



STUDY OF CLINICAL PROFILE OF THE PATIENTS WITH LONG STANDING TYPE 2 DIABETES MELLITUS

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ABSTRACT

Background: Type 2 diabetes mellitus (T2DM) is a chronic disease that is becoming increasingly prevalent in India. In the absence of adequate glucose control, patients with T2DM present a higher risk of developing macrovascular as well as microvascular complications. Severity increases with the long standing diabetes mellitus.

Aims And Objectives: To study the clinical profile of patients with long standing T2DM.

Methodology: Two hundred T2DM patients with diabetes duration of > 5 years were studied at the Department Of Medicine, Gandhi Medical College And Hamidia Hospital, Bhopal from year 2017 to 2020. Diagnosis of T2DM was performed as per the American Diabetes Association (ADA) recommendations. Details on age, sex, education, other co-morbid condition, family history of diabetes, dietary history, addiction, life style/exercise, on how many OHA/insulin and compliance to medication were recorded from each patient.

Results: Patients with long standing diabetes were in the fifth to sixth decade of their life (42%), were mostly male (58%), had only primary education and had family history of T2DM (34%). Other parameters associated with patients with long standing diabetes were carbohydrate rich diets (60%) eating at least twice a day (73.5%), were non alcoholic (75%), non-smokers (71%), not exercising (45%) and had Sedentary lifestyle (69%).

Conclusion: Patients with long standing diabetes were old (5th to 6th decade of life), males, had primary education, had diet rich in carbohydrates, were not exercising and had a sedentary life style. A counselling related to these factors is recommended to decrease the diabetes related complication in T2DM patients.

KEYWORDS : Sedentary Life Style, Diabetes Mellitus, Long Standing Diabetes, Diabetic Complication

INTRODUCTION-

With changing lifestyle and increasing obesity, the prevalence of diabetes mellitus (DM) has increased worldwide. The worldwide prevalence of DM was 425 million in 2017.⁽¹⁾ The incidence of type 2 DM (T2DM) varies substantially from one geographical region to the other as a result of environmental and lifestyle risk factors. In India, 69.2 million people with T2DM, is 2nd highest number of people living with DM worldwide next to China.⁽²⁾

Few studies have examined how these pathophysiological changes influence the selection of diabetes therapy in patients with long standing T2DM in actual clinical settings. A previous cross sectional study by Franch Nadal J et al showed that the prevalence of oral medication therapy or insulin therapy increased as the duration of diabetes increased, that study did not evaluate the association between the linearly increasing duration of diabetes and the selection of diabetes therapy.⁽³⁾ However this data is lacking in Indian population.

Understanding the clinical profile of patients with long standing diabetes will guide the clinicians to decide the therapy and further interventions. In present study we tried to evaluate the clinical profile of the patients presented with T2DM with duration of more than 5 years.

METHODOLOGY-

Present epidemiological, observational cross sectional study was performed on 200 patients at Department Of Medicine, Gandhi Medical College and Hamidia Hospital, Bhopal from year 2017 to 2020.

Patients with T2DM duration more than 5 years and onset of diabetes > 35 years of age were included whereas patients with H/O ketosis, pancreatic calcification/pancreatitis, all

form of diabetes other than type 2 diabetes mellitus, pregnancy and with any severe co-morbid state which interfere with day to day activities of patient were excluded.

Diagnostic criteria by the American Diabetes Association (ADA) include the following: A fasting plasma glucose (FPG) level of ≥ 126 mg/dL (7.0 mmol/L), or A 2-hour plasma glucose level of ≥ 200 mg/dL (11.1 mmol/L) during a 75-g oral glucose tolerance test (OGTT) or HbA1c level $\geq 6.5\%$.

Along with age and gender of the patients USG abdomen, fundus examination and Neuropathy examination using MNSI, tuning fork and monofilament was performed.

Clinical and laboratory data of long standing type 2 diabetes patients such as age, sex, other co-morbid condition, family history of diabetes, dietary history, addiction, life style/exercise, on how many OHA/insulin and compliance to medication were recorded from each patient.

Laboratory data investigated were Complete blood profile, Renal function test, Urine R/M, Liver function test, Lipid profile, Fasting blood glucose and Post prandial blood glucose were also recorded.

All the data analysis was performed using IBM SPSS ver. 20 software. Frequency distribution and cross tabulation was performed to prepare the tables. PRISM and Microsoft excel was used to prepare the tables. Quantitative data was expressed as mean and standard deviation whereas categorical data was expressed as number and percentage.

RESULTS-

Long standing T2DM was more common in the age group 51-60 years (42%) followed by 41-50 years (31%) and 61-70 years (19.5%) and among males population (58%).

