Dermoscopic Findings in Alopecia Areata: A Cross-Sectional Observational Study

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ABSTRACT

Background

Alopecia areata is an autoimmune condition characterized by non-scarring hair loss affecting the scalp and other hair-bearing regions. Dermoscopy, a non-invasive diagnostic method, significantly improves the ability to confirm diagnosis, evaluate disease progression, and monitor treatment outcomes.

Objective

To evaluate the clinical and dermoscopic patterns of alopecia areata among patients attending a tertiary dermatology centre in Nepal.

Method

A descriptive cross-sectional study was carried out over one year at Kathmandu Medical College Teaching Hospital's Dermatology Outpatient Department including 60 patients clinically diagnosed with alopecia areata. Scalp and affected areas were examined using a Heine Delta 20 contact dermoscope with 10–16× magnification. Demographic, clinical features, and dermoscopic findings were collected and analyzed.

Result

Sixty patients were evaluated. Male patients predominated (41/60), and the largest age group was 21–30 years (35/60). Disease duration was less than six months in 48/60 patients. Localized patchy alopecia was the predominant presentation (49/60), with the occipital scalp being the most frequently involved site (27/60). Dermoscopy most frequently demonstrated yellow dots (58/60), followed by short vellus hairs (42/60), black dots (37/60), broken hairs (35/60), exclamation mark hairs (32/60), and white regrowing hairs (14/60).

Conclusion

Dermoscopy is a rapid and non-invasive modality that demonstrates characteristic findings in alopecia areata. In this cohort, yellow dots, short vellus hairs, black dots, broken hairs, and exclamation mark hairs were frequently observed. Further analytical studies are required to determine their associations with disease duration and SALT severity. Dermoscopy also offers economic value by reducing the need for unnecessary laboratory investigations in resource-limited settings.

KEY WORDS

Alopecia areata, Dermoscopy, Hair loss, Nepal, Scalp

INTRODUCTION

Alopecia areata is a common, immune-mediated, non-scarring disorder of hair loss. The global prevalence ranges from 0.1 to 0.2% with a lifetime risk of about 1.7%.[1] It accounts for approximately 25% of all alopecia cases seen by dermatologists. Both males and females are affected equally, and most cases begin before the age of 30. The disease results from autoimmune attack by cytotoxic T lymphocytes targeting hair follicles. Key signaling pathways involve janus kinases that contribute to its pathogenesis.[2,3] Clinically, alopecia areata presents as localized, well-defined patches of hair loss, most commonly on the scalp (90%), and can be classified into patchy, reticular, ophiasis, sisaipho, diffuse, alopecia totalis, and universalis. Nail changes occur in 10–44% of cases, mainly in severe forms.[4] Severity is assessed using the SALT score, which grades scalp and body hair loss.[5]

The clinical course of alopecia areata is highly unpredictable. Even after successful treatment and apparent remission, there is no guarantee that new or additional lesions will not appear in the future, making long-term prognosis uncertain for individual patients.[6] Diagnosis is primarily clinical but can be challenging due to variable presentation and difficulty assessing disease activity by naked eye. Dermoscopy is a non-invasive tool that improves diagnostic accuracy by revealing characteristic features such as yellow dots, black dots, broken hairs, short vellus hairs and exclamation mark hairs. It aids in determining disease severity, activity, and treatment response.[7,8] However, dermoscopic patterns can vary across populations, and regional studies remain limited.

In Nepal, there is a scarcity of data on the dermoscopic features of alopecia areata. This study was conducted to identify common dermoscopic patterns and correlate them with clinical characteristics, aiming to highlight the usefulness of dermoscopy as a non-invasive, supportive diagnostic tool in routine dermatological evaluation and management.

METHODS

A hospital-based descriptive cross-sectional study was conducted at the Outpatient Department of Dermatology, Venereology, and Leprology, Kathmandu Medical College Teaching Hospital (KMCTH), Sinamangal, Kathmandu, Nepal. The study period spanned from April 1, 2024 to June 1, 2025.

Ethical approval was obtained from the Institutional Review Committee of Kathmandu Medical College (Reference number: 31082024/08). Written informed consent was secured from all participants, and confidentiality was ensured by de-identifying data and assigning unique study IDs. The study adhered to the Declaration of Helsinki and good clinical practice guidelines. Participants were recruited using convenience sampling.

