

Original Research Article

PREVALENCE OF THYROID DYSFUNCTION AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS IN SOUTH INDIAN POPULATION

Jhansi Rani C¹, Sarojini C², Venkatamani Yaamarthy³

¹Associate Professor, Department of Biochemistry, Government Medical College, Gadwal, Telangana, India.

²Assistant Professor, Department of General Medicine, Government Medical College, Nandyal, Andhra Pradesh, India.

³Assistant Professor, Department of Biochemistry, Gandhi Medical College, Secunderabad, Telangana, India.

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Corresponding Author:

Dr. Jhansi Rani C,
Associate Professor, Department of
Biochemistry, Government Medical
College, Gadwal, Telangana, India.
Email: jhansirani131@gmail.com

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ABSTRACT

Background: Diabetes mellitus and thyroid disorders are among the most prevalent endocrine diseases worldwide. Both conditions influence metabolic pathways and often coexist, affecting disease outcomes. **Objective:** To determine the prevalence of thyroid dysfunction among patients with Type 2 Diabetes Mellitus (T2DM) in a South Indian population.

Materials and Methods: A prospective hospital-based study was conducted among 160 patients with T2DM aged 20–70 years attending a tertiary care hospital. Fasting blood glucose and thyroid profile (T3, T4, TSH) were analyzed using standardized laboratory methods.

Results: Thyroid dysfunction was observed in 13 patients (8.1%). Hypothyroidism was the predominant abnormality and was more common among females and individuals above 50 years of age. Patients with hypothyroidism showed poorer glycemic control than euthyroid individuals.

Conclusion: Thyroid dysfunction, particularly hypothyroidism, is common among patients with T2DM. Routine thyroid screening may help improve diabetic management and reduce complications.

Keywords: Type 2 diabetes, Thyroid disorders, Hypothyroidism, TSH.

INTRODUCTION

Diabetes mellitus (DM) is one of the most common chronic metabolic disorders worldwide and represents a major public health challenge. It is characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or a combination of both. Long-term uncontrolled diabetes is associated with serious complications affecting multiple organ systems, including cardiovascular disease, nephropathy, retinopathy, neuropathy, and endocrine dysfunction. The global prevalence of diabetes, particularly Type 2 Diabetes Mellitus (T2DM), has increased significantly over recent decades due to urbanization, sedentary lifestyles, obesity, and population aging.

The thyroid gland is another important component of the endocrine system and plays a vital role in regulating metabolism, growth, development, and energy expenditure through the secretion of thyroid hormones, namely thyroxine (T4) and triiodothyronine (T3). These hormones influence carbohydrate, protein, and lipid metabolism and are

essential for maintaining normal physiological functions. Any alteration in thyroid hormone levels can significantly affect glucose metabolism and insulin sensitivity.

A close physiological relationship exists between diabetes mellitus and thyroid dysfunction. Thyroid hormones directly influence pancreatic β -cell function, hepatic glucose production, intestinal glucose absorption, and peripheral glucose utilization. Hyperthyroidism may lead to increased insulin resistance and elevated blood glucose levels, whereas hypothyroidism can reduce glucose absorption and alter insulin metabolism. Conversely, diabetes may affect thyroid hormone synthesis, secretion, and peripheral conversion, thereby contributing to thyroid abnormalities.

Several epidemiological studies have reported a higher prevalence of thyroid dysfunction among diabetic patients compared to the general population. Among the various thyroid disorders, hypothyroidism is the most frequently observed condition in individuals with Type 2 Diabetes Mellitus. Factors such as advancing age, female

gender, duration of diabetes, obesity, and poor glycemic control have been identified as important risk factors for the development of thyroid dysfunction in diabetic patients.

