



Original Research Article

EVALUATING CUTANEOUS MANIFESTATIONS IN PATIENTS WITH THYROID DISORDERS: A PROSPECTIVE STUDY

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Received : 15/12/2025
Received in revised form : 04/02/2026
Accepted : 19/02/2026

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DOI: 10.70034/ijmedph.2026.1.431

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (1); 2495-2499

ABSTRACT

Background: Thyroid disorders are among the most common endocrine conditions worldwide and are frequently associated with a wide range of systemic manifestations. The skin, hair, and nails are particularly sensitive to alterations in thyroid hormone levels, often exhibiting early and distinctive changes. Cutaneous manifestations may precede, accompany, or follow the diagnosis of thyroid dysfunction and can serve as valuable clinical indicators for early detection and disease monitoring. Despite their clinical relevance, the spectrum and frequency of dermatological manifestations in thyroid disorders remain underreported in many regions. **Objectives:** To evaluate the pattern and prevalence of cutaneous manifestations in patients with thyroid disorders and to assess their association with different types of thyroid dysfunction.

Material and Methods: This prospective observational study was conducted over a period of six months from June 2025 to December 2025 at D.Y. Patil University, School of Medicine, Ambi, Pune. A total of 75 patients diagnosed with thyroid disorders were enrolled after obtaining informed consent. Detailed dermatological examination was performed for each participant, focusing on skin, hair, nail, and mucosal changes. Thyroid function status was determined using serum thyroid-stimulating hormone (TSH), free T3, and free T4 levels, and patients were categorized as hypothyroid, hyperthyroid, or euthyroid on treatment. Data were analyzed to determine the frequency and pattern of cutaneous manifestations and their correlation with thyroid status.

Results: Cutaneous manifestations were observed in a majority of patients with thyroid disorders. Hypothyroid patients commonly presented with xerosis, coarse skin, diffuse hair loss, and brittle nails, whereas hyperthyroid patients predominantly exhibited warm moist skin, hyperhidrosis, diffuse alopecia, and nail changes such as onycholysis. The severity and number of cutaneous findings showed a significant association with the type and duration of thyroid dysfunction.

Conclusion: Cutaneous manifestations are common and clinically significant features of thyroid disorders and may provide early diagnostic clues to underlying endocrine abnormalities. Recognition of these dermatological signs can facilitate prompt diagnosis, appropriate referral, and timely management of thyroid diseases. A multidisciplinary approach involving dermatologists and endocrinologists is essential for improving patient outcomes.

Keywords: Thyroid disorders, cutaneous manifestations, hypothyroidism, hyperthyroidism, skin changes, prospective study.

INTRODUCTION

Thyroid disorders constitute one of the most prevalent endocrine abnormalities worldwide and represent a significant public health concern due to their wide-ranging systemic effects.^[1] The thyroid gland plays a crucial role in regulating metabolic activity, growth, and differentiation of tissues through the secretion of thyroid hormones. Alterations in thyroid hormone levels, as seen in hypothyroidism and hyperthyroidism, have profound effects on multiple organ systems, including the cardiovascular, gastrointestinal, neuromuscular, and integumentary systems.^[2]

The skin, hair, and nails are particularly sensitive to changes in thyroid hormone levels, often reflecting early and characteristic manifestations of thyroid dysfunction.^[3] Cutaneous features may precede the diagnosis of thyroid disease, occur concurrently, or develop during the course of treatment. These manifestations result from altered epidermal turnover, changes in dermal glycosaminoglycan deposition, variations in sweat and sebaceous gland activity, and disturbances in hair follicle cycling. As a result, thyroid disorders can produce a wide spectrum of dermatological findings ranging from subtle changes in skin texture to more distinctive and diagnostically significant signs.^[4,5]

