



# DIABETIC RETINOPATHY; PREVALENCE, AMONG PATIENTS ATTENDING THE FREE EYE CAMPS FOR CATARACT SURGERY IN SOUTHERN PUNJAB, PAKISTAN

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**ABSTRACT... Objectives:** The purpose of this study was to evaluate the prevalence and characteristics of diabetic retinopathy (DR) in patients attending the free eye camps for cataract surgery held in southern Punjab, Pakistan. **Study Design:** It was a cross sectional study. **Setting:** Free eye camps organized in different regions of the Southern Punjab, Pakistan. **Period:** July 2004 to June 2015. **Material and methods:** These community-based eye camps were held by the Department of Ophthalmology in collaboration of department of Pathology, B.V. Hospital, Bahawalpur, Pakistan. Participants were interviewed and examined by the ophthalmologists to determine their demographic characteristics, presence & duration of medical conditions and the regularity of their visits to eye care providers. All patients screened to have diabetes mellitus (DM) by pathologists underwent an eye examination through dilated pupils by using direct/indirect ophthalmoscope and slit-lamp bio-microscope to check for any signs of DR. Main outcome measure was the presence of diabetic retinopathy and its complications, which was classified as mild, moderate, severe NPDR, and proliferative diabetic retinopathy (PDR) based on the clinical examination. **Results:** Of the 7989 screened patients, 759 (9.5%) had type-II DM. Of them, 638 patients (84%) underwent eye examination. Mean age of the diabetics was  $45.75 \pm 8.17$  years. Diabetic retinopathy was prevalent in 93 (15%) patients followed by non-proliferative retinopathy was found in 87 (93.5%) patients and proliferative retinopathy was found only in 6 (6.5%) patients. More male 52 (20.39%) were effected of DR as compare to female 41 (10.7%). Highly significant association of DR with duration of DM was seen. (P: 0.001). **Conclusion:** It is concluded in this study that DR is commonly prevalent in Southern Punjab and the most common type of DR is non-proliferative retinopathy. DR frequently prevalent in male diabetics as compare to female diabetics and significant association of duration of DM with DR was found.

**Key words:** Diabetes mellitus; diabetic retinopathy; macular edema.

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## INTRODUCTION

Diabetes mellitus (DM) is the most common metabolic disorder in the world with a constantly increasing trends. According to W.H.O, estimates indicate that there were more than 169 million people throughout the world with diabetes in the year 2000. This number is projected to increase to 340 million by the year 2030, with the most significant contribution from developing countries.<sup>1</sup>

While the most of the people having DM in established areas are in old age group, the majority of individuals in developing countries are in relatively younger working age group (45-65

years), which intensifies the worse effects of DM in these communities.<sup>2</sup>

One of the major bad consequence of DM is the diabetic retinopathy which has become a leading cause of blindness among the working age subjects of both underdeveloped and developed countries.<sup>3</sup> The clinical signs of DR depend on the type of diabetes and affects nearly entire population of insulin dependent diabetes (type-1 diabetes) of 20 years or more duration and in nearly 75 percent of those having maturity onset diabetes (type-2 disease) with the same duration.<sup>4</sup>

Loss of productivity by affected working age

population and poor quality of life of the patients with DR creates an additional socioeconomic burdens on the society.<sup>5</sup> However, the loss of vision caused by DR can be lessened up to 90% by early detection and appropriate intervention.<sup>6</sup> In addition to the type and duration of diabetes, there are many factors including age, weight and gender of the patient, status of serum glucose and lipids levels, systemic hypertension, and micro albuminuria which are associated with the development and progression of DR.

If we consider all the subjects affected by type II DM, 20-30% have some changes in fundus at the time of diagnosis and probably more than 65% have DR during the first two decades of the pathology.<sup>7</sup>

It is estimated that around 11% of the adult population in Pakistan has DM and the country ranks seventh among the countries facing the highest burden of this disease.<sup>9</sup> It is a fact that before the this study, population-based data on the prevalence of DR and its effects on vision in the southern Punjab in Pakistan were lacking. Data is available but it is only hospital-based. Therefore, this study was conducted in order to find out the prevalence of DR among individuals screened positive for DM in community-based free eye camps arranged in different regions of southern Punjab, Pakistan.

## MATERIALS AND METHODS

This was a population based cross sectional study, conducted at the free eye camps organized in different localities of the southern Punjab, Pakistan, by the department of ophthalmology, Bahawal Victoria Hospital, Bahawalpur. This study was conducted from July 2004 to June 2015. Before the commencement of the project of study, a written approval was obtained from the institutional ethics committee of Bahawal Victoria Hospital, Bahawalpur, Pakistan.

