SCREENING AND PREVALENCE STUDY OF DIABETIC RETINOPATHY IN MULTAN, DISTRICT OF PAKISTAN: A CROSS SECTIONAL STUDY

Qurratul-ain Leghari1, Faiza Akhtar2, Shahzad Aslam3, Kiran Rafiq4, Saba Majeed5*, Saba Majeed6, Mehwish Wajdi7, Arfa Akram7, Sharmeen Bawani8

1Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Hamdard University, Karachi, Pakistan
2Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Ziauddin University, Karachi, Pakistan
3School of traditional Chinese Medicine, Xiamen University Malaysia, Sepang, 43900, Selangor, Malaysia
4Department of Pharmaceutical Chemistry, Institute of Pharmaceutical Sciences, Jinnah Sindh Medical University, Karachi, Pakistan
5Department of Pharmacology, Faculty of Pharmacy, Ziauddin University, Karachi, Pakistan
6Department of Pharmacy, Nazeer Hussain University, Karachi, Pakistan
7Department of Pharmaceutical Chemistry, Federal Urdu University of Science and Technology, Karachi, Pakistan
8Department of Pharmaceutics, Faculty of Pharmacy and Pharmaceutical Sciences, University of Karachi, Karachi, Pakistan

*Corresponding Authors: Dr. Saba Majeed. E. mail: sabakhurram_2011@hotmail.com

Abstract
The present study was designed to assess the Screening and Prevalence study of Diabetic Retinopathy in Multan, district of Pakistan.

Materials & methods: In 2020, a medical camp has been placed and a retrospect study has been conducted in Muzaffargarh, Multan District, Punjab. 1150 people of age group between 45-65 years were examined, under the supervision of a pharmacist team.

Results: Noting the BMI, blood sugar test was performed; patients having blood sugar level above the limit (125mg/dl) were considered as diabetic and further examined for diabetic retinopathy by performing fundoscopy. It was observed that around 45% of individuals were suffering from Diabetes highlighting almost 60% by male population. Upon further investigation, it was noticed that male population suffers more with diabetic retinopathy (71.77%) as compared to females i.e., 56.03%. Considering obesity and smoking as a risk factor, around 74% male population lied under extreme obese category whereas smoking was found more common in female population 80.55%.

Conclusion: Diabetes affects many organs along with liver and kidneys. In n=1150 people, n=522 persons were tested positive for diabetes. Among 522 individuals’ male population was more affected with diabetic retinopathy. Smoking and obesity were the risk factors that are associated with disease.

Keywords: BMI, Diabetes, Obesity, Retinopathy, Smoking

INTRODUCTION
The leading complication of diabetes is Diabetic retinopathy that cause major problem of blindness throughout the world especially in the age group of 20-60 (1-5). A socio-economic problem has been seen on the community among these individuals and 50 million blind people in the world have been reported to diabetic retinopathy 2.5 million (6-7).

In 2000 the world health organization estimated diabetes increase 30 million and in 2030 it will be increasing approximately 80 million, it was also estimated that the blindness causes due to diabetic
A mild non-proliferative abnormality diabetic retinopathy shows increased in vascular permeability while new blood vessels are formed on retina in the case of proliferative diabetic retinopathy. Several risk factors reported for diabetic retinopathy comprises of many factors include demographic, clinical, and ocular factors etc. The demographic risk factors include age, gender, studies and family income.

In Europe and United States, the screening of diabetic retinopathy has been done by trained and experienced practitioners by way of various methods, include retinal photography, digital imaging, slit-lamp bio microscopy, seven-field stereo retinal photography, direct and indirect ophthalmoscopy, Heidelberg retinal tomography etc. In epidemiological and clinical studies seven-field stereo retinal photography is 100% specific and sensitive.

A recent study of diabetic patients in Pakistan showed that cataract and uncorrected refractive error were more common than retinopathy. Many studies and screenings for diabetic retinopathy has been done in Pakistan, as the total 154 million population and by finding data's 10% are. Literature also reviewed that type I diabetes and II diabetes patients have 25% and 21% diabetic retinopathy during first 5 years and in two decades it may 100% (Standard). Only hospital-based data are available while prevalence is less in Pakistan. The National Health Survey of Pakistan translates in to 4-8 million diabetics and according to the survey among population aged > 25 year is 4.2%, while literature also revealed an estimated prevalence of 9.1 to 13.7%

The present study was undertaken to screen out the diabetic individuals from ongoing medical camp was held on 15th -18th May 2020. Also, to estimate the frequency of retinopathy that may be associated with diabetes along with other risk factors among male and females of Multan.

MATERIALS AND METHODS

Population consisting of n=1150 individuals was screened for diabetes in a camp. The objective was to scan the population for diagnosis of diabetic individuals and diabetic retinopathy amongst the residents and nearby villages. All the patients selected for blood sugar test were age range of 45-65yr. First, they all were tested for random urine sugar using urine sticks (Coombi-test). Those found positive were then investigated further for fasting blood sugar examination using automated glucometer (ACU-Check) through post camp follow ups with the help of trained volunteer medical students. Anyone with a reading of 125mg/dl or above for blood glucose level in fasting was labeled as diabetic. Those diagnosed diabetic were then examined for diabetic retinopathy through indirect ophthalmoscopy in a dilated pupil by ophthalmologist using fundoscopy.

DATA ANALYSIS

Descriptive analysis was performed to calculate frequencies and percentages. Data were analyzed using Statistical Package for Social Sciences version 20 (IBM SPSS 20).