Hypothyroidism is commonly associated with dry, coarse, and cold skin, diffuse hair loss, brittle nails, facial puffiness, and myxedematous changes due to mucopolysaccharide accumulation in the dermis. In contrast, hyperthyroidism often presents with warm, moist skin, hyperhidrosis, flushing, pruritus, diffuse alopecia, and nail abnormalities such as onycholysis.^[6] Certain cutaneous conditions, including pretibial myxedema, vitiligo, alopecia areata, and chronic urticaria, have also been reported to show associations with autoimmune thyroid diseases, further highlighting the close interplay between dermatological and endocrine disorders.^[7,8] Despite the clinical significance of these manifestations, cutaneous features of thyroid disorders are frequently underrecognized or attributed to primary dermatological conditions. Early identification of these signs can aid clinicians in suspecting underlying thyroid dysfunction, prompting timely investigation and management. Moreover, recognition of skin changes in patients with known thyroid disease may assist in monitoring disease activity, treatment response, and compliance with therapy.^[9]

In India, thyroid disorders are increasingly diagnosed due to improved awareness and access to diagnostic facilities; however, regional data on the prevalence and pattern of cutaneous manifestations remain limited. Variations in clinical presentation may be influenced by genetic factors, nutritional status, environmental conditions, and healthcare-seeking behavior. Prospective studies conducted in tertiary care teaching hospitals provide valuable insights into

the dermatological spectrum of thyroid disorders in diverse populations.

Therefore, the present prospective study was undertaken at D.Y. Patil University, School of Medicine, Ambi, Pune, to systematically evaluate the cutaneous manifestations in patients with thyroid disorders over a six-month period from June 2025 to December 2025. The study aims to analyze the frequency and pattern of skin, hair, nail, and mucosal changes associated with different thyroid dysfunctions, thereby emphasizing the importance of a comprehensive dermatological examination in patients with thyroid disease.

MATERIALS AND METHODS

Study Design and Setting

This was a **prospective observational study** conducted over a period of **six months from June 2025 to December 2025** at the **Department of Dermatology**, D.Y. Patil University, School of Medicine, Ambi, Pune, Maharashtra, India.

Study Population

The study population included patients diagnosed with thyroid disorders who attended the dermatology and endocrinology outpatient departments or were admitted to the hospital during the study period.

Sample Size

A total of **75 patients** with confirmed thyroid disorders were enrolled in the study. The sample size was determined based on feasibility and the expected patient load during the study period.

Sampling Technique

A **consecutive sampling method** was used to recruit eligible patients who fulfilled the inclusion criteria and provided written informed consent.

Inclusion Criteria

- Patients aged 18 years and above
- Patients with a confirmed diagnosis of thyroid disorder based on thyroid function tests
- Both newly diagnosed patients and patients on treatment for thyroid disorders
- Patients willing to participate and provide written informed consent

Exclusion Criteria

- Patients with pre-existing primary dermatological disorders unrelated to thyroid disease
- Patients with systemic illnesses known to independently affect the skin (e.g., chronic renal failure, liver disease, connective tissue disorders)
- Patients on long-term systemic corticosteroids or immunosuppressive therapy
- Pregnant and lactating women

Data Collection Procedure

After obtaining informed consent, detailed demographic data including age, sex, duration of thyroid disease, and treatment history were recorded using a structured proforma. Thyroid function status was assessed based on serum thyroid-stimulating hormone (TSH), free triiodothyronine (FT3), and free

thyroxine (FT4) levels, as documented in medical records.

Each patient underwent a comprehensive dermatological examination conducted by a dermatologist. Cutaneous findings were documented systematically under the following categories:

- **Skin changes** (xerosis, hyperhidrosis, pigmentation, pruritus, myxedema)
- **Hair changes** (diffuse hair loss, coarse hair, thinning, alopecia areata)
- **Nail changes** (brittle nails, onycholysis, ridging)
- **Mucosal changes**, if present

Associated dermatological conditions such as vitiligo, urticaria, and other autoimmune skin disorders were also noted.

Classification of Thyroid Disorders

Based on thyroid function tests, patients were categorized into:

- **Hypothyroidism**
- **Hyperthyroidism**
- **Euthyroid on treatment**

Study Variables

- **Independent variables:** Type of thyroid disorder, duration of illness, treatment status

- **Dependent variables:** Presence and pattern of cutaneous manifestations
- **Confounding variables:** Age, sex, and comorbid conditions

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using **Statistical Package for the Social Sciences (SPSS)** software. Categorical variables were expressed as frequencies and percentages. Continuous variables were summarized as mean and standard deviation. The **Chi-square test** was used to assess the association between thyroid status and cutaneous manifestations. A *p-value* of less than **0.05** was considered statistically significant.

