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GENDER DIFFERENCE OF THYROID PROFILE AMONG DIABETES MELLITUS.

Pathology

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ABSTRACT

Aims— To evaluated the prevalence and gender difference 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 with filling up Socio-demographic clinical data sheet then blood tests are done for lab reports for sugar estimation and thyroid function tests.

Results— sample consisted of 286 subjects with mean age of 54.21 years (± 7.34 years) and based on TSH cut off a total of 45 sample size was qualified as hypothyroidism, consisting 19.94 % of the total sample size. On gender comparison females had higher fasting blood sugar (136.84 ± 13.28 vs 130.04 ± 11.17 ; t = 4.547, p= .001) and significantly higher serum TSH level (5.59 ± 0.83 vs 4.57 ± 1.50; t= 7.381, df= 284, p= .000).

Conclusions— This study finds a prevalence of 19.94 % of hypothyroidism among diabetes mellitus patients and females are showing higher mean fasting blood glucose and TSH level.

KEYWORDS

Gender; Thyroid; Diabetes

INTRODUCTION

In a large study involving 17,353 subjects hypothyroidism was found in 4.6% and hyperthyroidism in 1.3% of subjects.[1] It was also found that thyroid dysfunction was associated with advancing age, diabetes and female gender [2].

The World Health Organization estimated diabetes prevalence was 2.8% in 2000 and 4.4% in 2030. [3] Factors such as adoption of a sedentary lifestyle, dietary modifications, ethnicity, hypertension and obesity are thought to be major contributions to this epidemic [4,5]. All this may lead to "metabolic syndrome," which is characterized by central obesity, hyperglycemia, hypertriglyceridemia, decreased high-density lipoprotein-cholesterol, and elevated blood pressure. Metabolic syndrome has an increased risk of type 2 diabetes mellitus and association with thyroid dysfunctions. Further, females, elderly patients and patients with uncontrolled diabetes has found stronger association with diabetes [6].

However, prevalence of hypothyroidism in diabetic patients may be ranged from 10 to 24% [7,8], thus we aimed this study is to investigate the gender difference in thyroid profile of with type 2 diabetes mellitus in ours sample.

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 five months period (January 2018 – May 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 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, it is an extension study of previous prevalence study with further increasing sample size by data collection. 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.

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 percentage of the variables. The parametric t-test was used to determine if differences existed between the groups. Statistically significant levels are reported for p values less than or equal to 0.05. Highly significant levels are p values less than .001.

RESULTS

A total of 286 subjects were included for the study, Table 1 summarizes the sample characteristics. The mean age of the sample was 54.21 years (± 7.34 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 11.66 ± 2.32 years. The mean duration of diagnosed as diabetes was 09.81 ± 6.36 Years. The gender distribution of the whole sample was 180 females and 106 male patients constituting 62.9% and 37.1% respectively. The sample consisted of mostly Hindu religion (n=221, 77.27%) and other non Hindu consisted only 22.73% (n=65) (Table -1).

Occupationally 156 (54.54 %) were employed and remaining 45.46% were either housewives or unemployed. There was family history of diabetes among 57 (19.94 %) of the sample. The BMI was categorized as underweight (BMI below 18.5) that consisted n=16 (5.59 %); BMI 18.5 – 24.9 is categorized as Normal, that consisted 87 sample (28.32 %); Overweight population consisted of n= 127 (44.40 %) and Obese population consisted of n=57 (19.94 %). Finally based on Thyroid function tests a total of 57 patients had thyroid dysfunctions consisting 19.94 % of the total sample size. (Table -1)

Means of all continuous variables were compared for gender by independent t test, result (table -2) shows significantly higher fasting blood sugar for females (136.84 ± 13.28 vs 130.04 ± 11.17 ; t = 4.547, p= .001) and serum TSH level were (5.59 ± 0.83 vs 4.57 ± 1.50) respectively for females and male patients (t= 7.381, df= 284, p= .000). Other variables like Age, PPBS and Hb1Ac were not different across the gender [Table -2].

