.

Data were analysed using SPSS-10. Age was presented as Mean±SD. The parameters of newly diagnosed type 2 diabetic patients with retinopathy were compared with that of without retinopathy using Student's *t*-test and  $\chi^2$  test.

## RESULTS

The study population comprised of 100 consecutive newly diagnosed type 2 diabetic patients over a period of 8 months. Sixty percent of them were women. Age of the patients ranged between 35 and 68 (45.1±3.2) years. The overall frequency of retinopathy was 17% (95% CI 16.7, 17.3). Background lesions were predominant (12%) followed by pre-proliferative (4%) and proliferative (1%) respectively.

In univariate analysis, there was a statistically significant difference between clinical parameters of patients who had retinopathy compared to those who did not have it. Patients with retinopathy were predominantly women, older in age, and with high BMI. They also had higher levels of fasting plasma glucose, HbA<sub>1c</sub> and serum cholesterol compared to patients without retinopathy. (Table-1).

**Table-1: Comparative parameters of the patients with and without retinopathy (n=100)**

Parameter	With retinopathy (n=17)	Without retinopathy (n=83)	<i>p</i>
<b>Clinical</b>			
Age (year)	49.1±3.1	43.2±3.3	0.05
Female Gender	65%	55%	0.57
BMI (Kg/m <sup>2</sup> )			
Overall	33.1±6.5	30.7±6.1	0.03
Women	36.5±6.4	32.7±6.1	
Men	30.5±6.2	28.9±5.8	
Blood Pressure (mmHg)			
Systolic	123±19.2	119±18.6	0.72
Diastolic	87±15.4	82.5±13.4	0.15
Fasting plasma glucose (mg/dl)	189±54.5	130.5±59.4	0.0001
Serum Creatinine (mg/dl)	1.2±0.3	0.9±0.2	<0.0001
HbA <sub>1c</sub> (%)	8.8±1.4	7.1±1.5	<0.0001
Serum Cholesterol (mg/dl)	219.8±34.2	185.7±29.3	0.005

*p*<0.05 is taken as significant

## DISCUSSION

In our study, frequency of diabetic retinopathy in newly diagnosed type 2 patients seems to be higher than previous reports with background lesions predominant, and therefore alarming health care system. According to Wahab S<sup>9</sup>, 15% of newly diagnosed type 2 diabetics have retinopathy at the time of diagnosis which is quite closer to results of our study. In addition, background lesions were predominant in our study which is similar to study by Iqbal T<sup>10</sup>. In a pilot study<sup>11</sup> conducted at Karachi on 3000 diabetic patients, it was observed that 26% of the

patients suffered with retinopathy. Various clinic based studies on newly diagnosed type 2 diabetic patients have shown varied rate of prevalence for retinopathy; Abdollahi A<sup>12</sup> reported 13.8%, Agarwal S<sup>13</sup> reported 11.7%, while Nathan<sup>14</sup> has reported 12.6% prevalence of retinopathy in newly diagnosed diabetics in a Diabetes Prevention Programme. However, a European study by Kohner EM<sup>15</sup> has reported 35% prevalence rate of retinopathy for women in United Kingdom Prospective Diabetes Study. This difference in prevalence of retinopathy in newly diagnosed type 2 diabetics might be due to variable time interval between onset and detection of the disease. It can be a result of socio-economical factors which mainly determine the access to and availability of medical care and variation in defining the presence of diabetes mellitus.

Our study showed that newly diagnosed type 2 diabetics with retinopathy were older in age, and had high BMI. They also had higher fasting plasma glucose, HbA<sub>1c</sub> and serum cholesterol levels compared to diabetics without retinopathy.

Abdollahi A<sup>12</sup> showed that age, duration of diabetes, fasting plasma glucose, HbA<sub>1c</sub> and systolic blood pressure were significantly higher in patients with retinopathy. Rema M *et al*<sup>16</sup> observed an association of age, higher levels of fasting plasma glucose and HbA<sub>1c</sub> with retinopathy in a population based study conducted in urban India. Studies from western countries, as United Kingdom Prospective Diabetes Study<sup>15</sup> and United States Beaver Dam Eye Study<sup>17</sup> have demonstrated higher levels of systolic blood pressure, fasting plasma glucose and HbA<sub>1c</sub> as important variables in diabetic retinopathy. A similar study from Denmark<sup>18</sup> has shown a strong correlation between the severity of retinopathy and duration of diabetes, higher HbA<sub>1c</sub> and systolic blood pressure.

An important aspect of our study is significant association of high serum cholesterol level with retinopathy but there is lack of association with systolic and diastolic blood pressure. This is quite contrary to the results of previously published data.

## CONCLUSION

The frequency of retinopathy in newly diagnosed type 2 diabetic patients was relatively higher in our study than previous reports and background lesions were predominant. Detailed fundoscopic examination of all type 2 diabetic patients at the time of diagnosis is of paramount importance

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