Table 1: General Characteristics Of Patients With Long Standing Diabetes-

Parameters	Minimum	Maximum	Mean	Std. Deviation
Age	36	78	53.60	7.940
Diabetes duration	5	20	8.61	2.98
Body mass index	23	37	30.56	3.206
Hemoglobin	8	15	11.81	1.548
Total leukocyte count	4200.0	12000.0	8114.428	1595.3497
Platelet count	1	3	2.09	.460
Blood Urea	16	80	37.13	9.309
Serum Creatinine	0	7	1.06	.563
AST	14	60	35.52	10.088
ALT	11	78	31.77	10.773
ALP	19	129	46.33	15.400
Fasting blood sugar	123	342	177.40	41.276
Post Prandial Blood Sugar	150	420	242.83	54.595
HbA1c	6	15	8.76	1.531
Total cholesterol	180	356	253.52	39.515
Triglyceride	140	462	220.82	67.092
High density lipoprotein	28	75	47.87	9.849
Low density lipoprotein	114	190	151.58	13.262

Long standing T2DM was more common among primary and secondary educated than the graduated and uneducated, with family history of T2DM (34%), those who were vegetarian (53%), having carbohydrate rich diets (60%) followed by fat rich (27%) and protein rich (26%).

Majority of the patients (73.5%) had meal twice a day and 33% had thrice a day. Majority of the patients were not alcoholic (75%) while 13.5% were mild and 11.5% were moderate alcoholic. Majority of the patients were non smokers (71%) and 29% were smokers. Majority of the patients were not exercising (45%), 24% were routine, 18% were occasional and 13% were exercising weekly. Most of patients had sedentary (69%) and 31% had healthy lifestyle. Of all patients 42% were on 3, 31% patients were 4, 19% were on two medicines while 8% were on multiple medicines with insulin. Patients compliance to Oral hypoglycemic agents (OAD) as average by 72%, good by 23% and poor by 5%.

DISCUSSION-

Persistent T2DM can cause several complications, both acute and chronic. It is one of the leading causes of cardiovascular disease (CVD), blindness, kidney failure, and amputation of lower limbs. Present study investigated the clinical profile of patients diagnosed with T2DM for more than 5 years duration and recorded the baseline parameters.

In present study mean age of patients was 53.60 years. Diabetes duration in years was 8.61 years. Similar study by Cha SA et al recorded the mean age and diabetic duration in the patients as 55.7±10.0 and 8.2±6.7 years, respectively.⁽⁴⁾ Another study by Verma VK et al reported the mean age of the T2DM patients as 56.50 ± 14.2 years and mean duration of diabetes as 9.5 ± 5.6 yrs.⁽⁵⁾

The lipid abnormalities are more prevalent in DM because insulin resistance or deficiency affects key enzymes and pathways in lipid metabolism. Present study recorded mean of BMI as 30.56 kg/m². Mean HDL, LDL, HbA1c, TC and TG were 47.87, 151.58, 8.76%, 253.52 and 220.82 mg/dL respectively. Similar study by Cha SA et al recorded the mean BMI as 24.8±3.4, HDL as 43.0±10.3, LDL as 108.3±32.6, HbA1c as 8.8±2.1, TC as 183.2±37.0 and mean triglyceride as 159.7±103.4.⁽⁴⁾ Ozder A et al in similar study tested the serum

lipid profile of diabetic patients and recorded that the mean values for TC, TG, HDL and LDL in female patients were 227.6 ± 57.7 mg/dl, 221.6 ± 101.1 mg/dl, 31.5 ± 6.7 mg/dl and 136.5 ± 43.7 mg/dl, respectively.⁽⁶⁾

Elevated leukocyte counts are associated with chronic complications in T2DM. Present study records the total leukocyte counts as 8114.42. Similar study including patients with persistent T2DM patients by Moradi S et al recorded the the mean leukocyte count as 7594 ± 1965/mm³ which is almost similar study findings.⁽⁸⁾

The platelets play a vital role in the pathological changes in diabetes leading to micro-vascular complications. Platelet indices being indicators of platelet activity, may be useful predictive markers of these complications. In present study mean platelet count of diabetic patients was 2.09 lakh/cumm. Similar study by Kshirsagar RM et al in reported the mean platelets count in diabetic patients as 2.93±1.00.⁽⁹⁾

Experimental evidence identifies blood urea as a putative culprit of reduced insulin sensitivity and defective insulin secretion. In present study mean blood urea was 37.13 mg/dl, serum creatinine was 1.06 mg/dl. In line with that Sirivole MR et al reported mean blood urea in non-diabetic control group was observed to be 25.36 ± 3.47, whereas in diabetic patients 58.84 ± 14.39. The mean serum creatinine levels in healthy controls was 0.88 ± 0.14 and in diabetics 1.839 ± 0.80. Thus, the mean blood sugar, blood urea and serum creatinine levels were significantly higher in the diabetic subjects compared to controls.⁽¹⁰⁾

The liver plays a central role in maintaining glucose homeostasis since it extracts glucose from blood to use as fuel, stores dietary glucose as glycogen for later use and also synthesizes glucose from non-carbohydrate sources to maintain blood glucose level during fasting states.⁽¹²⁾ In present study mean AST, ALT and ALP were 35.52, 31.77 and 46.33 U/L respectively. Similar study by Bora K et al conducted the liver function test on diabetic patients and recorded the mean AST (mg/dL) 38.44±28.64 in male and 31.73±23.36 in female, mean ALT (mg/dL) 42.04±25.18 in male and 32.88±27.62 in females, mean ALP (mg/dL) 110.17±30.43 in male and 128.30±49.79 in female patients. Elevated ALT (46.8%) and elevated ALP (48.5%) were the most common abnormality in males and females, respectively. ALP correlated positively with fasting glucose in both sexes. AST, ALT, and ALP were found to be independent determinants of glycemic status.⁽¹³⁾