RESULTS AND DISCUSSION

The prevalence of diabetes mellitus is predictable that it will be dramatically raised up to 592 million till the year of 2035. Diabetic retinopathy is one of the most common diseases found in diabetic patients which is recognized as a microvascular disease. Along with smoking and obesity, plasma lipid, serum uric acid, heart rate and blood pressure may also contribute the diabetes complications. In this retrospective study 1150 people were screened among them 793 (68.25%) males and 357 (31.04%) females. Out of 1150 people, 522 (45%) individuals were found diabetic and it was observed that no. of male’s population 59.77% was more affected with disease than female 40.22% (Table I and Fig. 1).

Among n=522 diabetic people, 54.21% individuals were tested for diabetes very first time. Upon further investigation, it was observed that out 522 people, 124 patients’ people was already suffering from diabetic retinopathy and around 398 people were tested first time for diabetic retinopathy which came positive. (Table 3) Again in this case, the count of male population was more who’s suffering from diabetic retinopathy either known or tested first time (56.03%) shown in Table III and Fig. 2.
Table I. Distribution of screened population on basis of gender and diabetic versus non-diabetic

<table>
<thead>
<tr>
<th>Population Screened</th>
<th>Males (n)</th>
<th>Percentage</th>
<th>Females (n)</th>
<th>Percentage</th>
<th>Total (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population tested</td>
<td>793</td>
<td>68.25%</td>
<td>357</td>
<td>31.04%</td>
<td>1150</td>
</tr>
<tr>
<td>Diabetic</td>
<td>312</td>
<td>59.77%</td>
<td>210</td>
<td>40.22%</td>
<td>522</td>
</tr>
</tbody>
</table>

![Diagram](image1)  
**Fig. 1.** Screened population on the basis of gender and diabetic versus non-diabetic individuals

Table II. Distribution of first time identified versus previously known diabetic population on gender basis

<table>
<thead>
<tr>
<th>Population Screened</th>
<th>Mean (n)</th>
<th>Percentage</th>
<th>Women (n)</th>
<th>Percentage</th>
<th>Total (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosed diabetics</td>
<td>145</td>
<td>60.66%</td>
<td>94</td>
<td>39.33%</td>
<td>239</td>
</tr>
<tr>
<td>Found diabetics first time</td>
<td>167</td>
<td>59.01%</td>
<td>116</td>
<td>40.98%</td>
<td>283</td>
</tr>
</tbody>
</table>

![Diagram](image2)  
**Fig. 2.** Diagnosis of Diabetic Retinopathy amongst diabetic population on gender basis

There were two risk factors that is associated with diabetic complications which was assessed in the course of this study. One is obesity and another one is smoking. The male and female population was categorized according to their BMI range. With reference to obesity male population was found extremely obese (73.71%) as compare to female (Table IV, Fig. 3). In case of Risk associated with smoking female population were found more at risk (80.55%) as compare to male population (71.83%) shown in Table V, Fig. 4.

Table III. Diagnosis of diabetic retinopathy amongst diabetic population on gender basis

<table>
<thead>
<tr>
<th>Population Screened</th>
<th>Males (n)</th>
<th>Percentage</th>
<th>Females (n)</th>
<th>Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previously Diagnosed Diabetic Retinopathy</td>
<td>89</td>
<td>71.77%</td>
<td>35</td>
<td>28.22%</td>
<td>124</td>
</tr>
<tr>
<td>Diagnosed Diabetic Retinopathy first time</td>
<td>223</td>
<td>56.03%</td>
<td>175</td>
<td>43.96%</td>
<td>398</td>
</tr>
</tbody>
</table>

![Diagram](image3)  
**Fig. 3.** Obesity as a risk factor associated with diabetes
### Table IV. Diagnosed risk factors associated with diabetes-related complications - with reference to obesity & BMI

<table>
<thead>
<tr>
<th>Gender</th>
<th>25.0 - 29.0 kg/m²</th>
<th>Percentage</th>
<th>30.0 - 39.9 kg/m²</th>
<th>Percentage</th>
<th>40.0 - 40.0 kg/m²</th>
<th>Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>312</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>210</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>522</td>
</tr>
</tbody>
</table>

*25-29 kg/m²: Overweight, 30.0 - 39.9 kg/m²: Obesity, 40.0 - 40.0 kg/m²: Extreme obesity

### Table V. Diagnosed risk factors associated with diabetes-related complications - with reference to smoking and BMI

<table>
<thead>
<tr>
<th>Gender</th>
<th>25.0 - 29.0 kg/m²</th>
<th>Percentage</th>
<th>30.0 - 39.9 kg/m²</th>
<th>Percentage</th>
<th>40.0 - 40.0 kg/m²</th>
<th>Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>284</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>108</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>392</td>
</tr>
</tbody>
</table>

*25-29 kg/m²: Overweight, 30.0 - 39.9 kg/m²: Obesity, 40.0 - 40.0 kg/m²: Extreme obesity

### CONCLUSION

Diabetes and its associated complications can lead to severe health issues regardless of gender if the disease is left untreated. Other factors included duration of diabetes mellitus, individual status, physical activities, intake of alcohol, smoking, family history of diabetes mellitus, neuropathy, nephropathy and these factors collectively summarized in systemic risk factors and in many clinical trial hyperglycemias, hypertension, dyslipidemia reported due to diabetic retinopathy. The diabetes requires continuous management and long-term treatment therefore blood sugar monitoring with routine follow-up with an ideal BMI is a necessary step for any individual around with world.

### Conflict of Interest:

The authors have no conflicts of interest to declare for this study

### Availability of data and material:

All relevant data and methodological detail pertaining to this study are available to any interested researchers upon reasonable request to corresponding author.

### Funding:

No financial support from any organization.

### References:
