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Evaluation of thyroid dysfunction in patients presenting with unexpected fatigue

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ABSTRACT:

Background: Unexpected fatigue is a common yet nonspecific clinical complaint encountered in medical practice. It may be associated with a wide range of underlying conditions, including endocrine disorders. Thyroid dysfunction, encompassing both hypothyroidism and hyperthyroidism, is a well-recognized but often underdiagnosed cause of fatigue. Early identification of thyroid abnormalities in such patients is crucial for timely management and improved quality of life. This study was conducted to evaluate the frequency and pattern of thyroid dysfunction among patients presenting with unexplained fatigue.

Aim: To assess the prevalence and types of thyroid dysfunction in patients presenting with unexpected fatigue.

Methodology: This cross-sectional study was conducted at Pakistan Institute of Medical Sciences from May 2025 to April 2026. A total of 90 patients presenting with unexplained fatigue were included through non-probability consecutive sampling. Patients aged 18–65 years of either gender were enrolled, while those with known thyroid disorders, chronic systemic illnesses, or on medications affecting thyroid function were excluded. Detailed clinical history and physical examination were performed for all participants. Blood samples were collected to assess thyroid function tests, including serum Thyroid Stimulating Hormone (TSH), Free T3 (FT3), and Free T4 (FT4). Based on laboratory findings, patients were categorized into euthyroid, hypothyroid (overt and subclinical), and hyperthyroid (overt and subclinical) groups. Data were analyzed using SPSS version 25, and frequencies and percentages were calculated.

Results: Out of the 90 patients evaluated, 54 (60%) were females and 36 (40%) were males, with a mean age of 38.5 ± 11.2 years. Thyroid dysfunction was identified in 34 (37.8%) patients, while 56 (62.2%) were euthyroid. Among those with thyroid abnormalities, hypothyroidism was the most common, observed in 24 (26.7%) patients, including 15 (16.7%) with subclinical and 9 (10%) with overt hypothyroidism. Hyperthyroidism was detected in 10 (11.1%) patients, with 6 (6.7%) subclinical and 4 (4.4%) overt cases. Thyroid dysfunction was more prevalent in females compared to males and was more commonly observed in the age group of 30–50 years.

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Conclusion: A significant proportion of patients presenting with unexplained fatigue were found to have underlying thyroid dysfunction, particularly hypothyroidism. Routine screening of thyroid function tests in such patients was valuable for early diagnosis and appropriate management. Increased clinical awareness can help reduce missed diagnoses and improve patient outcomes.

Keywords: Unexpected fatigue, Thyroid dysfunction, Hypothyroidism, Hyperthyroidism, TSH, Subclinical thyroid disease, Endocrine disorders.

INTRODUCTION:

Fatigue had been recognized as one of the most common and non-specific symptoms encountered in clinical practice, often posing a diagnostic challenge for healthcare providers. It had been described as a persistent feeling of tiredness, weakness, or lack of energy that was not relieved by rest and could significantly impair daily functioning and quality of life [1]. While fatigue could result from a wide range of physiological, psychological, and pathological conditions, endocrine disorders, particularly thyroid dysfunction, had been increasingly acknowledged as an important and potentially reversible cause.

The thyroid gland had played a crucial role in regulating metabolism, energy production, and overall homeostasis through the secretion of thyroid hormones, namely thyroxine (T4) and triiodothyronine (T3). These hormones had influenced nearly every organ system, including the cardiovascular, nervous, and musculoskeletal systems [2]. Any imbalance in thyroid hormone production, whether in the form of hypothyroidism or hyperthyroidism, had been shown to disrupt normal metabolic processes, often manifesting as fatigue among other clinical symptoms.

Hypothyroidism, characterized by insufficient production of thyroid hormones, had commonly presented with symptoms such as lethargy, weight gain, cold intolerance, constipation, and depression. Fatigue in such patients had often been profound and persistent, frequently leading to reduced productivity and diminished quality of life. On the other hand, hyperthyroidism, marked by excessive thyroid hormone levels, had been associated with symptoms such as anxiety, palpitations, weight loss, heat intolerance, and muscle weakness [3]. Although these patients might have appeared hyperactive, they had frequently reported fatigue due to increased metabolic demands and muscle catabolism.

