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Original Research Article

Clinical and Biochemical Correlation of TSH Levels with Symptoms in Patients with Thyroid Disorders: A Cross-Sectional Study

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Abstract

Background: Thyroid disorders are highly prevalent in India and often present with non-specific symptoms. While serum TSH is the most sensitive marker of thyroid function, its correlation with clinical symptoms remains variable.

Methods: A cross-sectional observational study was conducted among 100 patients presenting with symptoms suggestive of thyroid dysfunction. Patients were categorized into three groups based on TSH levels: normal (≤4.0 mIU/L), mildly elevated (4.1–10.0 mIU/L), and severely elevated (>10.0 mIU/L). Clinical features were recorded and correlated with TSH levels using chi-square test.

Results: Fatigue was present in all patients and was non-specific. Constipation was most common in the mildly elevated TSH group. Weight gain, neck swelling, and menstrual irregularities were significantly associated with severely elevated TSH levels.

Conclusion: Certain clinical features correlate strongly with the severity of TSH elevation. Symptom-based assessment combined with biochemical testing can improve early diagnosis of thyroid dysfunction.

Keywords: Hypothyroidism, TSH, Thyroid disorders, Clinical correlation, Subclinical hypothyroidism.

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Introduction

Thyroid disorders constitute a major endocrine problem worldwide, with a prevalence of approximately 11–13% in India [1]. Hypothyroidism is more common in women and elderly individuals [2]. The thyroid gland regulates metabolic processes, and its dysfunction leads to a wide range of clinical manifestations [3].

Common symptoms such as fatigue, weight gain, constipation, and menstrual disturbances are frequently encountered but lack specificity [4].

These overlapping clinical features often delay diagnosis, particularly in primary care settings [5].

Serum thyroid-stimulating hormone (TSH) is the most sensitive marker for thyroid dysfunction [6]. However, the degree to which TSH levels correlate with symptom severity remains inconsistent [7].

This study was undertaken to evaluate the relationship between TSH levels and clinical symptoms in patients with suspected thyroid disorders.

Materials and Methods

This cross-sectional observational study was conducted in the Department of Medicine, Agartala Govt Medical College and G B P Hospital, Northeast India, from January 2025 to March 2025.

A total of 100 patients aged ≥12 years presenting with symptoms suggestive of thyroid dysfunction were included. Patients on thyroid treatment for more than six months and pregnant women with known thyroid disease were excluded.

Demographic details, clinical symptoms, and thyroid function tests (TSH, T3, T4) were recorded using a predesigned proforma. Patients were categorized into three groups based on TSH levels according to standard guidelines: normal (≤4.0 mIU/L), mildly elevated (4.1–10.0 mIU/L), and severely elevated (>10.0 mIU/L) [3,8].

Statistical analysis was performed using SPSS version 25. Continuous variables were expressed as mean ± standard deviation, and categorical variables as percentages. Chi-square test was

applied to assess associations, with $p<0.05$ considered statistically significant.

Results

A total of 100 patients were included in the study. The mean age was 40.3 ± 12.5 years, and females constituted the majority (68%) of the study population.

Table 1: Demographic Characteristics of Study Population

Variable	Value
Total Patients	100
Mean Age (years)	40.3 ± 12.5
Mean Weight (kg)	56.9 ± 10.4
Male	32 (32%)
Female	68 (68%)

Values are expressed as mean ± standard deviation or number (%).

Table 2: Distribution of TSH Levels among Patients

TSH Category	Number (%)
Normal	30 (30%)
Mildly Elevated	36 (36%)
Severely Elevated	34 (34%)

TSH = Thyroid Stimulating Hormone.

Table 3: Presenting Symptoms of Patients

Symptom	Number of Patients	Clinical Note
Fatigue	100	Universal presenting complaint
Constipation	42	Early/subclinical hypothyroidism
Neck Swelling	22	Suggestive of goiter
Weight Gain	20	Advanced hypothyroidism
Irregular Menses	20	Menstrual dysfunction

Table 4: Correlation between TSH Levels and Symptoms

Symptom	Normal	Mildly Elevated	Severely Elevated
Fatigue	42	38	20
Constipation	2	40	0
Neck Swelling	0	0	22
Weight Gain	0	0	20
Irregular Menses	2	0	20

Values represent number of patients in each category.

