# FREQUENCY OF RETINOPATHY AMONG DIABETICS ADMITTED IN A TEACHING HOSPITAL OF LAHORE

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**Background:** Diabetic retinopathy is a complication of diabetes that affects the blood vessels of the retina and leads to blindness. Although 4 – 8 million diabetics exist in Pakistan, very little work has been done on this complication of diabetes. The present study was undertaken to estimate the frequency of retinopathy among diabetics admitted in a teaching hospital of Lahore. **Methods:** Every patient of diabetes mellitus, admitted in departments of Medicine, Surgery, Ophthalmology and Obstetrics & Gynecology at Sir Ganga Ram Hospital, Lahore between June 2001 and September 2001 was included in the study. After adequate mydriasis, detailed fundus examination using indirect opthalmoscope was carried out to determine the presence of diabetic retinopathy and its type. **Results:** Out of 4414 admissions, 540 patients – 340 females and 196 males were diabetics. Among 540 diabetics, 132 had Type-1 diabetes (24.4%) while 408 had Type-2 diabetes (75.6%). The duration of diabetes ranged from 10 to 12 years. The prevalence of diabetes among admitted patents was 12.2%. Among these 540 diabetics, 180 had diabetic retinopathy showing a prevalence of 33.3%. Non-proliferative retinopathy was present in 21.5% diabetics and proliferative retinopathy among 11.8% diabetics. The prevalence of retinopathy was significantly higher ($P<0.001$) among males (42.8%) as compared to females (27.9%). The prevalence was similar (33.3%) among both Type-1 as well as Type-2 diabetes as well as similar to that reported from other countries. **Conclusion:** Since 33.3% of our diabetic population is suffering from retinopathy – a condition amenable to timely and cost-effective treatment, every diabetic should be made aware of the importance of regular ophthalmologic examination.

## INTRODUCTION

Diabetic retinopathy is a complication of diabetes that affects the blood vessels of the retina and leads to blindness. The progression of retinopathy is orderly, advancing from mild abnormalities, characterized by increased vascular permeability, to moderate and severe non-proliferative diabetic retinopathy (NPDR), characterized by the growth of new blood vessels on the retina and posterior surface of the vitreous[1].

Retinopathy is the commonest complication of diabetes. Surveys from developed countries show that at any time, up to 10% of people with diabetes will have retinopathy[2]. The annual incidence of retinopathy requiring ophthalmological follow up or treatment has been reported to average 1.5% after one year[3]. Untreated, between 6-9% of the people with proliferative retinopathy or severe non-proliferative disease would become blind each year. Findings, consistent from study to study, make it possible to suggest that, after 15 years of diabetes, approximately 2% of people become blind, while about 10% develop severe visual handicap[3].

The knowledge of the retinopathy status of an individual is one part of the whole process of care in diabetes. The need to screen for diabetic retinopathy is uncontroversial. Early detection of sight threatening retinopathy and treatment by laser therapy has been shown to be effective in preventing the onset of visual impairment.

According to National Health Survey of Pakistan[4], the prevalence of diabetes among population aged $\geq$ 25 year is 4.2%, while Shera et al[5-6] have estimated a prevalence of 9.1 to 13.7%. These figures translate into 4-8 million diabetics in the country. In spite of this high number of diabetics very little work[7-8] has been done on macrovascular and microvascular complications of diabetes. The present study was undertaken to estimate the frequency of retinopathy in a group of diabetics attending a teaching hospital in Lahore.

## MATERIAL AND METHODS

The study was conducted between June 2001 and September 2001 at Sir Ganga Ram Hospital, attached to Fatima Jinnah Medical College, Lahore. Every patient of diabetes mellitus admitted in departments of Medicine, Surgery, Ophthalmology and Obstetrics & Gynecology was included in the study.

After obtaining informed consent, the information was obtained regarding the type, onset, duration, treatment, nature of diabetic control, associated systemic diseases and ocular complications. Each patient underwent a detailed ophthalmological examination by the principal author.