In present study long standing diabetes was more prevalent among male (58%). Similarly Barma PD et al recorded the gender distribution of T2DM as 62% males vs. 38% females which shows similar trend as ours.⁽¹⁴⁾

Long standing diabetes was more common in the age group 51-60 years (42%) followed by 41-50 years (31%) and 61-70 years (19.5%). Similar findings were seen by Poornima MP et al, 67.24% participants were in age group 30-49 years, 32.74% between 50 to 60 years.⁽¹⁵⁾

On comparing the education of patients, it was found that the long standing T2DM was more among primary and secondary educated than the graduated and uneducated. This could be due to the type of work linked with the level of education level. More uneducated population is involved in physical labor than the educated. Also education is linked with awareness where more educated population are more aware of diabetes and its management. Similar observations were made by Afroz A et al where low education level was found to be associated with inadequate and very poor glycemic control and result in long standing T2DM.⁽¹⁶⁾

Family history of T2DM is found in 34% patients, which indicates that it is a significant factor for T2DM. Similarly Chadha et al recorded family history of T2DM present in 43.45% of cases, this is similar to our findings.⁽¹⁷⁾

In this study most of patients were vegetarian (53%). Majority were having the carbohydrate rich diets (60%) followed by fat rich (27%) and protein rich (26%). This distribution could be influenced by the regionality where most of people are vegetarian and rice and wheat makes the major portion of meal. Barnard ND et al reported that 43% (21 of 49) of the vegetarian group and 26% (13 of 50) of the ADA group participants reduced diabetes medications. Including all participants, HbA1c decreased 0.96 percentage points in the vegan group and 0.56 points in the ADA group ($P = 0.089$).⁽¹⁸⁾ Sargrad KR et al investigated effects of high protein vs. high carbohydrate intake in T2DM patients. Both the high-carbohydrate and high-protein groups lost weight (-2.2 ± 0.9 kg, -2.5 ± 1.6 kg, respectively, $P < .05$) and the difference between the groups was not significant ($P = 0.900$). In the high-carbohydrate group, HbA1c decreased (from 8.2% to 6.9%, $P < .03$), fasting plasma glucose decreased (from 8.8 to 7.2 mmol/L, $P < .02$), and insulin sensitivity increased (from 12.8 to 17.2 micromol/kg/min, $P < .03$). No significant changes in these parameters occurred in the high-protein group, instead systolic and diastolic blood pressures decreased (-10.5 ± 2.3 mm Hg, $P = .003$ and -18 ± 9.0 mm Hg, $P < .05$, respectively).⁽¹⁹⁾

In Present study majority of the patients were not exercising (45%) weekly. Most of patients had Sedentary (69%) lifestyle. Sedentary lifestyle and obesity were significant risk factors for T2DM. A 64% of T2DM is explained by sedentariness, and if people would become active, a 62.2% of the cases of diabetes could be avoided (Bertoglia et al). Shi L et al concluded that physical activity was inversely associated with T2DM risk. Daily living, commuting, and total physical activity METs had inverse negative dose-response relationships with T2DM (P -trend = 0.0033, 0.0022, and < 0.0001 , respectively). Regular participation in exercise or sports reduced T2DM risk ($HR = 0.86$, 95%CI: 0.76-0.98).⁽²⁰⁾

In present study of all patients 42% were on 3, 31% patients were 4, 19% were on two medicines while 8% were on multiple medicines with insulin. In Oshin M et al 77.3% were on oral hypoglycaemic agents, 13.6% on insulin and 9.1% on combined therapy with oral hypoglycaemic agents and insulin.⁽¹¹⁾ Chadha M et al study reported that 46.08% patients were prescribed with dual therapy, 10.82% prescribed triple and 0.29% was prescribed with quadruple therapy.⁽¹⁷⁾

CONCLUSION-

Based on the results it can be concluded that long standing diabetes results in several serious complication which increased the chances of morbidities. Important factors associated with long standing diabetes can be summarized as-

Long standing diabetes was more prevalence among those who were in the fourth to sixth decade of their life affecting a major group of people who are working. Such patients seems to be male in majority. Long standing T2DM is more prevalent among primary and secondary educated than the graduated and uneducated. Also education is linked with awareness where more educated population is more aware of diabetes and its management. Other parameters associated with long standing diabetes were vegetarian diet twice a day having mainly carbohydrate rich diets in majority. Majority of the patients were non alcoholic and non smokers, lack of exercise and sedentary life style are important factors associated with long standing diabetes. Majority of the long standing diabetes patients seems to be on three drug combination regimen and patients found these OADs to be at average.

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