Sample size was calculated using the formula:

$n = Z^2pq / e^2$, where Z = 1.96 (95% confidence interval), p = 0.04, q = 1 – p, and e = 0.05 (margin of error), resulting in 60 participants.[13]

Inclusion criteria included patients aged 18 years or older of any sex, clinically diagnosed with alopecia areata, and willing to provide consent. Exclusion criteria were uncertain diagnosis, uncooperative patients, those treated for alopecia areata within one month prior.

Diagnosis was made clinically by a registered dermatologist. After consent, demographic and clinical data were collected via a structured proforma. Alopecia severity was assessed with the Severity of Alopecia Tool (SALT) score. Dermoscopic examination was performed using a Heine Delta 20 contact dermoscope (10–16× magnification), with findings interpreted and documented photographically by a dermatologist.

Data was entered into Microsoft Excel and analyzed using IBM SPSS version 25. Descriptive statistics (frequency, percentage, mean, standard deviation) summarized patient and dermoscopic features. Chi-square test assessed categorical variables, with $p < 0.05$ considered statistically significant.

RESULTS

A total of 60 patients clinically diagnosed with alopecia areata were enrolled in the study.

Demographic and Clinical Characteristics

The mean age of the 60 patients was 29.2 ± 9.3 years, with the largest age group being 21–30 years (35/60). Male patients predominated (41/60). Most patients had a disease duration of less than six months (48/60). Itching was reported by 21/60 patients and paresthesia by 3/60. Coexisting thyroid disorders were present in 7/60 patients and diabetes mellitus in 2/60. A positive family history was reported in 4/60 patients, while chronic medical illness was present in 11/60 patients illustrated in figure 1.

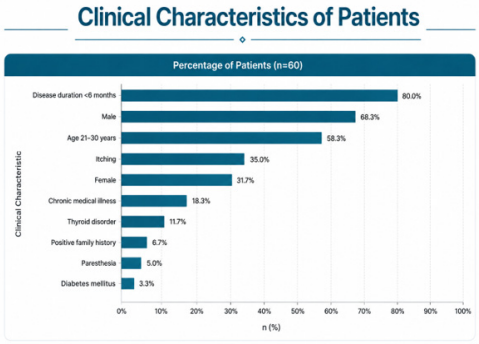


Figure 1. Clinical characteristics of patients with alopecia areata (n = 60).

Distribution of demographic and clinical characteristics among the study participants, including age, sex, disease duration, associated symptoms, comorbidities, family history, and chronic medical illness.

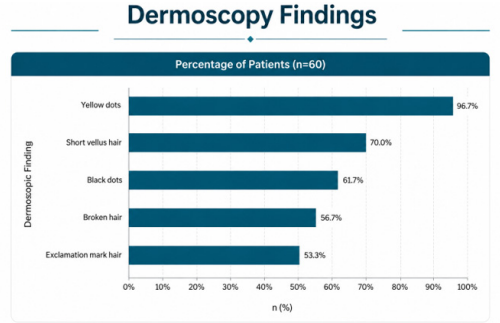


Figure 2. Frequency of dermoscopic findings in patients with alopecia areata (n = 60).

Frequency distribution of characteristic dermoscopic findings, including yellow dots being commonest followed by short vellus hairs, black dots, broken hairs, exclamation-mark hairs, and white regrowing hairs.

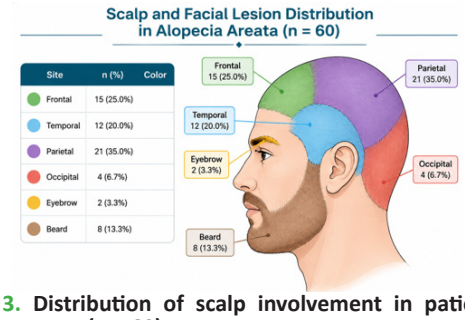


Figure 3. Distribution of scalp involvement in patients with alopecia areata (n = 60).

Distribution of affected scalp sites, demonstrating predominant occipital involvement followed by parietal, frontal, and temporal regions.

