Frequency of Diabetic Retinopathy Among the Patients Presenting to Ophthalmology Out Patient Department

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Abstract

Background: This study attempted to explore the magnitude of patients with Diabetes and its ophthalmological complication that is Diabetic retinopathy in patients presenting to Ophthalmology Out Patient Department of a tertiary care health facility of Rawalpindi. It also determined their association with gender and age.

Methods: This cross-sectional study was conducted from May to September 2015 where 450 patients presenting to Ophthalmology unit of Holy Family Hospital were included. Based on history, records and investigations patients were confirmed to be Diabetics. Through Fundoscopic examination, confirmation of Diabetic retinopathy and its types Proliferatory or non-proliferatory retinopathy was made.

Results: Diabetic patients were 96 (21.33%) of total 450 patients amongst whom 45 (46.87%) were females and 51 (53.12%) were males. Highest proportions of patients with Diabetes were above 45 years of age and a highly statistically significant difference was observed amongst age groups with presence of Diabetes (p-value= 0.00). Diabetic retinopathy was confirmed to be present in 15 (15.62%) patients out of 96 Diabetic patients amongst whom 11 (73.33%) were males and 4 (26.67) were female diabetic patients. Amongst 15 patients with Diabetic retinopathy 9 (60%) had non-proliferative stage of diabetic retinopathy while 6 (40%) had proliferative stage of diabetic retinopathy.

Conclusion: About one fifth of patients presenting in ophthalmology OPD of tertiary care had diabetes and amongst these diabetic patients, approximately further one fifth had diabetic retinopathy.

Key words: Diabetes Mellitus, Diabetic retinopathy, Fundoscopy, Proliferatory retinopathy, non-proliferatory retinopathy, age, gender

Introduction

Diabetes is a chronic, non-communicable disease that affects body's ability to use energy present in food because of lack of insulin produced by pancreas or inability of cells to respond to insulin being produced in body. Fact sheets of diabetes reviewed by WHO in Nov 2016 stated that global prevalence of diabetes has roughly doubled from 4.7% to 8.5% in last 3 decades; particularly more rapidly in middle and low income countries. In Pakistan, it is 7 million”*”making it a country harbouring 7th highest number of diabetics in the world. According to National Institute Of Diabetes And Endocrinology with an estimated prevalence of 7.6% at present, it is estimated that by 2030, Pakistan will have fourth largest diabetic population of world. Diabetes affects almost every organ of body and causes many complications, some of which may prove life threatening for example stroke, Cerebrovascular accidents and end stage renal disease and other complications make a person disable, having grave effects on quality of life of patients.

Diabetic retinopathy (DR) is one of such disabling complication which is leading cause of preventable blindness. Diabetic retinopathy is one of few diseases with developed role of preventive measures to delay its development and progression. Diabetes is estimated to account for 11.6% of annual health care budget in most countries and DR makes a big contribution to this figure. A diabetic patient is 25 times more likely to become blind as compared to a non-diabetic. In a prospective study by Wisconsin epidemiological study of diabetic retinopathy (WESDR), after 25 years follow-up of diabetic patients, 97% eventually developed DR with half progressing to sight-threatening disease. Diabetic retinopathy is characterized by early micro vascular dysfunction and is of two types, non-proliferative and proliferatory. Diabetic retinopathy affects 80% of patients who have diabetes for 20 years or more. A participant meta-analysis including 35 studies conducted world-wide from 1980-2008 gives global prevalence of diabetic retinopathy among diabetics to be 35.4%. Of an estimated 285 million diabetics worldwide, one third of these have diabetic retinopathy that is 33.3%.
screened diabetics in Pakistan, 26% (780) were
diagnosed to have retinopathy. In a descriptive
cross-sectional study conducted in 2012, Karachi,
Pakistan; prevalence of diabetic retinopathy was
28.8%, out of them; non-proliferatory DR was 33.4%
whereas proliferatory DR was 2.6%. Non-
proliferatory DR accounted for 79.1%, 92%, 89.3 to
94.1%, and 69.8% in studies conducted in Pakistan,
Australia, India and Oman respectively. In various
population based studies conducted in different parts
of world including Australia, ice land, Denmark and
USA, it was established that prevalence of diabetic retinopathy varies between 24% to
70%
2010 USA prevalence rates for diabetic retinopathy by age show maximum prevalence in aged 75 and above. In a descriptive cross-sectional study in Pakistan, most prevalent age group was 55-59 years
having 37% of all DR patients, with distribution of 28.48% in 60-69 years and 21.85% in age group 40-49.
Regarding gender no association has been established in various studies with Diabetic retinopathy. As regards gender distribution of DR is concerned, no
significant variation was observed in few researches.
The objectives of this study were to determine the
frequencies of Patients with Diabetes and Diabetic Retinopathy and its types in patients presenting to Ophthalmology outpatient Department (OPD) of Holy Family Hospital tertiary care health facility, Rawalpindi. It also assessed association between age and gender with Diabetes and Diabetic retinopathy.

