



GENDER AND ITS EFFECT ON THYROID PATHOLOGY IN TYPE 2 DIABETES MELLITUS PATIENTS SEEKING CARE IN A TERTIARY CARE HOSPITAL IN CHHATTISGARH

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ABSTRACT

Both thyroid and diabetes have same set of clinical signs and symptoms like weight gain, lethargy, weakness, fatigue, and sense of apathy. Relationship between thyroid and insulin have been documented to be antagonistic. Evidence suggesting relationship with gender has been documented elsewhere. AIIMS Raipur being the tertiary care center has large majority of patients coming with diabetes and thyroid.

Aim - A study was planned to measure the impact of gender on pathology of thyroid function in patients coming with diabetes mellitus.

Methods - The study was done in Medicine outdoor in a tertiary care hospital set up. Patients were evaluated and examined with detailed history. Appropriate investigations like TSH, RBS, and HbA1C etc. were done. Measures of central tendency and tests for association were applied to establish relationship p values less than .05 were taken as statistically significant.

Results and conclusions - It was found that males were having more abnormal thyroid function tests as compared to females who were evaluated (35% versus 26%). This results suggest that males need to be more alert and get their TSH levels monitored regularly if they are suffering from Diabetes Mellitus type 2.

KEYWORDS :

INTRODUCTION

Hyperglycemia shared by metabolic disorders have been grouped under Diabetes Mellitus caused by deficiency of insulin either absolute or relative. Insulin regulates how carbohydrate, protein or fat are metabolized in the body and lack of insulin impairs the normal metabolism resulting in the altered pathology which results in different complications encountered in patients suffering from diabetes mellitus type 2. (1) It is well known that both insulin and thyroid regulate major bodily functions and their effect ultimately decides how body will regulate its metabolites i.e protein, carbohydrates and lipids. Whereas thyroid hormone enhances the glucose absorption from gut, gluconeogenesis, and glycolysis in relation to metabolism of carbohydrate, while it also enhances protein synthesis but in relation to lipid metabolism the effect of thyroid hormone is impeding in nature as it decreases lipogenesis. Insulin on other hand has effects on same metabolites which in some instances are similar to thyroid hormone while in some it has antagonistic effects like it reduces the Glycogenesis, Glycolysis while it enhances the lipogenesis, protein synthesis and glycogenesis. (2) The growing evidence about relationship of developing hypothyroidism in diabetes mellitus perhaps stems from these facts and has been demonstrated globally not only in adults but also in pediatric population including in India (3,4,5) Considering these facts along with evidence suggesting India sharing maximum burden of world diabetic population the situation demands examination in various variables (6) Earlier too studies have indicated gender to play certain role in deciding about TSH levels in diabetic population considering its complex interdependence. (7)

The present study was done with an aim to understand further about the relationship of gender and thyroid hormone abnormality in diabetic population coming in tertiary care hospital.

METHODOLOGY

The study was done in a tertiary care set up after approval from appropriate authority in college administration. It was across sectional type of observational study where patients coming in OPD and staying in IPD of the medicine and surgery wards in the AIIMS Raipur hospital were included after they fulfilled the inclusion criterion. The study was done over a

duration of six months. Patients were informed about nature of the test they were being administered and after their consent they were included in the study. Total 158 patients were evaluated for assessing their weight, height, random blood sugar, HbA1c, systolic blood pressure and diastolic blood pressure, TSH and Free T4 Levels using the available lab inside the department concerned. Methods used to estimate plasma glucose was GOD/POD and other serum parameters like TSH, Free T4 etc were measured using ELISA Micro wells method with readings at 450nm in a strip ELISA reader.

Height was taken using a stadiometer, weight by trained staff after setting the scale at zero while blood pressure was measured using standard protocols available. (8)

Inclusion Criterion -

All previously diagnosed case of diabetes mellitus type 2 having fasting plasma glucose levels ≥ 120 mg/dL and were receiving some form of anti hypoglycemic treatment. All patients irrespective of gender, age more than 10 years were included. To ensure we don't have any bias towards euthyroid or else we included only those who didn't had any thyroid (TSH) levels tested earlier. Patients not matching these criterions were excluded. Pregnant women were not included in our study. Standard definition for Subclinical Hypothyroidism was set at TSH levels > 4.0 mIU/L along with a normal serum level of Free T4 (0.9 to 1.9 ng/dl) (9)

Data analysis- All variables being quantitative in nature are expressed as mean and standard deviation while qualitative data is explained in percentages. Other tests like One way ANOVA was used to compare continuous variable while tests of association was applied to determine any relationship. A p value of $p < .05$ was taken as of statistical significance. SPSS version 22 was used to analyze the data compiled on MS Office Excel sheets.

