

RISK FACTORS AND CO-MORBIDITIES IN TYPE 2 DIABETES MELLITUS PATIENTS VISITING HAYATABAD MEDICAL COMPLEX, PESHAWAR, KHYBER PAKHTUNKHWA

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ABSTRACT

Introduction: Various risk factors for type 2 diabetes mellitus (T2DM) and comorbid conditions have been identified in epidemiological and clinical studies. The present study was carried out to find out various risk factors and comorbidities in T2DM patients during their management.

Materials & Methods: This was a descriptive study, between conducted during September to December, 2015 on patients who presented with T2DM to Endocrinology Outpatient Department and Ward of Hayatabad Medical Complex (HMC), Peshawar, Khyber Pakhtunkhwa. Data were collected on objectively designed Performa based on convenience sampling. Assessment of risk factors and co-morbidities was done clinically by Endocrinologists and Performa filled under their supervision. BMI was calculated using formula kg/m^2 ; Obesity was defined as $\text{BMI} \geq 30$. Data were analyzed for descriptive statistics by using SPSS version 16.

Results: A total of 236 type 2 diabetic subjects from both sexes were included. Mean age of subjects was 55 ± 7.58 years; 77(32.63%) were male and 159(67.37%) were female. The most common mode of treatment in subjects was oral hypoglycemic medication (42%). In terms of risk factors, 50(21.19%) were obese, 113(47.89%) had family history of DM, 96(40.68%) were either active smokers or had history of chronic smoking and 97(41.10%) were not active physically. Among co-morbidities, 177(75%) were hypertensive, 96(40.68%) were having osteoporosis, 74(31.35%) were suffering from different types of renal diseases and 70(29.66%) had eye related issues. Also, 64(27.11%) and 33(13.98%) patients had concomitant coronary artery disease and heart failure respectively; 17(7.2%) patients had positive history of previous stroke and only 21(8.9%) subjects had diabetic foot.

Conclusion: Despite following treatment protocols, the frequencies of risk factors, complications, and comorbidities are quite high in type 2 diabetics.

Key Words: Diabetes Mellitus, Type 2; Risk Factors; Complications; Comorbidity.

INTRODUCTION

Diabetes Mellitus is one of the major global health issues.^{1,2} In 2011, 366 million people had diabetes mellitus around the world and it is estimated that 552 million people would be suffering from this disease by 2030.³ According to WHO, 12.9 million people are diabetics in Pakistan and currently, Pakistan is on seventh position worldwide in terms of diabetes prevalence and it may become fourth on WHO list if preventive steps are not taken to control the disease.⁴ Diabetes Mellitus is a non-communicable, progressive disease,^{1,5} characterized by hyperglycemia due to deficiency of insulin synthesis or diminished effectiveness.

Diabetes mellitus has two types: 1) Type 1 diabetes mellitus (T1DM) 2) Type 2 diabetes mellitus (T2DM) which comprises 90% to 95 % of all the diabetics.⁶ T1DM is also called Insulin Dependent Diabetes Mellitus (IDDM). It is less frequent and commences usually before 15 years of age. In this type, there is absolute deficiency of insulin which occurs mainly due to autoimmunity i.e. body produces antibodies against β -islet cells of pancreas (the cells responsible for the synthesis of insulin). The same may occur after viral infections e.g. Coxsackie B4, and after Mumps. Insulin therapy is imperative rather the only

option in such patients.^{6,7} T2DM is also called non-insulin dependent diabetes mellitus (NIDDM). It mostly occurs in middle aged obese people and is more prevalent. In this type, there is Insulin Resistance (IR) in which target cells fails to respond normally to insulin. There may be relative insulin deficiency. In this type, dietary control and oral hypoglycemic agents are useful in treatment but eventually patient needs insulin therapy.^{6,7}

In addition to carbohydrate metabolism, lipid metabolism is also deranged in diabetic patients resulting in dyslipidemia particularly in type 2 diabetes mellitus,⁸ resulting in high prevalence of cardiovascular diseases (CVD) in these patients.^{2,9,10} It is also estimated that 80% of the death among diabetic patients is due to cardiovascular diseases.¹¹

More than 300 risk factors for T2DM and co-morbid conditions/complications have been identified in epidemiological and clinical studies i.e. obesity, sedentary life style (lack of exercise), smoking, alcoholism, hypertension, family history of DM, family history of CVD, coronary artery disease, history of previous stroke, heart failure, nephropathy, neuropathy, retinopathy, depression, diabetic foot/ulcers, osteoporosis, stress, etc.¹²

Management of type 2 diabetes involves dietary control followed by oral hypoglycemic agents if glycemic control is poor with diet alone, and ultimately insulin therapy when oral hypoglycemic drugs fail to achieve normoglycemia.

