

# Thyroid dysfunction in patients with type 2 diabetes mellitus in a tertiary care center of North Karnataka

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## Abstract

**Background:** Type 2 diabetes mellitus (T2DM) has an intersecting underlying pathology with thyroid dysfunction. Hyperthyroidism and hypothyroidism have been associated with insulin resistance which has been reported to be the major cause of impaired glucose metabolism in T2DM.

**Methods:** In this hospital based case series, data was collected from T2DM patients attending diabetic clinic and admitted in BLDEU'S Shri B.M Patil Medical college Hospital and Research centre, Vijayapura. Early morning fasting blood sample from a known T2DM patient was collected and was sent for thyroid profile. TSH, T3 and T4 were estimated by using competitive binding ELISA method.

**Results:** Thyroid disorder was seen in 25% of T2DM patients. There was significant correlation of thyroid disorder with age. It was observed that there was high prevalence of thyroid disorders in diabetic patients with advancing age. The most common thyroid disorder was subclinical hypothyroidism (54%) followed by hypothyroidism (22%), hyperthyroidism (14%) and subclinical hyperthyroidism (10%).

**Conclusion:** As there is a high prevalence of thyroid disorders in patients of type 2 diabetes mellitus, regular screening of thyroid function has to be done for optimum management.

**Key words:** thyroid dysfunction; diabetes mellitus; glycosylated hemoglobin

## Introduction

Diabetes and thyroid dysfunction are being associated since long<sup>[1]</sup>. Type 2 diabetes mellitus (T2DM) has an intersecting pathology with thyroid dysfunction<sup>2</sup>. There is evidence indicating that abnormalities of thyroid hormones can lead to T2DM<sup>[1,2]</sup>.

The commonest mechanism leading to T2DM in thyroid dysfunction could be due to altered genetic expression along with physiological aberrations leading to impaired glucose utilization and disposal in muscles, overproduction of hepatic glucose output, and enhanced absorption of splanchnic glucose. These factors contribute to insulin resistance. Insulin resistance is also associated with thyroid dysfunction<sup>[2,3]</sup>.

Hyperthyroidism and hypothyroidism have been associated with insulin resistance which could be the cause of impaired glucose metabolism in T2DM. Evidence also suggests a major role of insulin resistance

in the link between T2DM and thyroid dysfunction<sup>[3]</sup>

## Materials and Methods

This was a hospital based case series study. Data was collected from 200 T2DM patients attending diabetic clinic and admitted in BLDEU'S Shri B.M Patil Medical college Hospital and Research centre, Vijayapura, between October 2014 to March 2016.

Early morning fasting blood sample of a known T2DM patient was collected and was sent for thyroid profile. TSH, T3 and T4 was estimated by using competitive binding ELISA method.

Classification of the values was based on the following criteria:

Normal when total T4 and TSH were in normal range (i.e., TSH=0.69-2.02ng/ml, T4=4.4-10mcg/dl for males and for females 4.8-11.6mcg/dl.

Hypothyroidism when total T4<4.4ng/dl and TSH >6.2mIU/l

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Subclinical hypothyroidism when T4 was within normal limit and TSH>6.2mIU/L

Hyperthyroidism when serum TSH< 0.4mIU/L.

**Inclusion Criteria:** All T2DM patients attending diabetic clinic OPD and admitted in Shri B.M Patil Medical college Hospital and Research Centre, were included in the study.

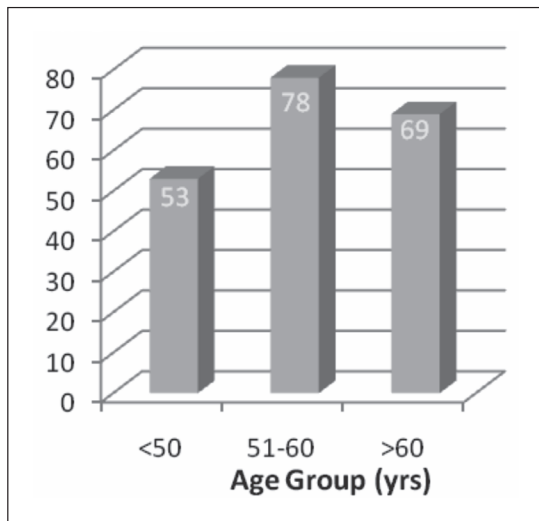
**Exclusion Criteria:** Those cases with known thyroid disorders, history of other illness which altered thyroid hormone levels like physiological Stress and CRF, DKA, patients on drugs like lithium and amiodarone, were excluded.

**Results**

A hospital based case series study was done among 200 T2DM patients in Shri B M Patil Medical College to evaluate the prevalence of thyroid dysfunction in patients with T2DM.

**Distribution of patients according to Age**

78 (39%) patients were in the age group of 51-60 years, followed by 69 (34.5%) patients in the age group of >60 years and 53 (26.5%) patients in the age group of <50 years (Figure 1).