Patients and Methodology
After taking approval from Institutional Research Forum of Rawalpindi Medical College (RMC), this
cross sectional study was conducted from June 2015-
September 2015, including adults aged 25 years and
above who presented to Outdoor patient department of Holy Family Hospital, Rawalpindi. Using WHO sample size calculator, the minimally required sample
size was calculated for both diabetes and diabetic retinopathy and largest value was selected. Keeping
level of confidence as 95%, absolute precision 5% and anticipated proportion of diabetic patients as 7.6%, the minimally required sample size was calculated to be 92 but we included 450 patients presenting to the OPD. Information was collected firstly through history and checking of available records for known diagnosis of Diabetes. These known cases of Diabetes were also inquired about glycemic control, presence or absence of diabetic retinopathy through previous examinations or records and its type. However, in patients who were not known cases of Diabetes, history was taken for confirmation of signs and symptoms of Diabetes through history and blood samples were drawn for Fasting or random blood Sugar levels for confirmation of Diabetes. Random blood sugar values of 200 mg/dl or higher and Fasting blood sugar levels of 126 mg/dl or higher were used for confirmation of Diabetic patients. All known and newly diagnosed Diabetic patients were examined for Diabetic Retinopathy where fundoscopy was performed by consultant ophthalmologist. All the information was recorded and entered in structured Performa designed for this study. Data was entered and analyzed using Statistical Package of Social Sciences (SPSS v-21). For categorical variables, frequencies and percentages were calculated while for numerical variables; means along with standard deviations were calculated. Pearson’s Chi square test was applied at 5% level of significance to compare the frequencies of Diabetes and Diabetic retinopathy according to gender and age groups.

Results
Total number of participants were 450 patients present ing to the OPD of Ophthalmology department of HFH, amongst whom 234 (52%) were males and 216 (48%) were females. Amongst all 450 patients, 67 (14.89%) were in age group 26-35 years, 147 (32.67%) were in age group 36-45 years, 108 (24%) in age group 46-55 years, 97 (21.56%) in age group 6-65 years while 31 (6.9%) were 66 years and above. The mean age of all 450 study participants was 45.86±14.32 years.
Frequency of Diabetes amongst all 450 patients was found to be 96 (21.33%) amongst whom 45 (46.87%) were females and 51 (53.12%) were males. When the presence of Diabetes was compared amongst both the gender groups then 21.79% amongst all males and 20.83% amongst all females were confirmed to be diabetics and this difference was not statistically significant with a chi statistic of 6.04 and p-value of 0.84.
However when the presence of Diabetes was compared based on age groups, higher proportions were observed in patients with age groups above 45 years as shown in Figure 1. When the distributions of Diabetic patients in each age group were compared, a highly statistically significant difference was observed amongst age group with a chi statistic of 30.98 and a p-value of 0.00.
72(75%) patients claimed to have good glycemic control over last one year while 24 (25%) of diabetic patients admitted poor glycemic control.
Diabetic retinopathy was confirmed to be present in 15 (15.62%) patients out of 96 diabetic patients amongst whom 11 (73.33%) were males and 4 (26.67) were female diabetic patients. When the presence of Diabetic retinopathy was compared based on gender, it was present amongst 21.56% of total male diabetic patients and 8.88% of female diabetic patients, the difference being statistically insignificant with a chi statistic of 2.91 and a p-value of 0.08.

Amongst 15 patients with Diabetic retinopathy, 9 (60%) had non-proliferative stage of diabetic retinopathy while 6 (40%) had proliferative stage of diabetic retinopathy. 6 (6.25%) Diabetes patients were found to have concurrent cataract and hypertension.

