



## Study on Prevalence of Various Complications in Type-2 DM: A Hospital Based Study

### KEYWORDS

Blood Sugar, Type-2DM and Complications

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**ABSTRACT** *In the ancient Sanskrit Literature, diabetes mellitus was described as "honey-urine disease," associated with gross emaciation and wasting. Diabetes is a global endemic with rapidly increasing prevalence in both developing and developed countries. Our aim was to detect the prevalence and clinical profile of various complications in type-2 Diabetes Mellitus patients. As the prevalence of diabetes mellitus is rising and at the same time it is now affecting rural as well as urban people both. Large proportion of T2DM patients presented with various complications because of insidious and silent onset of T2DM and hence this disease acts as a silent killer.*

### Introduction:

The term '*diabetes*' was first coined by Araetaeus of Capodocia (81-133AD). Mellitus (honey sweet) was added by Thomas Willis (Britain) in 1675, when he detected sweetness in urine. It is said that it was first noticed by the ancient Indians; Shushruta had named it as 'Madhumeha'.<sup>1</sup> In the ancient Sanskrit Literature, diabetes mellitus was described as "honey-urine disease," associated with gross emaciation and wasting. Diabetes is a global endemic with rapidly increasing prevalence in both developing and developed countries.<sup>2</sup> Diabetes mellitus is a common metabolic disorder and is associated with development of chronic complications leading to significant morbidity and mortality. The onset of type 2 diabetes (T2DM) is often silent and insidious. Pathogenic processes causing T2DM range from autoimmune destruction of cells of pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The asymptomatic phase of hyperglycemia accounts for the relatively high prevalence of complications at initial presentation.<sup>3</sup> Majority of India's population is in the villages and the rural population is ignorant about the disease and its complications. It is therefore, essential to devise cost-effective and simple screening tests to detect complications. According to Diabetes Atlas (5th edition) in 2011, the global prevalence of diabetes was estimated at 366 million; this figure is predicted to reach 552 million by 2030. Eighty percent people live in low and middle income countries. Diabetes caused 4.6 million deaths in 2011. China leads the world with largest number of diabetic subjects followed by India. According to the Diabetes Atlas 2011 published by the International Diabetes Federation, the number of people with diabetes in India currently around 61.3 million is expected to rise to 101.2 million by 2030. Our aim was to detect the prevalence and clinical profile of various complications in type-2 Diabetes Mellitus patients..

### Material and Methods:

The present study was conducted in the Department of Medicine, Narayan Medical College and Hospital, Sasaram, India, during the period from May 2016 to October 2016 contributed a sample of this study, by the random sampling and after taking informed consent. Subjects were put to detailed clinical workup, Laboratory diagnosis of Diabetes Mellitus was confirmed by criteria laid by the American Diabetes Association (ADA).<sup>1</sup> Peripheral Neuropathy

was regarded as the bilateral loss of ankle jerks or gross sensory deficit in both feet as per standard criteria. Blood glucose was estimated by the ortho-toluidine, while glycosylated hemoglobin by the modified chemical method of Flickinger and Winterhalter. Lipid profile and serum creatinine were determined in all the patients. . The study protocol was approved by the Ethics committee of Narayan Medical College and Hospital. The present study consists of total 60 subjects between the age group 22-65 years.

### Exclusion Criteria

- Type 1 Diabetes Mellitus
- Any other severe illness (eg. Hypertension)
- Refusal to be a part of the study
- Pregnancy

A thorough neurological assessment of samples was done. Presence of sensory neuropathy was defined by symptoms of tingling and numbness over the extremities (bilaterally symmetrical) with or without impaired touch, vibration sense or joint position sense. Presence of motor neuropathy was noted. Autonomic dysfunction in the form of resting tachycardia, orthostatic hypotension, gastroparesis/diarrhea or abnormal sweating was noted. Ten gram monofilament was used to note any reduced sensation due to neuropathy. Dilated pupil funduscopy was carried out in all patients by an ophthalmologist and retinopathy was defined and graded.

Presence of microalbumin in two urine samples within a period of six months taken as criteria for detecting Diabetic Nephropathy. Blood glucose, glycosylated hemoglobin, Lipid profile and serum creatinine were determined in all patients. SPSS software package was used for the analysis. Statistical significance was defined as a p value <0.05 (two-sided). Mean standard deviation (SD) and confidence interval (CI) was calculated. Student's t-test and Chi-square test was used to calculate the significance between the variables.

### Results and Discussion:

In this present study, 55 were males and 40 were females. The mean age was  $52.05 \pm 3.01$  years. The maximum incidence of diabetes was seen between 52-68 years. Table-1 shows various metabolic parameters in the study population. The patients presenting with various diabetic compli-

cations, as CAD (n= 35), cerebrovascular accidents (n=9), PVD (n=11), Retinopathy (n=21), neuropathy (n=15) and nephropathy (n=4) was seen in the diabetic patients .Classical symptoms of diabetes as polydipsia, polyphagia and increased hunger was seen (n=35) without diabetic complications.

The patients presenting with complaints correlated with diabetic complications of CAD, Cerebrovascular disease, peripheral artery disease, retinopathy, nephropathy and neuropathy was 36.8%, 9.5%, 11.6%, 22.1%,15.8% and 4.2% respectively. Table-2 Prevalence of Various Complications in Type-2 DM.The high incidence of various complications of DM occur in patients having >7 HbA1C. Table-3 shows p values of the various complications in Type-2 DM.

