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Pathology

PREVALENCE OF HYPOTHYROIDISM AMONG DIABETES MELLITUS.

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ABSTRACT

Aims— There is great variability in the prevalence of hypothyroidism among general population and among diabetes. We evaluated the prevalence of hypothyroidism among patients of type 2 diabetes mellitus.

Methods— : It was a cross sectional observational study. All subjects already diagnosed cases of type 2 diabetes mellitus were assessed for **inclusion –** exclusion criteria, and on qualification they were requested to fill up Socio-demographic data sheet or asked verbally and filled up by investigators. The lab reports were recorded in tabulated form.

Results— sample consisted of 220 subjects with mean age of 45.78 years (± 6.21 years) and mean duration of diabetes 11.56 ± 7.54 years. There was family history of diabetes among 44 (20%) of the sample. and based on TSH cut off a total of 45 sample size was qualified as hypothyroidism, consisting 20.45% of the total sample size.

Conclusions— This study finds a prevalence of 20.45% of hypothyroidism among diabetes mellitus.

KEYWORDS : Prevalence; Hypothyroidism; Diabetes Mellitus

INTRODUCTION

The World Health Organization (WHO) estimated diabetes prevalence was 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is expected to increase from 171 million in 2000 to 366 million in 2030 [1,2] Factors such as adoption of a sedentary lifestyle, dietary modifications, ethnicity, hypertension and obesity are thought to be major contributions to this epidemic [3,4]

Impact of persistent weight gain and hyperglycemia may leads to many general medical complications and may be due to thyroid dysfunction (hypothyroidism). There is great variability in the prevalence of hypothyroidism in general population, ranging from 6.6% to 13.4% [5,6]. In diabetic patients, the prevalence is still greater and varies from 10 to 24% [6,7].

The aim of this study is to investigate the prevalence of hypothyroidism in patients with type 2 diabetes mellitus (T2DM) in clinical routine in our population.

MATERIALS AND METHOD

This study was conducted at Ante natal out patients department at a tertiary care medical college hospital of Jharkhand, India. The study protocol was approved by the institutional review board of the institute. It was a cross-sectional study carried out over a nine months period (January 2018 – April 2018). All consenting patients who attended this hospital for management of diabetes were recruited. All recruited subjects who satisfied the inclusion criteria for the study, presence of any other major co morbid medical or other illness like hypertension, chronic kidney disease, was kept as exclusion criteria. Included patients were examined clinically after taking detailed history and their socio demographic variables. They were requested to complete a questionnaire about their socio-demographic data sheet and advised for a blood test for blood sugar profile including Hb1Ac and thyroid profile. Their height weight records were updated and noted, thus body mass index (BMI) of the subjects was calculated and expressed in kg/m2. Details of family history of diabetes, history of previous pregnancies and the socio-economic status were obtained.

Tools

Socio-demographic Data Sheet: The socio demographic data sheet included age, religion, occupation, education and clinical information like duration of diabetes and other medical history.

Procedure:

It was a cross sectional observational study. All subjects were assessed for inclusion – exclusion criteria, and on qualification they were requested to fill up Socio-demographic data sheet or asked verbally and filled up by investigators. The lab reports were recorded in tabulated form. Thyroid dysfunction was classified as clinical hypothyroidism, if TSH levels were greater than 4.20 µUI/mL and FT4 levels were lower than 0.93 ng/dL.

Statistical Analysis:

The collected data of all patients was statistically analyzed, using Statistical Package for Social Sciences (SPSS, Inc., Chicago, Illinois) version 10.0. Data analysis included means and standard deviations for complete sample. Frequency analysis was used to determine the prevalence of HYPOTHYROIDISM.

RESULTS

A total of 220 subjects were included for the study, Table 1 summarizes the sample characteristics. The mean age of the sample was 45.78 years (± 6.21 years) with minimum age of 36 years to a maximum age of 72 years in ours sample. The mean education years for the sample were found to be 11.56 ± 2.10 years. The mean duration of diagnosed as diabetes was 11.56 ± 7.54 Years. The sample consisted of mostly Hindu religion (n=181, 82.27%) and other non Hindu consisted only 17.73% (n=39) (Table -1).