The present study was carried out to determine various risk factors and co-morbidities in patients of type 2 diabetes mellitus during their management.

MATERIALS & METHODS

This was a descriptive study in which data were collected from patients who presented with Type 2 Diabetes Mellitus to Endocrinology Out Patients Department (OPD) and Ward of

Hayatabad Medical Complex (HMC) between September and December, 2015 after obtaining permission from the department In Charge. In the present work, T2DM was defined as the use of anti-diabetic agents (oral hypoglycemic medicines or insulin or both) at the time of admission or the patients having documents containing laboratory results of previous HbA1c test compatible with the diagnosis of diabetes according to American Diabetes Association (ADA) guidelines or documentation related to history of diabetes mellitus.^{13,14} Those patients having T2DM and of ages 21-75 years were included in this study after obtaining informed consent. Data were collected on objectively designed Performa during their visit to hospital. The Performa contained patient's personal information (age, gender) and patient's past and present history about DM (mode of diagnosis, mode of treatment, risk factors and co-morbidities assessment according to ADA 2015 guidelines). Assessment of patient was done by Endocrinologist and Performa was filled under their supervision. Body Mass Index (BMI) was calculated using WHO formula of kilogram per meter square (kg/m^2). Obesity was defined as $\text{BMI} \geq 30$. Data collected from the patients were analyzed by using SPSS version 16. Arithmetic Mean and Standard Deviation (SD) was used for expressing age and frequency and percentage were calculated for categorical variables.

RESULTS

A total of 236 type 2 diabetic subjects from both sexes were included in the work undertaken. Mean age of subjects was 55 ± 7.58 years; 77(32.63%) were male and 159(67.37%) were female (Table 1).

Table 1: Age of subjects (n= 236)

Variables	Values
Age (years), Mean \pm SD	55 \pm 7.58
Gender, n (%)	
Males	77 (32.63)
Females	159 (67.37)

Figure 1 displays the modes of treatment in patients. The most common mode of treatment

was oral hypoglycemic medication (42%); whereas only 5% subjects were on dietary control only.

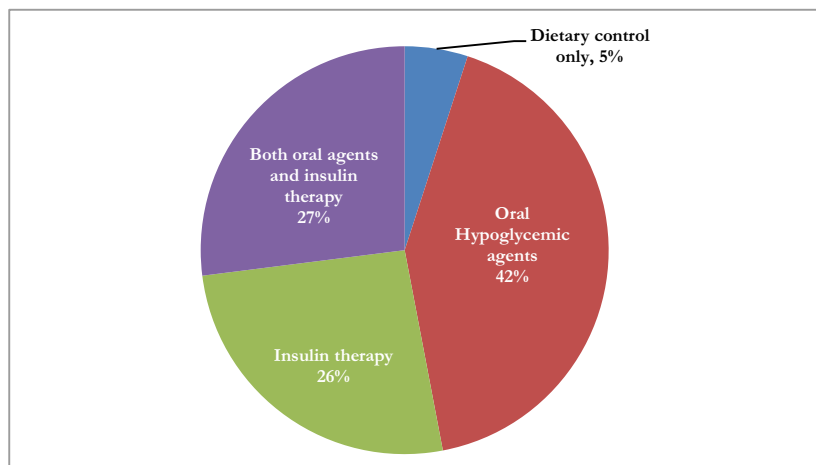


Figure 1: Mode of Treatment of Type 2 Diabetes Mellitus patients

Table 2 shows the mode of diagnosis of Type 2 Diabetes Mellitus in patients.

Table 2: Mode of diagnosis of Type 2 Diabetes Mellitus

Mode of Diagnosis	n (%)
Accidental	19 (8.05%)
Sign/Symptoms report by patient himself	210 (89%)
During routine check-up	7 (2.97%)

In 89% subjects, diabetes was diagnosed when they visited doctor after experiencing various symptoms of DM; accidental diagnosis followed with 8.05% and routine check-up was the mode of diagnosis in 2.97% of patients.