South Punjab consist of a diverse population of around 35 million, almost 32% of the entire population of the whole province (Pakistani Punjab). The inhabitants of this area includes

almost all of the major ethnic groups of Pakistan including Punjabis, Saraikis, Muhajirs and Sindhis. Individuals of all ages visited the eye camps organized by ophthalmology department and all the patients with the history of diabetes were included in the study. Written informed consent was obtained from all participants before inclusion in the study. The patients were screened for diabetes and those who were positive for the disease were evaluated for DR. A selected team of three proficient ophthalmologists examined the participant's eyes by using a slit-lamp and 90-dioptre lens. The presence or absence of any diabetic changes were recorded. Diabetic retinopathy (DR) was classified as mild, moderate, severe NPDR and PDR. Grading of the DR was according to clinical findings and to the early treatment of diabetic retinopathy study (ETDRS) protocol.

Statistical analysis was performed by using SPSS version 17. Frequencies and percentages were calculated for categorical variables. Means and standard deviation were calculated for continuous variables. Chi-square test was used to assess the associations between variables. P value  $\leq 0.005$  was considered statistically significant.

## RESULTS

Total 638 patients with type-II DM were included in this study. Mean age of the patients was  $45.75 \pm 8.17$  years. Among the 634 type-II diabetics, retinopathy was found in 93 (15%) patients. (Figure-1). Out of 93 patients with DR, no proliferative retinopathy was found in 87 (93.5%) patients followed by mild nonproliferative retinopathy in 43 (46.24%) patients, moderate nonproliferative retinopathy in 32 (34.4%) patients and severe nonproliferative retinopathy in 12 (12.9%) patients. Proliferative Retinopathy was found only in 6 (6.5%) patients. (Table-I)

Stratification of gender was done to see the association of gender with diabetic retinopathy. Out of 255 (40%) male diabetics, retinopathy was found in 52 (20.39%) patients and among the 383 (60%) female diabetics, retinopathy was found 41 (10.7%) patients. Highly significant association of

gender with retinopathy was seen. P. value 0.001. (Table-II)

All (638) diabetics were divided in 3 groups according to duration of DM. In <5 years group, out of 160 (25%) patients retinopathy was found in 13 (8.1%) patients, 224 (35%) patients belong to 6-10 years group and retinopathy was found in 28 (12.5%) patients and in 11-15 years group, out of 254 (40%) patients retinopathy was found in 52 (20.47%) patients. Duration of DM was found significantly associated with retinopathy. P. value 0.001. Table-III

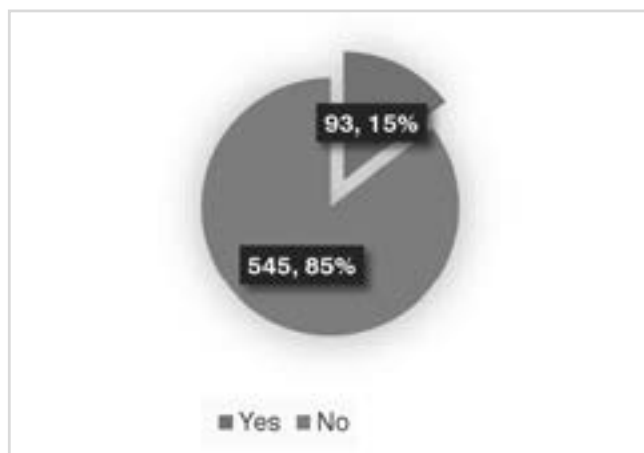


Figure-1. Prevalence diabetic retinopathy in patients of type-II diabetes mellitus

Type of diabetic retinopathy	N	%
<b>Nonproliferative Retinopathy</b>	<b>87</b>	<b>93.5</b>
Mild Nonproliferative Retinopathy	43	46.24
Moderate Nonproliferative Retinopathy	32	34.4
Severe Nonproliferative Retinopathy	12	12.9
<b>Proliferative Retinopathy</b>	<b>6</b>	<b>6.5</b>
<b>Total</b>	<b>93</b>	<b>100</b>

Table-I. Types of diabetic retinopathy (n = 93)

Gender	Diabetic Retinopathy		Total	P. value
	Yes (%)	No (%)		
<b>Male</b>	52 (20.39)	203 (79.61)	255 (40)	<b>0.001</b>
<b>Female</b>	41 (10.7)	342 (89.3)	383 (60)	
<b>Total</b>	93 (15)	545 (85)	638	

