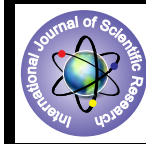


Incidence of Undiagnosed and Diagnosed Type 2 Diabetes Mellitus in Patients Admitted for Elective Surgery: A Multi-centric Study at, Jaipur



Medical Science

KEYWORDS : Incidence, Type 2 diabetes, Jaipur

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ABSTRACT

Among the total population of patients admitted to surgical wards, 289 patients, both diagnosed and undiagnosed were recorded as type 2 diabetics. The patients were allocated to four treatment groups receiving different treatment regimens for metabolic control. The characteristics of each patient and the incidence of diagnosed and undiagnosed type 2 diabetes mellitus were recorded and compared. There was no significant difference ($p>0.05$) in mean age of the patients in different treatment groups. Interestingly, 43.59% of the patients recorded were undiagnosed type 2 DM as compared to 56.41% diagnosed diabetic patients admitted for elective surgery. 57% of patients were associated with hypertension, 14.53% with hormonal disease, 2.07% with liver disease and 2.6% with other ailments. This study reveals the percentage of incidence of undiagnosed type 2 diabetes mellitus almost equal to diagnosed type 2 diabetics at different participating study centers in Jaipur. There is a strong need for awareness, patient education and more importantly early diagnosis of the diabetes to reduce its, long and short term complications.

Introduction:

Diabetes mellitus (DM) is a metabolic disorder resulting from a defect in insulin secretion or insulin action, or both.¹⁻⁴ It is the most common endocrine disorder and was estimated that more than 200 million people worldwide had DM in 2010, and 300 million will subsequently have the disease by 2025.⁵⁻⁷ India had 32 million diabetic subjects in the year 2000 and this number would increase to 80 million by the year 2030.⁸ The prevalence of diabetes is rapidly rising all over the globe at an alarming rate.⁹ India leads the world at rank one in number of diabetic patients hence being termed as the "Diabetes capital of the world". Type 2 diabetes, the major form of diabetes mellitus, accounts for 90 percent of the diabetic population. Patients with diabetes mellitus (DM) undergo surgery at a higher rate than non-diabetics and are prone to adverse outcomes.^{10,11} One fifth of the patients undergoing surgery are diabetic. Though various treatment strategies are employed to eradicate it globally but the awareness, patient education and diagnosis of diabetes at large scale in developing countries where resources are limited needs to be reviewed. The status of diabetes has changed from being considered a mild disorder to one of the major causes of morbidity and mortality over past thirty years. It is important to note that the rise in prevalence of DM is seen in all the six inhabited continents of the globe.⁸ The difference in percentage of urban rural prevalence in type 2 DM has been consistently reported from all parts of the globe including India. Hence, due to alarming prevalence of diabetes it was felt worthwhile to study the incidence of prevalence and percentage of undiagnosed type 2 diabetics admitted for elective surgery at different centers at, Jaipur.

Patients and Methods:

Among total population of patients admitted to surgical wards from a period of June 2009 to July 2011, 289 patients both diagnosed and undiagnosed were recorded as type 2 diabetics. All the patients were referred to endocrinology unit of the concerned participating hospital for metabolic management. In addition the percentage of other diseases associated with dia-

betes in each patient was noted. This study was conducted at M. G. Hospital, S. M. S. Hospital and Fortis Escorts Hospital, Jaipur. Written, informed consent of all the patients and approval of Institutional Ethics Committee (IEC) was obtained before starting the study.

Study design and protocol:

On enrolling the patients, routine investigation of fasting, random and post prandial blood glucose profile was done twice for confirmation by employing the glucose oxidation test for estimation of blood glucose. The history and duration of diabetes in addition to epidemiological characteristic profile was noted. After being educated on diet, importance of insulin with special emphasis on need to adhere to treatment, the patients were allocated to different treatment groups for metabolic control.

Statistical analysis:

ANOVA (one way classification) and percentages were employed for statistical analysis. A probability value of less than 0.05 ($p<0.05$) was considered to be statistically significant.

