



RESEARCH PAPER

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Assessment of clinical complications associated with diabetes mellitus type-2 in patients reporting to Mardan Medical Complex (MMC)

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Abstract

The disease of diabetes mellitus type-2 has been characterized as long-term metabolic disorder with high blood sugar level, insulin resistance, and insufficient amount of insulin. The most common clinical symptoms are increased hunger and thirst, feeling tired, frequent urination and excessive weight loss. It is the most common non-communicable disease of the modern world, affecting 200 million people worldwide and causes an estimated 32 million deaths every year. Its prevalence has risen exponentially around the globe in the last few decades. The most common complication arise with time in diabetic patients are hypertension, retinopathy, neuropathy, Obesity, diabetic foots and nephropathy. In the current study the reported cases of diabetic mellitus type-2, at Mardan Medical Complex (MMC), were observed for the development of the aforementioned complications. In the study period of two months, March and April 2016, 163 patients suffering from diabetes Mellitus type-2 disease (including 89 female patients and 74 male patients) visited MMC were included for assessment. The most common and highly developed complication found in around 72% diabetic patients was hypertension. The other complications found were retinopathy in around 65%, diabetic foot in around 20%, and neuropathy in around 18% and nephropathy in around 12% patients suffering from diabetes Mellitus type-2 disease.

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Introduction

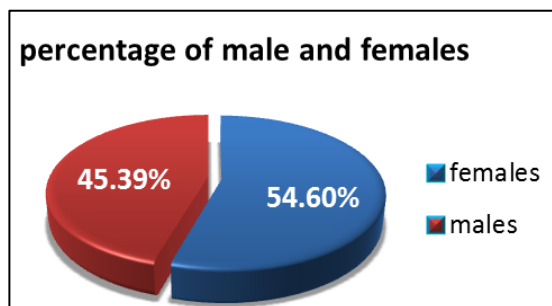
Type 2 diabetes is an incremental state of health in which the body becomes resistant to the normal effects of insulin or gradually loses the capacity to produce enough insulin in the pancreas. Type 2 diabetes is associated with changeable lifestyle risk factors. This disease also has strong genetic and family related risk factors¹ type 2 diabetes is companion with an array of micro vascular, macro vascular, and neuropathic complications. Micro vascular complications of diabetes include retinal, renal, and also neuropathic disease. Macro vascular complications include coronary artery and peripheral vascular disease. Diabetic neuropathy influence autonomic and peripheral nerves² Type 2 diabetes is a solemn medical condition that often requires the use of anti-diabetic medication, or insulin to keep blood sugar levels under control. However, the development of type 2 diabetes and its (complications) can be impeded if detected and treated at an early stage. In recent years, it has become ostensible that most of the people with type 2 diabetes are able to reverse diabetes through methods including low-carb diets, very-low-calorie diets and exercise³ you have a higher peril of type 2 diabetes if you are aged, have obesity, have a genetically history of diabetes, or do not exercise. Having prediabetes also increases your risk. Prediabetes means that your blood sugar is higher than normal but not high enough to be called diabetes. If you are at risk for type 2 diabetes, you may be able to hold up or prevent developing it by making some changes. The signs of type 2 diabetes appear slowly. Some people do not observe symptoms at all. The symptoms can include. Being very thirsty, urinating, often Feeling very hungry or tired, Losing weight , Having blurry eyesight.⁴ The two goals of diabetes treatment are to make sure you feel well gradually and to prevent or stop long term health problems. The best way to reach those goals is by: taking regularly medications if your doctor prescribed, make suitable planning of meal that how much you eat, what to eat, and when to eat.⁵ some patients of diabetes can maintain their normal blood level with diet and exercise. But many also need medication and insulin therapy.

The decision of medication is depend on many factors including your level of blood sugar and any other health problems you have. Your doctor might even combine drugs from different classes to help you control your blood sugar in several different ways⁶.