After adequate mydriasis, detailed fundus examination using indirect ophthalmosocope was carried out to determine the presence of diabetic retinopathy and its type. Diabetic retinopathy was classified as non-proliferative, when microaneurysms, haemorrhages (dot, blot or flame shaped) or hard exudates were seen in any quadrant of retina. **P**roliferative diabetic retinopathy was diagnosed, if neovascularisation of the retina or iris or angle, pre retinal or vitreous haemorrhage, and or tractional retinal detachment was present. SPSS version 10 was used for data analysis.

## RESULTS

Total number of admissions during the study period was 4414. Out of these admissions, 540 patients were diabetics. Three hundred and forty four diabetics (63.7%) were female and 196 were males (36.3%). Table-1 shows the distribution of cases according to various characteristics.

The frequency of diabetes among admitted patients was 12.2%. The age of the diabetics ranged between 40 and 60 years except those from Department of Obstetrics & Gynecology, majority of whom were less than 45 years of age. Out of these 540 diabetics, 132 had Type-1 diabetes (24.4%) while 408 had Type-2 diabetes (75.6%). The duration of diabetes ranged from 10 to 12 years.

Among 540 diabetics, 180 had diabetic retinopathy showing a prevalence of 33.3% (Table-2). Non-proliferative retinopathy was present in 21.5% diabetics and proliferative retinopathy among 11.8% diabetics. The prevalence of retinopathy was significantly higher ($P<0.001$) among males (42.8%) as compared to females (27.9%). Proliferative retinopathy was significantly higher ($P<0.01$) among males (18.1%) as compared to females (8.1%). However, the difference in the prevalence of non-proliferative retinopathy among males (24.5%) and females (19.8%) was not significant.

The prevalence of retinopathy was similar (33.3%) among both Type-1 as well as Type-2 diabetes. Non-proliferative retinopathy was more common (22.5%) in Type-2 diabetes as compared to Type-1 diabetes (18.2%), whereas proliferative retinopathy was more common in Type-1 (15.1%) as compared to Type-2 diabetes (10.8%). However, the differences were not statistically significant ($P>0.05$).

# DISCUSSION

Knowledge of the retinopathy status of an individual is one part of the whole process of care in diabetes. The implicit "gold standard" for identifying and grading retinopathy is a retinal examination using indirect biomicroscopy by a senior ophthalmologist or seven field stereoscopic photographs of each eye interpreted by experienced readers.

Several sudies[9-10] have reported the cost effectiveness of screening for retinopathy. They have established that screening for diabetic retinopathy saves vision at a relatively low cost and this cost is many times less than the disability payments provided to people who go blind in the absence of a screening programme. In 1983, the annual cost of treating a diabetic at risk of blindness was estimated to be GBP 387/- compared with welfare benefits paid to a blind person of GBP 3575/- per annum. Similar results were reported in more recent American and European studies[11-12].

Table – 1: Characteristics of Study Population

| **Characteristic** | Number | **Percent** |
|---|---|---|
| **Sex** | | |
| Male | 196 | 37.3 |
| Female | 344 | 63.7 |
| Total | 540 | 100.0 |
| **Department of Admission** | | |
| Medicine | 304 | 56.2 |
| Surgery | 52 | 9.7 |
| Obstetrics & Gynaecology | 52 | 9.7 |
| Ophthalmology | 132 | 24.4 |
| Total | 540 | 100.0 |

| | | |
|---|---|---|
| Type of Diabetics | | |
| Type 1 | 132 | 24.4 |
| Type 2 | 408 | 75.6 |
| Total | 540 | 100.0 |

Table – 2: Frequency of diabetic retinopathy among 540 diabetics according to sex and type of retinopathy

| Characteristic | Number Examined | Positive for Retinopathy | Frequency (%) |
|---|---|---|---|
| **Sex** | | | |
| Male | 196 | 84 | 42.8 |
| Female | 344 | 96 | 27.9 |
| Total | 540 | 180 | 33.3 |
| **Type of Retinopathy** | | | |
| Non Proliferative | 540 | 116 | 21.5 |
| Proliferative | 540 | 64 | 11.8 |
| Total | 540 | 180 | 33.3 |

