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A PROSPECTIVE OBSERVATIONAL STUDY ON ASSESSMENT OF RISK FACTORS, CO MORBIDITY AND COMPLICATIONS OF TYPE II DIABETES MELLITUS PATIENTS ADMITTED IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Background: Despite the availability of efficacious anti-diabetic drugs, which act by different mechanisms to reduce the blood-glucose, the majority of people with diabetes on anti-diabetic drug therapy, have poor glycemic control and diabetic vascular complications. **Aims & Objectives:** The aim was to assess the risk factors and co-morbidities in type 2 diabetes mellitus patients admitted to a tertiary care teaching hospital. **Materials and Method:** A prospective observational study was conducted Department of General Medicine in Karuna Medical College Hospital, Vilayodi, Chittur, Palakkad, Kerala, 500 bedded multi-specialty tertiary care teaching hospital located in rural India for 6 months. The study is based on the data collection from 92 patients who were aged >30 years old and above of either gender with T2DM in a tertiary care hospital. Demographics of the patients are collected in a designed questionnaire form and the relevant information is recorded and analyzed. **Results:** A total of 92 patients were included. The mean age was 64.8 years out of which the majority were male (54.3 %) and female (45.6 %). Among all patients, 21.7% had only T2DM; however, 78.3% of patients had T2DM with other comorbidities (T2DM with hypertension, cardiovascular diseases, and chronic kidney disease). The major risk factors that were found in our study were family history (41.3%), social habits such as smoking (24.9%), alcohol (14%), and physical inactivity**.** **Conclusion:** Comorbidities and risk factors are common in this population and this pattern emphasizes the need for patient-centered healthcare, mental health is a growing concern, and there is a need for interventions that target both physical and mental health in this population

Keywords: *Comorbidity, Type 2 diabetes mellitus, risk factors.*

INTRODUCTION

Diabetes is a leading cause of illness and death in our society, consuming a significant amount of resources through treatment and prevention.[1] Diabetes mellitus, commonly referred to as diabetes is a condition in which the pancreas no longer produces enough insulin or cells stop responding to the insulin that is produced so that glucose in the blood no longer be absorbed into the system. [1] Type 2 diabetes mellitus (T2DM) is the most common form of diabetes sometimes called Age onset or Adult onset diabetes. It is a milder form of diabetes because of its slow onset (sometimes developing over the years) and because it usually can be controlled with diet and oral medications.[1] . The pandemic of DM affected 9.3% of the global population in 2019 and is projected to increase to more than 10% by 2030. In India, the estimated number of people living with diabetes was 77 million in 2019 and it will reach 101 and 134 million by 2030 and 2045, respectively [2]. In the UK over 90% of diabetes cases are type 2 diabetes, with most individuals having at least one other chronic condition [3]. The major risk factors are obesity, familial and social history, sedentary lifestyle, and co-morbidities such as cardiovascular, end-stage renal disease, hypertension, depression, thyroid gland diseases, and chronic obstructive pulmonary disease (COPD), which further decreases compliance due to diabetes-related healthcare outcomes, treatment options, care needs, cost and length of hospital stay[4]. Therefore, this study was carried out to find the risk factors and comorbidities in T2DM patients in a tertiary care teaching hospital

METHODOLOGY

A prospective observational study was conducted in the inpatient's Department of General Medicine at Karuna Medical College Hospital, Vilayodi, Chittur, Palakkad, Kerala, 500 bedded multi-specialty tertiary care teaching hospitals located in rural India for 6 months. Ethical clearance [Ethical No: KMC/IHEC/03/2021] and approval of the study was obtained from Karuna medical college's ethical review board, the institution of health before starting the actual data collection. Subsequent permission was granted from the college to assess data and interview patients. Each participant was asked to sign an informed consent before data collection. In this study, patients aged >30 years old and above of either gender with T2DM in a tertiary care hospital and Patients who received at least one anti-diabetic drug (oral anti-diabetic drug or insulin) were included. Patients with a history of cancer or mental retardation, pregnant or lactating women, and patients with incomplete data were excluded. Data collection forms were prepared as a tool for the collection of data and the informed consent was signed by participants. Information like demographic profile, past medication history, family history, associated comorbidity, social habits, duration of diabetes, and duration of hospitalization was collected. All collected data were entered in MS Excel and performed by descriptive statistics. Data were expressed in terms of the actual number, mean, and percentages.