Patients of diabetes type 2 have high risk to develop more life threatening problems like cardiovascular disease, eye problems, hypertension, and diabetic foot so on. Due to diabetes you have face serious problems like hypertension which is also known as blood pressure can raise your risk for heart attack stroke and kidney problems.⁷ like hypertension there is another most common complication which is retinopathy it is most common micro vascular complication and responsible for 10,000 cases of blindness in USA. Retinopathy may begin to develop as early as 7 years before the diagnosis of diabetes in patients with type 2 diabetes.⁸ if you have diabetes your blood level is too high it can damage your blood vessels. Due to nerve damage it can cause you to lose in your feet.⁹ foot diseases are affect about 6% of people with diabetes.it also include the more infections, like ulceration and destruction of the foot's tissues¹⁰. Diabetes also causes eye diseases like retinopathy. Diabetic retinopathy affects blood vessels of retina due to this loss of vision occur in diabetic patients. Diabetic eye diseases also include cataract and glaucoma¹¹. Cataract is a form of eye disease in which the lens of eye becomes cloudy and commonly caused blurred or hazy vision. While in glaucoma the optic nerves are damage which causes blindness. This condition often develops many years without causing pain or any noticeable symptoms.¹² when sugar level is increase in body it can damage the wall of blood vessel or capillaries that nourish nerves especially in legs⁶. neuropathy affect more than 50% people with diabetes. Common symptoms of neuropathy include numbness or pain in hand, feet, legs and arms. It also affects organs including heart and sex organ³.

Diabetic nephropathy is the cause of kidney damage or disease¹³. Prolong nephropathy can cause kidney failure in patients with diabetes¹³. kidney problems are common in diabetic patients because diabetes

affect the blood vessels/arteries and kidney filters blood from those arteries¹⁴. Approximately up to 40% people with diabetes develops nephropathy¹⁴. It is estimated that 422 million people were affected from DM in 2014, as compared to 108 million in 1980. Due to diabetes 1.5 million deaths occur in 2012¹⁵. by increasing the risk of cardiovascular & other complications it caused additionally 2.2 million deaths¹⁵. According to IDF there are 415 million people affected with diabetes in the world and more than 35.4 million people in the MENA (middle east and north Africa) region, this will rise to 72.1 million by 2040¹⁶. In 2015 there were over 7 million cases of diabetes in Pakistan¹⁶. The objective of this study is to analyze the associated complications with diabetic mellitus type-2 in one of the tertiary care hospital of Mardan Medical Complex (MMC).



Material and methods

Location of the study

The trail was conducted in the department of biotechnology abdul wali khan university mardan kpk. The diabetic patients were registered in diabetic ward of medical complex.one of tertiary hospital in district mardan kpk.

Sample size/numbers

A total of 163 diabetic patients who had further developed complications were selected in the diabetic ward of Mardan Medical Complex (MMC) from March of 2016 to May 2016.

Criteria for diabetes

A detailed history of diabetes was taken from patients include males and females. All patients over the age of 40 years. The diabetic patient should not be noninsulin therapy and should not be use any medication other than anti diabetic. There fasting glucose range should be in the range 160mg/dl to 250mg/dl.

Screening of subject

All patients were interviewed by the researchers themselves and questionnaire was elaborated to all patients in local language. They were asked to reply with either a Yes, No or Not sure/don't know to all the questions asked. A total of 10 questions were asked from all patients and they were categorized in one of the four groups, as patient's name, patient's age, location, and complications. All the information including answers to all questions and patient's demographic information were recorded in an objectively structured pro forma. Frequencies and percentages were calculated for categorical variables like gender, and diabetic's associated complications. After conducting data statistical analysis was done on the questionnaire and association of different complications with diabetic was studied.

Results

Gender wise distribution of patients out of 163 patients 89 were female patients (54.60%) and 74 were male patients (45.39%). Fig.1.

Age ranges

The age range in type-2 diabetes was from 40 and so on. But the average and common range was between the 50 & 65. The most diabetic patients were of above the 50 years.

Diabetic's complications

Various complications associated with diabetic-2 are shown in Table.1, 2. the common complications in diabetic-2 were hypertension. In One hundred and eighteen (72.39%) have hypertension disease in both males and females. One hundred and six (65.03%) out of 163 have retinopathy disease. Thirty three (20.24%) were diabetic foets. In other complication include only thirty (18.40%) is neuropathy. And Twenty (12.26%) were nephropathy patients which are not more frequent than others complications. In more details on the basis of males and females. The percentage of hypertension was 32.51% in males while in females was 38.03%. The retinopathy was 36.80% in females and males was 28.22% as well as the nephropathy was 8.58% while in female 9.81%.

The neuropathy was 15.95% in females and the in male was 7.97%. The percentage of obesity in males was 12.88% while in females was 14.11% and the diabetic foot was 10.42% in males & in females was 9.81%.

