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## A study on spectrum of thyroid dysfunction in type 2 DM

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### Abstract

The prevalence of thyroid disease in diabetic patients is significantly higher than in general population. Apart from autoimmune etiology linked to the higher prevalence of thyroid disease in DM, it has also been observed that thyroid function is intrinsically linked to insulin resistance. It has also been stated that common factors simultaneously are responsible for increased TSH levels and insulin resistance. 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. It is seen that out of 110 diabetic patients, 16 (14.55%) patients had subclinical hypothyroidism, 7 (6.36%) patients had overt hypothyroidism, 3(2.73%) patients had overt hyperthyroidism and 84(76.36%) patients were in euthyroid group.

**Keywords:** Thyroid dysfunction, Type 2 DM, euthyroid

### Introduction

Thyroid disease is common in the general population, and the prevalence increases with age. Hypothyroidism is more common than hyperthyroidism. It can be autoimmune in origin, presenting as either primary atrophic hypothyroidism or Hashimoto's thyroiditis. The mean incidence rate of autoimmune hypothyroidism is upto 4/1000 women and 1/1000 men<sup>[1]</sup>. Subclinical hypothyroidism (SCH) is found in 6–8% of women (10% over the age of 60) and 3% of men. The annual risk of developing clinical hypothyroidism is about 4% when subclinical hypothyroidism is associated with positive Thyroid peroxidase (TPO) antibodies. Graves' disease accounts for 60–80% of thyrotoxicosis. The prevalence varies among populations, reflecting genetic factors and iodine intake (high iodine intake is associated with an increased prevalence of Graves' disease).

Graves' disease occurs in up to 2% of women but is one-tenth as frequent in men. The disorder rarely begins before adolescence and typically occurs between 20 and 50 years of age; it also occurs in the elderly<sup>[2,3]</sup>.

The prevalence of thyroid disease in diabetic patients is significantly higher than in general population. Apart from autoimmune etiology linked to the higher prevalence of thyroid disease in DM, it has also been observed that thyroid function is intrinsically linked to insulin resistance. It has also been stated that common factors simultaneously are responsible for increased TSH levels and insulin resistance<sup>[4]</sup>.

In type 2 DM, prevalence of thyroid disease has been found to be as high as 31%, the most common disorder being SCH, followed by subclinical hyperthyroidism, overt hypothyroidism and overt hyperthyroidism<sup>[5]</sup>.

Hyperthyroidism in DM is typically associated with worsening glycemic control and increased insulin requirement. There is increased hepatic gluconeogenesis and rapid gastrointestinal glucose absorption.

Hypothyroidism in DM, may lower the exogenous insulin requirement due to reduced rate of insulin degradation. Hypothyroidism is also accompanied by increased TG, LDL, TC levels in the blood, thereby increasing the risk of CVD.

Subclinical hypothyroidism is defined as a serum TSH level above normal despite normal levels of serum free thyroxine. Subclinical hyperthyroidism is defined as normal serum free thyroxine and free T3 levels with a TSH level suppressed below the normal range.

SCH, in various studies, has been shown to be associated with elevation in serum TC, TG, LDL, coronary artery disease, LV diastolic dysfunction, LV systolic dysfunction with exercise, increased peripheral vascular resistance, mental depression. Among diabetics, association of SCH with microvascular complications like nephropathy, retinopathy has been studied, in various populations. Subclinical hyperthyroidism is associated with increased risk of atrial fibrillation, increased LV mass, LV diastolic dysfunction, decrease in bone mineral density and neuropsychiatric abnormalities like poor concentration [6].

**Methodology**

In the present study, all newly diagnosed Type 2 diabetes mellitus patients who had attended Diabetic clinic, Medicine OPD and were admitted in Medicine ward, were selected as per the inclusion and exclusion criteria for the study.

The data for the purpose of study were collected in a predesigned Proforma. The Patient or his/her attendant was fully informed about the study and their informed consent was taken prior to the study.

All the cases of newly diagnosed type 2 diabetes mellitus who had attended and/or were admitted in the Department of Medicine and Diabetic Clinic, were taken up for the study.

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

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:** Age distribution

Age Group (in years)	Number (n)	Percentage (%)
20—<30	5	4.55
30—<40	22	20.00
40—<50	41	37.27
50—<60	31	28.18
>=60	11	10.00
TOTAL	110	100.00

Mean ± S.D.: 46.39 ± 9.88; Range: 20—64 years.

It is seen that 37.27% patients were in the 40-<50 years age group. Mean age of the study population was 46.39 (±9.88) years.

**Table 2:** Sex Distribution

Sex	Number (n)	Percentage (%)	Ratio (Male: Female)
Male	52	47.27	1: 1.12
Female	58	52.73	
Total	110	100.00	

Above table shows that, out of 110 diabetic patients there were 52 male patients and 58 female patients. The male: female ratio was 1:1.12.

**Table 3:** Spectrum of thyroid dysfunction in type 2 DM

Thyroid Function	Number (n)	Percentage (%)
Euthyroid	84	76.36
Subclinical Hypothyroidism	16	14.55
Subclinical Hyperthyroidism	0	0.00
Overt Hypothyroidism	7	6.36
Overt Hyperthyroidism	3	2.73
TOTAL	110	100.00

From the above table it is seen that out of 110 diabetic patients, 16 (14.55%) patients had subclinical hypothyroidism, 7 (6.36%) patients had overt hypothyroidism, 3(2.73%) patients had overt hyperthyroidism and 84(76.36%) patients were in euthyroid group.

**Discussion**

In the present study out of 110 newly detected type 2 diabetes mellitus patients, 26 patients had thyroid dysfunction of which 16 patients had subclinical hypothyroidism, 7 patients had overt hypothyroidism, and 3 had hyperthyroidism.

The prevalence of thyroid dysfunction in our study was 23.64%, of which 14.55% had subclinical hypothyroidism, 6.36% had overt hypothyroidism, 2.73% had overt hypothyroidism. Our study results were in concordance with study done by Dem Itrost L *et al.* [7], 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.

**Table 4:** Comparison of prevalence of thyroid dysfunction with other studies

Study	Prevalence (%)
Present study	23.64
Celani MF <i>et al.</i> [8]	31.40
Radaideh AR <i>et al.</i> [9]	12.50
Kiran Babu <i>et al.</i> [10]	28.00

**Conclusion**

In the present study, the prevalence of thyroid dysfunction was 23.64%, of which subclinical hypothyroidism was seen in 14.54% patients, overt hypothyroidism was seen in 6.36% patients and hyperthyroidism was present in 2.7% patients. There was not a single case of subclinical hyperthyroidism present in our study.

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