RESULT AND DISCUSSION

A total of 92 prescriptions were analyzed during the study, of these more than half of them were males 50 and 42 were females[Fig1]. This showed that type 2 DM was more prevalent in males compared to females. The mean age of study participants was 64.8 years with a range of 51-70 years[Fig2].

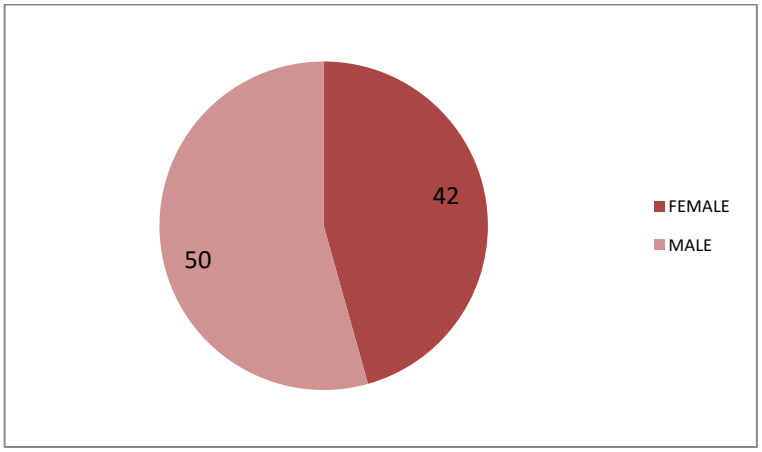

Fig. 1. Distribution based on gender

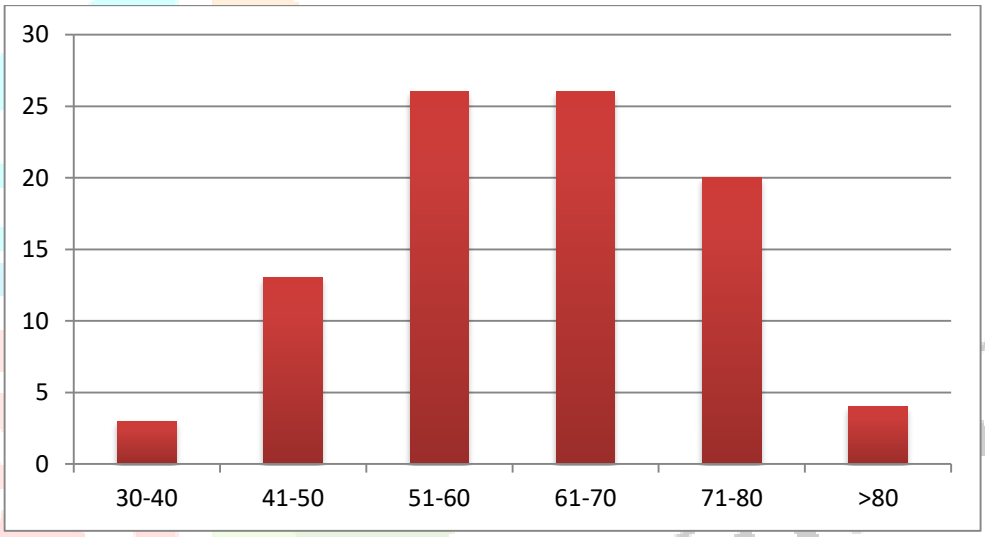

Fig.2. Age distribution of Type 2 DM

Distribution Based on Risk Factor

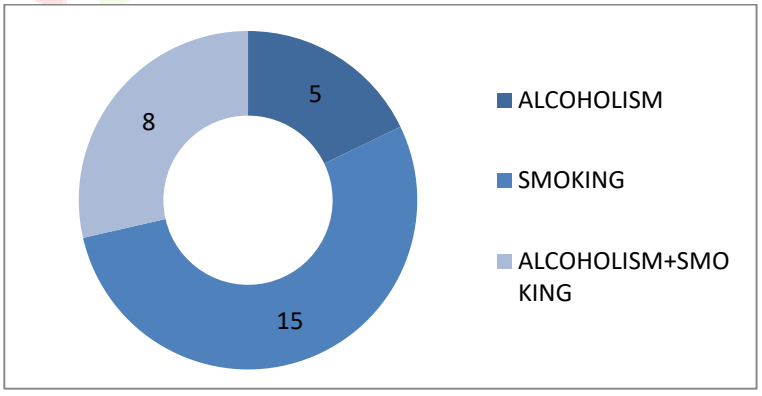

Fig.3. Distribution based on social history

The major risk factors that were found in our study were social habits which were more common in males due to alcoholism (5), smoking (8), and (15) having both history[Fig3]. Most of the male patients had this social history for more than 10 years. The female gender also showed a growing trend of T2DM during our study.