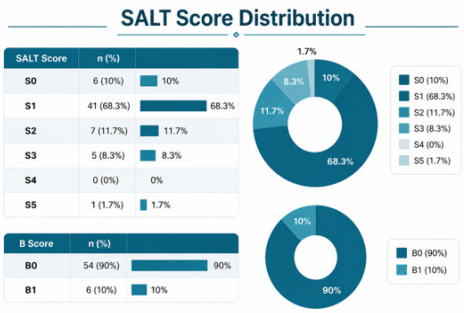


Figure 5. Distribution of Severity of Alopecia Tool (SALT) scores among patients with alopecia areata (n = 60).

Distribution of patients according to SALT score, demonstrating predominance of mild disease with progressively fewer patients having moderate, severe, or very severe scalp involvement.

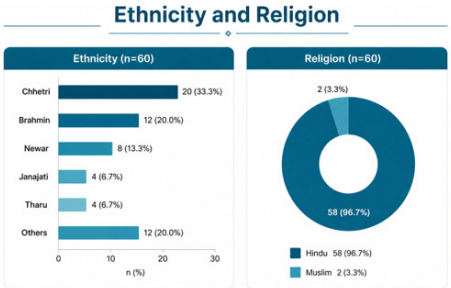


Figure 6. Ethnic and religious distribution of study participants.

Distribution of clinical lesion characteristics, including localized patchy alopecia, lesion number, lesion shape, and associated nail changes.

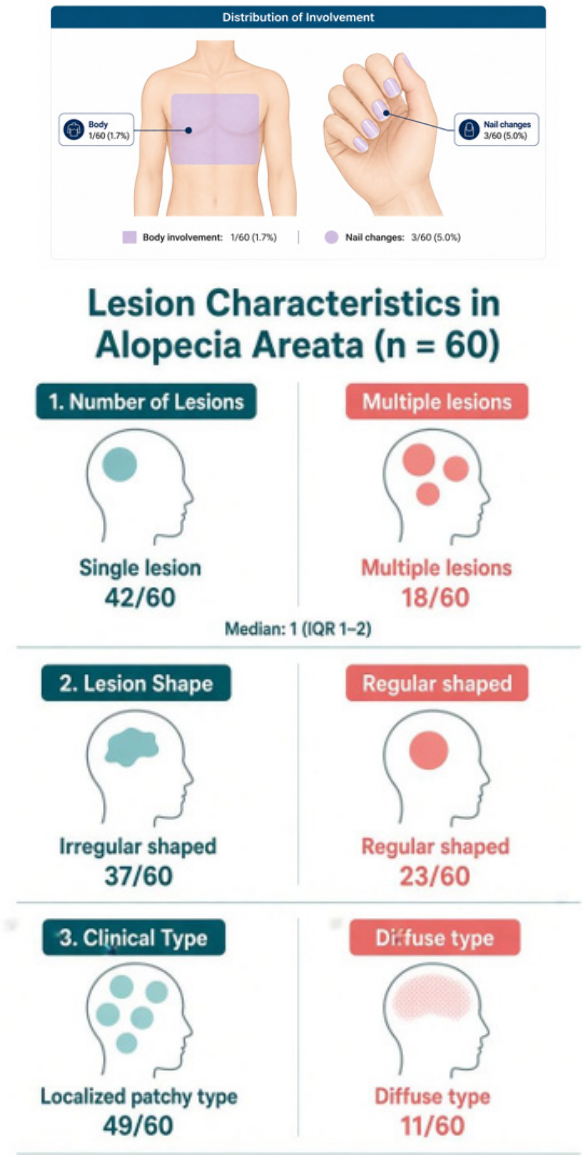
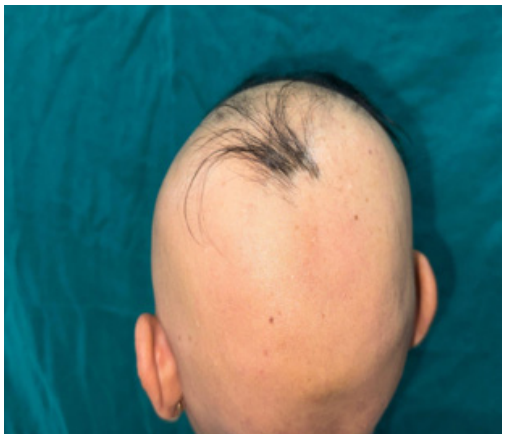


