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## Correlates of thyroid disorder in type DM patients

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### Abstract

Diabetic patients have a higher prevalence of thyroid disorders compared with the normal population. Because patients with one organ-specific autoimmune disease are at risk of developing other autoimmune disorders, and thyroid disorders are more common in females, it is not surprising that up to 30% of female type1 diabetic patients have thyroid disease. A thorough clinical examination including vitals, general physical examination, systemic examination and investigations was carried out. Biochemical investigations were carried out using proper aseptic precautions for collecting blood. It is seen that, in the present study patients were divided into 2 groups based on duration of diabetes. There were 52 diabetic patients in  $\leq 3$  months group, of which 40 patients were euthyroids and 12 patients had thyroid dysfunction. There were 58 diabetic patients in  $\geq 3$  months group, of which 44 patients were euthyroids and 14 patients had thyroid dysfunction. However there was no statistically significant difference between these two groups. (p value was 1.00).

**Keywords:** Diabetes, thyroid disorders, euthyroids

### Introduction

It is estimated that approximately 285 million people or 6.4% in the age group 20-79 will have diabetes worldwide in 2010. About 70% of these live in low-and middle-income countries. The worldwide estimate is expected to increase to some 438 million, or 7.7% of the adult population, by 2030. The largest increases will take place in the regions dominated by developing economies [1].

The Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: phase I results of the Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study shows that weighted prevalence of diabetes (both known and newly diagnosed) was 10.4% in Tamilnadu, 8.4% in Maharashtra, 5.3% in Jharkhand, and 13.6% in Chandigarh. The prevalences of prediabetes (impaired fasting glucose and/or impaired glucose tolerance) were 8.3%, 12.8%, 8.1% and 14.6% respectively [2].

It has long been known that thyroid hormones act differentially in liver, skeletal muscle and adipose tissue – the main targets of insulin action. While thyroid hormones oppose the action of insulin and stimulate hepatic gluconeogenesis and glycogenolysis, they up-regulate the expression of genes such as GLUT-4 and phosphoglycerate kinase, involved in glucose transport and glycolysis respectively, thus acting synergistically with insulin in facilitating glucose disposal and utilisation in peripheral tissues [3, 4].

Diabetic patients have a higher prevalence of thyroid disorders compared with the normal population. Because patients with one organ-specific autoimmune disease are at risk of developing other autoimmune disorders, and thyroid disorders are more common in females, it is not surprising that up to 30% of female type1 diabetic patients have thyroid disease.<sup>5,6</sup> A number of reports have also indicated a higher than normal prevalence of thyroid disorders in type 2 diabetic patients, with hypothyroidism especially subclinical being the most common disorder.

### Methodology

**Type of study:** Hospital-based Observational Study,

**Sample size and type**

After considering the inclusion and exclusion criteria, a total number of 110 eligible cases were taken up for the study.

**Ethical consideration**

Ethical approval to conduct the study was obtained from the Institutional Ethics Committee (H) of the institute prior to the study.

**Method of collection of data**

Method of collection of data was done by taking detailed clinical history regarding diabetes mellitus (onset, duration), any history of long term illness, any previous thyroid dysfunction, previous history of any kind of drug therapy, whether the patient was on insulin or oral hypoglycemic drugs was sought. A thorough clinical examination including vitals, general physical examination, systemic examination and investigations was carried out. Biochemical investigations were carried out using proper aseptic precautions for collecting blood.

Patients were examined for presence of diabetes mellitus according to ADA criteria for diagnosis of diabetes mellitus. All diabetic patients were then subjected to estimation of BMI, HbA1C, Serum cholesterol, Serum triglyceride, HDL, VLDL and LDL levels.

Then all the patients were evaluated for thyroid dysfunction by testing thyroid profile (T3, T4, TSH and anti TPO Ab).

**Results**

**Table 1:** Correlation of thyroid disorder with gender in type DM patients

Sex	Total		Euthyroid		Thyroid dysfunction	
	n	%	n	%	n	%
Male	52	82.69	43	82.69	9	17.31
Female	58	70.69	41	70.69	17	29.31
TOTAL	110	76.36	84	76.36	26	23.64

Above table shows that out of 52 diabetic male patients, 9 had thyroid dysfunction and out of 58 diabetic females, 17 had thyroid dysfunction. In other words out of 110 diabetic patients, 26 patients had thyroid dysfunction of which 9 patients were males and 17 patients were females. This difference was not statistically significant. (p value was 0.1789).

**Table 2:** Correlation of thyroid disorder with age in type 2 DM patients

Thyroid function	Range	Mean ± S.D.	p value
Euthyroid	20—64	46.01 ± 10.40	0.3607
Thyroid Dysfunction	38—63	48.00 ± 6.64	

From the above table, it is seen that the mean age of the diabetes patients who had no thyroid disorder was 46.01(±10.40) years and the mean age of the diabetes patients with thyroid dysfunction was 48.00(±6.64) years. This difference was not statistically significant (p value was 0.3607).

**Table 3:** Correlation of thyroid disorder with duration of type 2 DM

Duration of diabetes mellitus (in months)	Total		Euthyroid		Thyroid dysfunction	
	n	%	n	%	n	%
≤/ = 3	52	76.92	40	76.92	12	23.08
>3	58	75.86	44	75.86	14	24.14
TOTAL	110	76.36	84	76.36	26	23.64

From the above table, it is seen that, in the present study patients were divided into 2 groups based on duration of diabetes. There were 52 diabetic patients in ≤3 months group, of which 40 patients were euthyroids and 12 patients had thyroid dysfunction. There were 58 diabetic patients in ≥3 months group, of which 44 patients were euthyroids and 14 patients had thyroid dysfunction. However there was no statistically significant difference between these two groups. (p value was 1.00)

**Table 4:** Correlation of thyroid dysfunction with hba1c levels in type 2 DM

Thyroid Function	Range	Mean ± S.D.	p value
Euthyroid	6.1—16	8.40 ± 2.23	0.8107
Thyroid Dysfunction	6.8—11.6	8.29 ± 1.22	

From the above table it is seen that the mean HbA<sub>1c</sub> of diabetes patients with euthyroid group (8.40±2.23) was higher than diabetes patients with thyroid dysfunction (8.29±1.22) but the difference was not statistically significant.(p value was 0.8107).