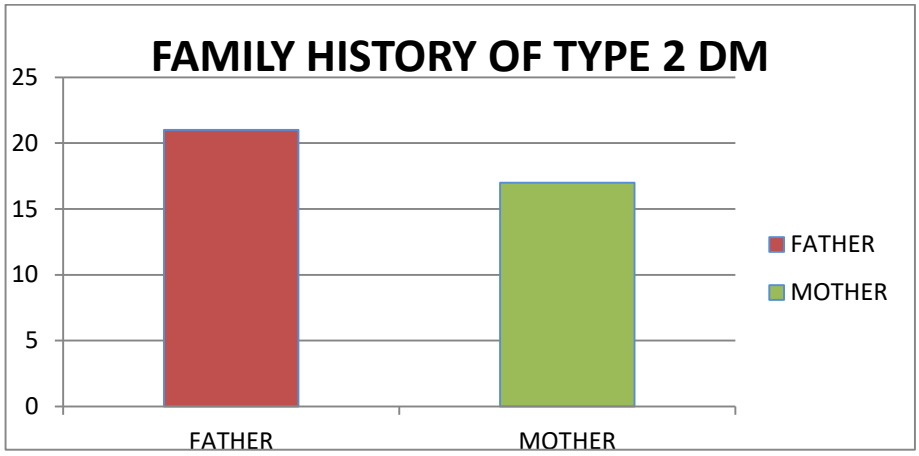

Fig.4. Distribution based on Familial history

Familial history of diabetes in patients showed high genetic predisposition from their parents. In our study father's (22) diabetic history was the major risk factor for developing T2DM and the mother's was (17)[Fig4].

During our study, we also found that minor population had obesity and sedentary lifestyle as other risk factors for developing T2DM.

Table No: 1. Distribution Based on Co-morbidities

CLINICAL CONDITION	NO. OF PATIENTS (n=92)	PERCENTAGE (%)
Diabetes Mellitus	**25**	**21.7**
Diabetes mellitus + Hypertension	**32**	**34.78**
Diabetes + CKD+Hypertension	**7**	**7.6**
Diabetes + CAD+Hypertension	**9**	**9.7**
Diabetes + Lung disorder+Hypertension	**4**	**4.34**
Diabetes Mellitus+Thyroid disorder +HTN	**2**	**2.17**
Diabetes Mellitus+CAD	**3**	**3.26**
Diabetes Mellitus+Lung disorder	**4**	**4.34**
Diabetes Mellitus+CKD	**1**	**1.08**
Diabetes mellitus + thyroid disorder	**5**	**5.43**

In our study majority of the patients had diabetes for more than 10 years hence we found that the patients with type 2 diabetics had at least one chronic co-morbid condition among which Hypertension was the major co-morbidity(58.6%), additional co-morbidities such as Cardiovascular Disease(10.8%), Chronic

Kidney disease(8.68%), Lung disorders(8.68%), Thyroid disorder(7.5%) and a few had depression due to poor compliance[Table1].

DISCUSSION

The present study evaluated the risk factors associated with T2DM along with comorbidities in a tertiary care teaching hospital. The key findings were as follows: a majority of patients were men in the age group of >35 to ≤45 years; around 70% of the population had elevated BMI, and more than half of the patients had additional associated one or two comorbidities (hypertension, cardiovascular disease, chronic kidney disease, lung disease, and thyroid disorders; family history of T2DM, sedentary lifestyle, alcohol consumption, and regular smoking were the common risk factors associated with T2DM

In this study, we found a higher incidence of diabetes in elderly patients with a high incidence in the age group of 51-70 years. This finding is per a similar study conducted by Ramachandran G. Et. al. In general, patients developing type 2 DM are in the age group of more than 50 years.In our study 54.3% (50 males) and 45.6% (42 females) had DM. The reason for having diabetes more in males than in females could be because of lifestyle.

