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Original Research Article

Morbidity and Mortality Pattern in T2DM in and around Jabalpur city of Madhya Pradesh

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Abstract: Individuals living with type 2 diabetes mellitus (T2DM) are prone to different types of complications which become one of the reasons for the early death. The aims of the study are to analyze the pattern of morbidity in terms of micro and macrovascular complications and mortality among T2DM patients in and around Jabalpur. Total 491 T2DM patients were studied at Diabetes Education and Care Clinic, Jabalpur for 1 year. All included patients were screened for retinopathy using fundus examination, nephropathy using serum creatinine and proteinuria test, neuropathy using monofilament and biothesiometer, peripheral vascular disease was assessed using colour doppler and ECG was used for the assessment of cardiovascular disease. There was a male predominance with mean age of 46.23±2.34 years. Among morbidity, prevalence of retinopathy, nephropathy and neuropathy was 28.63%, 16.70% and 58.23% respectively. Prevalence of cerebrovascular disease, peripheral vascular disease and ischemic heart disease was 25.53%, 23.62% and 18.85% respectively. Mortality rate was 1.6% as during the study period 8 patients died. The present study has revealed a high prevalence of morbidity in terms of micro and macrovascular complication. Neuropathy was the most common microvascular complication whereas among macrovascular complication cerebrovascular disease was most common.
Keywords:morbidity, mortality, type 2 diabetes mellitus, microvascular, macrovascular

INTRODUCTION

Type 2 diabetes mellitus is associated with increased risk of various serious and many a time life-threatening complications. These complications are grouped as microvascular and macrovascular[1].

In microvascular complications hyperglycemia affect small blood vessels such as arterioles, venules and capillaries. Development of microvascular complications starts at the onset of diabetes mellitus and is the main reason for the different form of morbidities such as retinopathy, neuropathy and nephropathy[2].

Macrovascular complications are the major reason for the diabetes related mortality which includes cerebrovascular disease, coronary heart disease (CHD) and peripheral vascular disease (PAD). In a patients with T2DM, risk of stroke and heart attack increased by 2 to 4 times as compared to normal person[3].

Keen Knowledge about the morbidity and mortality pattern among diabetes cohorts of the area will provide the knowledge about the disease severity and help in providing the right tools for its management[1,2].

Hence, present study was performed to analyze the pattern of morbidity in term of micro and macrovascular complications and mortality among type 2 diabetes mellitus (T2DM) patients in around Jabalpur.

MATERIALS AND METHODS

A prospective study enrolled 500 T2DM patients,who were on regular follow up at Diabetes Education and Care Clinic, Jabalpurfrom Sept., 2013 to Sep., 2014.

Known patients with T2DM age >20 years who were attending the diabetes clinic during 2013 to 2014 were included in the present study. Patients with T1DM and pregnant women were excluded from the present study.

Detailed history was taken and recorded on a predesigned performa. All the patients were also evaluated for microvascular and macrovascular complications such as retinopathy, nephropathy,

neuropathy, cerebrovascular disease, peripheral vascular disease and ischemic heart disease, either alone or in combination.

Retinopathy examination was carried out by an experienced ophthalmologist using direct ophthalmoscopy andfundoscopy. Retinopathy was confirmed by the presence of microaneurysm, haemorrhage, exudates and macula oedema[4].Nephropathy was determined by proteinuria (>2.5 gm/24 hrs) and serum creatinine level> 1.5 mg/dl. Neuropathy was confirmed using parasthesia, numbness history, loss of ankle reflex or loss of light touch sensation using 10- gram monofilament and tingling sensation[5].

All the data were recorded in excel sheet and analyzed using IBM SPSS ver. 20.

RESULTS

Out of 500 registered cases of T2DM, 81 (16.2%) were dropped out whereas 8 (1.6%) patients died during the study period. Analysis of 419 (83.8%) patients was carried out in present study.

Mean age of study population was 46.23±2.34 years. Out of 419 patients, 230 (54.89%) were male and 189 (45.11%) were female. Most of the patients [155 (37%)] were from the age group of46-55 years followed by 89 (21.24%) patients who belong to age group of 55-65 years.

Out of 419 patients, 318 (75.89%) patients had uncontrolled diabetes mellitus whereas 101 (24.10%) were controlled.

The prevalence of microvascular complications likeretinopathy, nephropathy and neuropathy was 28.63%, 16.70% and 58.23% respectively and prevalence of cerebro vascular disease, peripheral vascular disease and ischemic heart disease was 25.53%, 23.62% and 18.85% respectively.

