

Clinical Profile of Patients with Diabetes Mellitus Attending Tertiary Care Hospital

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Abstract

Many patients with this form of Diabetes mellitus are obese and obesity itself causes some degree of insulin resistance. Patients who are not obese by traditional weight criteria may have increased percentage of body fat distributed predominantly in the abdominal region. Ketoacidosis seldom occurs in this type of diabetes, it usually arises in association with the stress of another illness such as infection. Out of 240 patients attending diabetic clinic 54 patients were selected. The relevant information was recorded in a pre-tested proforma. After taking detailed history, thorough clinical examination was done according to the proforma. BMI was calculated as weight (kilograms) divided by height (meters) squared. The mean FBS of Study Group was 163.13 with SD 15.06 and the mean PPBS of Study Group 232.35 with SD 35.71. The mean FBS of Control Group was 102.61 with SD 6.07 and the mean PPBS of Control Group was 150.13 with SD 10.64. It is seen that, the mean FBS and PPBS of the Study Group was more than the Control Group.

Keywords: Diabetes Mellitus; FBS; PPBS.

Introduction

Diabetes mellitus is a syndrome characterized by chronic hyperglycemia and disturbances of carbohydrate, fat and protein metabolism associated with absolute or relative deficiency in insulin secretion and/or insulin action.

This form of Diabetes mellitus was previously referred to as non-insulin dependent Diabetes mellitus or adult onset diabetes. It is a term used for individuals who have insulin resistance and usually have relative insulin deficiency. At least initially and often throughout their life time, these individuals do not need insulin treatment to survive. There are probably many different causes of this form of diabetes, and it is likely that the proportion of patients in this category will decrease in the future as identification of specific pathogenic processes and genetic defects permits better differentiation among them and a more definitive sub classification [1].

Many patients with this form of Diabetes mellitus are obese and obesity itself causes some degree

of insulin resistance. Patients who are not obese by traditional weight criteria may have increased percentage of body fat distributed predominantly in the abdominal region. Ketoacidosis seldom occurs in this type of diabetes, it usually arises in association with the stress of another illness such as infection. This form of Diabetes mellitus frequently goes undiagnosed for many years because the hyperglycemia develops gradually and at earlier stages is often not severe enough for the patient to notice any of the classic symptoms of diabetes. Nevertheless, such patients are at increased risk of developing macrovascular and microvascular complications. The risk of developing this form of Diabetes mellitus increases with age, obesity and lack of physical activity. It occurs more frequently in women with prior Gestational Diabetes Mellitus (GDM) and in individuals with hypertension or dyslipidemia and its frequency varies in different racial/ethnic subgroups. It is often associated with a strong genetic predisposition; more so than is the autoimmune form of Type 1 Diabetes. However, the genetics of this form of Diabetes mellitus are complex and not clearly defined [2,3].

Type 2 Diabetes mellitus is characterised by excessive increase in plasma glucose levels which results from failure in inhibition of hepatic glucose production in combination with reduction in uptake by tissues especially muscles. These abnormalities result from combination of inadequate insulin secretion and insulin resistance by both liver and muscle failure to suppress plasma glucose.

Descriptively, three phases of Type 2 Diabetes Mellitus can be recognized.

- In first phase glucose level remain normal even in the presence of demonstrable insulin resistance because insulin levels are elevated.
- In second phase insulin resistance worsens, so that post meal hyperglycemia develops despite of increased insulin concentrations.
- In third phase insulin resistance does not change but decline in or decreased insulin secretion causes fasting hyperglycemia and overt diabetes [4].

Hyper secretion of insulin leads to insulin resistance. Majority of patients of Type 2 Diabetes mellitus are obese and obesity is an important cause of insulin resistance, though not the sole cause and insulin resistance is seen in non-obese Type 2 Diabetes mellitus patients. Also, individuals with central pattern of obesity are more likely to have glucose intolerance, vascular disease, hyperlipidemia and hypertension a constellation of features which is termed as syndrome-X, also called Reevan's syndrome. Once even mild hyperglycemia develops, a final common pathway is entered that can lead towards further metabolic deterioration [5].

Methodology

Inclusion Criteria

- Patients with Type 2 Diabetes Mellitus satisfying ADA 2011 criteria

Exclusion Criteria

- Patients with hypertension.
- Patients with coronary artery disease.
- Patients with any other acquired or congenital heart disease causing systolic and diastolic dysfunction.
- Thyroid disorder.
- Overt renal disease.
- Patients with corpulmonale.

- Heart failure secondary to any cause.
- Any other disease/ disorders interfering with the cardiac function like anaemia, vitamin deficiencies, toxin induced etc.,

With these exclusion criteria, out of 240 patients attending diabetic clinic 54 patients were selected. The relevant information was recorded in a pre-tested proforma.

After taking detailed history, thorough clinical examination was done according to the proforma. BMI was calculated as weight (kilograms) divided by height (meters) squared.

Diagnosis of Diabetes: (ADA Criteria 2011)

Symptoms of diabetes plus random blood glucose concentration ≥ 11.1 mmol/L (200 mg/dL)^a

or

Fasting plasma glucose ≥ 7.0 mmol/L (126 mg/dL)^b

or

A1C $> 6.5\%$ ^c

or

Two-hour plasma glucose ≥ 11.1 mmol/L (200 mg/dL) during an oral glucose tolerance test^d

a = Random is defined as without regard to time since the last meal.

b = Fasting is defined as no caloric intake for at least 8 h.

c = The test should be performed in laboratory certified according to A1C standards of the Diabetes Control and Complications Trial.

d = The test should be performed using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water, not recommended for routine clinical use.

Results

Table 1: Showing Age Distribution of Study and Control Group

Age Groups (in years)	Study Group	Control Group	Total
36-40	6 (11.1%)	8(14.8%)	14 (13.1%)
41-45	7 (12.9%)	8 (14.8%)	15 (13.8%)
46-50	13 (24.1%)	14 (25.9%)	27 (25.1%)
51-55	16 (29.6%)	13 (24.2%)	29 (26.8%)
56-60	12 (22.3%)	11 (20.3%)	23 (21.2%)
Total	54 (100%)	54 (100%)	108 (100%)

Maximum of 16 cases (29.6%) belonged to the age group of 51-55 years, followed by 13 cases

(24.1%) in the age group of 46-50 years, 12 cases (22.3%) in the 56-60 years age group, 7 cases (12.9%) in the 41-45 years age group and 6 cases (11.1%) in 36-40 years age group. The mean age of Study Group was 50 years and the mean age of Control Group was 49.19 years with Standard Deviation 6.36 and 6.42 respectively (Table 1).

Table 2: Showing Sex Distribution of Study and Control Group

Sex distribution	Study Group	Control Group	Total
Male	30 (55.5%)	30 (55.5%)	60 (55.5%)
Female	24 (44.5%)	24 (44.5%)	48 (44.5%)
Total	54 (100%)	54 (100%)	108 (100%)
Sex ratio	1: 0.8	1: 0.8	1:0.8

As seen from the Table 2 in both the study and control group 30 cases (55.5%) were males and 24 cases (44.5%) were females. The male : female ratio was 1:0.8. (Table 2).

Table 3: Showing Duration of Diabetes in the Study Group

Duration of Diabetes (in years)	Study Group
3	2 (3.7%)
4	5 (9.3%)
5	9 (16.7%)
6	11 (20.4%)
7	10 (18.5%)
8	8 (14.8%)
9	5 (9.3%)
10	4 (7.3%)
Total	54 (100%)

From the Table 3, it can be seen that a majority of 11 cases (20.4%) had diabetes of 6 years duration, this followed by 10 cases (18.5%) of 7 years, 9 cases (16.7%) of 5 years, 8 cases (14.8%) of 8 years, 5 cases (9.3%) each of 4 and 9 years, 4 cases (7.3%) of 10 years and 2 cases (3.7%) had diabetes of 3 years duration. The mean duration of diabetes in the study group was 6.59, with standard deviation of 1.84.

Table 4: Showing Blood Pressure in Study and Control Group

	Study Group	Control Group	P value
Mean SBP	122.07±6.78	114.74±4.55	<0.001
Mean DBP	77.59±5.24	74.75±4.17	0.002

It is seen that mean SBP of Study Group was 122.07 with SD of 6.78. The mean SBP of Control Group was 114.74 with SD 4.55 and shows p-value of <0.001 which is statistically significant. The mean DBP of Study Group was 77.59 with SD of 5.24. The mean DBP of Control Group was 74.75 with SD of 4.17 and shows a p-value of 0.002 which is statistically significant (Table 4).

Table 5: Showing Body Mass Index in Study and Control Group

BMI (kg/m ²)	Study Group	Control Group
< 18.5 (Under weight)	0	0
18.5-22.9 (Normal)	23 (42.6%)	29 (53.7%)
23-24.9 (Over weight)	26 (48.1%)	21 (38.9%)
>25 (Obese)	5 (9.3%)	4 (7.4%)
Total	54 (100%)	54 (100%)

The standards have been taken from the consensus guidelines for the Prevention and Management of Obesity and Metabolic Syndrome published from the ministry of health released on October 2008.

The Table shows 5 that within the study group a majority of 26 cases (48.1%) were overweight, 23 cases (42.6%) had a normal BMI and 5 cases (9.3%) were obese. The mean BMI of Study Group was 23.8, with standard deviation of 1.9. The mean BMI of Control Group was 22.4 with SD of 1.74. Mean BMI in Study Group was more than that of controls. The p-value is <0.001 which is statistically significant.

Table 6: Showing Blood Sugar (FBS and PPBS) in Study and Control Group

	Study Group	Control Group
FBS	163.13±15.06	102.61±6.07
PPBS	232.35±35.71	150.13±10.64

The mean FBS of Study Group was 163.13 with SD 15.06 and the mean PPBS of Study Group 232.35 with SD 35.71. The mean FBS of Control Group was 102.61 with SD 6.07 and the mean PPBS of Control Group was 150.13 with SD 10.64. It is seen that, the mean FBS and PPBS of the Study Group was more than the Control Group (Table 6).

Table 7: Showing Glycemic Status in Study and Control Group

Control	Study Group	Control Group	p-value
Normal <5.6%	0	54 (100%)	
Good 5.6- 7%	4 (7.4%)	0 (0%)	
Fair 7.1-9%	28 (51.8%)	0 (0%)	
Poor > 9%	22 (40.8%)	0 (0%)	
Total	54 (100%)	54 (100%)	
Mean ± SD	8.88±1.37	5.585±0.491	<0.001

It is seen that out of 54 cases in the study group, a majority of 28 cases (51.8%) had fair control of glycemic status, 22 cases (40.8%) had poor control and only 4 cases had a good control of their glycemic status. The mean glycated haemoglobin of Study Group was 8.88 with standard deviation of 1.37 (Table 7).

The mean glycated haemoglobin of Control Group was 5.585 with standard deviation of 0.491. The p value of < 0.001 was statistically significant.

Table 8: Showing Lipid Profile in Study and Control Group

	Group	Mean	SD	p-value
Total cholesterol	Study Group	189.35	17.37	<0.001
	Control Group	166.61	26.37	
Triglycerides	Study Group	123.56	14.96	0.004
	Control Group	116.25	11.06	
HDL	Study Group	37.67	3.59	<0.001
	Control Group	41.01	3.45	

In the present study, mean total cholesterol in Study Group was 189.35±17.37 as compared to 166.61±26.37 in Control Group, mean triglyceride in Study Group was 123.56±14.96 as compared to 116.25±11.06 in Control Group and mean HDL level in Study Group was 37.67±3.59 as compared to 41.01±3.45 in Control Group. p-value is significant for all the values (Table 8).

Discussion

In the present study age of the patients ranged from 36 years to 60 years with mean age of 50 years and SD of 6.36. Majority of the patients belonged to 4th and 5th decades of life.

Table 9: Showing the Mean Age and SD in Related Studies with Comparison to Present Study

Study	Mean	SD
Poirier P et al. [6]	48	6
Abdul Khaliq M.H. et al. [7]	51	4.5
Boyer J.K et al. [8]	49.8	6.9
Present study	50	6.36

Mean age of the present study was comparable to that of Poirier P et al. Abdul Khaliq M.H. et al. and Boyer J.K et al. As all the studies mentioned above as well as present study included only Type 2 Diabetes mellitus the mean age was almost identical (Table 9).

Table 10: Showing Sex Incidence in Related Studies with Comparison to Present Study

Sex	Abdul Khaliq M.H. et al. (N=66)		Boyer J.K et al. (N=61)		Present study (N=54)	
	N	%	N	%	N	%
Male	35	53%	31	50.81%	30	55.5%
Female	31	47%	30	49.19%	24	44.5%
Total	66	100%	61	100%	54	100%

In the present study male patients were more than

the female patients with a male : female ratio of 1:0.8.

This is comparable to that of Abdul Khaliq M.H. et al. [7] and Boyer J. K et al. [8]

In the present study the mean duration of Diabetes was 6.59 years with a SD 1.84. The duration ranged from a minimum 3 to a maximum of 10 years. Also, The majority of the patients belonged to the duration of 6th and 7th year of diabetes (Table 10).

Table 11: Showing Duration of Diabetes (in years) in Related Studies with Comparison to Present Study

Study	Mean	SD
Poirier P et al. [6]	4.8	2.0
Abdul Khaliq M.H. et al. [7]	4.0	1.0
Boyer J.K et al. [8]	5.8	5.5
Present study	6.59	1.84

In comparison to the related studies the mean duration of diabetes in the present study was slightly higher. However, the difference was not statistically significant (Table 11).

Table 12: Showing Blood Pressure (JNC VIIth) in Related Studies with Comparison to Present Study

Study	Systolic blood pressure		Diastolic blood pressure	
	Mean	SD	Mean	SD
Poirier P et al. [6]	124	12	78	8
Abdul Khaliq M.H. et al. [7]	122	10	76	8
Boyer J.K et al. [8]	120	11	75	7
Present study	122	6	77	5

In the present study the mean SBP of the Study Group was 122.07±6 and mean DBP was 77.59±5. This was comparable to BP recordings of Poirier P et al. Abdul Khaliq M. H. et al. and Boyer J. K et al.

As all the studies mentioned above including the present study were aimed at evaluation of left ventricular dysfunction among normotensive diabetic patients, the mean BP was within normal range (Table 12).

Table 13: Showing BMI (kg/m²) in Related Studies with Comparison to Present Study

Study	Mean	SD
Poirier P et al. [6]	29.9	4.7
Abdul Khaliq M.H. et al. [7]	30.2	4.2
Boyer J. K et al. [8]	33.4	7.8
Present study	23.8	1.9

In the present study the mean BMI of the Study Group was 23.8±1.9. The mean BMI in studies by Poirier P et al. Abdul Khaliq M.H. et al. and Boyer J.K et al. were slightly more than that of the

present study. It could be due to ethnicity, racial difference and genetic make up of the individuals. Also, majority of Type 2 DM patients in Indian subcontinent are non-obese (Table 13).

Table 14: Showing Blood Sugar (FBS and PPBS) (mg/dl) in Related Studies with Comparison to Present Study

Study	FBS		PPBS	
	Mean	SD	Mean	SD
Poirier P et al. [6]	180	54	234	56
Abdul Khaliq M.H. et al. [7]	203	51	261	58
Rajput R et al. [9]	182	33	245	37
Present study	163	15	232	35

In the present study the mean FBS of the Study Group was 163 ± 15 and mean PPBS was 23 ± 235 . From the above table it is evident that the blood sugar values are highly variable among the various studies and no comparison can be derived. This could be due to various factors, such as mode of diabetic management, duration of diabetics, etc. which in turn dependent on various factors, including genetics and environmental factors [10,11,12] (Table 14).

Conclusion

- The mean age in Study Group was 50 ± 6.36 years as compared to 49.19 ± 6.42 years in Control Group. Male : Female ratio in both the Study and Control Group was 1:0.8.
- In the Study Group majority of the patients belonged to duration of 6th and 7th year of diabetes and the mean duration of diabetes was 6.59 ± 1.84 years.

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