

# A Prospective Study on Alterations in Thyroid functions in Type 2 Diabetic Patients in a Tertiary Care Hospital

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## ABSTRACT

**Background:** Diabetes mellitus (DM), a common endocrine metabolic disorder, is an important cause of morbidity and mortality worldwide. Patients with diabetes have a higher prevalence of thyroid disorders when compared with general population. Alteration in thyroid function complicates the management of DM and its complications.

**Methods:** This study was conducted from June 2015 to June 2016 in Medicine Department of Department of Medicine, KIMS, Bhubaneswar. 50 patients with known Type 2 DM or newly detected cases were included in the study. All the patients were evaluated for thyroid dysfunction by testing thyroid profile (triiodothyronine, thyroxine, and thyroid-stimulating hormone). The correlation of prevalence of thyroid disorder with gender distribution, age distribution, duration of diabetes, hypertension, family history of diabetes was then done. The observations and interpretations were recorded, and results obtained were statistically analysed.

**Results:** In this study, age of the patient ranges from 35 to 70 years with maximum number of patients between the age group 41 and 60 years. In our study, 16% of the patients with Type 2 DM had abnormal thyroid profile. Among abnormal thyroid profile, the most common abnormality was subclinical hypothyroidism (62.5%) followed by subclinical hyperthyroidism (25%) followed by overt hypothyroidism. The prevalence of thyroid abnormality is more common in females than in males.

**Conclusion:** The occurrence of thyroid dysfunction among Type 2 DM patients is very high (16%) with subclinical hypothyroidism is being most common. Therefore, endocrinologists/clinicians should go for thyroid profile check in all type 2 diabetic patients.

**Key words:** Diabetes mellitus, Hyperthyroidism, Hypothyroidism

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## INTRODUCTION


Diabetes mellitus (DM) is a leading endocrine disorder which left untreated or not controlled properly will eventually involves multiple organ systems and leads to significant morbidity and mortality due to accompanying complications.<sup>[1-5]</sup>

DM has been defined as “a metabolic syndrome characterized by chronic hyperglycaemia and disturbance of carbohydrate, fat and protein metabolism associated with absolute or relative deficiency in insulin secretion and or insulin action.”

There were lots of studies on the large macrovascular and microvascular complications of diabetes involving kidneys, eyes, blood vessels, nerves, and heart. Thyroid diseases are also a common endocrinopathy seen in the adult population. Thyroid hormones are intimately involved in cellular metabolism.<sup>[6-10]</sup>

Thus, excess or deficit of either insulin or thyroid hormones could result in the functional derangement of the cellular metabolism.

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The present work is a modest attempt to study the occurrence of thyroid disorders in patients with Type 2 DM.

## METHODS

This study titled "study of thyroid profile in patients with Type 2 DM" was carried out in the Department of Medicine, KIMS, Bhubaneswar.

This prospective cross-sectional study included 50 patients with known Type 2 DM or newly detected Type 2 DM without known thyroid disorders either admitted in wards or attending the outpatient departments who met the inclusion criteria.

All patients in the study group were selected without any bias for sex, duration, severity, or control of diabetes. Family history regarding DM, thyroid disorders, and treatment history of oral hypoglycaemics or insulin along with duration was also included in the study.

The criteria of categorizing patients to sub-clinical hypothyroidism, sub-clinical hyperthyroidism, clinical hypothyroidism, and clinical hyperthyroidism has to be defined as follows :

1. Thyroid dysfunction was classified as clinical hypothyroidism (C-Hypo) if TSH > 4.20  $\mu$ UI/mL and FT4 < 0.93 ng/dL; Subclinical hypothyroidism (SC-Hypo) if TSH > 4.20  $\mu$ UI/ml and FT4 ranged from 0.93 to 1.7 ng/dL; Subclinical hyperthyroidism (SC-Hyper) if TSH < 0.27  $\mu$ UI/ml and FT4 in the normal range (0.93 and 1.7 ng/dL) and Clinical hyperthyroidism (C-Hyper) if TSH < 0.27  $\mu$ UI/ml and FT4 > 1.7  $\mu$ UI/mL. Autoimmunity were diagnosed when anti-TPO levels were greater than 34 IU/mL. The positive autoimmunity was not considered as a criterion of thyroid dysfunction.
2. Number of subjects should be more than 150 to give it statistical power since it is a observational study.
3. Anti-TPO antibody has to be taken into account.