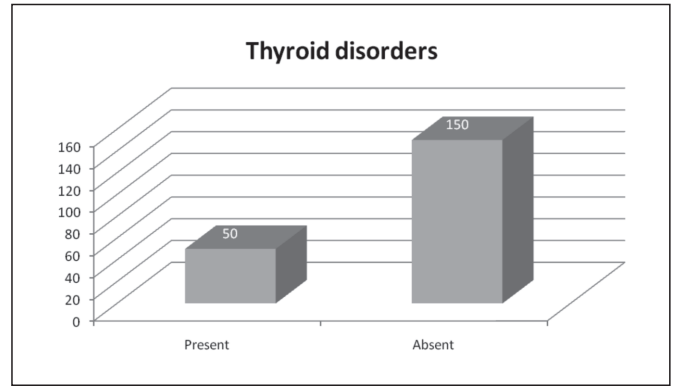


**Figure 1. Distribution of patients according to Age**

Majority of patients were females (73%) as compared to males (27%). 15% patients had a family history of thyroid disorder whereas 85% patients had no family history of thyroid disorder. 136 (68%) patients had dyslipidaemia whereas 64 (32%) patients did not have dyslipidaemia.

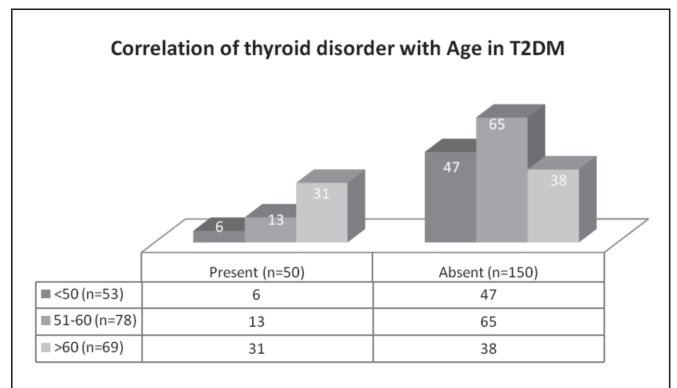
**Distribution of patients according to Thyroid disorders**

25% of T2DM patients had thyroid disorder and it was absent in 75% patients (Figure 2).



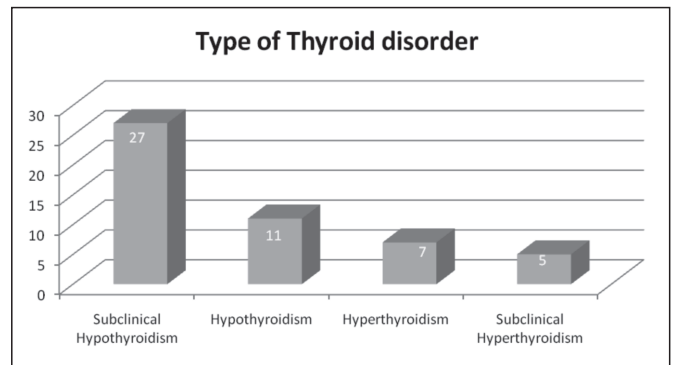
**Figure 2. Distribution of patients according to thyroid disorders**

There was significant correlation of thyroid disorder with age. It was observed that there was high prevalence of thyroid disorders in diabetic patients with advancing age (Fig 3).



**Figure 3. Correlation of thyroid disorders with age in T2DM**

Prevalence of thyroid disorder was more in female patients (28.76%) than in male patients (14.81%) and this association was significant. The most common thyroid disorder (Figure 4) was subclinical hypothyroidism (54%) followed by hypothyroidism (22%), hyperthyroidism (14%) and subclinical hyperthyroidism (10%).



**Figure 4. Distribution of T2DM patients according to type of thyroid disorders**

## Discussion

Thyroid diseases and diabetes mellitus are the two most common endocrine disorders encountered in clinical practice.

Thyroid hormones contribute to the regulation of carbohydrate metabolism and pancreatic function and on the other hand, diabetes also affects thyroid function tests to a variable extent<sup>[4,5]</sup>.

However, underlying thyroid disorders may go undiagnosed because the common signs and symptoms of thyroid disorders are similar to those for diabetes and can be overlooked or attributed to other medical disorders<sup>[5]</sup>.

39% patients in the age group of 51-60 years had thyroid disorder followed by 34.5% patients in the age group of >60 years and 26.5% patients in the age group of <50 years.

There was significant correlation of thyroid disorder with age.

It was observed that there was high prevalence of thyroid disorders in diabetic patients with advancing age.

This is similar to the studies of Vondra K et al<sup>[6]</sup> and Michalek AM et al<sup>[7]</sup> who also found high prevalence of thyroid disorders in diabetic patients with advancing age.

Prevalence of thyroid disorder was also significantly more in females as compared to males. Our results are consistent with studies of Papazafiropoulou A et al<sup>[8]</sup>, Celani MF et al<sup>[9]</sup>, Vondra K et al<sup>[6]</sup>, and Michalek AM et al<sup>[7]</sup> in which they also reported prevalence of thyroid disorders higher in diabetic females as compared to diabetic males.

## Conclusion

We conclude that there is a high prevalence of thyroid disorders in patients of type 2 diabetes mellitus which was further found to be more in females and elderly patients.

So regular screening of thyroid function in all type 2 diabetic patients should be done, especially in those with uncontrolled diabetes.

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