The coexistence of diabetes and thyroid disorders can complicate disease management and adversely affect metabolic control. Undiagnosed or untreated thyroid dysfunction may worsen glycemic status, increase insulin resistance, alter lipid profiles, and enhance the risk of cardiovascular complications. Furthermore, thyroid abnormalities may mask or mimic diabetic symptoms, making clinical assessment more challenging. Therefore, timely identification and appropriate management of thyroid dysfunction are essential to improve overall patient outcomes and quality of life.

Given the increasing burden of diabetes and the significant impact of thyroid disorders on metabolic control, routine screening for thyroid dysfunction among diabetic patients has gained considerable attention. Early detection and treatment of thyroid abnormalities may help optimize glycemic control, reduce complications, and improve long-term prognosis. Hence, the present study was undertaken to determine the prevalence of thyroid dysfunction among patients with Type 2 Diabetes Mellitus and to evaluate its association with demographic and clinical characteristics.

MATERIALS AND METHODS

Study Design: Prospective descriptive hospital-based study.

Study Setting: Department of Biochemistry, Government Medical College and Hospital, Gadwal.

Study Duration: Three months.

Sample Size: 160 patients with Type 2 Diabetes Mellitus. **Inclusion Criteria:** Diagnosed T2DM patients aged 20–70 years.

Exclusion Criteria: Known thyroid disease, pregnancy, chronic renal failure, hepatobiliary disorders, diabetic ketoacidosis, and patients receiving medications affecting thyroid function.

Laboratory Analysis: Blood glucose was estimated by the GOD-PAP enzymatic method. Thyroid profile (T3, T4, and TSH) was measured using chemiluminescence immunoassay.

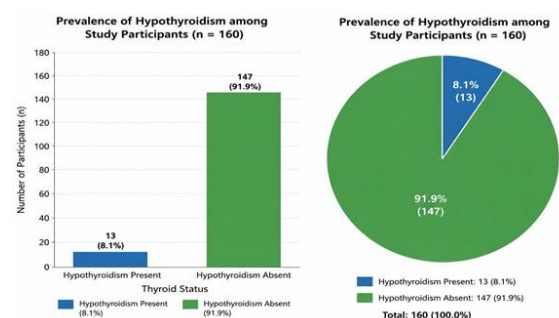
Statistical Analysis: Data were analyzed using descriptive statistics. A p-value<0.05 was considered statistically significant.

RESULTS

A total of 160 patients with Type 2 Diabetes Mellitus were included in the present study. Thyroid function assessment revealed that 13 participants (8.1%) were diagnosed with hypothyroidism, while 147 participants (91.9%) had normal thyroid function. Female patients constituted the majority of hypothyroid cases. The prevalence of thyroid dysfunction increased with advancing age, with the highest frequency observed among individuals older than 50 years.

Table 1: Prevalence of Hypothyroidism among Study Participants (n=160)

Thyroid Status	Number of Participants(n)	Percentage (%)
Hypothyroidism Present	13	8.1
Hypothyroidism Absent	147	91.9
Total	160	100.0



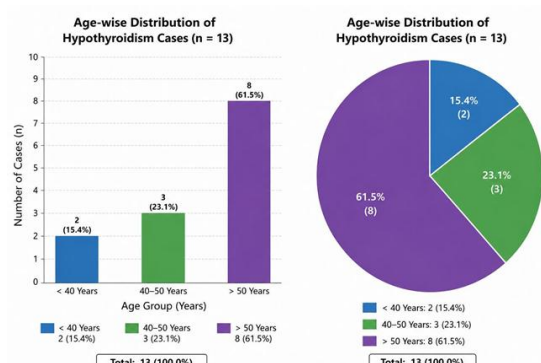
The present study demonstrated that 8.1% of patients with Type 2 Diabetes Mellitus were affected by hypothyroidism. This indicates that approximately one out of every twelve diabetic patients had

associated thyroid dysfunction. Although the majority of patients were euthyroid (91.9%), the observed prevalence is clinically significant because thyroid hormones play an essential role in regulating glucose metabolism, insulin sensitivity, and overall energy balance.