In terms of risk factors shown in Table 3, 50 (21.19%) were obese ($BMI \geq 30$), 113 (47.89%) had family history of DM, 96 (40.68%) were either active smoker or had history of chronic smoking and 97 (41.10%) were not active physically.

Table 3: Risk Factors of Diabetes in Patients

Risk Factors	Number of Patients n (%)
Obesity ($BMI \geq 30$)	
Yes	50 (21.19)
Family History of DM	
Yes	113 (47.89)
Active Smoker or History of chronic smoking	
Yes	96 (40.68)
Physical activity	
No	97 (41.10)
History of Alcohol Consumption	
Yes	0 (0)

Among co-morbidities (Table 4), 177(75%) were hypertensive, 96(40.68%) were having osteoporosis, 74(31.35%) were suffering from

different types of renal diseases and 70(29.66%) had eye related issues. Also, 64(27.11%) and 33(13.98%) had concomitant coronary artery

disease and heart failure respectively. 17(7.2%) patients had history of previous stroke positive

and only 21(8.9%) subjects had diabetic foot.

Table 4: Co-morbidities in Patients of T2DM

Co-morbidities/Complications	Number of Patients <i>n</i> (%)
Hypertension	177 (75.0)
Coronary Artery Disease	64 (27.11)
Heart Failure	33 (13.98)
Osteoporosis	96 (40.68)
Depression	88 (37.29)
Nephropathy	74 (31.35)
Retinopathy	70 (29.66)
Previous history of stroke	17 (07.2)
Diabetic foot	21 (08.9)

DISCUSSION

Management and care of diabetes mellitus is poor in low and middle income countries (including Pakistan). Type 2 diabetic population is on a rapid rise in Pakistan which is increasing financial burden on Pakistan's health care system. The objective of the study undertaken was to determine the risk factors and complications in previously diagnosed type 2 diabetic patients for the modification and implementation of policies and practices in clinical setup of this country to gain better control of type 2 diabetes mellitus. In this study, standard guidelines and latest protocol of each risk factor and co-morbidity was followed by the endocrinologist during evaluation.¹³

The mean age of 236 diabetic subjects was 55 ± 7.58 years with 67.37% females (Table 1). This observation is similar to study of Shera et al., (2004) in which 68% were females and mean age was 55.2 ± 10.6 years.¹⁵ However, in a study conducted by Chan et al. in 2012,¹⁶ the mean age was 68.98 ± 11.79 years. Similarly, Stolker et al., (2011)¹⁷ and Narayana et al., (2015)¹⁸ showed mean age around 63-64 years in their results. This difference in age might be due to racial factors as these previous studies were carried out on white Caucasians. There was no significant difference in

terms of gender. Stolker et al. (2011),¹⁷ Chan et al. (2012),¹⁶ and Kassaian et al. (2012)¹⁹ have also reported similar observations.

In current study, approximately 48% subjects had positive history of diabetes mellitus; whereas none of the subject reported alcohol intake. This may be due to the fact that in this society, admission of alcohol intake is considered taboo and against the religious sentiments of family members. In this study, 75% subjects were hypertensive; retinopathy was seen in 29.66% and nephropathy was seen in 31.35%. In contrast, Shera et al. (2004)¹⁵ reported hypertension in 64.6%, retinopathy in 43%, and nephropathy in 20% patients. This difference might be due to more than double sample size of 500 patients in Shera et al. (2004)¹⁵ study in comparison to 236 patients from whom data were collected in this research. Concomitant Coronary Artery Disease and T2DM were seen in 27.11% subjects in present study; whereas Hamzullah et al. (2006)²⁰ reported 49.81% subjects having the same. This is probably due to the difference in the study design as Hamzullah et al. (2004)²⁰ study was based on multicenter research and was of 1 year duration; whereas in this research, data were collected from

a single center. Also, the sample size of above mentioned study was twice in comparison to the current study.

Another significant observation of this study is that only 21(8.9%) subjects had diabetic foot; which is double to the results of Shera et al. (2004)¹⁵ study. In contrast, Hamzullah et al.

(2006)²⁰ study showed diabetic foot ulcers in 11.46%.

Conclusion

Despite following protocols of treatment, the frequencies of risk factors, complications, and co-morbidities in type 2 diabetics remain high.

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