Table 1: Baseline parameters of the study population

Parameters		No of patients (%)
Age (years)	<25	0 (0)
	25-35	26 (6.20)
	36-45	62 (14.80)
	46-55	155 (37%)
	56-65	89 (21.24)
	>65	87 (20.76)
Socioeconomic status (Rs/month)	<1000	194 (46.4)
	1001-2000	161 (38.4)
	2001-3000	47 (11.2)
	>3000	21 (5)
BMI (kgm^2)	<19	102 (24.34)
	20-25	198 (47.25)
	>25	119 (28.40)
Duration of diabetes (years)	<5	206 (49.16)
	5-10	65 (15.51)
	11-15	26 (6.20)
	16-20	12 (2.86)
	>20	10 (2.38)
Treatment mode	Di*et al*one	100 (23.86)
	Diet + OADs	300 (71.60)
	Diet + insulin	19 (45.34)
Total calories (per day)	<1500	259 (61.81)
	1500-2000	152 (36.27)
	20001-2500	8 (1.90)
	>2500	0 (0)

Data is expressed as no of patients (%)

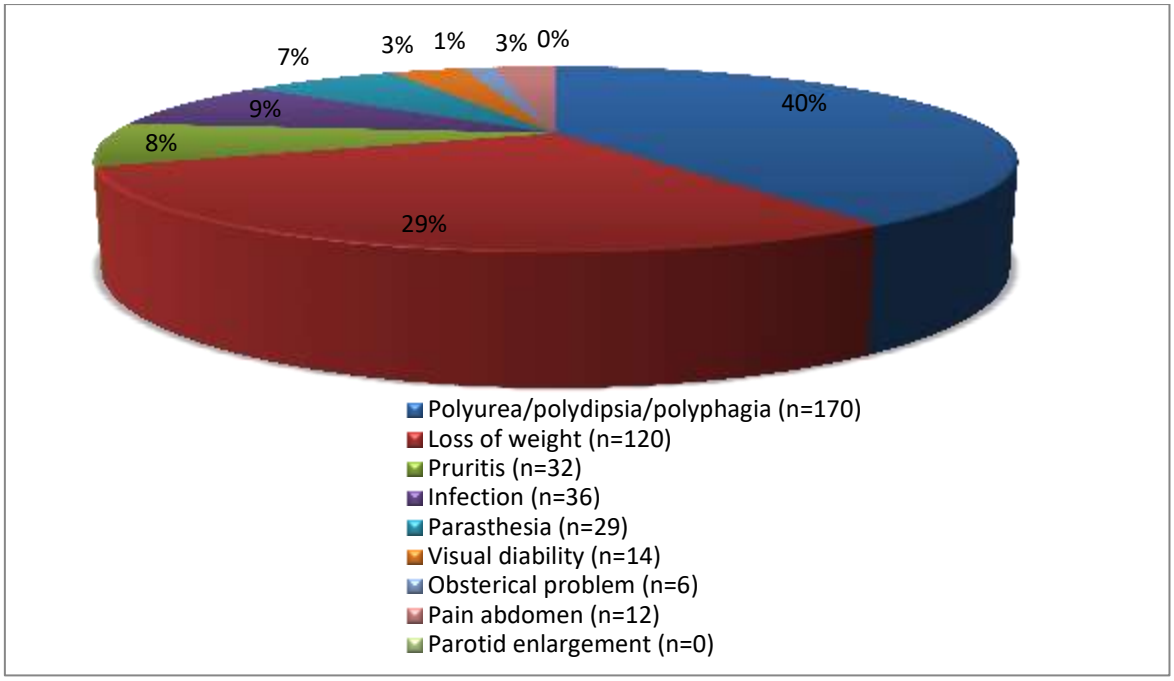

Fig-1: Distribution of patients according to presenting symptoms

Table 2: Morbidity characteristics of T2DM patients in present study

Morbidity type		No of patients (%)
CVA	None	312 (74.46)
	TIA	9 (2.14)
	Completed stroke	98 (23.38)
PVD	None	330 (78.75)
	Intermittent claudication	51 (12.17)
	Chronic ulcer in leg	25 (5.96)
	Amputation	13 (3.10)
IHD	None	340 (81.14)
	Angina Pectoris	18 (4.29)
	MI	61 (14.55)
Retinopathy	None	299 (71.36)
	Microaneursm	34 (8.11)
	Exudates	38 (9.06)
	Haemorrhages	28 (6.68)
	Proliferative	9 (2.14)
	Macular oedema	11 (2.62)
Nephropathy	None	349 (83.29)
	Proteinuria (>2.5 gm/24 hrs)	70 (16.70)
	Serum creatinine (1.5-2.5 mg/dl)	59 (14.08)
	Serum creatinine (>2.5 mg/dl)	11 (2.62)
Neuropathy	None	129 (30.78)
	PN	244 (58.23)
	MN	18 (4.29)
	AN	21 (5.01)
Hypertension		72 (14.4)