RESULTS

A total of 75 patients with thyroid disorders were included in this prospective study conducted over a six-month period. All participants underwent detailed dermatological examination. Based on thyroid function tests, patients were classified into hypothyroid, hyperthyroid, and euthyroid on treatment groups.

Table 1: Distribution of Patients According to Demographic Profile and Thyroid Status (n = 75)

| Variable | Hypothyroid (n = 46) | Hyperthyroid (n = 21) | Euthyroid on treatment (n = 8) | Total |
|---------------------------------------|----------------------|-----------------------|--------------------------------|------------|
| Mean age (years) | 34.6 ± 9.8 | 31.2 ± 8.5 | 36.4 ± 7.9 | — |
| Female | 38 (82.6%) | 16 (76.2%) | 6 (75.0%) | 60 (80.0%) |
| Male | 8 (17.4%) | 5 (23.8%) | 2 (25.0%) | 15 (20.0%) |
| Duration of thyroid disease < 2 years | 28 (60.9%) | 14 (66.7%) | 5 (62.5%) | 47 (62.7%) |
| Duration ≥ 2 years | 18 (39.1%) | 7 (33.3%) | 3 (37.5%) | 28 (37.3%) |

Females constituted the majority of the study population, reflecting the higher prevalence of thyroid disorders among women. Hypothyroidism

was the most common thyroid disorder observed. Most patients had a disease duration of less than two years at presentation.

Table 2: Cutaneous Manifestations Observed in Patients with Thyroid Disorders

| Cutaneous Manifestation | Hypothyroid (n = 46) | Hyperthyroid (n = 21) | Euthyroid (n = 8) | Total (%) |
|-------------------------|----------------------|-----------------------|-------------------|------------|
| Xerosis | 32 (69.6%) | 4 (19.0%) | 2 (25.0%) | 38 (50.7%) |
| Coarse skin | 26 (56.5%) | 2 (9.5%) | 1 (12.5%) | 29 (38.7%) |
| Warm, moist skin | 3 (6.5%) | 15 (71.4%) | 1 (12.5%) | 19 (25.3%) |
| Hyperhidrosis | 4 (8.7%) | 14 (66.7%) | 1 (12.5%) | 19 (25.3%) |
| Myxedema | 11 (23.9%) | 0 (0%) | 0 (0%) | 11 (14.7%) |
| Pruritus | 10 (21.7%) | 7 (33.3%) | 1 (12.5%) | 18 (24.0%) |

Xerosis and coarse skin were the predominant findings among hypothyroid patients, whereas warm moist skin and hyperhidrosis were significantly more common in hyperthyroid patients. Myxedema was

observed exclusively in hypothyroid individuals. The distribution of cutaneous manifestations showed a significant association with the type of thyroid disorder ($p < 0.05$).

Table 3: Hair and Nail Manifestations in Relation to Thyroid Disorders

| Manifestation | Hypothyroid (n = 46) | Hyperthyroid (n = 21) | Euthyroid (n = 8) | Total (%) |
|-------------------|----------------------|-----------------------|-------------------|------------|
| Diffuse hair loss | 29 (63.0%) | 12 (57.1%) | 3 (37.5%) | 44 (58.7%) |
| Coarse, dry hair | 24 (52.2%) | 3 (14.3%) | 1 (12.5%) | 28 (37.3%) |
| Brittle nails | 21 (45.7%) | 4 (19.0%) | 1 (12.5%) | 26 (34.7%) |
| Onycholysis | 2 (4.3%) | 9 (42.9%) | 1 (12.5%) | 12 (16.0%) |
| Nail ridging | 14 (30.4%) | 5 (23.8%) | 2 (25.0%) | 21 (28.0%) |

Diffuse hair loss was the most frequently observed hair abnormality across all thyroid disorders. Hypothyroid patients showed a higher prevalence of

coarse hair and brittle nails, whereas onycholysis was predominantly seen in hyperthyroid patients. These findings were statistically significant and

demonstrated a strong correlation between thyroid hormone imbalance and appendageal changes.

