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Research Article

Cutaneous Changes in Newly Diagnosed Hypothyroid Patients of Indian Subtropical Region

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ABSTRACT

Background: Hypothyroidism often presents with cutaneous, hair, and nail changes that can serve as early diagnostic indicators. Regional variations in climate and population characteristics may influence the prevalence and pattern of these manifestations. This study aimed to evaluate the spectrum of cutaneous changes in newly diagnosed hypothyroid patients in the subtropical region of India.
Material and Methods: A prospective observational study was conducted at a tertiary care hospital from January 2025 to June 2025. 400 newly diagnosed adult hypothyroid patients were included. Demographic data and clinical characteristics were recorded. Comprehensive dermatological examinations were performed to document skin, hair, nail, and soft tissue changes. Associations with age and sex were analyzed using chi-square or Fisher's exact test, with $p < 0.05$ considered statistically significant.
Results: Among 400 patients, the mean age was 38.4 ± 12.7 years, with 258 (64.5%) females and 236 (59.0%) urban residents. The most common cutaneous manifestations were xerosis (68.0%), dry, coarse hair (49.5%), diffuse hair loss (43.0%), pallor (36.0%), and brittle nails (27.0%). Myxedema was observed in 24.0%, facial puffiness in 22.0%, carotenemia in 13.0%, and madarosis in 11.0%. No statistically significant differences in cutaneous features were noted between males and female. Age-wise analysis showed a trend toward higher prevalence of myxedema and xerosis in older patients, particularly those aged 46–60 years and above 60 years.
Conclusion: Cutaneous, hair, and nail changes are highly prevalent in newly diagnosed hypothyroid patients, with xerosis, hair changes, and myxedema being the most frequent. Recognition of these manifestations can facilitate early diagnosis and guide timely management in hypothyroid patients.

Keywords: *Hypothyroidism, Cutaneous manifestations, Xerosis, Myxedema, Hair changes, Indian subtropical region.*

INTRODUCTION

Hypothyroidism is a prevalent endocrine disorder characterized by insufficient thyroid hormone production, leading to a variety of systemic manifestations. In India, the prevalence of hypothyroidism is estimated to be approximately 11%, which is notably higher compared to Western populations [1].

Cutaneous manifestations are common in hypothyroidism and can serve as early indicators of the disease. These manifestations include dry, coarse skin (xerosis), hair loss, brittle nails, and myxedema. For instance, a study by Puri et al. reported that dry, coarse skin was the most common cutaneous symptom, observed in 65.22% of patients, followed by hair loss in 42.6% and puffy edema in 38.48% [2,3].

The pathophysiology behind these cutaneous changes is primarily due to decreased metabolic activity and reduced peripheral circulation associated with hypothyroidism. This leads to alterations in skin texture, hair growth, and nail integrity. Additionally, the accumulation of mucopolysaccharides in the dermis results in myxedema, contributing to skin thickening and puffiness [4-6].

In the Indian context, where iodine deficiency remains a significant public health issue, understanding the cutaneous manifestations of hypothyroidism is crucial. These manifestations can aid in early detection and management, especially in regions where access to advanced diagnostic facilities may be limited.
This study aimed to evaluate the spectrum of cutaneous changes in newly diagnosed hypothyroid patients in the subtropical region of India, thereby contributing to the existing body of knowledge and facilitating early diagnosis and intervention.

MATERIAL AND METHODS

Study Design and Setting: This was a prospective, observational study conducted at a tertiary care hospital in the subtropical region of India from January 2025 to June 2025. Informed consent was obtained from all participants.
Study Population: The study included newly diagnosed adult patients (≥18 years) with clinical hypothyroidism, confirmed by elevated serum Thyroid-Stimulating Hormone (TSH) levels and low Free Thyroxine (FT4) levels, as per the American Thyroid Association guidelines [7]. Patients with a history of thyroid surgery, radioactive iodine therapy, or those on thyroid hormone replacement therapy prior to the study were excluded.

Sample Size: Based on a study by Vartika et al. [4], which reported that 67.83% of hypothyroid patients exhibited xerosis, a common cutaneous manifestation, and considering a 95% confidence level and a 5% margin of error, the required sample size was calculated to be approximately 400 patients. This sample size was deemed sufficient to detect significant associations between cutaneous changes and hypothyroidism.

