

A Study on Type 2 Diabetes Mellitus related risk factors and complications

ABSTRACT

Aims: To identify the risk factors and complications of type 2 diabetes mellitus.

Study design: It is a single-centre, prospective, observational study

Place and Duration of Study: This study site includes in-patient departments of Gandhi Hospital, Secunderabad done for a period of six months between December'2022 to May'2023.

Methodology: A total of 58 cases were collected. Utilizing a data collecting form that included the following, patient demographics were gathered: socio-demographics characteristics: age, sex, height, weight, history in family, risk factors, past medication history, past medical illnesses etc. Any complications due to diabetes mellitus experienced by patient was also noted. The medications prescribed were assessed for appropriateness in treating Diabetes Mellitus. Case sheets with complete information regarding patient details were included.

Results: The majority were males 63.79% followed by females 36.20%. More cases were of the age group 53 -69 years (25 cases, 43.10%). T2DM was majorly treated with Metformin (46, 79.31%) followed by Glimepiride (12, 20.68%). Risk factors for T2DM were observed to be more with hypertension (15, 25.86%) followed by smoking habit (22.41%). Symptoms of T2DM were abdominal pain (15, 25.86%) followed by excessive thirst (20.68%), and tiredness (10%). Complications associated with T2DM were found to be Nephropathy in 2 cases followed by retinopathy, ischemic stroke, and diabetic foot in each 1 case. As per WHO Guidelines, it was observed that the maximum number of patients were of pre-diabetes instances (33, 56.89%) followed by DM (25, 43.10%).

Conclusion: Study observations conclude that various risk factors can lead to T2DM, hence it is essential to create awareness among the general population on this. Strategies for preventing DM should also be highlighted such as lifestyle changes and following proper dietary guidelines that would avert any life-threatening conditions.

Keywords: Type 2 Diabetes Mellitus, risk factors, complications, patients

1. INTRODUCTION

Diabetes remains one of the four most prevalent non-communicable diseases (NCDs) in the world. It results in disability and premature death while creating an increasing burden on health systems, economic development, and the well-being of a large proportion of the global population. The most common forms of diabetes are type 1 diabetes, in which complete insulin deficiency causes the destruction of the pancreatic beta cells, and type 2 diabetes, in which insulin resistance can lead to hyperglycemia. Most diabetes cases (up to 95% of diabetic patients) are type 2 diabetes (so-called insulin-independent).(7)

The International Diabetes Federation (IDF) estimates that as of 2021 there were 537 million people with diabetes worldwide, and this was predicted to increase to 783 million by 2045. The incidence of diabetes is more prevalent in highly developed countries, but the highest rate of increase in cases is in developing countries. The continuing upward trend is mainly caused by the increase in the number of diabetes patients with type 2 diabetes, which is attributed to population growth and aging (39.7%), increased incidence (28.5%), and the interaction of these two factors (31.8%). It is widely believed that the main cause of type 2 diabetes is a high-energy Western-style diet combined with a sedentary lifestyle, which underlines the role of lifestyle as the most important risk factor for type 2 diabetes. The level of patients' knowledge of diabetes plays an important role in the self-management of the disease. It is considered that patients with good disease knowledge have a better understanding of the nature and consequences of diabetes and are less prone to various complications and severe exacerbations of diabetes [1].

Type 2 diabetes mellitus (T2DM) is one of the most common metabolic disorders majorly affecting the adult population. It accounts for 90–95% of all diabetes cases. Long-term elevations in blood glucose levels contribute to many complications in various organs, including the kidneys, skin, nerves, heart, and blood vessels. This rise in blood glucose, particularly after diagnosis, is mainly due to a lack of compliance with the management plan that involves lifestyle modification and pharmaceutical interventions. One of the main impairment occurring from hyperglycemia is damage to the vasculature. It occurs either at small (microvascular complications) or large blood vessels (macro-vascular complications). Diabetic retinopathy is the most common microvascular complication, followed by diabetic nephropathy and neuropathy. All macro-vascular complications arise from the development of atherosclerosis, which gradually causes the narrowing of arterial walls.(5)

It is also necessary recognizing the management strategies practiced as treatment and prevention to prevent immediate and long-term complications, and enhance the patient's quality of life. Hence, the study was aimed to assess T2DM complications, their management practice, and risk factors attributed to the existence of complications [2].