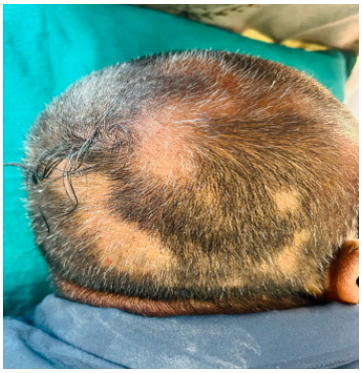
Figure 4. Clinical patterns and characteristics of alopecia areata lesions.

Distribution of clinical lesion characteristics, including localized patchy alopecia, lesion number, lesion shape, and associated nail changes.



Picture 1. Extensive, confluent, alopecia involving the scalp, with smooth normal-appearing scalp skin and sparse residual hairs, consistent with alopecia totalis.

Picture 2. **Solitary Well-circumscribed, round-to-oval nonscarring patch of alopecia areata.**



Picture 3. **Extensive nonscarring multifocal patches of alopecia areata with preserved follicular openings.**

Lesion Distribution and Pattern

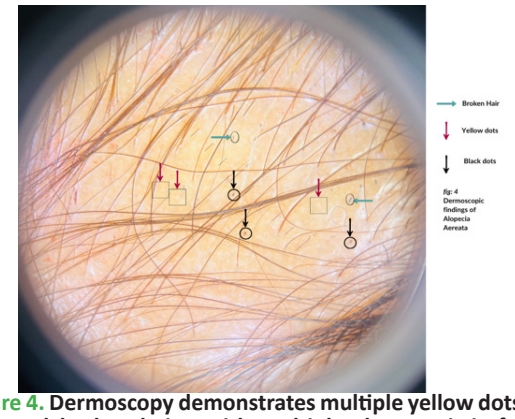
As shown in figure 4, the occipital scalp was the most frequently affected site (27/60), followed by the parietal, frontal, and temporal regions. Extra-scalp involvement included the beard (8/60), eyebrow (2/60), and body hair (1/60). Most patients had a single lesion, with a median number of lesions of 1 (IQR: 1–2). Irregularly shaped lesions were observed in 37/60 patients, while localized patchy alopecia was the predominant clinical pattern. Nail changes were observed in 3/60 patients.

Dermoscopic findings

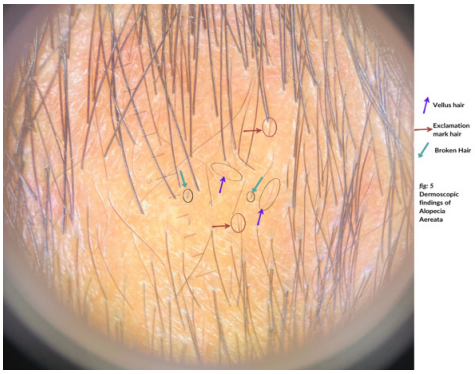
The dermoscopic findings are summarized in figure 1 and graphically shown in picture 4 and 5 . Yellow dots were the most frequently observed finding (58/60), followed by short vellus hairs (42/60), black dots (37/60), broken hairs (35/60), exclamation-mark hairs (32/60), and white regrowing hairs (14/60). White regrowing hairs within alopecic patches were considered an early dermoscopic sign of hair regrowth.

SALT Scoring

The SALT score distribution indicates that the majority of patients had relatively limited disease involvement, with mild disease predominating, while progressively fewer patients had moderate to very severe disease. This pattern suggests that most patients in our cohort presented with lower overall scalp involvement, with extensive disease occurring less frequently illustrated in figure 5.