Table-II. Association of diabetic retinopathy with gender

Duration of DM (years)	Diabetic Retinopathy		Total	P. value
	Yes (%)	No (%)		
<b>&lt; 5</b>	13 (8.1)	147 (91.9)	160 (25)	<b>0.001</b>
<b>6-10</b>	28 (12.5)	196 (87.5)	224 (35)	
<b>11-15</b>	52 (20.47)	202 (79.53)	254 (40)	
<b>Total</b>	93 (15)	545 (85)	638	

Table-III. Association of diabetic retinopathy with duration of diabetes mellitus

### DISCUSSION

Diabetes mellitus is the one of the most common metabolic disorder. It was believed for a longer time to be a disease of the developed societies but now it has emerged as a problem of underdeveloped and developing areas, affecting the working age population.<sup>10</sup>

Diabetic retinopathy is a progressive and potentially vision threatening condition resulting from chronic high levels of serum glucose.<sup>11</sup> The basic pathology underlying the disease are vascular leakage and capillary occlusion.<sup>12</sup> It is a major cause of blindness in those affected by type 2 diabetes. It is projected globally that diabetic retinopathy (DR) would be the major contributor in the blindness in future.<sup>13</sup>

The prevalence of DR ranges from 15- 55%, depending on the methodology adopted for screening, age of the patients and the duration of the disease. The prevalence is usually found to be on the lower side in population-based as compared to hospital-based populations.<sup>14</sup>

In present study mean age of patients with DR is 45.75 ± 8.17 years which is comparable with the study of Jamil et al<sup>13</sup> who reported mean age of patients with DR as 50.95 ± 10.12 years. In our study prevalence of DR was 15%, similar (15.7%) prevalence of DR was reported in one study.<sup>15</sup> Hussain et al<sup>16</sup> also reported prevalence of DR as 12% in their study which is also comparable with our study. Some other studies were also

reported comparable prevalence of DR.<sup>17-18</sup> In one pilot study by Kayani et al,<sup>19</sup> higher (26.1%) prevalence of DR was reported which is higher than present study. Some international studies also reported a higher prevalence of DR as 35% and 36% respectively.<sup>20</sup> Variations could primarily be attributed to the different settings and the different base of population involved.

In present study the commonest form of diabetic retinopathy was non-proliferative (93.5% [mild in 46.24%, moderate in 34.4 %, and severe in 12.9%]), and proliferative diabetic retinopathy in (6.5%) patients. In one study by Bharathi et al,<sup>21</sup> non-proliferative DR was present in 85.3% patients which is comparable with our study. Findings of some other studies are in favor of our study.<sup>20,22</sup> In one study frequency of non-proliferative DR was 72.61% which is not comparable with our study.<sup>23</sup> In another study, the most prevalent type of DR was non-proliferative in 76.5% patients which is in contrast with our study. Same study was also reported Mild non-proliferative diabetic retinopathy in 35.3% patients, Moderate non-proliferative diabetic retinopathy in 29.4% patients and severe non-proliferative diabetic retinopathy in 11.8% patients.<sup>15</sup>

In present male patients are more victim of DR as compare to female patients (20.39% vs 10.7%) and the difference was statistically significant (P. value 0.001). Similarly Raman et al<sup>24</sup> reported significantly (P. value 0.002) higher proportion of male patients with DR as compare to female patients (21.1% vs 14.6%). But in one study, women had a slightly greater prevalence of diabetic retinopathy than men (16.4% vs. 14.9%) although the difference was not statistically significant (p: 0.83).<sup>15</sup>

In present study there was a statistically significant difference (P. value 0.001) in the presence of retinopathy between those with less years of disease duration and those with longer disease period. Many studies have found duration of diabetes to be an important predictor of diabetic retinopathy.<sup>25</sup> In one study by Memon et al<sup>26</sup> DR was found in 21.2% patients with having duration

of DM <5 years, 27.15% patient having DM 5-10 years and 27.15% patients having 11-15 years of duration of disease. Findings of this study were in favor of our study.

## CONCLUSION

It is concluded in this study that DR was commonly prevalent in Southern Punjab and the most common type of DR was non-proliferative retinopathy. DR frequently prevalent in male diabetics as compare to female diabetics and significant association of duration of DM with DR was found.


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### AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Rao M. Rashad Qamar	Author made substantial contributions to designs of study acquisition of data, analysis and interpre of data.	
2	Dr. Sadiq Hussain	Author preticipated in conception and involved in partial tasks, drafting the article of revising it critically for important intlectual content	
3	Dr. Rao M. Aslam Tariq	Author participated in organization and gave final approval of the version to be submitted	