Table 1. Various complications associated with diabetes type-2

Complications	Percentage %
Hypertension	(72.39%)
Neuropathy	(18.40%)
Obesity	(26.38%)
Retinopathy	(65.03%)
Diabetic foot	(20.24%)
Nephropathy	(12.26%)

Table 2. Various complications associated with diabetes type-2 among genders.

Complications	Males (%)	Females (%)
Hypertension	32.51%	38.03%
Neuropathy	7.97%	15.95%
Obesity	12.88%	14.11%
Retinopathy	28.22%	36.80%
Diabetic foot	10.42%	9.81%
Nephropathy	8.58%	9.81%

Discussion

Diabetes mellitus is a group of metabolic disorder characterized by hyperglycemia resulting from defect in insulin secretion, insulin resistance or both¹⁷. The hyperglycemia in diabetes leads to long term complications of various organ especially kidney, blood vessels, nerves, and eyes¹⁸. In present study type-2 diabetes was more common in patients than type-1. Morbidity rate of type-2 diabetes was also far greater than diabetes-1. We found that hypertension is the major complication in diabetes type-2 affecting 72.39% of the whole population. It has been observed that hypertension disease is more common.

- In people age more than 40 years.
- In type-2 diabetes of more than 10 years durations.
- In the presence of autonomic nephropathy, neuropathy, obesity, diabetic foot, & hypertension¹⁹.

Over time, diabetes can increase the risk of health-related problems including blindness, kidney damage, nerve damage, obesity & hypertension. Although diabetes cannot be cured, the disease can be managed

by non-pharmacological and pharmacological strategies, where improvements in glycaemia control are important factors in delaying the onset and progression of diabetes-related complications²⁰. Type-2 diabetes is important because it is common, has serious complications and reduces life expectancy by 8–10 years; it is difficult to treat, and expensive to manage. Type 2 diabetes is rapidly becoming one of the major diseases within the European Union (EU); of the existing 110 million diabetics world-wide 80–90% have type 2 diseases²¹. In 2008–2015, of adults with diabetes aged 40 years or older, damage to the small blood vessels in the retina that may result in loss of vision²². In our study 65.03% of patients with type 2 diabetes have already developed retinopathy which is the second most common complication in diabetes-2.

The rapid increase in obesity prevalence across the world gives obesity the status of an epidemic; in numerous countries, 50–80% of adults are now either overweight or obese (BMI > 25kgm⁻²) Obesity is particularly associated with an increased risk of developing non-insulin-dependent (NIDDM) or type 2 diabetes²⁵. Our present study show that obesity cases with type-2 diabetes were 26.38% recorded. Diabetes was listed as the primary cause of kidney failure in 44% of all new cases in 2011. In 2011, 49,677 people of all ages began treatment for kidney failure due to diabetes. In 2011, a total of 228,924 people of all ages with kidney failure due to diabetes were living on chronic dialysis or with a kidney transplant²⁵. In our observational study at Mardan Medical Complex MMC show that 12.26% of the whole population have nephropathy. Neuropathy refers to damage to peripheral nerve, which typically starts in the nerves to the toes. This damage leads to "phantom" feelings such as pain, burning, tingling, and other unusual sensations, and also deficits such as numbness, inability to sense position of toes and feet, loss of balance, and loss of touch, pain, and temperature sensation in the feet and legs²⁶. In out of our study the neuropathy complications were not more common like hypertension our statistical analysis show that 18.40% were neuropathy out of the 163 patients. Diabetic foot is one of the major complications of diabetes mellitus type 2. It is the one of the chronic disease of diabetes 2.

Diabetes is one such metabolic disorder that impedes the normal step of wound healing process. Many study show a prolong inflammatory phase in diabetic wound which cause a delay in the formation of mature granulation tissue and parallel reduction in wound tensile strength. In all over the Pakistan 45% have diabetic foot²⁷. In present statistical analysis of our study show that diabetic foot with 20.24% out of the whole population.

Conclusion

Type-2 diabetes mellitus is a major modifiable risk factor for retinopathy, hypertension, neuropathy, nephropathy and obesity. The frequency of hypertension is more common in our selected patients than others complications. Type-2 diabetes & their complications are still posing a challenge for the diabetologists. Early detection and proper control is need of the time to avoid its complications.

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