

SURVEY ON DIABETIC RETINOPATHY (DR) IN DIABETES MELLITUS TYPE 1(T1DM) PATIENTS OF DIFFERENT AGE GROUPS IN HYDERABAD AND JAMSHORO

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ABSTRACT:

Diabetes mellitus (DM) is a big threat to wards public health. In 2013 >382 million people suffered from DM. The diabetes mellitus type 1(T1DM) is an autoimmune disorder and T1DM leads due to many factors i.e. environment, heredity, etc. Patients with DM are leads to be diabetic retinopathy (DR).The number of DR patient's increases due to increasing the prevalence of DM. In DM patient's comments, the complication is DR, chronic damage of the micro blood vessels in the retina is leads to be DR. Most common complication of T1DM is DR, representing the leading cause of blindness in young adults. The purpose of the present research was to evaluate the frequency of DR of different age group patients with T1DM and was conducted in the medical outdoor patients (OPD) of two main hospitals named Civil Hospital Hyderabad and LUMHS Hospital Jamshoro from July 2018–to December 2018. The results found that out 180 DR patients were enrolled in the present study. Out of 180 patient DR 120 (66.66%) males and 60 (33.33%) females. Out of 180 DR patients, 117 (65%) patients have non-Proliferative (NPDR) & 63(35%) have Proliferative (PDR). Out of 117 NPDR, 50 patients were mild NPDR, 35 patients were moderate NPDR and 32 patients were severe NPDR. Of the total DR patients, the majority 100(55%) had 15-20 years of duration of T1DM, followed by 60 (%) 10-15 years and 20 (%) up to 10 years. The results found that the maximum number of patients of DR were at the age 26– 30 years 99 and 81 patients of 20-25 years of age. Out of 180 DR patients, 60 have a positive family history and 120patients have a negative family history. Out of 180 DR patients, 30 had good glycemic control and 150 patients had poor glycemic control. Out of 180DR patients 100 patients were hypertensive (BP >145/95mmHg and 80 patients were normotensive (BP <145/90mmHg).

KEYWORDS: Diabetes, Micro vascular Complications, Retinopathy, Hyperglycemia.

Abbreviation: Diabetes mellitus (DM), Diabetic retinopathy (DR), Proliferative diabetic retinopathy (PDR), Proliferative diabetic retinopathy (PDR), Liaquat University of medical health and sciences (LUMHS), Cotton wool spots (CWS), Internal limiting membrane (ILM)

Introduction:

Diabetes mellitus (DM) is known as huge public health disorders in most countries, with about 70 million people are suffering from diabetes mellitus with the change in their living style (**David SK et al., 2010; Zimmet and Alberti, 2001**). DM is a metabolic and chronic disorder due to the insufficiency of insulin production and that leads to hyperglycemia and glycosuria at any stage of a human life mostly in childhood (**Ramanathan et al., 2010; Baş et al., 2011**). However, T1DM is an autoimmune disorder and is susceptible by both environmental and heredity characteristics (**Ribeiro et al., 2010**). DM is major chronic endocrine disorder known to have adverse effects on the overall human body. High blood glucose levels can result in brain dysfunction and it promotes the formation of sorbitol, which damages blood vessels and causes degeneration of the nerves, leading to neuropathy, which can lead to dementia or cognitive impairment (**Alina et al., 2012**). The time period and severity of hyperglycemia develop risk factors for the increase in diabetic retinopathy or other microvascular complications such as nephropathy, retinopathy, and neuropathy (**Brownlee, 2001**). Diabetic retinopathy (DR) is considered as one of the common microvascular complication and responsible for 10,000 blindness cases in each year of the United States (**Kodl and Seaquist, 2008**). DR is notified by high vascular permeability, vascular closure of new blood vessels on the retina and back layer of the vitreous and it may be recognized in both T1DM and T2DM patients. Moreover, DR is classified into non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR) (**Da Silva et al., 2010**). The word “proliferative” refers to there is neovascularization or not in the retina. Early DR without neovascularization is known as NPDR. As the DR progresses, it may change into PDR, NPDR – retinal capillaries damage due to high levels of glucose in the blood (hyperglycemia). This weakens the capillary walls and results in small outpouchings of the vessel lumens, known as microaneurysms. Microaneurysms eventually rupture to form haemorrhages deep within the retina, confined by the internal limiting membrane (ILM). A liquid affidavit under the macula, or macular edema, meddles with the macula's typical capacity and is a typical reason for vision misfortune in those with DR. Goals of liquid lakes can abandon dregs, like a retreating waterway after a flood. These dregs are made out of lipid results and show up as waxy, yellow deposits known as hard exudates. As NPDR advances, the influenced vessels, in the end, become hindered. This deterrent may cause infarction of the nerve fiber layer, bringing about fleecy, white patches called cotton wool spots (CWS). (**Selamoglu Zeliha and Alp Elifsena Canan, 2018**) nicely worked on the General Approaches to the Stem Cell Therapy in Diabetes Mellitus as Innovative Researches.