DISCUSSION

Thyroid disorders are frequently associated with a wide spectrum of dermatological manifestations due to the pivotal role of thyroid hormones in regulating epidermal proliferation, dermal metabolism, sebaceous and sweat gland activity, and hair follicle cycling. The present prospective study was conducted to evaluate the pattern of cutaneous manifestations among patients with thyroid disorders and to correlate these findings with thyroid functional status.^[2,10]

In the present study, hypothyroidism was the most common thyroid disorder observed, with a clear female predominance. This finding is consistent with previous studies, which have reported a higher prevalence of thyroid dysfunction among women, attributed to hormonal influences and a higher incidence of autoimmune thyroid diseases in females. The majority of patients belonged to the younger to middle-aged adult population, reflecting increased healthcare awareness and early diagnosis.^[11]

Cutaneous manifestations were observed in a significant proportion of patients, emphasizing the strong association between thyroid dysfunction and skin changes. Xerosis and coarse skin were the most common findings among hypothyroid patients in this study. These manifestations can be explained by reduced eccrine and sebaceous gland activity, decreased epidermal turnover, and dermal mucopolysaccharide deposition seen in hypothyroid states. Similar observations have been reported in earlier studies, which describe dry, rough, and cold skin as hallmark features of hypothyroidism.^[12,13]

Myxedema was observed exclusively in hypothyroid patients, supporting its strong association with long-standing or poorly controlled disease. The presence of pruritus in both hypo- and hyperthyroid patients may be attributed to altered skin barrier function and changes in cutaneous blood flow.^[14]

Hyperthyroid patients predominantly exhibited warm, moist skin and hyperhidrosis, findings that reflect increased basal metabolic rate, enhanced peripheral vasodilation, and increased sweat gland activity. These features are well-recognized indicators of thyrotoxicosis and were consistent with observations reported in earlier dermatological and endocrinological studies.^[8,15]

Hair and nail changes were commonly observed across all thyroid disorders. Diffuse hair loss was the most frequent hair abnormality noted in the present study. Thyroid hormones play a critical role in maintaining the normal hair growth cycle, and their imbalance leads to premature transition of hair follicles into the telogen phase, resulting in diffuse alopecia. Coarse, dry hair and brittle nails were more prevalent among hypothyroid patients, whereas onycholysis was predominantly seen in hyperthyroid

individuals. Onycholysis, also referred to as Plummer's nails, is a well-documented nail manifestation of hyperthyroidism.^[16]

The presence of cutaneous manifestations in patients who were euthyroid on treatment suggests that skin changes may persist despite biochemical correction of thyroid hormone levels. This highlights the importance of long-term follow-up and the need for multidisciplinary management involving both dermatologists and endocrinologists.

Overall, the findings of this study reinforce the concept that cutaneous manifestations are not merely cosmetic concerns but serve as valuable clinical markers of underlying thyroid dysfunction. Early recognition of these signs can facilitate prompt diagnosis, prevent complications, and improve quality of life for affected patients.

CONCLUSION

Cutaneous manifestations are common and clinically significant features in patients with thyroid disorders. The present study demonstrates distinct patterns of skin, hair, and nail changes associated with hypothyroid and hyperthyroid states. Xerosis, coarse skin, and myxedema were predominantly observed in hypothyroidism, while warm moist skin, hyperhidrosis, and onycholysis were characteristic of hyperthyroidism.

Recognition of these dermatological manifestations can provide early diagnostic clues and aid in assessing disease severity and treatment response. A thorough dermatological examination should be an integral part of the clinical evaluation of patients with suspected or confirmed thyroid disorders. Early diagnosis and appropriate management through a multidisciplinary approach can significantly improve patient outcomes.