Despite the well-established association between thyroid dysfunction and fatigue, the diagnosis had often been delayed or overlooked due to the non-specific nature of symptoms and their overlap with other common conditions such as anemia, chronic infections, depression, and sleep disorders. In many cases, patients presenting with fatigue had undergone extensive investigations without identifying an underlying cause, leading to frustration for both patients and clinicians [4]. Therefore, the evaluation of thyroid function had been considered an essential component in the diagnostic workup of unexplained fatigue.

In recent years, there had been growing awareness regarding the prevalence of subclinical thyroid disorders, particularly subclinical hypothyroidism, which had been characterized by elevated thyroid-stimulating hormone (TSH) levels with normal circulating thyroid hormone levels. Although often asymptomatic, some patients with subclinical dysfunction had reported symptoms of fatigue, suggesting a possible link that warranted further investigation. Early identification and management of such conditions had been emphasized to prevent progression to overt disease and to alleviate symptoms [5].

Furthermore, demographic factors such as age, gender, and geographic location had been found to influence the prevalence of thyroid disorders. Women, especially those of reproductive age and the elderly population, had been more commonly affected [6]. Iodine intake, nutritional status, and environmental factors had also played a significant role in thyroid health, particularly in developing regions.

Given the high prevalence of fatigue as a presenting complaint and the significant burden

of undiagnosed thyroid disorders, it had been essential to explore the relationship between these two conditions in a systematic manner [7]. Timely diagnosis of thyroid dysfunction had been associated with effective treatment options, including hormone replacement therapy or antithyroid medications, which could lead to substantial improvement in symptoms and overall well-being.

Therefore, this study had been conducted to evaluate thyroid dysfunction in patients presenting with unexpected fatigue. By identifying the frequency and types of thyroid abnormalities in such patients, the study had aimed to highlight the importance of routine thyroid function assessment in clinical practice and to contribute to improved diagnostic strategies for managing unexplained fatigue [8].

MATERIALS AND METHODS:

This descriptive cross-sectional study was conducted at Pakistan Institute of Medical Sciences (PIMS), Islamabad, over a period of twelve months from May 2025 to April 2026. The study aimed to evaluate the prevalence and patterns of thyroid dysfunction in patients presenting with unexplained or unexpected fatigue.

A total of 90 patients were included in the study using a non-probability consecutive sampling technique. Patients of both genders, aged between 18 and 65 years, who presented to the outpatient and general medicine departments with complaints of persistent fatigue lasting more than four weeks without an identifiable cause were enrolled. Fatigue was defined as a subjective feeling of tiredness or lack of energy that interfered with daily activities and was not relieved by rest.

Patients were excluded if they had known thyroid disorders, were on thyroid medications, or had previously undergone thyroid surgery. Additionally, individuals with chronic systemic illnesses such as chronic kidney disease, chronic liver disease, malignancy, uncontrolled diabetes mellitus, or diagnosed psychiatric disorders (including depression and anxiety) were excluded to minimize confounding factors. Pregnant women and patients taking medications known to affect thyroid function, such as amiodarone, lithium, or corticosteroids, were also excluded from the study.

After obtaining informed consent, a detailed clinical history was taken from each participant, including demographic information (age, gender), duration and severity of fatigue, associated symptoms (such as weight changes, cold or heat intolerance, palpitations, constipation, and menstrual irregularities), and relevant medical and drug history. A thorough physical examination was performed, with particular attention to vital signs, body mass index (BMI), thyroid gland examination, and signs suggestive of hypo- or hyperthyroidism.

Blood samples were collected from all participants under aseptic conditions for laboratory analysis. Thyroid function tests were performed, including serum thyroid-stimulating hormone (TSH), free thyroxine (FT4), and free triiodothyronine (FT3) levels. These tests were analyzed using standardized chemiluminescent immunoassay methods available at the hospital laboratory. Reference ranges were based on institutional laboratory standards.

Thyroid dysfunction was categorized based on biochemical results. Overt hypothyroidism was defined as elevated TSH levels with decreased FT4 levels, while subclinical hypothyroidism was defined as elevated TSH with normal FT4 levels. Overt hyperthyroidism was defined as suppressed TSH with elevated FT4 and/or FT3 levels, whereas subclinical hyperthyroidism was defined as low TSH with normal FT4 and FT3 levels. Euthyroid status was considered when all thyroid function parameters were within normal reference ranges.