Results:

Among a total population of patients admitted in surgical wards in different study centers receiving different treatments for metabolic control, 289 patients were recorded as type 2 diabetics. While assessing the demographic profile of the patients no significant difference ($p>0.05$) was recorded in mean age (58.36 ± 0.80 , 55.60 ± 1.44 , 52.49 ± 1.37 , 63.50 ± 1.05) of both the diagnosed and undiagnosed patient population in different treatment groups. 34.25% of the patients were from rural and 65.74% from urban sector. There was a significant different ($p<0.001$) in mean BMI of the male and female patient population. It is interesting to note that 43.59% of the patients were newly detected (undiagnosed) type 2 diabetics which are almost equal to the diagnosed type 2 diabetics. Moreover, there was a significant difference ($p<0.001$) in associated diseases among treatment groups. Hormonal diseases in addition to diabetes mellitus were recorded in 14.53% and hypertension in 57.43%

patients respectively. However, 2.07% of the patient population had liver disease and 2.6% some other ailments (Table 1)

Table 1: Characteristics of the patients

Characteristics of the patients					
No. of Patients	Regime A	Regime B	Regime C	Regime D	p Value
	74	75	69	71	---
Mean age (years)	58.36±0.80	55.60±1.44	52.49±1.37	63.50±1.05	---
Sector Rural/urban	Rural 34.25%		Urban 65.74%		---
Sex-ratio (Male/female)	2.04:1				---
BMI (weight/height ²)	Male 23.94±0.15		Female 26.26±0.33		<0.001
Incidence of DM	Newly detected	< 5 years	> 5 years		---
	43.59%	15.57%	40.83%		
Associated disease	Liver disease	Hormonal disease	Hypertension	Others	<0.001
	2.07%	14.53%	57.43%	2.6%	

A= Regular + NPH 30:70 (pre-mixed), B= Regular + NPH (split-mixed), C= Glargine + lispro (split-mixed), D= Detemir + aspart (split-mixed)

Discussion

The prevalence of diabetes is rapidly rising all over the globe at an alarming rate.⁹ India leads the world at rank one in number of diabetic patients. The incidence of undiagnosed type 2 diabetes mellitus is more than diagnosed type 2 diabetics in Indian scenario. It was found worthwhile to study the incidence of undiagnosed type 2 DM in patients admitted in surgical wards for different surgical procedures as the diabetics are more prone to adverse events than their non diabetic counterparts. Many attempts have been made to reduce the suffering due to acute and chronic complications of the patients who are diabetic. Almost equal or sometimes more percentage of undiagnosed

than diagnosed DM is found in general patient population when they come with complaint of some other ailment and are suddenly diagnosed as diabetic after clinical investigations. The awareness, patient education and diagnosis of diabetes need to be reviewed at larger scale for its adequate metabolic control. Hence, this study has recorded the total percentage of diabetics among patient population who were admitted in different surgical wards to be operated for different surgical procedures. The percentage of undiagnosed type 2 DM so recorded along with the associated disease were compared with diagnosed type 2 DM. Statistically there was no significant difference (p>0.05) in mean age of the diagnosed and undiagnosed patients in different treatment groups. As usual more incidence (65.74%) of type 2 DM was recorded from urban than rural population (34.25%). Moreover, a significant different (p<0.001) was noted in mean BMI of the male and female patient population. "Asian Indian Phenotype" which refers to certain unique clinical and biochemical abnormalities in Indian population includes increased insulin resistance and greater abdominal adiposity.¹² Which makes Asian Indians more prone to diabetes and premature coronary artery disease.¹³ A study by WHO-ICMR showed that the prevalence of self-reported diabetes was 7.3% in urban, 3.2% in periurban, and 3.1% in rural areas.¹⁴ In 'Prevalence Of Diabetes in India Study (PODIS)', based on the ADA criteria, the prevalence of diabetes was 4.7 per cent in the urban compared to the 2.0 percent in rural population. Interestingly this study has recorded 43.59% of the patients as newly detected (undiagnosed) type 2 diabetics which are almost equal to the diagnosed type 2 diabetics. Moreover, the associated disease in addition to type 2 DM were also recorded and compared among the groups. A statistically significant difference (p<0.001) was noted in percentage of associated diseases among patient population. Hormonal diseases were recorded in 14.53% and hypertension in 57.43% patients. However, 2.07% patients had liver disease and 2.6% some other ailments. This study reveals almost equal incidence of undiagnosed and diagnosed type 2 DM in patients with other associated diseases at different participating centers in Jaipur. It is an indication that there is a strong need for awareness, patient education and early diagnosis of diabetes so as to reduce its, long and short term complications.

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