

Research Article

Survey on major micro vascular complication of Diabetes Mellitus Type 1 (T1DM) patients in different age groups in Hyderabad and Jamshoro

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Abstract

Diabetes mellitus (DM) is a common medical condition known to have adverse effects on all system of human body. Diabetes mellitus is a big threat towards public health. More than 382 million public suffered from DM in the year 2013. The type 1 diabetes mellitus (T1DM) is a multifactorial autoimmune disease and its susceptibility is recognized by combination of environmental factors and heredity factors. Microvascular complications are specific to diabetes and related to longstanding hyperglycemia. The aim of this study was to evaluate the frequency major microvascular complication of different age group patients with T1DM and was conducted in medical outdoor patient department (OPD) of two main hospitals named as Civil Hospital Hyderabad and Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro from July 2018–December 2018. The results found that out of 410 T1DM patients 250 (61%) were males and 160 (39%) were females were enrolled in the present study. The present study concluded that total 410 Diabetic patients have major microvascular complications included 180 (44%) diabetic retinopathy (DR) patients, 125 (30.4%) diabetic nephropathy patients and 105(25.6%) diabetic neuropathy patients. Out of 180 patient 120 (66.66%) males have DR and 60 (33.33%) females were DR. Out of 125 diabetic nephropathy patients 70 males (56%) were suffer and 55(44%) females. Out of 105 diabetic neuropathic patients, 60 (57%) males and 45 (43%) were females. Out of 180 DR patients, 117 (65%) patients have Non-Proliferative Diabetic Retinopathy (NPDR) & 63(35%) have Proliferative Diabetic Retinopathy (PDR). Out of 125 Diabetic Neuropathy (DN) patients 110 patients have proteinuria, 90 patients have swelling of hands, feet & ankle, 95 patients have swelling on eyes & 80 patients have confusion or difficulty to concentrate on work. Out of 105 Diabetic neuropathy patients 100 have numbness, 95 have muscles weakness, 90 have constipation sometimes diarrhea, 65 have urinary incontinence. Out of the total T1DM patients, mostly 320 (78%) of the patients were with uncontrolled glycemic level in the T1DM patient whereas only 90 (22%) T1DM patients showed glycemic control.

Keywords: Diabetes; Micro vascular Complications; Nephropathy; Neuropathy; Retinopathy

Introduction

Diabetes mellitus (DM) is known as huge public health disorders in most of the countries, with about 70 million people are suffering from diabetes mellitus with the change in their living style [1, 2]. DM is long term metabolic disease of hydrated carbon metabolism due to the lack of insulin production and that leads to hyperglycemia and glycosuria at any stage of human life mostly in childhood [3, 4]. However, T1DM is autoimmune disorder and is susceptible by both environmental and genetic characteristics [5]. DM is major long-term 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 time period and severity of hyperglycemia develops risk factors for increase in diabetic retinopathy or other micro vascular complications such as nephropathy, retinopathy, and neuropathy [7]. Diabetic retinopathy is considered as one of the common micro vascular complication and responsible for 10,000 blindness cases in each year of the United States [8]. Diabetic retinopathy is notified by high vascular permeability, vascular closure of new blood vessels on the retina and posterior layer of the vitreous and it may be recognized in both type 1 and type 2 diabetic patients. Moreover, DR may be categorized into non-proliferative diabetic retinopathy and proliferative diabetic retinopathy [9].

Diabetic Nephropathy is also the most serious threat in which kidneys fail in their functions such as high blood sugar level [10]. In the first phases of nephropathy diet and drugs may control its condition. The most common kidney failure symptoms are tiredness, loss of appetite, and anemia too [11, 12]. About 30 to 40 % of Type I diabetics

and 20 to 30% of Type 2 diabetics are found with severe kidney failure.

Diabetic neuropathy is also one of the chronic micro vascular diseases, damaging both somatic and autonomic peripheral nerves [13, 14] and may be characterized as dysfunction of peripheral nerves after the exclusion of other causes of neuropathy. Generally it starts with foot nerves and this condition is known as diabetic peripheral neuropathy (DPN) [15]. Lack of perspiration, feeling of burning and weakness etc are clinical features of diabetic neuropathy [16].

Keeping in view the importance of T1DM as serious disorder, the present research work was designed to document age wise patients suffering from major micro vascular complications (MVCs) of 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 were conducted to collect primary data from July to December 2018. Data were collected through self-developed Questionnaire in English version (Table.1). During visit oral consent was taken from the type 1 Diabetes Mellitus (T1DM) patients and predesigned questionnaire regarding the T1DM is being filled out by asking questions to the medical OPD patients of both hospitals. In total 410 major micro vascular complication of T1DM, patients of different sex age groups were surveyed from both of the above-mentioned hospitals from July to December 2018. Among those 410 patients (250 males and 160 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. Questionnaire related to age group of the patients were designed and graphically represented by using “www.GraphPad Prism

for Windows version. Statistical significance was determined by using Statistical Package for the Social Sciences (SPSS) tool to determine the significant effects. In addition, differences in the means of different variables between the age and hospital groups were tested using the t-test.