TABLE-1 VARIOUS METABOLIC PARAMETERS OF DIABETES MALLITUS:

Parameters	Diabetes mellitus (n=95)	CAD (n=35)	CVD (n = 9)	PVD (n = 11)	DR (n = 21)	DN (n = 15)	DNe (n = 4)
Age	52.05 ± 3.01	58	63	56	57	54	61
Weight(kg)	75 ± 13	77	78	86	77	79	76.3
Height(cm)	164 ± 6.3	165	166.25	165	166	165	165
BMI	28.02 ± 12.8	28.04	30.10	30.6	27.28	27.85	28.81
Waist Circumference	90.14 ± 9.40	90	90.6	92.2	91	89.9	90.4
FBS	209 ± 73.7	221	227	278	227	235	244
PPBS	301 ± 95	324	345	422	336	345	339
Blood Urea	28.6 ± 15.5	36.5	37.4	34.5	31.4	33.8	31.1
Serum Creatinine	1.03 ± 0.39	1.24	1.275	1.9	1.24	1.203	1.12
HbA1c	8.67 ± 1.8	9.016	9.15	10.5	9.24	9.23	9.4
Cholesterol	201±45.5	245	200	210	245	210	230

BMI = Body mass index; CAD = Coronary artery disease; CVD = Cerebrovascular disease; DN = Diabetic nephropathy; DNe = Diabetic neuropathy; DR = Diabetic retinopathy; FBS = Fasting blood sugar; PPBS = Postprandial blood sugar; PVD = Peripheral vascular disease.

Table-2 Prevalence of Various Complications in Type-2 DM:

Various Complications	Number	Percentage(%)	P-Value
CAD	35	36.8	0.02
CVD	9	9.5	0.03
PVD	11	11.6	0.37*
DR	21	22.1	0.04
DN	15	15.8	0.02
DNe	4	4.2	0.03

\*Nonsignificant; Significant p <0.05.

Table-2 HbA1C in Correlation with Various Complications in Type-2 DM:

HbA1C (%)	Number	CAD (n=35)	CVD (n = 9)	PVD (n = 11)	DR (n = 21)	DN (n = 15)	DNe (n = 4)
<7	4	2	1	-	-	1	-
7-8	42	10	7	5	8	9	3

8-9	18	6	3	5	1	2	1
>9	31	9	5	3	5	7	2

Table-2 Comparison of Prevalence of Complications with Other Studies:

Complications (%)	Mohan et al <sup>13</sup> (n=4,471)	Hoorn study <sup>12</sup> (n=255)	Weerasuriya et al <sup>9</sup> (n=597)	Drivsholm et al <sup>8</sup> (n = 1,137) (M) (F)	Our study (n = 95)%
CAD	7.9		26.9	28.4 27.9	36.8
CVD			5.1	3.4 2.4	9.5
PVD	2.3		4.6	16.1 17.5	11.6
DR	34.2	1.9	15.2	5.4 4	22.1
DN		26.7	29	48.1 37.4	15.8
DNe		48.3	25.2	19.1 19.1	4.2

As we have conducted this study in our set up of Department of Medicine, Narayan Medical College and Hospital, Sasaram, India, where the awareness regarding the diabetes is substantially low. Majority of the patients who were diagnosed in this study was already presented with symptoms and signs of diabetic complications at the time of diagnosis .Very few cases were presented with the minor symptoms or on routine examinations done before various surgical procedures. Total 35 cases presented with sypmtoms classical for diabetes melltus like polyurea and polydipsia and increased appetite and was not associated with diabetic complications at the time of diagnosis. These findings are similar to the study done by Drivsholm et al<sup>7</sup> study. In our study we have found out CAD (n=35) 36.8%, Retinopathy (n =21) 22.1 % , Nephropathy (n=15) 15.8% . These findings are consistant with the study done by Weersurya et al<sup>6</sup> , they have found out CAD 26.9%, Diabetic nephropathy 25.2%, Neuropathy 29% in their study. In the study by Mohan et al<sup>4</sup> results are not similar to our study. They have found out majority of cases of diabetic complication was Retinopathy 34.2%, cases of CAD was low 7.9%. In Hoorn study<sup>5</sup> diabetic nephropathy was highest 48.3% and diabetic neuropathy was 26.7% . These findings are also consistant with our study. The study done by Agrawal et al<sup>8</sup> also shows the results approximate similar to our study, in which Retinopathy was highest 32.5%, Nephropathy 30.2%, Neuropathy 26.8%, CAD was found in 25.8%. The study done by Nafisa et al<sup>9</sup> which was done on the rural population of Goa also shows results similar to our study. They found Neuropathy 60%, CAD 32.6%, Retinopathy 15.4%, Peripheral vascular disease 11.5%, and Cerebrovascular accidents 6.9% in their study.

Conclusion:

As the prevalence of diabetes mellitus is rising and at the same time it is now affecting rural as well as urban people both. Large proportion of T2DM patients presented with various complications because of insidious and silent onset of T2DM and hence this disease acts as a silent killer. In summary, prevalence of complications is quite high even at the time of diagnosis of Type 2 diabetes. This is probably because of the insidious onset of diabetes and long duration of asymptomatic disease before symptoms develop. Hence screening tests for complications are strongly recommended at the time of diagnosis not only for early detection, but also to prevent the progression to end-stage disease.

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