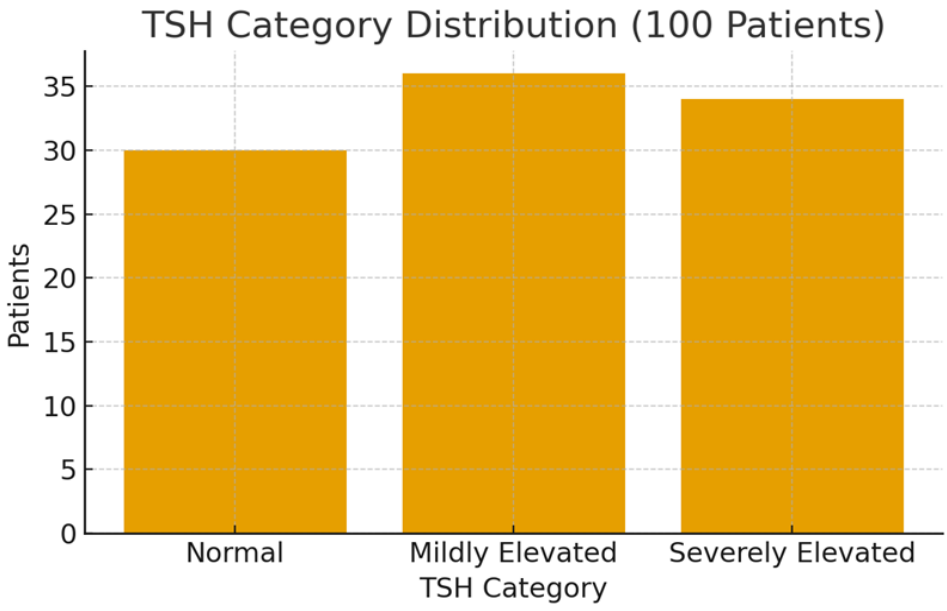

Figure 1: Distribution of TSH Levels among Patients

Bar diagram showing Normal vs Mild vs Severe TSH distribution.

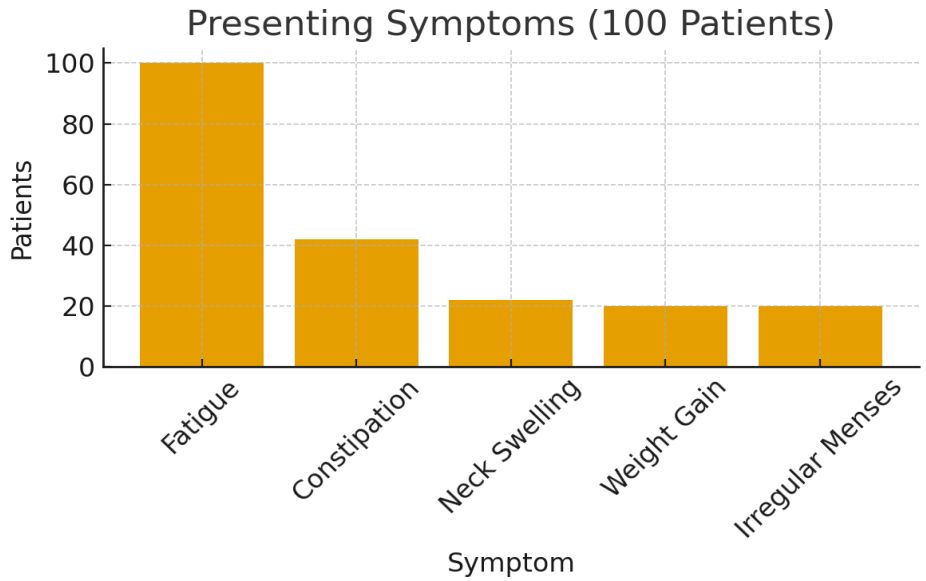

Figure 2: Symptom Distribution across TSH Categories

Clustered bar diagram showing symptom correlation with TSH levels.

Discussion

In the present study, fatigue was observed in all patients irrespective of TSH levels, highlighting its non-specific nature. Similar observations have been reported in previous studies, where fatigue was found to be a common presenting complaint even in euthyroid individuals [9,4]. This limits its utility as a standalone diagnostic indicator.

Constipation was most frequently observed in patients with mildly elevated TSH levels, suggesting its role as an early clinical manifestation of subclinical hypothyroidism [7,10]. This finding is clinically relevant, as early identification of such patients may allow timely intervention before progression to overt disease.

Weight gain, neck swelling, and menstrual irregularities were strongly associated with severely elevated TSH levels in this study. These findings are in agreement with established clinical patterns described in standard endocrine guidelines [3,4,8]. Goiter reflects chronic TSH stimulation leading to thyroid gland hypertrophy, while menstrual irregularities may be attributed to disruption of the hypothalamic–pituitary–ovarian axis [3,11].

The female predominance observed in the present study is consistent with global epidemiological data, which indicate a higher burden of thyroid disorders among women [2,12]. Hormonal factors and autoimmune predisposition are likely contributors to this pattern. An important observation from this study is that symptom clustering appears to have greater diagnostic value than individual symptoms. For instance, the combination of fatigue with constipation may suggest early thyroid dysfunction, whereas fatigue with weight gain and goiter is more indicative of advanced disease. This approach may be particularly useful in resource-limited settings and primary care practice, where access to biochemical testing may be delayed or limited5.

Conclusion

Fatigue is a non-specific symptom and cannot reliably predict thyroid dysfunction. Constipation may serve as an early marker of mild TSH elevation, while weight gain, neck swelling, and menstrual irregularities are indicative of severe hypothyroidism.

A combined clinical and biochemical approach improves diagnostic accuracy and facilitates early management.

Limitations

- Single-center study
- Small sample size
- Lack of thyroid antibody testing
- No follow-up data

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