DISCUSSION

Females are known to suffer from hypothyroidism approximately 2-3 times then male counterparts in general population [9]. Here in ours study we found a 19.94 % of prevalence of hypothyroidism among patients of type 2 diabetes mellitus. This found higher prevalence of hypothyroidism is in continuation to ours preliminary report of 20.45 % with lesser sample size. These findings are in accordance with many

other studies reporting similar prevalence rate ranges between 10 to 24% [7,8]. The reason for found prevalence of hypothyroidism on slightly higher side of this range of these referenced studies, could be due to inclusion of subclinical hypothyroidism.

As expected, we found a clear relationship between diabetes and thyroid abnormality. The both disease represents area of endocrinology and metabolism, and genetic differences may be attributable to genetic structure, environment and lifestyle. Pathophysiologically dysfunction of thyroid hormone binding inhibitor (THBI), an inhibitor of the extra thyroidal conversion enzyme (5'-deiodinase) of T4 to T3, and dysfunction of the hypothalamo-pituitary thyroid axis is considered as reasons thyroid hormone dysfunctions in diabetes [10].

We found higher mean TSH level in ours study, this shows that females are at higher risk for developing hypothyroidism. This is in accordance to the idea of female preponderance in thyroid disorders, and its prevalence increases with age. Thyroid hormones have pleiotropic effects on lipid and glucose metabolism, blood pressure, and energy expenditure. Thyroid dysfunction is a risk factor for diabetes as well as to cardiovascular disease [11]. This study has demonstrated that thyroid dysfunction affects more to diabetics, literature support that causality, a positive family history of thyroid disease had a higher chance of developing thyroid dysfunction, while the family history of diabetes did not increase the risk for thyroid dysfunction [12].

We conclude that Type 2 diabetic mellitus patients are affected by thyroid dysfunction in approximately 20% of cases, whereby the majority are hypothyroid cases. Our findings regarding the Gender difference, we found higher mean TSH value and higher mean fasting blood sugar value among female diabetics. 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.

Based on a high prevalence of thyroid dysfunction among Type 2 diabetic patients, routine screening for thyroid dysfunction is highly recommended in clinical practice.

CONCLUSION

This study finds a prevalence of 19.94% of thyroid dysfunction among patients of type 2 diabetes mellitus and females are showing higher mean fasting blood glucose and TSH level.

Table 1. Sociodemographic and clinical features of the study (n=286)

	Mean ± SD	Min	Max
age	54.21 ± 7.34	36	72
Years of education	11.66 ± 2.32	7	15
Duration of diagnosed as diabetes (Years)	09.81 ± 6.36	2	21
		n	%
Gender	Female	180	62.9
	Male	106	37.1
Religion	Hindu	221	77.27
	Others	65	22.73
Occupation	Working	156	54.54
	House wife / unemployed	130	45.46
Family h/o Diabetes	Yes	57	19.94
	No	229	80.06
BMI	Under weight below 18.5	16	5.59
	Normal (18.5 – 24.9)	87	28.32
	Over weight (25 – 29.9)	127	44.40
	Obese (over 30)	56	19.58
HYPOTHYROIDISM	No	229	80.06
	Yes	57	19.94

Table 2: Comparison of mean serum glucose level and thyroid function values across gender with independent t test.

	Gender	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Age	Female	54.17	7.38	-.123	284	.902
	male	54.28	7.30			
FBS	Female	136.84	13.28	4.547	284	.001*
	male	130.04	11.17			
PPBS	Female	154.60	12.99	-1.758	284	.080
	male	157.37	12.61			
Hb1AC	Female	6.03	0.59	-1.678	284	.094
	male	6.15	0.63			
TSH	Female	5.59	0.83	7.381	284	.000*
	male	4.57	1.50			
T3	Female	94.60	16.09	1.466	284	.144
	male	91.84	13.98			
T4	Female	5.87	2.58	.742	284	.459
	male	5.61	3.10			

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