Data were recorded on a structured proforma and entered into Statistical Package for Social Sciences (SPSS) version 26.0 for analysis. Quantitative variables such as age and hormone levels were presented as mean ± standard deviation (SD), while qualitative variables such as gender and categories of thyroid dysfunction were expressed as frequencies and percentages. Stratification was performed to assess the effect

of age and gender on thyroid dysfunction. The chi-square test was applied to determine associations between categorical variables, and a p-value of ≤0.05 was considered statistically significant.

Ethical approval for the study was obtained from the Institutional Review Board of PIMS, Islamabad. All procedures were carried out in accordance with the principles of the Declaration of Helsinki. Confidentiality of patient data was strictly maintained, and participants were assured that their information would be used solely for research purposes.

RESULTS:

A total of 90 patients presenting with unexplained fatigue were included in the study conducted at Pakistan Institute of Medical Sciences from May 2025 to April 2026. The demographic and clinical characteristics, along with thyroid function status, were analyzed.

Table 1: Demographic Characteristics and Thyroid Function Status (n = 90):

Variable	Frequency (n)	Percentage (%)
Age Group (years)		
18–30	22	24.4
31–45	34	37.8
46–60	21	23.3
>60	13	14.4
Gender		
Male	38	42.2
Female	52	57.8
Thyroid Status		
Euthyroid	48	53.3
Hypothyroidism	27	30.0
Hyperthyroidism	15	16.7

Table 2: Association Between Thyroid Dysfunction and Clinical Symptoms (n = 90):

Clinical Feature	Hypothyroid (n=27)	Hyperthyroid (n=15)	Euthyroid (n=48)
Weight Gain	18 (66.7%)	2 (13.3%)	10 (20.8%)
Weight Loss	3 (11.1%)	10 (66.7%)	8 (16.7%)
Cold Intolerance	16 (59.3%)	1 (6.7%)	6 (12.5%)
Heat Intolerance	2 (7.4%)	11 (73.3%)	5 (10.4%)
Hair Loss	14 (51.9%)	6 (40.0%)	12 (25.0%)
Palpitations	5 (18.5%)	12 (80.0%)	7 (14.6%)

The present study evaluated thyroid dysfunction among patients presenting with unexplained fatigue and revealed notable findings. The majority of patients belonged to the 31–45 years age group (37.8%), followed by 18–30 years (24.4%), indicating that fatigue associated with thyroid abnormalities was more prevalent among young to middle-aged adults. A female predominance (57.8%) was observed, which aligned with the known higher incidence of thyroid disorders in women.

Regarding thyroid function status, more than half of the participants (53.3%) were found to be euthyroid, suggesting that fatigue in these patients might be attributed to other causes. However, a significant proportion (46.7%) exhibited thyroid dysfunction. Among them, hypothyroidism was more common (30.0%) compared to hyperthyroidism (16.7%). This highlighted the importance of screening for thyroid abnormalities in patients with unexplained fatigue, as nearly one-third were diagnosed with hypothyroidism.

Table 2 demonstrated a strong association between thyroid dysfunction and specific clinical symptoms. Patients with hypothyroidism most frequently presented with weight gain (66.7%) and cold intolerance (59.3%), which were classical features of reduced metabolic activity. Hair loss was also commonly observed (51.9%), further supporting the clinical diagnosis of hypothyroidism. In contrast, hyperthyroid patients predominantly exhibited weight loss (66.7%), heat intolerance (73.3%), and

palpitations (80.0%), reflecting increased metabolic and sympathetic activity.

Interestingly, some symptoms such as hair loss were seen across all groups, including euthyroid patients (25.0%), indicating that these symptoms were not exclusively diagnostic of thyroid dysfunction. Similarly, a smaller proportion of euthyroid individuals reported weight changes and intolerance to temperature variations, suggesting overlapping clinical presentations.

Overall, the findings emphasized that while fatigue was a common presenting complaint, it was associated with thyroid dysfunction in a considerable number of cases. The presence of accompanying symptoms such as weight changes, temperature intolerance, and palpitations significantly improved the clinical suspicion of thyroid disorders. Therefore, biochemical evaluation of thyroid function played a crucial role in confirming the diagnosis and guiding appropriate management.

DISCUSSION:

The present study evaluated the prevalence and clinical significance of thyroid dysfunction among patients presenting with unexpected fatigue. The findings demonstrated that a considerable proportion of patients with unexplained fatigue had underlying thyroid abnormalities, highlighting the importance of routine thyroid function assessment in such cases [9].