Data is expressed as no of patients (%). CVA; cerebro vascular disease, PVD; peripheral vascular disease, IHD; ischemic heart disease, TIA; transient ischemic attack, MI; PN; peripheral neuropathy, MN; mono neuropathy, AN; autonomic neuropathy

In present study 38 (9.06%) patients were suffering from pulmonary fibrosis, 7 (1.67%) had Vulvovaginitis, 26 (6.20%) had UTI and 5 (1.19%) were having Carbuncle type of chronic infection. Malignancy [14 (3.34%)] and liver diseases [24 (5.72%)] were also observed in present study.

Table 3: Mortality characteristic of study population

Parameter		Male	Female
Age (year)	<40	1 (12.5)	1 (12.5)
	41-50	1 (12.5)	0 (0)
	51-60	2 (25)	1 (12.5)
	61-70	1 (12.5)	0 (0)
	>70	1 (12.5)	0 (0)
Duration of diabetes (years)	<5	1 (12.5)	0 (0)
	6-10	1 (12.5)	1 (12.5)
	11-15	1 (12.5)	0 (0)
	16-20	1 (12.5)	1 (12.5)
	>20	1 (12.5)	0 (0)

DISCUSSION

In India diabetes mellitus is one of the common metabolic disordersand also has the second highest prevalence in world[6].Tight glycaemic control has been recommended by different studies as one of the authentic method to prevent and/or delay the progression of diabetes related complications[7,8].

In present study 40% patients complained regarding polyurea, polydipsia and polyphagia which is similar to the study done by Drivsholm *et al*.[9].

In present clinic based study, the prevalence of microvascular complications were lower as compared to study done by Agrawal *et al* but prevalence of macrovascular complication were higher as compared to Agrawal *et al*.[6]. The possible reason for this high prevalence of macrovascular complication may be that 75.89% of the patients were having uncontrolled diabetes.

According to American Diabetes Association 20-40% of diabetes patients suffer from nephropathy which is one of the leading reasons for end-stage renal disease (ESRD)[10].In our study 58.23% patients had nephropathy.

Ngwogu *et al* in their study of 853 diabetic patients reported that among microvascular complication peripheral neuropathy was most common (10.6%) followed by retinopathy in 2.5% and nephropathy in 5.5% patients [11].Similarly in our study 58.23% had neuropathy and 28.63% reported retinopathy.

Litwak *et al* in a large study involving 66,726 T2DM patients found that 27.2% of the patients were having macrovascular complications whereas 53.5% hadmicrovascular complications which are consistence with the present study findings[12].Deepa *et al* in 100 newly diagnosed T2DM patientsreported similar prevalence of microvascular and macrovascular complication as found in present study[13].

Another study done by Abougalambou *et al* on 1077 T2DM patients, reported higher prevalence of microvascular (78%) and similar prevalence of macrovascular complication[1].

Different studies have reported that duration of diabetes, poor glycaemic control, associated hypertension and dyslipidemia are considered as the risk factors for the microvascular complications[1,14].

Study done by Aguocha *et al* on 1124 diabetic patients reported 14% mortality with mean age being 55±16 years and mean duration of diabetes was 5.5 years[15].But in present study there was no such pattern of age and duration of diabetes. Another study done by Chijioke *et al* on 785 T2DM patients reported 32.5% mortality rate among study population which is very high compared to present study findings[16].The possible reason for this may be due to short follow up of the patients in present study.

CONCLUSION

The present study shows the high prevalence of micro and macrovascular complication in diabetic population of our area and the most common microvascular complication was neuropathy followed by retinopathy. Among macrovascular complications cerebrovascular disease and peripheral vascular disease were most common. Mortality rate during one year follow up was 1.6%. So to reduce the burden of complications there is a need of patient education and awareness to maintain the euglycemia as much as possible.

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