2. MATERIAL AND METHODS

This study was done to assess the risk factors, complications connected with Type 2 Diabetes Mellitus and also assess the management practices in treatment of Type 2 DM patients.

2.1 Study Design: It is a single center Prospective Observational Study done in the In-patient Departments of Gandhi Hospital, Secunderabad during the study period from December'2022 to May'2023, for six months duration. Sample Size collected was of 58 cases.

2.2 Inclusion Criteria

Age group from greater or equal to 2 years on wards

Inpatients of General Medicine Department, Gastroenterology Department and Paediatrics Department.

2.3 Exclusion Criteria

Lactating and pregnant women, terminally ill patients.

Out-patients department.

2.4 Study Procedure

The aspects of the study were gathered by utilizing a data collecting form that included the following, patient demographics were gathered: socio-demographics characteristics: age, sex, height, weight, history in family, risk factors, past medication history, past medical illnesses etc. Any complications due to diabetes mellitus experienced by patient was also noted. The medications prescribed were assessed for appropriateness in treating Diabetes Mellitus. Case sheets with complete information regarding patient details were included.

3. RESULTS

Total 58 cases collected from In-patients Department of Gandhi Hospital at a tertiary care centre. It comprises of Type 2 Diabetes Mellitus patients. The cases collected were analyzed and interpreted as follows. Majority of patients comprised of males 37 patients (63.79%) followed by females 21 patients (36.20%). The vast majority of patients were having ages between 53-69 years (25, 43.10%), followed by 12 patients (20.68%) of age group 36 -52 , and again followed by 12 patients (20.68%) of age group > 70 years, followed by 5 patients (8.62%) of age group 2-18, and only 4 patients (6.89%) of age 19-35. Most cases were collected from general medicine ward 51 cases (87.93%), from gastroenterology 5 cases were collected (8.62%), and then from pediatric 2 cases were collected (3.44%).

As per WHO Diabetes Mellitus classification, Pre-diabetes Mellitus cases of less than 26 mg/dl were seen as 33 (56.89%) cases and then followed by 25 (43.10%) cases were seen in DM (\geq 126mg/dl)

In majority of the cases the symptom was of abdominal pain 15 (25.68%) and then followed by 12(20.68%) cases were seen as thirsty and then 10 (17.24%) cases were seen as tiredness and 3 (5.17%) were seen as slow healing of cuts and wounds and then followed by 5 (8.62%) cases were seen as symptoms as frequent urine output, headache,

were seen as 4 (6.89%) and 3 (5.17%) nausea/vomitings were seen and dizziness were seen as 2(3.44%) and then 3(5.17%) cases were seen as sudden weight loss.(6)

Table 1 shows the risk factors for type 2 DM as the majority of instances were seen as risk factor as smoking habit 13(22.41%) cases and then followed by 15(25.86%) cases were seen as risk factor hypertension and then followed by 10(17.24%) cases were seen as risk factor obesity and then followed by 10(17.24%) cases were seen as risk factor as alcohol consumption and then 5(8.62%) cases were seen as risk factor of age >45 yrs are at high risk and then 2(3.44%) cases were seen as risk factor of sedentary lifestyle and then 3(5.17%) cases were seen as risk factor of pre diabetic.

Table 1: Risk Factors For Type 2 DM

Risk factors	Number of cases	Percentage%
Hypertension	15	25.86%
Smoking habit	13	22.41%
Alcohol consumption	10	17.24%
Obesity	10	17.24%
Sedentary lifestyle	2	3.44%
Age > 45 yrs high risk	5	8.62%
Pre diabetic	3	5.17%
Total	58	100%

The complications of T2DM consisted of 2 cases of nephropathy and then 1 cases of ischemic stroke and then followed by 1 case of retinopathy and then 1 case of diabetic foot. The medications for type 2 DM were taking single drugs (monotherapy) 56(80%) cases were seen as taking metformin and then followed by 14 (20%) cases were seen as taking glimepiride from total 58 cases.

Table 2 shows that the length of hospital stay of type 2 DM that is seen as no cases were found on 1st and 2nd day wise and 10 (17%) cases were seen on 3rd day and then 12 (20%) cases were seen on 4th day and then 36 (62%) cases were seen on 5th day final day from total 58 cases.