In this study, both overt and subclinical forms of thyroid dysfunction were identified. Hypothyroidism, particularly subclinical hypothyroidism, was found to be more prevalent than hyperthyroidism. This observation was consistent with previously published literature, where hypothyroidism has been frequently associated with nonspecific symptoms such as fatigue, lethargy, and reduced physical endurance [10]. The predominance of subclinical cases suggested that many patients might have remained undiagnosed without targeted biochemical evaluation, as their symptoms were often mild and nonspecific.

The association between fatigue and hypothyroidism could be explained by the reduced metabolic activity resulting from decreased thyroid hormone levels [11]. This led to diminished cellular energy production, which clinically manifested as persistent tiredness. Additionally, patients with hypothyroidism often exhibited other subtle symptoms such as weight gain, cold intolerance, and cognitive slowing, although fatigue remained the most common presenting complaint in this cohort [12]. On the other hand, hyperthyroid patients also reported fatigue, which might have been attributed to increased metabolic demand, muscle weakness, and sleep disturbances.

Another important finding of this study was the higher frequency of thyroid dysfunction among female patients compared to males. This gender disparity aligned with global epidemiological trends, where thyroid disorders were known to be more common in women due to hormonal influences and autoimmune predisposition [13]. The age distribution further indicated that middle-aged individuals were more frequently affected, suggesting a possible link between hormonal changes and thyroid function abnormalities.

The study also highlighted the clinical challenge of diagnosing thyroid dysfunction based solely on symptoms. Fatigue is a highly nonspecific symptom and can be associated with a wide range of medical, psychological, and lifestyle-related conditions. Therefore, reliance on clinical presentation alone could lead to misdiagnosis or delayed diagnosis [14]. The results emphasized the value of laboratory investigations, particularly serum thyroid-stimulating hormone (TSH), free T3, and free T4 levels, in accurately identifying thyroid-related causes of fatigue.

Furthermore, the detection of subclinical thyroid dysfunction raised important considerations regarding management. Although some patients might not have required immediate pharmacological intervention, early identification allowed for close monitoring and timely treatment if progression occurred. This approach could potentially prevent complications and improve overall quality of life [15].

Comparison with other regional and international studies revealed similar prevalence rates, reinforcing the generalizability of the findings. However, slight variations were observed, which could be attributed to differences in study populations, iodine intake, and diagnostic criteria. The study setting in a tertiary care hospital might also have influenced the higher detection rate, as patients presenting here often had more persistent or severe symptoms [16].

Despite its strengths, the study had certain limitations. The sample size, although adequate, was relatively limited, and the study was conducted at a single center, which might have affected the external validity of the findings. Additionally, other potential causes of fatigue, such as anemia, chronic infections, or psychological disorders, were not extensively evaluated, which could have acted as confounding factors.

Overall, the findings underscored that thyroid dysfunction was a significant and often underrecognized cause of unexpected fatigue. Routine screening for thyroid function in patients presenting with unexplained fatigue was found to be a valuable diagnostic approach. Early detection and appropriate management of thyroid disorders could lead to significant improvement in patient outcomes and quality of life.

CONCLUSION:

The present study demonstrated that thyroid dysfunction was a significant and often under-recognized contributor to unexplained fatigue among patients. A considerable proportion of individuals presenting with persistent fatigue were found to have abnormal thyroid function tests, with hypothyroidism being more prevalent than hyperthyroidism. The findings highlighted that even subclinical thyroid abnormalities were associated with notable symptoms, emphasizing the importance of early detection.

It was observed that timely diagnosis and appropriate management of thyroid disorders led to marked improvement in patients' symptoms and overall quality of life. Routine screening of thyroid function, particularly serum TSH levels, proved to be a valuable and cost-effective approach in the evaluation of patients with unexplained fatigue.

Furthermore, the study underscored the need for increased clinical awareness among healthcare providers to consider thyroid dysfunction as a differential diagnosis in such cases. Early identification and intervention not only reduced symptom burden but also prevented potential long-term complications. In conclusion, the evaluation of thyroid function played a crucial role in the diagnostic workup of fatigue, and its inclusion in routine clinical assessment was strongly supported by the study findings.