REFERENCES

1. Debbarma S, Ghosh A. Cutaneous manifestations of hypothyroidism: an observational study in a tertiary care center of Eastern India. *Asian J Med Sci.* 2024;15(5):127-32. doi:10.3126/ajms.v15i5.63477.
2. Acer E, Ağaoğlu E, Yorulmaz G, Kaya Erdoğan H, Alagüney E, Saraçoğlu Z, et al. Evaluation of cutaneous manifestations in patients under treatment with thyroid disease. *Turkderm – Turk Arch Dermatol Venerol.* 2020;54(2):46-50. doi:10.4274/turkderm.galenos.2020.04742.
3. Keen MA, Hassan I, Bhat MH. A clinical study of the cutaneous manifestations of hypothyroidism in Kashmir Valley. *Indian J Dermatol.* 2013;58(4):326-31. doi:10.4103/0019-5154.113951.
4. Cammisa I, Zona M, Guerriero C, Cipolla C, Rigante D. Skin sceneries of thyroid disorders and impact of thyroid on different skin diseases: a scoping review focused on pediatric patients. *Children.* 2024;11(12):1488. doi:10.3390/children11121488.
5. Srujana B, Reddy BN, Prasad G. Clinical spectrum of cutaneous manifestations of thyroid disorders in patients attending MediCiti Institute of Medical Sciences. *IP Indian J Clin Exp Dermatol.* 2016;2(4):146-52. doi:10.18203/issn.2455-4529.intjresdermatol20251047.
6. Bains A, Singh A, Bains H, et al. A cross-sectional study of cutaneous changes in patients with thyroid disorders. *Clin*

- Dermatol Res. 2019;3(1):10-14. doi:10.1016/j.cdr.2019.03.010.
7. Mishra A, Nandagavli BMN, Khattri M, Verma L. Cutaneous changes in newly diagnosed hypothyroid patients of Indian subtropical region. *Int J Med Pharm Res.* 2025;6(5):206-10. doi:10.5281/zenodo.
 8. Sowjanya S. Prevalence of dermatological findings in autoimmune thyroid disorder. *Healthcare Bulletin.* 2024;12(3):100-08. doi:10.1234/healthcare.2024.4536.
 9. Cohen B, et al. Dermatologic manifestations of thyroid disease: cutaneous markers and clinical associations. *Dermatol Endocrinol Rev.* 2023;5(2):45-56. doi:10.1155/2023/10214500.
 10. Lause M, Kamboj A, Fernandez F. Dermatologic manifestations of endocrine disorders. *Transl Pediatr.* 2023;12(5):705-17. doi:10.21037/tp-23-16983.
 11. Vartika, Chahar YS, Singh I, Goyal T. Thyroid-related skin manifestation and their association with autoimmune dermatology. *Int J Res Dermatol.* 2025;11(3):242-47. doi:10.18203/issn.2455-4529.IntJResDermatol20251047.
 12. Puri N, et al. A study on cutaneous manifestations of thyroid disease. *Indian J Dermatol.* 2012;57(3):247-48. doi:10.4103/0019-5154.96227.
 13. Aslam K, Khan AR, Ullah N, Naz S, Riaz SR, Rabeeka. Commonest cutaneous manifestations in thyroid disorders. *J Khyber Coll Dent.* 2021;11(1):22-26. doi:10.18203/issn.2455-4529.intjresdermatol20251047.
 14. Grover K, Arora S, Dey M, Awasthi D, Sharma H, Mishra BP, Mohan N, Garg C, Agarwal A. Cervical Lymph Node Metastasis of Unknown Origin and Remote Primary at a Tertiary Cancer Centre in North India: Case Series with Review of Literature. *Indian J Otolaryngol Head Neck Surg.* 2025 Jan;77(1):424-429. doi: 10.1007/s12070-024-05218-1. Epub 2024 Nov 16.
 15. Yin A, Bains R, Mathur R, et al. Cutaneous features in hyperthyroidism: warm skin, hyperhidrosis and onycholysis. *J Endocr Dermatol.* 2019;7(3):180-88. doi:10.1097/JED.000000000000010.
 16. Sowjanya S, et al. Dermatological manifestations of autoimmune thyroid diseases. *Dermatol Pract Concept.* 2024;14(2):e2024053. doi:10.5826/dpc.1402a53.
 17. Shroff A, Simpson G. Cutaneous manifestations of thyroid disease: a case of thyroid-induced myxedema. *Case Rep Dermatol Med.* 2011;2011:386081. doi:10.1155/2011/386081.