Picture 4. **Dermoscopy demonstrates multiple yellow dots, black dots, and broken hairs, with multiple characteristic follicular openings consistent with alopecia areata.**



Picture 5. **Dermoscopy demonstrates multiple vellus hair, exclamation mark hair, and broken hairs, with multiple characteristic follicular openings consistent with alopecia areata.**

DISCUSSIONS

Dermoscopy also known as Trichoscopy has been a standard for not only diagnostic purpose in alopecia areata but also to look for follow up and prognosis by allowing to visualise details microstructures.[9,10] Dermoscopy is a valuable first step before biopsy, which helps us avoid unnecessary biopsies and also identify the optimal biopsy site.[11]

The present study evaluated the clinical and dermoscopic characteristics of alopecia areata in 60 patients attending a tertiary dermatology centre in Nepal. The most commonly seen dermoscopic findings were yellow dots, short vellus hairs, black dots, broken hairs, and exclamation-mark hairs. Yellow dots were the most frequently observed dermoscopic feature in our study, occurring in 58 of 60 patients. This is consistent with multiple studies worldwide that recognize yellow dots as one of the characteristic features of alopecia areata.[12] Inui et al. in their analysis of 300 patients, reported yellow dots in approximately 63.7% of cases, which was lower than that compared to our study.[13] The higher frequency in our study may be due to differences in patient selection, disease duration, disease activity, treatment status, or study setting. Yellow dots corresponds to the dilated follicular infundibulum containing keratinous material and sebum and are considered an important diagnostic feature of alopecia areata. It is a primary and most sensitive dermoscopic finding of AA. Higher number of yellow dots correlates

with more severe,chronic and widespread forms of alopecia areata. Although previous studies have suggested an association between the abundance of yellow dots and disease severity or chronicity, this relationship was not specifically evaluated in the present study and therefore cannot be established from our findings.

Short vellus hairs were observed in 70% of our patients, which is similar to the 65–75% prevalence reported in previous studies.[13] It represents regrowth and active follicular cycling. These hairs demonstrates successful treatment response or spontaneous recovery.[14] However, because patients were not followed longitudinally in our study, we could not determine whether short vellus hairs predicted subsequent clinical recovery or treatment response.

The presence of black dots (61.7%) and broken hairs (58.3%) in our study were higher than those reported by Paudel et al., who observed black dots in 30.8% and broken hairs in 22.2% of patients.[15] Black dots symbolizes dystrophic or broken hairs at the follicular openings, while broken hairs represents fragile, dystrophic hair shafts. These findings have been associated with disease activity in previous studies and indicates an active phase of alopecia areata. However, disease activity was not independently assessed in relation to these dermoscopic features in the present study.

Interestingly, the prevalence of exclamation mark hairs in our cohort (53.3%) was somewhat greater than reported in a study done by Jha et al. which showed (31.9%) prevalence of exclamation mark hairs.[10] These are considered the hallmark signs in AA. Differences in prevalence between studies may reflect variation in disease duration, disease activity, treatment exposure, and patient selection. Their relatively frequent occurrence in our study may indicate that a substantial proportion of patients presented with clinically active disease, although this interpretation requires confirmation using longitudinal clinical assessment.

The appearance of white regrowing hairs within patchy alopecia spots, observed in 14 patients, is particularly noteworthy. On dermoscopy, these white hairs represent an early and encouraging sign of recovery, indicating that the follicle has shifted from an immune-mediated resting phase toward active anagen growth. Recognition of this feature can reassure both clinician and patient that initial regrowth is occurring even before pigmented terminal hairs become clinically evident. However, because this study was cross-sectional and patients were not followed longitudinally, the prognostic significance of white regrowing hairs could not be established.

Our study further found a high percentage (61.7%) of irregularly shaped lesions, which is a notable finding. Sharma et al. reported similar observations in South Asian populations, suggesting that irregular lesion morphology might be more common in certain ethnic groups compared to predominantly oval or round lesions described in Western cohorts.[16] This emphasizes the importance of considering regional phenotypic variations in clinical assessment.

Male patients predominated in our study, comprising 41 of 60 patients (68.3%). A similar male predominance has been reported by Sharma et al.[16] In contrast, Barahmani et al. reported a higher frequency of alopecia areata among females.[17] Differences in sex distribution between studies may reflect variations in study populations, healthcare-seeking behaviour, referral patterns, and other demographic factors.

