International Journal Dental and Medical Sciences Research
Volume 2, Issue 4, pp: 24-29 www.ijdmsrjournal.com ISSN: 2582-6018

Clinical Profile And Status Of Glycaemic Control In Type 2 Diabetes Mellitus Patients In A Tertiary Care Hospital.

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Date of Submission: 01-10-2020 Date of Acceptance: 19-10-2020

ABSTRACT: INTRODUCTION: The number of people with Diabetes has risen from 108 million in 1980(4.7%) to 422(8.5%) million in 2014. Its prevalence has been rising more rapidly in middle and low socio economic classes. Most of them are type 2 DM(90%).The study regarding clinical profile and status of glycaemic control in type DM in a tertiary teaching hospital is scanty in India.

OBJECTIVES: To determine the status of glycaemic control, prevalence of micro and macro vascular complications, acute metabolic complications, infections, Non Alcoholic Fatty Liver Disease (NAFLD) and cause of mortality in T2DM patients admitted at Vimsar.

MATERIAL AND METHODS: This was a hospital based prospective study evaluating 150 T2DM patients admitted to Post graduate department of medicine, vss institute of medical sciences and research centre from august 2018 to july 2020 with the help of post graduate dept. of Biochemistry. Status of glycemic control and diagnosis of micro and macro vascular complications, infections and NAFLD was made using standard protocols. In case of death, the most probable cause was noted.

RESULTS: Out of 150 patients,22(14.6%) patients were newly diagnosed T2DM and out of them 7(30%) patients had vascular complications and 8(32.5%) had infections. Of the total patients,71(47.3%)had nephropathy, 30(20%) neuropathy, 40(26%) retinopathy,49(32.66%)CVD, 18(12%)CAD, 10(6.7%) acute metabolic complications, 59(39.33%) infections and 26(17.33%) had NAFLD respectively.119(79.33%) patients discharged from the hospital where as 31(20.66%) died due to different complications.

CONCLUSION: Macrovascular events occured earlier than microvascular complications. There is strong association of age, duration of diabetes, serum cholesterol, triglyceride, LDL level with retinopathy,while only duration of diabetes was strongly associated with nephropathy and neuropathy . Increasing age was associated with CAD and FBG was a risk factor for CVD.Cerebrovascular (CV)-related deaths were most most common.

I. INTRODUCTION

Diabetes mellitus (DM) is common and with on going global increase in incidence, type-2 diabetes mellitus is reaching epidemic proportions. The number of people with Diabetes has risen from 108 million in 1980 to 422 million in 2014.The global prevalence of Diabetes has risen from 4.7% in 1980 to 8.5% in 2014.Its prevalence has been rising more rapidly in middle and low socio economic classes. The World Health Organization (WHO) has defined diabetes as a metabolic endocrine disorder characterised by chronic hyperglycaemia, with disorders of carbohydrate, fat and protein metabolism occurring as a result of deficiencies in insulin secretion, action, or both [1,2].

As a chronic disease, complications of DM may affect the functioning of various organ systems, and account for much of the morbidity and mortality associated with this disease. These chronic complications can be broadly classified into two major categories: vascular and non-vascular. Vascular complications are further divided according to whether they are microvascular (retinopathy, neuropathy, and nephropathy) or macrovascular (coronary artery disease [CAD], peripheral arterial disease [PAD], and cerebrovascular disease (CVD). Conditions such as gastroparesis, infections, and skin changes constitute the non-vascular complications of diabetes[9].

Despite the morbidity and mortality associated with retinopathy, nephropathy, and neuropathy, cardiovascular disease remains the leading cause of death in type 2 diabetes mellitus[10] consequently; the treatment of confounding risk factors of obesity, hypertension, and dyslipidemia assumes major importance and must be coordinated with good glycemic control for reduction in total morbidity and mortality in type 2 diabetes mellitus

[11].Therefore the present study was conducted to estimate the clinical profile and status of glycemic control in type 2 DM in tertiary care hospital.

II. AIMS AND OBJECTIVES OF THE STUDY

The present study was conducted with the following aims and objectives to determine Status of Glycemic control, various clinical profile of diabetes mellitus such as prevalence of Microvascular and Macro vascular complications, acute metabolic complications, prevalence of other complications like Fatty liver, CKD, COPD, Hypertension , obesity and infections like pneumonia, UTI, Diabetic foot, Septicaemia, Fungal infections etc and the cause of mortality in patients with diabetes mellitus.

III. MATERIAL AND METHODS:

This study was a prospective hospital based study conducted in the postgraduate department of Medicine, Vss medical College of sciences and Research centre, Burla, Odisha, India. One hundred and fifty cases of T2 DM patients admitted from August 2018 to july 2020 of both gender and age group ≥30 year were enrolled for the study. Patients with other forms of DM, history of chronic alcoholism or smoking, HIV/AIDS,were excluded from this study. Institutional ethical committee clearance was duly obtained. DM was diagnosed according to WHO criteria [8]. Blood glucose level estimation was done by glucose oxidase method. Glycosylated haemoglobin (HbA1C) was measured by ion-exchange chromatography method. Lipid profile, liver function test, blood urea, serum creatinine, and serum electrolytes were done by auto analyser. Serum triglyceride (TG) was estimated using a standard kit supplied by Chemelex SA.Serum LDL was estimated using a standard kit. Serum HDL was estimated and VLDL was estimated by dividing the TG by 5.Direct and indirect fundoscopy was used to make the diagnosis and grading of retinopathy [9]. Nephropathy was diagnosed based on 24 hour urine albumin excretion rate. Neuropathy was diagnosed by history of paresthesia, numbness and tingling sensation and confirmed by touch sensation with 10-g monofilament pressure.CAD was diagnosed from history of angina or myocardial infarction documented by previous medical records or by ECG changes. CVD was diagnosed from the history of neurological deficit, clinical examination and CT scan/MRI of brain. Diabetic keto acidosis (DKA) and hyperglycemic hyperosmolar state (HHS) were diagnosed by standard diagnostic criteria.

IV. OBSERVATIONS

The present study of "CLINICAL PROFILE AND STATUS OF GLYCEMIC CONTROL IN TYPE 2 DIABETES MELLITUS" was undertaken between August 2018 and july 2020 in postgraduate department of medicine,in association with post graduate dept. of biochemistry at Veer Surendra Sai Institute Of Medical Science And Research,Odisha.

Table 1: Age and Gender distribution of cases

AGE in year	Male	Female	Total
30-39	4	3	7
40-49	21	8	29
50-59	19	9	28
60-69	20	20	40
70-79	17	14	31
>80	10	5	15
	91	59	150

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The age and gender distribution of patients is given in Table 1. The age of patients studied ranged between 30 year and 90 years with a mean age of 60. Out of them 91(60%) were male and 59(40%) were female..

Table 2: Duration of Diabetes

Duration in years	Male	Female	Total
<1	16	6	22 (14%)
1-5	34	29	63 (42%)
6-10	25	18	43(28%)
>10	17	5	22(14%)
	91	59	150

Duration of Diabetes is shown in Table 2 . The mean duration of DM was 5.99±5.15 years. Most of the patients having duration of diabetes of less than 5 years (56%)

Table 3: Microvascular complications in Type 2 DM

Microvascular complications	Male(%)	Female(%)	Overall %	P value
Nephropathy	46.1 (n=42)	49.1 (n=29)	47.3 (n=71)	0.71
Retinopathy	24.1 (n=22)	30.5 (n=18)	26.6 (n=40)	0.39
Neuropathy	16.4 (n=15)	25.4 (n=15)	20.0 (n=30)	0.18

Among the microvascular complications (Nephropathy, Neuropathy, Retinopathy) nephropathy was the most common microvascular complication.

Table 4: Prevalence of Macrovascular complications

Complications	Male(%)	Female(%)	Overall %	P value
Cerebro Vascular Disease(CVD)	34.06 (N=31)	30.50 (N=18)	32.66 (n=49)	0.64
Coronary Artery Disease(CAD)	13.18 (N=12)	10.16 (N=6)	12 (n=18)	0.5

Regarding macrovascular complications, it was found in 63 patients (42% of all patients). Cerebro Vascular Disease(CVD) was present in 32.66% patients (34.06% male,30.50% female) and Coronary Artery Disease(CAD) was present in 12% of patients(13.18% male, 10.16% female). Out of 150 patients, 23 patients (15.3%) did not have any microvascular or macrovascular complicati

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Table 5: Other complications

Other complications	Male (n=91)	Female (n=59)	Total (n=150)
Hypertension	65	36	101 (67.33%)
Infections	31	28	59 (39.33%)
Dyslipidemia	24	14	38 (25.33%)
Fatty liver	13	13	26 (17.33%)
Hypoglycemia	5	3	8 (5.33%)
Hyperglycemia Hyperosmolar State(HHS)	4	2	6 (4%)
Diabetic Ketoacidosis(DKA)	1	1	2(1.3%)

Apart from micro and macrovascular complications, Hypertension was the most common complication in DM. It was present in 67.33% of patients .The prevalence of other complications were infection 39.33%, dyslipidemia 25.33%, fatty liver 17.33%, Hypoglycemia 5.33%, HHS 4% and DKA 1.3% in our study.

Table 6: OUTCOME OF PATIENTS

OUTCOME	Male	Female	Total	P value 0.18
Discharge	69 (75.82%)	50 (84.74%)	119 (79.33%)	
Death	22 (24.17%)	9 (15.24%)	31 (20.66%)	

Taking the all causes of death, 20.66% (31 out of total 150) patients have died due to different complications in our study.The mean age of death for male was 65.09±11.25 years and for female was 64.5±13.62 years.

Table 7: Cause of mortality (n=31)

Parameters	No of patients (%)
CVD	45.16 (n=14)
Infection	29.03 (n=9)
CAD	9.67 (n=3)
CKD	9.67 (n=3)
HHS	6.45(n=2)

Disease specific mortality rate in our study is as follows: Cerebro vascular disease(CVD) was the major culprit and accounted for 45.16% of total deaths.

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V. DISCUSSION

In this study, out of 150 patients, 91(60%) were males and 59(40%) were females. The study shows the majority of patients (47.3%) were in the age group 60-80 years, which corroborates with the finding of other studies in developing countries.

Table 2 showed the duration of DM and mean age of patients in different durations of diabetes. Here we found that 14.66% (22 patients: 16 male and 6 female) patients were newly detected DM.The mean age of new detection is 52.69±12.50 years, (49.42±12.02 in males and 52.64±11.72 years in female).

The overall prevalence of nephropathy in our study was 47% (46.1% in male and 49.1.% in female) taking microalbuminuria (12%).This study data showed lower prevalence of microalbuminuria and higher prevalence of macroalbuminuria than to Micro Albuminuria Prevalence (MAP) Study[108] [microalbuminuria 39.8% (39.2–40.5; 95% CI), macroalbuminuria 18.8% (18.2–19.3; 95% CI)], CURES study (microalbuminuria 20.9%).

Diabetic neuropathy found to be 20% (16.4% in male and 25.4% in female) in our study. Other Indian studies reported higher results. Preeti P Pawde et al[99] from Tamil Nadu, India reported 33.33% prevalence of neuropathy among Diabetics. In our study duration of diabetes was the positive risk factors for developing neuropathy..

Table 3 shows the prevalence of retinopathy is 26.6% (24.1% in male, 30.5% in female) which is higher than previously reported Indian studies (in CINDI 6%)[42], and also CURES[32] 17.6% whereas Ramachandran et al had reported similar prevalence of retinopathy (23.7%).

The prevalence of macrovascular complications are shown in (Table 4). In our study Coronary Artery Disease (CAD) was present in 12% of patients (13.18% male, 10.16% female). The prevalence reported by different Indian studies ranges from 9% to 14%. In our study the mean duration of DM in CAD patients is higher than patients not having CAD (7.61±5.10 years vs 5.75±5.10 years).

The prevalence of all the micro and macrovascular complications are increasing with increasing duration of DM.There were 32.66% patients (49 patients: 31 male and 18 female) suffering from CVD in our study. Out of them 72.72% (21.33% of total patients) were having infarction and 27.27% (8% of total patients) were having haemorrhage. According to UKPDS study 2.6% of diabetic patients developed stroke on a 7.9 years follow up. The incidence of DM among patients with CVD in different geographical areas reported were North Carolina 13.9%, Africa 4-8%, Hong Kong 33.5%, Mumbai 14.2% and Cuttack , Odisha(S Das et al in 1993)[67] 8.0% .

The prevalence of other complications(Table 5)in our study were hypertension 67.33%, infection 39.33%, dyslipidemia 25.33%, fatty liver 17.33%, Hypoglycemia 5.33%, HHS 4% and DKA 1.3%. The Hypertension in Diabetes study (HDS-1) reported the prevalence of hypertension to be 39% (35% of the males, 46% of the females)[117] in patients of DM.

Diabetic patients are susceptible for many acute and chronic infections leading to high morbidity and mortality. In our study 39.33 (59 patients: 31 male, 28 female) suffered from one or multiple infections . The most common infections were Pneumonia (47.4%), UTI (35.5%), and Septicaemia (32.2%). Various Indian studies reported the high prevalence of tuberculosis in DM. In our study it is very low (4.5%) probably because of small sample size.

Out of 150 patients studied, 79.33% (119 patients) were discharged and 20.66% (31patients) died due to diabetes related complications (Table 7). Cerebro vascular disease (CVD) was the major cause of death in our study. It accounts for 45.16% of total deaths. Stroke was the third common cause of mortality in DM patients after heart disease and cancer, and represents a major health burden in our country. Other causes of death in the descending order are Infections, CAD, CKD and HHS with 27.3%, 15.16%, 12.1%, 9% respectively[123].

VI. CONCLUSIONS

This study highlights the high prevalence of vascular complications and infections In T2DM patients of this part of India. Nephropathy is the most common Microvascular complication and cerebrovascular disease was the most common macrovascular complication. CV-related death was the most common cause of death (CVD more than CAD) followed by infections and CKD.

This study emphasizes the need for screening of all T2DM patients for complications at the time of diagnosis for early detection. The higher prevalence of cerebrovascular disease and nephropathy as observed by us may be similar to a few Indian studies but a visibly different from world literature. This suggests further work on etiopathogenesis of T2DM as well as its complications in our population group.

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