NPDR subdivisions on the basis of retinal examination: **Early NPDR** – only one microaneurysm present on retinal exam. **Moderate NPDR** – Many microaneurysms, dot-and-blot haemorrhages, venous beading, cotton wool spots (CWS) are found on the retinal exam. **Serious NPDR** – In the most extreme phase of NPDR, you will discover CWS venous beading and extreme intraretinal microvascular variations from the norm. It is analyzed utilizing the "4-2-1 standard." A conclusion is made if the patient has any of the accompanying: diffuse intraretinal hemorrhages and microaneurysms in four

quadrants, venous beading in ≥ 2 quadrants, or IRMA in ≥ 1 quadrant. 52-75% of patients falling into this class will develop to PDR within a year (**Aiello, 2003**). Neovascularisation in the retina / vitreous posterior surface is Characterization of PDR. The vessels may rupture or bleed into the vitreoretinal space which is vision-threatening. Haemorrhage and retinal detachment due to fibrosis and adhesions are results of advanced PDR. Preretinal haemorrhage/ vitreous and location and extent of neovascularisation high-risk characteristics for visual loss (**Chowdhury et al., 1999**). Keeping in view the importance of T1DM as a serious disorder, the present research work was designed to document age-wise patients suffering from retinopathy in T1DM from two different district hospitals of Sindh-Pakistan.

MATERIALS AND METHODS:

During the regular visits of OPD at two major hospitals named Civil Hospital, Hyderabad, and LUMHS, Jamshoro was conducted to collect primary data from July to December 2018. Data were collected through a self-developed Questionnaire in English version (**Table 1**). During the visit oral consent was taken from the type 1 Diabetes Mellitus (T1DM) patients and a predesigned questionnaire regarding the T1DM is being filled out by asking questions to the medical OPD patients of both hospitals. In total 410 major microvascular complications of T1DM, patients of different sex age groups were surveyed from both of the above-mentioned hospitals from July to December 2018. The present study concluded that a total of 410 Diabetic patients have major microvascular complications including 180 (44%) DR Among those 180 patients (120 males and 60 females) were included for thorough medical history, especially taking into account the duration of illness, chronic complications previous blood sugar records, dietary control and treatment record of the patients were taken. Blood pressure and random blood glucose readings for Diabetic patients (type-1) were recorded. Moreover, Oral consent was also taken from all the Diabetic patients. Patients with different ages of both sexes were also recorded with their controlled or uncontrolled diabetics based on blood glucose measurements either random or fasting. Questionnaires related to the age group of the patients were designed and graphically represented by using "www.GraphPad Prism for Windows version. Statistical significance was determined by using SPSS Statistics were used to determine the significant effects. In addition, differences in the means of different variables between the age and hospital groups were tested.

Table 1: Questionnaire about Microvascular complications of Type1 Diabetes patients used in the present study

S.NO.	QUESTIONNAIRE	YES	NO
01	Do you know about diabetic retinopathy?		
02	Do you known about symptoms and complications of DR?		
03	In your family anyone else suffer from same condition?		
04	Are you hypertensive?		
05	Does sugar level under controlled?		
06	Are you suffering other problems related with DM?		
07	Did your eye sight decreased sudden or gradually?		
08	Vision affected on both eyes?		
09	Do you have persistent pain?		
11	When your eyesight was decreasing spots or floaters appeared?		
12	Have you ever visited doctor before?		
13	Do you irritation in your eyes?		

Results and discussions:

The present study describes the analysis of the main variables surveyed in the survey questionnaire. Out of 410 T1DM patients of both gender of two different age groups (20-25 & 26-30 years) were surveyed during the study. Out of 410 T1DM patients, 250 (61%) were males and 160 (39%) were females (**Table 2**); all were enrolled in the present study. The present study concluded that a total of 410 Diabetic patients have major microvascular complications including 180 (44%) DR patients, 125 (30.4%) nephropathy patients, and neuropathy patients 105 (25.6%). Out of 180 patients, 120 (66.66%) males have DR and 60 (33.33%) females were DR. Out of 180 DR patients 117 (65%) patients have NPDR & 63 (35%) have PDR (**Table 3-7**) and (**Figure 1-2**).

Table 2: Showing gender wise distribution of total DR patients (n=180)

Gender	Numbers of DR Patients	Percentage (%)
Male	120	66.66
Female	60	33.33

Table 3: Showing the duration period of DR patients (n=180)

Duration period	Frequency	%
15-20	100	55.5
10-15	60	33.3
Up to 10 years	20	11.1

Table 4: Showing the age of DR patients (n=180)

Age range	Number of patients	Percentage
26-30	99	55%
20- 25	81	45%

Table 5: Showing the Number of family background of DR patients (n=180)

History	Numbers of background History of DR	Percentage
Negative family history	120	70.55%
Positive family history	60	29.45%

Table 6: Showing distribution of DR patients type wise (n=180)

Type of DR	Frequency	Percentage
NPDR	117	65%
PDR	63	35%

Table 7: Showing distribution of NPDR patients gender wise (n=117)