While the clinical presentation and dermoscopic features in our study largely correspond with existing literature, the higher proportion of localized patchy alopecia (81.7%) and predominant occipital involvement (45%) may reflect referral patterns or environmental influences unique to Nepal. Furthermore, the co-existence of thyroid disorders in 11.7% of our patients is consistent with autoimmune associations reported by Marahatta et al. supporting the systemic nature of alopecia areata.[18]

Disease severity was assessed using the SALT score; however, the present study primarily described dermoscopic findings and did not demonstrate statistically significant associations between individual dermoscopic features and SALT severity. Although previous studies have suggested that certain dermoscopic findings may vary according to disease severity, these associations require confirmation in larger analytical studies. Future research should specifically evaluate the relationship between the frequency or combination of dermoscopic features and SALT categories.

The clinical course of alopecia areata remains highly unpredictable. Even after apparent clinical improvement and dermoscopic signs of regrowth (such as short vellus hairs and white regrowing hairs), new lesions may still appear. This uncertainty underscores the need for careful counseling and long-term follow-up rather than reliance on any single treatment episode.

Dermoscopy may be particularly useful in the assessment in patients with darker skin phototypes, in whom clinical assessment of scalp and hair changes may sometimes be more challenging. Previous studies have described characteristic dermoscopic features of alopecia areata in individuals with darker skin and have emphasized the usefulness of trichoscopy in the evaluation of hair and scalp disorders in skin of color.[19-21] In the present study too,findings align the practical utility of dermoscopy as a non-invasive adjunct to clinical examination in the Nepalese population.

Additionally, the predominance of short-duration disease (< 6 months in 48 patients) allowed us to document white regrowing hairs at an earlier stage than most published

series; these white hairs may therefore serve as a time-sensitive biomarker of recovery that is particularly useful in young adult populations, the demographic most affected in Nepal.[22] From a health-economics perspective, routine dermoscopy at first presentation can exclude clinically similar conditions such as secondary syphilis or tinea capitis, thereby avoiding serologic testing and prolonged antifungal courses that impose substantial out-of-pocket costs on patients in a resource-constrained public health system like ours. Nevertheless, ancillary investigations should be guided by the clinical differential diagnosis, and dermoscopy should not be considered a substitute for laboratory or histopathological evaluation when these are clinically indicated.[23]

The present study adds to the limited literature describing dermoscopic features of alopecia areata in the Nepalese population. The overall dermoscopic pattern observed was consistent with findings reported internationally, while differences in the frequency of individual features may reflect variation in patient characteristics and clinical presentation. These findings provide locally relevant data supporting the use of dermoscopy in routine evaluation of alopecia areata in Nepal. Limitations of this study include its single-centre hospital-based design and convenience sampling, which may limit generalizability. The cross-sectional design precludes assessment of temporal changes or treatment response, and interobserver variability in dermoscopic interpretation was not formally measured. Confounding factors such as disease duration, chronicity and prior subclinical treatments could have influenced dermoscopic patterns.

CONCLUSION

Dermoscopy is a useful, non-invasive method for diagnosing alopecia areata and evaluating disease activity in the Nepalese population, according to this study. The most common dermoscopic findings, which support its use in regular clinical evaluation, were yellow dots, short vellus hairs, black dots, broken hairs, and exclamation-mark hairs. White regrowing hairs within patches further served as an early marker of recovery. In resource-limited settings, dermoscopy provides significant economic value by helping clinicians avoid unnecessary and costly investigations.

The study's drawbacks include a single-center design, a small sample population, and the possible impact of previous subclinical treatments and other confounding variables. Its strengths include standardized dermoscopic examination and systematic data collection. The results are in line with previous research, demonstrating regional differences in lesion morphology and validating characteristic aspects of alopecia areata.

Future multicenter studies with larger sample sizes are recommended to strengthen statistical power. Investigations should be conducted across different ethnic tribes and geographic regions of Nepal to capture regional phenotypic variation. Age-stratified analyses, associations with other autoimmune diseases, gender-specific treatment outcomes, dietary patterns, and lifestyle factors should be systematically evaluated. Longitudinal follow-up studies are needed to clarify the relationship between dermoscopic markers (especially white regrowing hairs) and long-term prognosis, and to assess the impact of disease duration and treatment history on dermoscopic patterns.

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