**Table 5:** Correlation of prevalence of thyroid dysfunction in type 2 DM with hypertension

Hypertension	Total		Euthyroid		Thyroid dysfunction	
	n	%	n	%	n	%
Yes	53	73.58	39	73.58	14	26.42
No	57	78.95	45	78.95	12	21.05
TOTAL	110	76.36	84	76.36	26	23.64

From the above table it is seen that, out of 110 diabetes patients 53 patients had HTN, of which 14(26.42%) patients had thyroid dysfunction and another 39(73.58%) patients were in the euthyroid group. But this difference was not statistically significant (p value was 0.6539).

**Table 6:** Correlation between dyslipidemia and thyroid dysfunction in type 2 DM

Dyslipidemia	Total		Euthyroid		Thyroid dysfunction	
	n	%	n	%	n	%
Yes	41	63.41	26	63.41	15	36.59
No	69	84.06	58	84.06	11	15.94
TOTAL	110	76.36	84	76.36	26	23.64

From the above table it is seen that out of 110 diabetes patients, 41 patients had dyslipidemia, of which 15(36.59%) patients had thyroid dysfunction and another 26 patients were in the euthyroid group. This difference was statistically significant (p value is 0.0198).

## Discussion

In the present study there were 52 diabetic males and 58 diabetic females. Male: female ratio was 1:1.12.

In the present study the prevalence of thyroid disorders was more in females as compared to males. 29.31% diabetic female patients and 17.31% diabetic male patients had thyroid dysfunction. This difference was not statistically significant. Our study results were comparable to study by Yang GR *et al.* [7] who studied 371 diabetics, in which 83 subjects (22.4%) were diagnosed as SCH of whom 12.1% were males and 29.9% were females.

Most of the studies have shown that thyroid disorders are more common in females with Type 2 Diabetes—Celani MF *et al.* [8], Babu K *et al.* [9], etc.

In the present study, the mean age of the diabetic patients who were in the euthyroid group was 46.01(±10.40) and the mean age of the diabetic patients with thyroid dysfunction was 48.00(±6.64). Though the mean age was slightly higher in patients with thyroid dysfunction, it was not significant statistically. our study results were comparable to study done by Dem Itrost L *et al.* [10], who did a retrospective study and found that, out of 202 type 2 DM patients 139(68.8%) were euthyroid, 33 (16.3%) had subclinical hypothyroidism, 23 (11.4%) have hypothyroidism, 4 (2%) had subclinical hyperthyroidism and 3 (1.5%) were overt hyperthyroid.

Maximum cases were of hypothyroidism (subclinical and clinical) seen in the age group of 45-64 years. They also found that patients with BMI > 25 were at increased risk of having hypothyroidism ( $P < 0.016$ ).

In the study by Kim *et al.* [11], the mean age of euthyroid patients of type 2 DM was 57.8 (SD±11.8) years and the mean age of type 2 diabetics with SCH was 61.7 (SD ±9.8) years( $p$  value was 0.014) indicating that SCH in type 2 DM was associated with increasing age.

In the present study patients were divided into 2 groups. There were 52 diabetic patients in the ≤3 Months duration group, of which 12 had thyroid dysfunction. There were 58 diabetic patients in ≥3 Months duration group, of which 14 patients had thyroid dysfunction. However there was no statistically significant difference present between these two groups ( $p$  value was 1.00).our study findings were similar to the study done by Diez JJ *et al.* [12] who also found no significant relationship between presence of thyroid dysfunction and duration of diabetes.

In the present study, out of 41 diabetes patients with dyslipidemia, 15 patients had thyroid dysfunction. This association was statistically significant. ( $p$  value was 0.0198). We found increased levels of triglycerides, LDL and Cholesterol levels and decreased HDL levels in patients with thyroid dysfunction.

Our study findings were comparable with some of the other studies, viz. Papazafiropoulou A *et al.* [13] and Regmi A *et al.* [14] who found significant correlation between prevalence of thyroid disorder in diabetic patients and dyslipidemia.

Pasupathi *et al.* [15] in their study found that there were increased levels of HbA1C, triglycerides and VLDL-C and reduced level of HDL-C in diabetics. In our study we found a similar pattern of biochemical disturbances.

The association between dyslipidemia & thyroid dysfunction were significant with each lipid parameter except LDL, which failed to reach the significance, was concluded by the study done by Chubb SA *et al.* [16].

In the present study out of 53 diabetes patients with HTN, 14 had thyroid dysfunction. But there was no statistically significant difference. ( $p$  value was 0.6539)

Kim *et al.* [11]. showed that though the mean SBP and DBP was higher in patients with thyroid dysfunction it was not significant.

## Conclusion

In the present study, out of 110 diabetes patients, 41 patients had dyslipidemia of which 15 patients had thyroid dysfunction and another 26 patients were in the euthyroid group. This difference was statistically significant. ( $P$  value is 0.0198).

In the present study, out of 110 diabetes patients 53 patients had HTN of which 14 patients had thyroid dysfunction and another 39 patients were in the euthyroid group. But this difference was not statistically significant. ( $p$  value was 0.6539)

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