The increasing prevalence of obesity, in general, maybe a contributing factor. However, the prevalence of obesity seems to be higher in women than in men, and men seem to be at greater risk of type 2 diabetes development than women with similar BMIs. Some of these inconsistencies may be explained by an estimate of adiposity. A growing body of evidence suggests that central obesity, or visceral adiposity, is a stronger risk factor for diabetes type 2 than BMI. Central obesity has also been found to be a stronger risk factor for glucose intolerance, insulin resistance, and hyperinsulinemia [6].

The female gender who are married are not well adhered to diabetic medications due to physical inactivity, obesity, overweight, and poor glycemic control. This finding is per a similar study conducted by GebreTeklemariamDemoz et al. A good explanation for such issues was provided by a similar study conducted by Gabri et al., [5]. This includes physical inactivity, obesity, and poor glycemic control during their gestational period.

Apart from gender, age is also a risk factor for type 2 diabetes. The age group of 51-70 years was more prevalent in this study. A study conducted in Indonesia was more prevalent in the same age group of 51-60 years.[7,8] The function of pancreatic organs will also decrease with age and the effects of decreasing insulin secretion and decrease insulin receptor sensitivity or insulin resistance in old age. Hence this difference could be associated with differences in social, and economic conditions and lifestyles. Increasing age of about 65 years and above is a factor associated with multiple medical conditions

The major risk factors that were found in our study were social habits and family history, a proportional hazards regression analysis indicated that those who were currently smoking 16–25 cigarettes per day had a 3.27 times higher risk of developing NIDDM during the follow-up period than never smokers[11]. Despite this evidence of an association between cigarette smoking and increased risk of T2DM, a cause-effect link between smoking and T2DM cannot be established with certainty because other risk factors play a role, such as stress, diet, and levels of physical activity and distribution of body fat. In both men and women, moderate consumers of alcohol tended to have a lower incidence of type 2 diabetes than

low consumers. A slightly increased incidence of diabetes was suggested in women with comparatively high alcohol consumption. Abstaining alcohol compared with low consumption was not associated with type 2 diabetes in either men or women [12]. High consumers of alcohol tended to be smokers, less physically active, and have lower socioeconomic status. Former drinkers had elevated glucose levels and reduced HOMA-β cell levels, indicating impaired glucose tolerance and pancreatic β-cell dysfunction compared with lifetime abstainers [13] which were concluded from the study.

We found that the majority of the patients with diagnosed T2DM had one chronic co-morbid condition. Hypertension is the major co-morbidity in DM patients due to higher glucose levels and greater genetic predisposition which were associated with increased arterial stiffness, which coincided with the development of hypertension[9-10],. The period from the initial impairment of glucose tolerance to the onset of diabetes is marked by a state of hyperglycemia and hyper insulinemia. During this period, there is a risk of developing hypertension. This further lead to additional co-morbidities such as Cardiovascular Disease10, Chronic Kidney disease, and lung associated diseases. T2DM may be associated with poor quality of life, and painful symptoms may be linked with a reduced well-being index.

CONCLUSION

Diabetes Mellitus is reaching potential epidemic proportions in India. The level of co-morbidity and mortality due to diabetes and its potential complications are enormous and those are significant health care burdens on both families and societies. Worryingly Diabetes is now been shown to be associated with a spectrum of complications. In India, the study migration of people from rural to urban areas, the economic boom, and corresponding lifestyle changes are all affecting the level of diabetes.

The study strongly highlights the risk factors and associated co-morbidities of T2DM, History of T2DM, sedentary lifestyle, alcohol consumption, and smoking are the risk factors associated with T2DM in adults. Hypertension and Cardiovascular diseases are the prevalent co-morbidities associated with T2DM. Hence, early diagnosis of diabetes and the associated co-morbidities and treating hyperglycemia and its co-morbidities to target levels early in the course of the disease is necessary for alleviating the long-term risk of T2DM-related complications.

LIMITATION

- The sample size of the study was small.
- It was a prospective study of six months conducted on 92 diabetic patients.
- Many of the patients were not cooperative enough.

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