Table 3 summarizes the results of various studies on diabetic retinopathy in developing countries. Ghana[13] and Spain[14] showed a significantly lower prevalence of 22.4% and 20.9% respectively (P<0.01). Saudi Arabia[15], Sri Lanka[16] and Brazil[17] reported a prevalence of 31.3%, which is equal to our figure of 33.3%. The prevalences reported from Egypt[18] (42%) and India[19] (48.1%) are significantly higher (P<0.05) from our findings, while the prevalence notices among South African[20] diabetics (40.3%) is not significantly different from the prevalence noticed in our study (P>0.05). The reported prevalence among 3000 diabetics from Karachi[7] (26.1%) is significantly lower than our findings. This could be due to the younger age of that population and the shorter duration of disease. In that study, the duration of diabetics in 52.2% of those suffering from retinopathy was 10 years or less, whereas in our study the duration of diabetes was 10 year or more.

Diabetic retinopathy is a complication of both Type-1 and Type-2 diabetes mellitus.

Table – 3: Comparison with the prevalence of Retinopathy in Various Countries

| Country | Author | Year | No of Subjects | Retinopathy (%) |
|---|---|---|---|---|
| Ghana | Ndiaye et al[13] | 1999 | 129 | 22.4 |
| Spain | Lopez et al[14] | 2002 | 3544 | 20.9 |
| Saudi Arabia | El. Asrar et al[15] | 1998 | 502 | 31.3 |
| Sri Lanka | Fernando[16] | 1993 | 1003 | 31.3 |
| Brazil | Gomes et al[17] | 2002 | 50 | 31.3 |
| Egypt | Herman et al[18] | 1998 | 6052 | 42.0 |
| India | Singh et al[19] | 2001 | 52 | 48.1 |
| South Africa | Rotchford et al[20] | 2002 | 203 | 40.3 |
| Pakistan | Akhtar[7] | 1991 | 3000 | 26.1 |
| Pakistan | Present Study | 2003 | 540 | 33.3 |

Prevalence is related primarily to the duration of disease and secondarily to quality of blood sugar control. Aiello et al have shown that after 20 years, nearly all Type-1 diabetics and greater than 60% of Type-2 diabetics will have retinopathy regardless of diabetic control[21]. Vision-threatening retinopathy rarely occurs in Type-1 patients in the first 3-5 years after diagnosis or before puberty. Over the next 20 years, nearly all Type-1 patients will have some degree of retinopathy. Up to 21% of Type-2 patients have retinopathy at the time of initial diagnosis related to prolonged hyperglycemic ("borderline") states. The majority (approximately > 60%) will develop retinopathy over the subsequent years[21].

The Wisconsin Epidemiologic Study of Diabetic Retinopathy (WESDR) concluded that 3.6% of those diagnosed with Type-1 diabetes, and 1.6% of those diagnosed with Type-2 diabetes, were legally blind. For Type-1 diabetics, blindness was due to diabetic retinopathy in 86% of the cases. For Type-2 diabetics, blindness was related to retinopathy in 33% of the cases; the percentage was lower due to other ocular causes[22].

The United Kingdom Prospective Diabetic Study (UKPDS) is the longest and largest study of Type-2 patients. The study revealed that improved control led to a reduction in retinopathy, a 25% reduction in overall microvascular complications and that one point decrease in HbA1c was associated with 35% reduction in risk for microvascular complications[23]. UKPDS has further shown a slowed progression of retinopathy with improved control. The end result is preservation of sight, decreased morbidity and decreased need for more expensive intervention.

Screening saves vision at a relatively low cost, much lower than with later interventions like involving intro-ocular surgery. The personal and societal costs are reduced with increased productivity, decreased morbidity, and decreased disability. This is a valuable strategy to identify patients with asymptomatic macular edema and proliferative retinopathy. Timely intervention with laser photocoagulation, when appropriate, can prevent visual loss.

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