The coexistence of hypothyroidism and diabetes can adversely affect metabolic control, leading to increased insulin resistance, dyslipidemia, weight gain, and cardiovascular complications. The findings emphasize the importance of routine thyroid function screening among diabetic patients, particularly because hypothyroidism may remain asymptomatic or present with nonspecific symptoms that can be overlooked during routine diabetic care.

Table 2: Age-wise Distribution of Hypothyroidism Cases (n =13)

Age Group (Years)	Number of Cases (n)	Percentage of Hypothyroid Cases (%)
<40 Years	2	15.4
40–50 Years	3	23.1
>50 Years	8	61.5
Total	13	100.0



Age-wise analysis revealed a clear increase in the occurrence of hypothyroidism with advancing age. Among the 13 hypothyroid patients, 8 cases (61.5%) were observed in individuals aged above 50 years, whereas only 2 cases (15.4%) were found among patients younger than 40 years. Patients aged 40–50 years accounted for 23.1% of the hypothyroid cases. The findings suggest that advancing age is an important risk factor for thyroid dysfunction in patients with Type 2 Diabetes Mellitus. The higher prevalence among older individuals may be attributed to age-related endocrine alterations, increased autoimmune activity, progressive decline in thyroid reserve, and long-standing metabolic disturbances associated with diabetes. Furthermore, hypothyroid patients in the study exhibited comparatively poorer glycemic control, reflected by higher fasting blood glucose levels than euthyroid subjects. This observation supports the concept that thyroid dysfunction may contribute to worsening glucose metabolism and complicate diabetes management. Therefore, elderly diabetic patients should be considered a high-risk group and may benefit from periodic thyroid function evaluation for early detection and timely therapeutic intervention.

DISCUSSION

The present study demonstrated a significant prevalence of thyroid dysfunction among patients with Type 2 Diabetes Mellitus. Hypothyroidism emerged as the most common thyroid abnormality, consistent with findings reported in previous national and international studies. The observed prevalence supports the concept that diabetes and thyroid disorders frequently coexist due to shared endocrine and metabolic pathways.

The higher prevalence among females may be explained by the greater susceptibility of women to autoimmune thyroid diseases and hormonal fluctuations. Similar observations have been reported

in studies conducted across different populations. Female diabetic patients therefore represent an important target group for thyroid screening programs.

Age-related increases in thyroid dysfunction observed in the present study are also in agreement with earlier research. The greater occurrence of hypothyroidism in patients older than 50 years may reflect age-associated decline in thyroid reserve, increased autoimmune activity, and long-standing metabolic stress associated with diabetes.

An important finding of this study was the association between hypothyroidism and poor glycemic control. Thyroid hormones influence insulin secretion, insulin sensitivity, and glucose metabolism. Reduced thyroid hormone levels may contribute to impaired glucose utilization, thereby worsening diabetic status. Conversely, chronic hyperglycemia may alter hypothalamic-pituitary-thyroid axis regulation and thyroid hormone metabolism.

The clinical implications of these findings are substantial. Undiagnosed thyroid dysfunction may interfere with diabetes management, increase cardiovascular risk, and negatively affect quality of life. Therefore, periodic thyroid function testing should be considered an integral component of comprehensive diabetic care, particularly in elderly patients, females, and those with poor glycemic control.

The study's strengths include its prospective design and focused evaluation of thyroid abnormalities among diabetic patients. However, the study was limited by its single-center setting and relatively short duration. Future multicenter studies with larger sample sizes and long-term follow-up are recommended to further clarify the relationship between thyroid dysfunction and diabetes.

CONCLUSION

Thyroid dysfunction is a common co-morbidity among patients with Type 2 Diabetes Mellitus, with hypothyroidism being the predominant disorder. The prevalence is higher among females, elderly individuals, and patients with poor glycemic control. Routine screening for thyroid dysfunction should be incorporated into diabetes management protocols to facilitate early diagnosis and improve clinical outcomes.

Conflict of Interest: None

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