Data Collection: Demographic and clinical data were collected through structured interviews and medical records. A comprehensive dermatological examination was performed to identify and document cutaneous manifestations, including:

- Skin changes: xerosis, thinning, myxedema, carotenemia
- Hair changes: diffuse hair loss, coarse hair, brittle hair, madarosis
- Nail changes: longitudinal striations, brittle nails, slow growth
- Pigmentary changes: pallor, xanthelasma, acanthosis nigricans
- Oedematous changes: puffiness of face, hands, and feet

Statistical Analysis: Data were analyzed using SPSS version 26.0. Descriptive statistics were used to summarize demographic and clinical characteristics. The prevalence of each cutaneous manifestation was calculated. Associations between categorical variables were assessed using the Chi-square test or Fisher's exact test, as appropriate. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 400 newly diagnosed hypothyroid patients were included in the study. The mean age was 38.4 ± 12.7 years, with the majority being female (258/400, 64.5%) and urban residents (236/400, 59.0%) (Table 1)
Cutaneous manifestations were observed in a high proportion of patients. The most prevalent skin changes were xerosis (68.0%), followed by dry, coarse hair (49.5%), diffuse hair loss (43.0%), and brittle nails (27.0%). Other notable features included pallor (36.0%), myxedema (24.0%), facial puffiness (22.0%), carotenemia (13.0%), and madarosis (11.0%) (Table 2).

When analyzed by sex, the prevalence of most cutaneous features was slightly higher among females, although differences were not statistically significant. Xerosis was present in 69.8% of females versus 64.8% of males ($p = 0.31$). Similarly, diffuse hair loss, dry coarse hair, brittle nails, and myxedema showed no significant sex-based differences (Table 3).

Age-wise analysis revealed that xerosis and hair loss were common across all age groups, with a slightly higher prevalence in the 46–60 years age group (xerosis 73.5%, hair loss 46.9%). Myxedema prevalence increased with age, reaching 40.0% in patients above 60 years (Table 4).

Table 1: Demographic Profile of Study Population (n = 400)

Variable	Total (n=400)
Age (years), mean ± SD	38.4 ± 12.7
Sex, n (%)	
Male	142 (35.5%)
Female	258 (64.5%)
Residence, n (%)	
Urban	236 (59.0%)
Rural	164 (41.0%)

Table 2: Prevalence of Cutaneous Manifestations (n=400)

Cutaneous Feature	n (%)
Xerosis	272 (68.0%)
Dry, coarse hair	198 (49.5%)
Hair loss (diffuse)	172 (43.0%)
Brittle nails	108 (27.0%)
Myxedema	96 (24.0%)
Pallor	144 (36.0%)
Carotenemia	52 (13.0%)
Facial puffiness	88 (22.0%)
Madarosis (eyebrow loss)	44 (11.0%)

Table 3: Association of Cutaneous Manifestations with Sex

Cutaneous Feature	Male (n=142)	Female (n=258)	p-value
Xerosis	92 (64.8%)	180 (69.8%)	0.31
Dry, coarse hair	68 (47.9%)	130 (50.4%)	0.61
Hair loss	58 (40.8%)	114 (44.2%)	0.50
Brittle nails	34 (23.9%)	74 (28.7%)	0.34
Myxedema	30 (21.1%)	66 (25.6%)	0.38

Table 4: Association of Cutaneous Manifestations with Age Group

Age Group (years)	n	Xerosis n (%)	Hair Loss n (%)	Myxedema n (%)
18–30	110	70 (63.6%)	42 (38.2%)	18 (16.4%)
31–45	162	110 (67.9%)	72 (44.4%)	38 (23.5%)
46–60	98	72 (73.5%)	46 (46.9%)	28 (28.6%)
>60	30	20 (66.7%)	12 (40.0%)	12 (40.0%)

DISCUSSION

Our study observed a notably high prevalence of cutaneous manifestations among newly diagnosed hypothyroid patients residing in the Indian subtropical region. The most frequently reported dermatological features included xerosis, characterized by dry and rough skin; dry, coarse hair; diffuse hair loss affecting the scalp and body hair; and myxedema, manifesting as non-pitting swelling and thickening of the skin. These observations are consistent with findings from

earlier studies conducted in various regions of India, which similarly reported xerosis, hair abnormalities, and mucinous skin changes as prominent features in hypothyroid individuals [2,3,8-10].

The underlying pathophysiology of these cutaneous manifestations is primarily linked to the systemic metabolic derangements seen in hypothyroidism. Reduced thyroid hormone levels lead to decreased basal metabolic rate and diminished peripheral blood flow, which collectively impair nutrient and oxygen delivery to the skin and adnexal structures. Consequently, there are marked alterations in epidermal turnover, keratinization, and hair follicle cycling, resulting in xerosis, coarse hair, and diffuse hair loss. Furthermore, the deposition of glycosaminoglycans, particularly hyaluronic acid and chondroitin sulfate, in the dermis leads to mucopolysaccharide accumulation, contributing to myxedema and the characteristic thickened, puffy appearance of the skin [11,12]. Impaired sebaceous and sweat gland function in hypothyroid patients further exacerbates skin dryness and coarseness.

In our cohort, the prevalence of cutaneous manifestations was higher among female patients, reflecting the well-established higher incidence of hypothyroidism in females. Nonetheless, statistical analysis did not demonstrate significant differences in the spectrum or severity of dermatological features between males and females. Age-stratified analysis revealed that xerosis and hair loss were prevalent across all age groups, with a modestly higher occurrence in individuals aged 46–60 years. Notably, the prevalence of myxedema demonstrated an age-dependent increase, reaching 40.0% in patients aged over 60 years, suggesting progressive dermal glycosaminoglycan accumulation with advancing age [13-16].