Table 2: Length of Hospital Stay of Type 2 DM

Day Wise	Number of Cases	Percentage %
Day One	0	0%

Day Two	0	0%
Day Three	10	17%
Day Four	12	20%
Day Five	36	62%
Total	58	100%

4. DISCUSSION:

In this study it was discovered that men were maximum population of 63.79%. The age group of (53-69) years showed maximum cases of 43.10 % which showed highest prevalence of T2DM in patients. This was similar to a study done by Jagadeesha Aravinda which showed average age of patients having DM to be 53.28 years [3].

In this research it was observed that major risk related with T2DM was hypertension (15%), followed by smoking (13%), which was in similarly with another study done by Debrah Asimwe et al, that showed HTN, smoking, alcohol, obesity to be common risk factor, as in **Table 1** [4].

It was noted that the most typical symptoms for T2DM is Abdominal pain (25%), Increased thirst (20%), Tiredness (17%). Another study done by Kuba Sekowski et al, demonstrated polyuria (42%) followed by thirst increase (57%) as major symptoms [1].

The findings showed majority T2DM was prevalent at our site of (82%), followed by T1DM (17%) cases. This was analogous to a study done by Kuba Sekowski which also showed maximum cases of T2DM (56.4%) and T1DM of (15.5%) and (11.8%) of GDM, at their study site of Warsaw, Poland. [1]

Table 2 indicates that maximum length of hospital stay consists of 5 days which was in (62%) cases, showing 5 days time to normalize the sugar levels in Diabetes patients.

The medications prescribed for T2DM in our study were metformin (79%) cases majorly followed by glimepiride (68%). Another study done by Zenebe Negash et al, demonstrated maximum usage of combination therapy of metformin and glimepiride followed by only metformin as monotherapy [2].

The common complication for T2DM was Nephropathy in 2 cases, followed by Retinopathy, Ischemic stroke and diabetic foot each having one case. However at our study site the complications associated with T2DM were fairly less observed in patients. In a study done by Zenebe Negash it was seen that maximum complications with T2DM was with Neuropathy(36.3%), Nephropathy(8.1%), Retinopathy(6.6%), which wasn't the case with our study observations [2].

Patients were more with pre-diabetes profile of 56.89% and having diagnosed DM of 43.10% making the treatment to be given well in advance and reducing the length of hospital stay, by treating diabetes in timely manner.

4.1 Prevention Points for avoiding T2DM associated complications:

Make a commitment to managing your diabetes.

Don't smoke and avoid tobacco chewing.

Keep your blood pressure and cholesterol level under control by limiting intake of salt and fatty foods.

Schedule regular physicals and eye exams to prevent any life threatening complications associated with diabetes.

Keep your vaccines up to date.

Take care of your teeth.

Pay attention to your feet as it may lead to diabetic foot as a complication.

Maintain a normal body weight to regulate metabolism and insulin regulation.

Limit alcohol consumption.

Manage your stress conditions by participating in meditation or yoga.

Choose drinks without added sugars, preferring natural fruit juices.

Eat plenty of fruits and well cooked vegetables.

Take a balanced carbohydrate-controlled diet.

5. CONCLUSION

The study has showed important findings of complications of T2DM, risk factors and possible medical management. However, it is inappropriate to generalize the findings of this study to general population diagnosed with T2DM. This is due to limited duration of our study, low sample size and single center. Hence, expanding the study population to a larger size in various other study sites can help understand the risk of DM better. For better understanding of this disease it requires improvement and advancement of education programs to create awareness in the public. People should also be given awareness on life style changes such as exercising, eating fruits and vegetables to maintain a normal BMI (Body mass index) and have a good healthy life, preventing DM.

However, This study has not showed severity of complications and its outcome and management. Thus, the risk DM causes on one's health or causing medical conditions not quoted in detail.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this research work. A copy of the written consent is

available for review by the Editorial office/Chief Editor/Editorial Board members of this journal."

ETHICAL APPROVAL

All authors hereby declare that the study was examined and approved by the Institutional ethics committee CMR College of Pharmacy, (CMRCP/IEC/2022-23/11).

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