Table 2: Distribution of diabetic retinopathy according to age groups

<table>
<thead>
<tr>
<th>Age in years</th>
<th>No retinopathy</th>
<th>Proliferatory diabetic retinopathy</th>
<th>Non-proliferatory Diabetic retinopathy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-35</td>
<td>67 (14.89%)</td>
<td>0</td>
<td>0</td>
<td>67(14.89%)</td>
</tr>
<tr>
<td>36-45</td>
<td>146(32.67%)</td>
<td>1(0.22%)</td>
<td>0</td>
<td>147(32.67%)</td>
</tr>
<tr>
<td>46-55</td>
<td>104(23.11%)</td>
<td>1(0.22%)</td>
<td>3(0.66%)</td>
<td>108(24%)</td>
</tr>
<tr>
<td>56-65</td>
<td>92(20.44%)</td>
<td>2(0.44%)</td>
<td>3(0.66%)</td>
<td>97(21.56%)</td>
</tr>
<tr>
<td>&gt;65</td>
<td>26(57.67%)</td>
<td>2(0.44%)</td>
<td>3(0.66%)</td>
<td>31(6.9%)</td>
</tr>
<tr>
<td>total</td>
<td>435(96.67%)</td>
<td>6(1.33%)</td>
<td>9(2%)</td>
<td>450(100%)</td>
</tr>
</tbody>
</table>

Amongst 15 patients with Diabetic retinopathy, none of the patients belonged to age group 25-35 years, 1(0.68%) belonged to age group 36-45 year, 4(3.7%) patients were between ages 46-55 years, 5(5.15%) in age group 56-65 years while 5 (6.12%) patients were above 65 years of age.

Discussion

In our study, prevalence of diabetes was quite high that is 21.33% as compared to documented 7.6% according to International Diabetes Federation prevalence in Pakistan. One possible explanation of getting this exaggerated frequency of diabetes is that our research was conducted in a hospital setting whereby default more sick patients are presenting and results cannot be generalized onto whole population for whom a population based survey would have been more representative. But still our study provides some information about magnitude of this disease and its burden on ophthalmology department. Roughly 25% of type 1 diabetic patients have been reported to be influenced with DR, with the frequency increasing to about 80% after 15 years of anguish; in addition, in Pakistan only 33% to 44% of total diabetic patients had correct knowledge of diabetes and its complications; thus getting an exaggerated frequency of diabetes in our setting is understandable.

Age distribution of diabetes was in concordance to many other researches that is maximum prevalence in age group 56-65 years although our results show very prominent differences between those aged less than 45 and those above 45; total diabetes patients in less than 45 years age group are only 19.02% and that above 45 years harboured remaining 80.98% of all diabetics.

Gender distribution of diabetes is equal in our study population with no preference and it is also evident from many other studies. Frequency of diabetic retinopathy is 15.62% in our study. Prevalence of diabetes shows wide intra-regional, inter-regional and inter-country variations. In various population based studies conducted in different parts of world including Australia, Denmark, and USA, it was established that prevalence of diabetic retinopathy varies from 24% to 70%. According to research conducted on epidemiology of diabetes in India, its prevalence is 10%; the difference can be attributed to difference in methodology, sampling and target population of both researches. Whereas in most of western countries and in various researches of Pakistan, its prevalence varies from 28% to 34% which is grossly high as compared to our study, the difference can be attributable to variety of factors influencing development and progress of retinopathy; most important being duration and control of diabetes along with patients specific co-morbid like hypertension etc. which may accelerate development of retinopathy. In our study, only 6 diabetics had other co-morbid. Adding further, 60% patients of diabetic retinopathy were in early stages of retinopathy development giving us inference that the patients had short duration of diabetes so retinopathy has not yet progressed to late stages.
In our study, maximum prevalence of diabetic retinopathy was seen in age group 65 and above, whereas in USA maximum prevalence was seen in age group 75 and above. Difference can be attributed to development of health infrastructure, better education of patients, longer life expectancy and better diabetes management in USA. A research conducted in Karachi, Pakistan states age group 55-59 as most prevalent for diabetic retinopathy, difference again can be attributed to better literacy rates of twin cities and better hospital conditions and early referral to diabetic clinics.

In our study, the proportions of diabetic retinopathy in females and males were equal suggesting diabetic retinopathy distribution was not associated with gender; thus concordant with the previous studies conducted on Diabetic retinopathy in Taiwan, USA and Pakistan. However its statistical association could not be explored as expected count was less than 5 in more than 20% of cells of cross tabulation of gender and DR, making it inappropriate for calculation of chi square test. We recommend future comparative analytic studies with ample and equal proportions of both genders, to explore effect of gender on DR in Pakistani Population.

Conclusion:
About one fifth of patients presenting in ophthalmology OPD of tertiary care had diabetes and amongst these diabetic patients, approximately further one fifth are leading towards permanent visual impairment and blindness on the account of diabetic retinopathy. No association was evident based on gender while Diabetes was found to be more common in patients with ages above 45 years and Diabetic retinopathy in most patients above 65 years of age.

References
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