These findings highlight the clinical relevance of dermatological assessment in patients suspected of hypothyroidism. Recognizing characteristic skin and hair changes can serve as early, non-invasive indicators of thyroid dysfunction. Prompt identification and diagnosis facilitated by careful cutaneous examination may allow earlier initiation of thyroid hormone replacement therapy, thereby mitigating systemic complications and improving overall patient outcomes.

CONCLUSION

Cutaneous manifestations are highly prevalent in newly diagnosed hypothyroid patients in the subtropical Indian region. Xerosis, hair changes, and myxedema are the most common features, while nail and pigmentary changes are less frequent. These findings highlight the importance of thorough dermatological examination in hypothyroid patients, as early recognition of skin, hair, and nail changes can aid in diagnosis and prompt management.

REFERENCES

1. Bajaj S. Thyrovigilance for hypothyroidism in India. Thyroid Res Pract. 2022 Jan–Apr; 19(1):1–7. doi: 10.4103/trp.trp_16_22.
2. Keen MA, Hassan I, Bhat MH. A clinical study of the cutaneous manifestations of hypothyroidism in Kashmir Valley. Indian J Dermatol. 2013 Jul; 58(4):326. doi: 10.4103/0019-5154.113951.
3. Debbarma S, Ghosh A. Cutaneous manifestations of hypothyroidism: An observational study in a tertiary care center of Eastern India. Asian J Med Sci. 2024 May; 15(5):126–132. Available from: https://doi.org/10.3126/ajms.v15i5.63477
4. Vartika, Chahar YS, Singh I, Goyal T. Thyroid-related skin manifestations and their association with autoimmune dermatology. Int J Res Dermatol. 2025 May–Jun; 11(3):1047. Available from: https://doi.org/10.18203/issn.2455-4529.IntJResDermatol20251047
5. Cohen B, Cadesky A and Jaggi S (2023) Dermatologic manifestations of thyroid disease: a literature review. Front. Endocrinol. 14:1167890. doi: 10.3389/fendo.2023.1167890
6. Dogra, Alka; Dua, Aman; Singh, Parminder. THYROID AND SKIN. Indian Journal of Dermatology 51(2): p 96-99, Apr–Jun 2006. | DOI: 10.4103/0019-5154.26927
7. Garber JR, Cobin RH, Gharib H, Hennessey JV, Klein I, Mechanick JI, et al. Clinical practice guidelines for hypothyroidism in adults: cosponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association. Endocr Pract. 2012 Nov-Dec; 18(6):988-1028. doi: 10.4158/EP12280.GL.
8. Patil CC, Bhatnagar A, Hiremath RN, Sandhu S, Suhag D, Kumar M, et al. A spectrum of dermatological manifestations associated with hypothyroid condition – A pilot study. BLDE Univ J Health Sci. 2023 Jan–Jun; 8(1):47–50. doi: 10.4103/bjhs.bjhs_21_22.

9. 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 (Basel). 2024 Dec 6; 11(12):1488. doi: 10.3390/children11121488.
10. Bagcchi S. Hypothyroidism in India: more to be done. Lancet Diabetes Endocrinol. 2014 Oct; 2(10):778. doi: 10.1016/S2213-8587(14)70208-6.
11. Doshi DN, Blyumin ML, Kimball AB. Cutaneous manifestations of thyroid disease. Clin Dermatol. 2008 May-Jun; 26(3):283-7. doi: 10.1016/j.clindermatol.2007.10.020.
12. Safer JD. Thyroid hormone action on skin. Curr Opin Endocrinol Diabetes Obes. 2012 Oct; 19(5):388-93. doi: 10.1097/MED.0b013e328357b45e.
13. Unnikrishnan AG, Kalra S, Sahay RK, Bantwal G, John M, Tewari N. Prevalence of hypothyroidism in adults: An epidemiological study in eight cities of India. Indian J Endocrinol Metab. 2013 Jul; 17(4):647-52. doi: 10.4103/2230-8210.113755.
14. Jessy AS, Sandhya G, Monisha S, Sundarakumar JS, Stezin A, Issac TG. Prevalence of hypothyroidism in older adults and its association with cognition: a cross-sectional study from a South Indian ageing urban cohort. Brain Commun. 2024 Dec 5; 6(6):fcae391. doi: 10.1093/braincomms/fcae391.
15. Sharma P, Verma A. Prevalence of hypothyroidism among postmenopausal women in an urbanised village of northern India: a cross-sectional study. J Family Med Prim Care. 2024 Sep; 13(9):3815–3821. doi: 10.4103/jfmpc.jfmpc_229_24.
16. Mahanta A, Choudhury S, Choudhury SD. Prevalence of hypothyroidism in Assam: a clinic-based observational study. Thyroid Res Pract. 2017 May–Aug; 14(2):63–70. doi: 10.4103/trp.trp_38_16.