Gender	NO: of NPDR Patients (117)	%
Male	85	72%
Female	32	27%

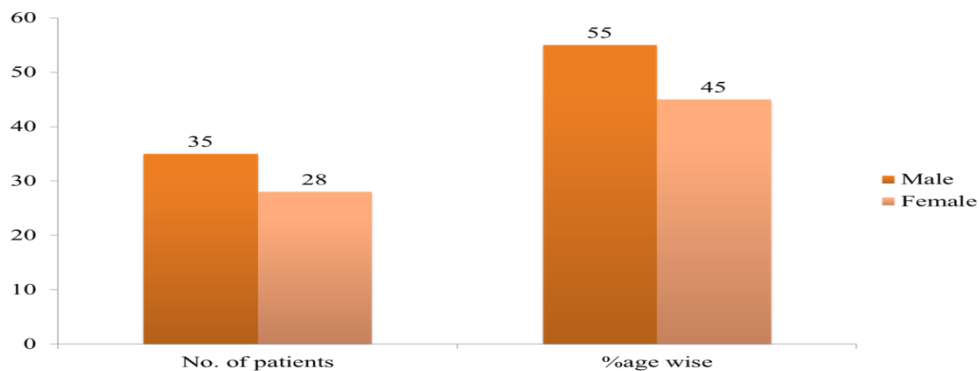


Figure 1: Showing distribution of PDR patients gender wise (n=63)

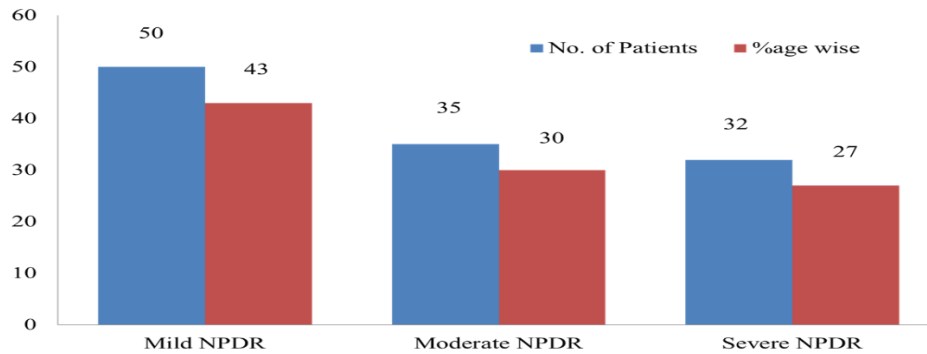


Figure 2: Showing no: & % wise distribution of NPDR patients

Discussion:

The present study was carried out to determine the prevalence of major microvascular complications of T1DM in both males and females of different ages between (20-25 and 26-30) years at two major hospitals of Sindh-Pakistan from July to December 2018. Diabetes Mellitus (DM) is a multifactorial disorder that leads to increased glucose in the blood because of impairment of insulin secretion and function, insulin function, or both. DM commonly developed at the age of forty. Diabetes Mellitus is a major chronic endocrine metabolic disorder known to have adverse effects on the overall human body. High blood glucose levels can result in brain dysfunction and it promotes the formation of sorbitol, which damages blood vessels and causes degeneration of the nerves, leading to neuropathy which can lead to dementia [6]. The present study was based on a survey and used routinely collected data through a questionnaire by asking the questions from a defined population at a certain specific period of time in the local language which was then converted into the English language. These data were then examined in relation to the presence or absence of the diabetes disease under investigation or its severity with a view to test the hypothesis and look into associations between various factors. Studies were planned to carry the survey in the district Hyderabad of Sindh Province to find out the number of persons of both genders having major microvascular complications of T1DM. After 3years of diagnosis of DM, About 18% of T1DM young patients have DR. In previous studies gender-related differences in the development of DR have been only in young patients of T1DM and have been inconsistent, number of male patients of DR more than female.[12-14]., postulating hormonal differences during maturity as a possible explanatory factor. Old age patients with T1DM have a high risk of DR has been reported previously and postulated to be associated with increased risk related to maturity (**Forga et al., 2016**). Concordance of diabetic nephropathy and DR could be because of common risk factors, leading to being leakage of protein from vessels of the eyes. (**Ciulla, 2003**). In past studies, males outnumbered females in the prevalence of DR 57% males versus

43.0% females and this was probably due to males being more in number than females to attend the OPD. The present research also shows that 66.66% were male and 33.33% were female patients of DR. In our Social setup females have less of an outdoor exposure as compared to males hence the lower detection rate of diabetic retinopathy prevalence in the former. Diabetic Macular edema was seen in 12.6% of patients while NPDR in 42.6% of patients and PDR in 7.0% of patients. Another study done in Cameroon showed that 57.8% of patients had NPDR, while 36.6% (60/164) had PDR (Jingi, 2014).

Conclusion:

The present study included 180 DR patients. Out of 180 patients, 120 (66.66%) males have DR and 60 (33.33%) females were DR. The maximum numbers of DR patients were male and have the age of between 26 to 30 years old. It was concluded the maximum number of patients has NPDR and mild NPDR with uncontrolled glycemic levels. Study also find out that most patients were negative family history of T1DM.

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Conflict of interest

The authors have declared no conflict of interest

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