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

S. No.	Questionnaire	Yes	No
01	Do you known about T1DM?		
02	Do you known about symptoms and complication of T1DM?		
03	Do you known about symptom of heart attack?		
04	Do you known about symptom of stroke?		
05	Is in your family any one suffer from T1DM?		
06	Did your eye sight decreased sudden or gradually?		
07	Vision affected on both eyes and only one eye?		
08	Do you have persistent pain or sometime?		
09	Do you feel swelling of feet & ankle?		
10	Are you using your proper diabetic diet plan?		
11	Are you maintaining your body weight?		
12	Do you have persistent itching?		
13	Do you have pain & numbness of lower leg?		
14	Do you exercise and walk easily or feel pain & swelling of feet?		

Results

The present study describes the analysis of the main variables surveyed in the survey questionnaire. Out of 410 T1DM patients (Table 2) of both gender of two different age groups (20-25 & 26-30 years) were surveyed during the study (Table 3). Out of 410 T1DM patients 250 (61%) were males and 160 (39%) were females were enrolled in the present study. The present study concluded that total 410 Diabetic patients have major

microvascular complications included 180 (44%) DR patients, 125 (30.4%) nephropathy patients and neuropathy patients 105 (25.6%) (Table 4). Out of 180 patients 120 (66.66%) males have DR and 60 (33.33%) females were DR (Table 5). Out of 180 DR patients 117 (65%) patients have NPDR & 63 (35%) have PDR (Table 6). Out of 180 DR patents 125 (69.45%) patients vision loss gradually & 55 (30.55%) patients vision loss suddenly .Out of 125 diabetic nephropathy patients 70

males (56%) were suffer and 55 (44%) females (Table 7). The symptoms found in the diabetic patients which were 125, all have proteinuria as a major symptom, in 110 patients the swelling of feet and hand was noticed, 95 patients of diabetic nephropathy

showed eyes swelling and 80 diabetic nephropathy patients showed confusion or difficulty in concentration (Table 8 & 9). Total 105 diabetic neuropathic patients 60 (57%) males and 45 (43%) females (Table 10).

Table 2. Showing Diabetic Mellitus type 1 patients attending the medical OPD of Civil Hospital Hyderabad and LUMHS Jamshoro (n=410)

Gender	Number of T1DM Patients	%
Male	250	61%
Female	160	39%

Table 3. Showing the age of Type 1 diabetes mellitus (T1DM) patients (n=410)

Age group	NO: of patients	Percentage (%)
26-30	249	60.73%
20-25	161	39.2%

Table 4. Showing Diabetic Mellitus type 1(T1DM) patients attending the medical OPD of Civil Hospital Hyderabad and LUMHS Jamshoro having microvascular complication (n=410)

Major micro vascular complication in T1DM patients	No. of patients
Diabetic retinopathy	180
Diabetic nephropathy	125
Diabetic neuropathy	105

Table 5. Showing gender with percentage of Diabetic retinopathy (DR) patients

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

Table 6. Showing type wise number & % of DR patients (n=180)

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

Table 7. Showing gender with percentage of Diabetic nephropathy (DN) patients

Gender	Numbers of DN patients	Percentage (%)
Male	70	56
Female	55	44

Table 8. Showing Diabetic Nephropathy patients symptoms (n=125)

Symptoms	No. of patients
Proteinuria	125
Swelling of feet, ankle & hands	110
Swelling of eyes	95
Confusion or difficulty concentrating	80

Table 9. Showing Diabetic Nephropathy patients symptoms (n=125)

Symptoms	No. of patients	%
Proteinuria	125	100%
Swelling of feet, ankle & hands	110	80%
Swelling of eyes	95	76%
Confusion or difficulty concentrating	80	64%

Table 10. Showing gender with percentage of Diabetic neuropathy patients

Gender	Numbers of diabetic neuropathy patients	Percentage (%)
Male	60	57
Female	45	43

Discussion

The present study was carried out to determine the prevalence of major micro vascular complications of T1DM in both male and female of different ages between (20-25 and 26-30) years at two major hospitals of Sindh-Pakistan during July to December 2018. DM is multifactorial disorder leads to increase glucose in the blood because of impairment of insulin secretion and function, insulin function, or both. DM commonly developed at the age of forty. DM is major long term endocrine disease 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 survey and used routinely collected data through questionnaire by asking the questions from a defined population at a certain specific period of time in the local language which was then

after converted into 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 hypothesis and look into associations between various factors. Studies was planned to carry the survey in the district Hyderabad of Sindh Province to find out the number of persons in both genders having of major micro vascular complication of T1DM. According to Kaplan–Meier estimates, by 3 years after DM diagnosis, at least 18.0% of youths with T1DM developed DR Kaplan–Meier .et al. previous studies reporting sex-related differences in the development of DR have been only in youths with T1DM and have been inconsistent, noting either increased DR among female patients [17-19] postulating hormonal differences during maturity as a possible explanatory factor. Increasing risk of DR among patients who were diagnosed with T1DM at older ages has also been reported previously and postulated to be associated to increased risk related with maturity [20]. Concordance of diabetic

nephropathy and DR could be due to common risk factors or could be a marker of general vascular damage, leading to leakage of protein from eye vessels [21].

Conclusion

The present study concluded that total 410 Diabetic patients have major microvascular complications included 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 125 diabetic nephropathy patients 70 males (56%) were suffer and 55 (44%) females. Out of 105 diabetic neuropathic patients 60 (57%) males and 45 (43%) females.

Authors' contributions

Conceived and designed the experiments: TJ Ursani & J Ahmed, Performed the experiments: F Channa, Analyzed the data: T Jabeen & J Ahmed, Contributed materials/ analysis/ tools: F Channa, TJ Ursani, Wrote the paper: Ahmed, SAA Shah & A Khaskheli.

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