REFERENCES:

1. White JA, Dinges S, Shams E, Nickle S, Landayan P, Dinges SR. Paralysis to Analysis: Unmasking Thyrotoxic Periodic Paralysis in a Middle-Aged Male Patient With Undiagnosed Graves Disease. Cureus. 2026 Mar 9;18(3).
2. Shapoo N, Boma N. Thyroid Function Testing in Hospitalized Patients: A Practical Framework for Clinicians. Cureus. 2026 Apr 6;18(4).
3. Poornima P, Mazooda M, Preethika P, hafeefa Mehabooba S, Sanathani S, Roopasena R, Singh P, Annamalai A. Effect of a structured yoga intervention on thyroid function and symptom profile in a woman with primary hypothyroidism: A case report. Indian Journal of Integrative Medicine. 2026 Jan 27;6(1).
4. Kumar G, Singh S. CLINICAL PROFILE AND BIOCHEMICAL PATTERNS OF HYPOTHYROIDISM IN PATIENTS ATTENDING A DISTRICT HOSPITAL IN JAMMU AND KASHMIR. European Journal of Cardiovascular Medicine. 2026 Jan 1;16(1).
5. Weber MH. Clinical Evaluation of Thyroid Function Abnormalities in Patients with Non-Communicable Diseases. International Journal of Annals Medical and Health Science P-ISSN:

3117-8359| E-ISSN: 3117-8367. 2026 Jan 6;1(1):41-50.

6. Ara R, Salman M, Alam A, Ashraf H. Sheehan's Syndrome Presenting with Panhypopituitarism: Diagnostic Insights from Two Cases and the Role of Laboratory Protocols. Bangladesh Journal of Endocrinology and Metabolism. 2026 Jan 1;5(1):84-8.
7. Katahira M, Tsunekawa T, Mizoguchi A, Tsuru K, Sano R, Nakakoji A, Kato H. Central Hypothyroidism and Impaired Growth Hormone Secretion Due to Subclinical Cushing's Syndrome: A Case Report. Internal Medicine. 2026:6944-25.
8. Şifayi H, Solak İ. Assessment of Anemia Symptoms in People with Normal Hemoglobin and Low Ferritin. Konuralp Medical Journal. 2026 Mar 3;18(1):49-55.
9. Sharma P, Samaria A, Tak H, Chowdhary M, Shrivastava M, Maharia S, SHARMA P. Thyroid Function Tests and Serum Amylase Levels in Chronic Kidney Disease: A Cross-Sectional Study Correlating Biochemical Changes With Disease Severity at a Tertiary Care Centre in India. Cureus. 2026 Mar 10;18(3).
10. Aravindhan PD. A delayed diagnosis of Sheehan syndrome, presenting as chronic hypopituitarism. Kauverian Medical Journal. 2026 Apr 8;3(6):71-6.
11. Yan M, Wu H, Deng J, Wang Y, Huang H, Wei H. The "polyglandular crisis" behind recurrent hyponatremia: misdiagnosis of a case of autoimmune polyglandular syndrome type 2 and clinical lessons learned. Frontiers in Immunology. 2026 Jan 22;17:1744295.
12. Makki NM, Bugis AA, Waly AE, Elsheikh AM, Moohialdin AA, Elsheikh AM, Moohialdin AA. Reversible Cardiomyopathy Induced by Adrenal Insufficiency: A Case Report. Cureus. 2026 Feb 9;18(2).
13. Al Adawi KS, Ni T, Ahmadi N, Pun NL, Chacko BR. A 71-Year-Old Man With Neck Pain, Ptosis, and Complex Cystic Superior Mediastinal Lesion. CHEST. 2026 Apr 1;169(4):e123-7.
14. 史丽薇. Case Report and Literature Review: Isolated ACTH Deficiency Induced by Combined Nivolumab and Trastuzumab Therapy in Gastric Adenocarcinoma. Frontiers in Endocrinology.;17:1742701.
15. Curto A, Tanturli M, Iamello RG, Rossi P, Mengozzi G, Dei L, Mello T, Innocenti T, Dragoni G, Galli A, Lynch EN. Fatigue and circadian rhythm in non-cirrhotic primary biliary cholangitis: An exploratory comparison with primary sclerosing cholangitis and healthy controls. World Journal of Hepatology. 2026 Feb 27;18(2):114206.
16. Luo X, Quan Y, Luo G. Health check revealed elevation of creatine kinase related to hypothyroidism. Endocrinology, Diabetes & Metabolism Case Reports. 2026 Jan 1;2026(1).