Among the total sample size of 220 patients 129 patients (58.63 %) reported their occupational status as working class and 41.37% (n=91) were either housewives or unemployed. There was family history of diabetes among 44 (20 %) of the sample. The BMI was categorized as underweight (BMI below 18.5) that consisted n=13 (5.90 %); BMI 18.5 – 24.9 is categorized as Normal, that consisted 74 sample (33.63%); Overweight population consisted of n=91 (41.36%) and Obese population consisted of n=42 (19.09 %). Finally based on Thyroid function tests a total of 45 patients had thyroid dysfunctions consisting 20.45% of the total sample size. (Table -1)

DISCUSSION

We found a 20.45% of prevalence of hypothyroidism among diagnosed patients of type 2 diabetes mellitus, The found prevalence is in accordance with many other studies reporting similar prevalence rate ranges between 10 to 24% [6,7]. We found prevalence of hypothyroidism on slightly higher side of this range of these referenced studies, this may be due to inclusion of subclinical hypothyroidism. However we did not found any case of hyperthyroidism. Usually mild variation in prevalence may be attributable to sample selection and different lab test or different criteria used. In ours study we also found very high prevalence of positive family history of diabetes that is 20%, In a large sample of 10283 participants the prevalence of diabetes among individuals who have a first-degree relative with diabetes were found to be 14.3% [9]. It is also noticeable that earlier studies showing higher prevalence are usually carried out at metropolitan background and higher socioeconomic class, where food habits and physical exercise may be compromised. But ours study from small city and middle lower

socioeconomic class is alarming that prevalence of DM is spreading across socio demographic boundaries.

Abnormal thyroid hormone levels found in diabetes may be considered as dysfunction of thyroid hormone binding inhibitor (THBI), an inhibitor of the extra thyroidal conversion enzyme (5'-deiodinase) of T4 to T3, and also dysfunction of the hypothalamo-pituitary thyroid axis. These situations may prevail in diabetes and would be aggravated in poorly controlled diabetics. Stress, which is associated with diabetes, may also cause changes in the hypothalamus-anterior pituitary axis in these diabetics [8].

As most of the earlier studies used blood sugar estimation in fasting state and post prandial as 2 hr after 75 gm of oral glucose. However, post meal blood sugar estimation depends upon certain transient or immediate dietary or metabolic or psychological factors, which may influence and attribute to glucose measurement result. Whereas measurement of Hb1Ac is known to provide average glucose level for previous two to three months. But for this cross sectional study we had an aim to detect hypothyroidism among type 2 DM, we used only fasting sugar estimation for the assessment.

In future we also need larger samples size, along with a matched control group, simultaneous assessment of other biochemical parameters, and burden of various other metabolic problems, and follow-up studies to know the longitudinal course of these problems.

CONCLUSION

This study finds a prevalence of 20.45% of hypothyroidism among 220 patients of type 2 diabetes mellitus.

Table 1. Sociodemographic and clinical features of the study (n=220)

	Mean ± SD	Min	Max
age	45.78 ± 6.21	36	72
Years of education	11.56 ± 2.10	7	15
Duration of diagnosed as diabetes (Years)	11.56 ± 7.54	2	23
Mean Hb1Ac	7.09 ± 1.23	5.5	9.80
		n	%
Religion	Hindu	181	82.27
	Others	39	17.73
Occupation	Working	129	58.63
	House wife / unemployed	91	41.37
Family h/o Diabetes	Yes	44	20
	No	176	80
BMI	Under weight below 18.5	13	5.90
	Normal (18.5 – 24.9)	74	33.63
	Over weight (25 – 29.9)	91	41.36
	Obese (over 30)	42	19.09
HYPOTHYROIDISM	No	175	79.55
	Yes	45	20.45

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