## RESULTS

The study sample included 50 Type 2 diabetes patients in the wards and outpatient departments.

In this study, 9 (13%) patients are in the age group of 35-40 years, 21 (37.03%) patients are in between 41 and 50 years, 38 patients (35.18%) are in the age group 51-60 years, and 16 (14.8%) patients are in between 61 and 70 years.

In this study, 40.7% (44) patients were male and 59.3% (64) patients were female.

**Table 1: Demographic details of Patients (n=50)**

Age group (years)	Number of cases (%)
30-40	9
41-50	14
51-60	18
61-70	7
>70	2
Duration of DM (in years)	
Up to 5 years	32
6-10 years	10
>10 years	8

**Table 2: Distribution of thyroid disease n=8**

Thyroid profile	Number of cases (%)
Normal	42
Overt hypothyroidism	1
Subclinical hypothyroidism	5
Overt hyperthyroidism	0
Subclinical hyperthyroidism	2

In this study, 32 patients had duration of diabetes <5 years, 10 patients had duration of 6-10 years, and 8 patients had duration of diabetes more than 10 years.

Table 2 shows that n=5 patients had report suggestive of subclinical hypothyroidism, n=2 patients had report suggestive of subclinical hyperthyroidism, and only n=1 patient had report suggestive of overt hypothyroidism.

Out of n=8 patients with abnormal thyroid profile, 1 patients were found to be of age 61-70 years, 4 were found to be of age between 51 and About 60 years, 2 were found to be of age between 41 and 50 years and 1 were in the age group 35-40 years.

Out of 14 patients with abnormal thyroid profile, 2 were males and 6 were females.

Among the 8 patients with abnormal thyroid profile, n=1 had diabetes more than 10 years, n=3 had duration between 6 and 10 years, and 42.9% (4) had diabetes 5 years or less.

All patients with thyroid abnormality had family history of DM abnormality, but only n=16 of normal thyroid group had it.

Out of 8 persons with abnormal thyroid profile, n=6 were overweight and obese.

## DISCUSSION

DM is the most common endocrine disorder which involves multiple organ systems and leads to significant morbidity and mortality due to accompanying complications. Thyroid diseases are also a common endocrinopathy seen in the adult population. Thyroid hormones are intimately involved in cellular metabolism. Thus, excess or deficit of either insulin or thyroid hormone could result in the functional derangement of the cellular metabolism.

With reference to the above result, This shows that the disease was more prevalent between 41 and 60 years of age. This observation was similar to WHO report which predicts that while the main increase in diabetes would be in >65 year age group in the developed countries, in India and developing countries the highest increase would occur in the age group of 45-65 year of age group. This observation is also similar to Kapur *et al.*, who reported maximum number of cases in the same age group.

Among the study population, 30 patients were overweight and obese; 20 patients had normal BMI.

Gray *et al.* reported that prevalence of IGT in subjects of all age group increased with rising BMI. Gik *et al.* reported that the prevalence of DM and IGT increased with rising BMI and with increase in WHR. Both these studies support our findings.

In the present study, 16% (8) of the total 50 patients with DM had abnormal thyroid profile. Whereas in the study conducted by Abdel-Rahman *et al.* found that the prevalence of thyroid disease was 12.5%, 6.6% of whom were newly diagnosed and 5.9% had known thyroid dysfunction. The prevalence of thyroid disease in the nondiabetic control group was 6.6%.

Chubb *et al.* in a cross-sectional study of 420 patients with Type 2 DM found that 8.6% of patients had subclinical hypothyroidism.

Uppal in his study found that the prevalence of thyroid disease in the diabetic patients registered in general practice was 24.5%

Our findings are in accordance with Akbar *et al.* who founded that the prevalence of thyroid dysfunction was 16% and in control group of nondiabetics, it was 7%.

In this study, 40.7% (44) patients were male and 59.3% (64) patients were female. Celani *et al.*, Michalek *et al.*, and Abdel-Rahman *et al.* in their study found that the prevalence of thyroid dysfunction was significantly higher in the female than in the male diabetic patients.

Furthermore, Vondra *et al.* and Cardoso *et al.* found a significant correlation between female gender and altered thyroid profile.

## CONCLUSION

- Occurrence of thyroid dysfunction is 16% of the total 50 patients with Type 2 DM in our study.
- There is a significant correlation between sex, family history of diabetes, serum lipid profile, and abnormal thyroid profile.

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