RESULTS

Variable	Total	Males (n= 93)	Females (n=65)	P value
Age	46.4 \pm 10.5	46.7 \pm 11.4	45.8 \pm 11.4	>.05
BMI	28.6 \pm 10.6	29.2.7 \pm 10.2	28.1 \pm 1.48	<.05
Hypertension	64(40%)	44(28%)	20(13%)	>.05
Systolic BP	119.9 \pm 9.8	120.7 \pm 11.7	117.7 \pm 9.5	>.05

Diastolic BP	76.5 ± 8.9	77.74 ± 9.78	76.7 ± 10.8	>.05
FBG	142.5 ± 39.4	140.6 ± 36.4	137.6 ± 24.9	<.05
HbA1C	7.64 ± 1.4	7.6 ± 1.3	7.7 ± 1.4	<.05
TSH	2.8 ± 1.6	2.9 ± 1.5	1.14 ± 1.1	<.00
Free T4	1.23 ± 0.4	1.32 ± 0.2	1.25 ± 0.2	>.05
SCH	65 (41%)	35 (22%)	30 (19%)	<.05

Table 1. Describing the Age in years , BMI , Hypertensive population out of 158 study participants in percentage, Systolic BP in mm Hg , Diastolic BP in mm Hg , Fasting Blood Glucose levels in mg/dL , Glycosylated hemoglobin (HbA1C) , serum TSH (Thyroid Stimulating hormone) and Free T4 levels. Subclinical Hypothyroidism has been described in percentages .

Variable	Euthyroid n=98			P value	SubClinical Hypothyroidism n=65			P value
	Total	Males (n=93)	Females (n=65)		Total	Males (n=35)	Females (n=30)	
Age	53.23 ± 10.1	53.3 ± 9.6	54.14 ± 9.3	>.05	53.23 ± 10.1	53.3 ± 9.6	54.14 ± 9.3	>.05
BMI	28.1 ± 2.9	27.2 ± 2.6	25.8 ± 3.5	<.05	28.1 ± 2.9	27.2 ± 2.6	25.8 ± 3.5	<.05
Hypertension	36 (39%)	22 (24%)	24 (26%)	>.05	28 (43%)	18 (28%)	10 (16%)	>.05
Systolic BP	128.7 ± 12.7	129.7 ± 11.5	127.19 ± 14.9	>.05	132.7 ± 12.7	130.7 ± 11.5	132.19 ± 14.9	>.05
Diastolic BP	82.0 ± 9.7	82.0 ± 8.9	80.9 ± 11.2	<.05	83.10 ± 7.7	82.8 ± 8.9	83.31 ± 11.2	>.05
FBG	135.9 ± 38.3	139.6 ± 38.3	128.3 ± 37.2	<.05	138.9 ± 38.3	139.72 ± 38.3	136.3 ± 37.2	<.05
HbA1C	7.5 ± 1.4	7.5 ± 1.3	7.4 ± 1.3	<.05	8.0 ± 2.0	7.8 ± 1.3	8.25 ± 2.3	<.05
TSH	1.6 ± 0.8	1.6 ± 0.8	1.8 ± 0.8	<.00	6.5 ± 2.4	6.8 ± 2.8	5.9 ± 2.1	<.00
Free T4	1.2 ± 0.4	1.3 ± 0.2	1.3 ± 0.2	>.05	1.2 ± 0.4	1.3 ± 0.2	1.2 ± 0.1	>.05

Table 2- Comparative analysis of Diabetic Population with Euthyroidism and Sub Clinical Hypothyroidism.

In our study we found out that more males 35(22%) of the total 158 diabetic population had sub clinical hypothyroidism out of 65 patients detected with TSH levels matching the defined criterion of SCH. (Table 1) Incidentally we had 64 (40%) hypertensive patients with males outnumbering females . We found most of our diabetic study participants were of age 46 years with SD of 10.5 with BMI closing to obesity (Table 1) .

On comparing the euthyroid population with SCH population we found that TSH levels of gender were significantly different with p value <.05 (Table 2) .

DISCUSSION

Our Findings suggest some relationship between gender and TSH levels in Diabetic Population of type 2 in nature . Other studies conducted too have noted similar findings with males having more SCH than females in their diabetic population . Studies done previously with more subjects and different study designs have yielded similar results . (10) Some studies though have found that females were having more thyroid hormone level abnormalities in diabetic population (11) Studies done in Indian setting earlier have more females having thyroid abnormality when compared to males . (12)

CONCLUSION

Our study is certainly making the evidence more firm that all diabetic pateints should get evaluated for their TSH levels periodically . Males and females both can be having the altered TSH levels so both should be made aware about this relationship and made alert about possible outcomes owing to thyroid malfunction and elevated TSH levels .More research with large sample size may enable us to say conclusively which sex is more likely to have the alteration .

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