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Original Article

Clinical presentation and dermoscopic features of alopecia areata patients

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Abstract

Objective This study aims to comprehensively investigate the clinical and dermoscopic profiles of AA patients and establish correlations between dermoscopic findings and disease severity. The research was conducted among patients attending the Department of Dermatology, Venereology, and Leprology at the Karnataka Institute of Medical Sciences, Hubballi.

Methods Detailed patient histories and clinical examinations were conducted for the study. Dermoscopic analysis was performed using a handheld dermoscope (IDS-1100), and relevant diagnostic tests were administered for all participants.

Results The study encompassed 100 patients, with an average age of 24.5 years. A male-to-female ratio of 1.2:1 was observed. Predominantly, the patchy type of AA was identified, with the scalp being the most commonly affected area. Notably, fine nail pitting emerged as the predominant nail abnormality. Disease severity distribution revealed 39% with mild, 52% with moderate, and 9% with severe AA. No significant link was established between disease severity and onset age, family history, or atopy. However, nail changes exhibited a significant association with severe AA. Dermoscopically, prevalent patterns included black dots, broken hairs, short vellus hairs, yellow dots, and tapering hairs. Yellow dots demonstrated a positive correlation with AA severity, while other patterns showed no significant associations.

Conclusion Alopecia areata primarily affects the younger population, with a slight male preponderance. Dermoscopic analysis offers insights into AA diagnosis and severity assessment. The most prevalent dermoscopic finding, black dots, is complemented by the positive correlation of yellow dots with disease severity.

Key words
Alopecia areata; Dermoscopy; Black dots; Short vellus hairs; Broken hairs; Yellow dots, Tapering hairs.

Introduction

Alopecia areata (AA) is a prevalent chronic inflammatory disorder causing non-scarring hair loss, with manifestations ranging from small, self-recovering patches to extensive hair loss with poor prognosis for regrowth. Concurrent nail involvement can also occur.[1] The prevalence of AA hovers around 0.2% at any given time, with an estimated lifetime risk of 1.7%.[2] It is the second most common non-scarring alopecia, following androgenetic alopecia.[3] Often credited to Celsius, the earliest description of AA dates back to ancient Rome. The term "alopecia areata" emerged in 1763

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with Sauvages, while Rothman's proposition established AA as an autoimmune ailment.[1]

Onset can be at any age, but typically initiates before 40, peaking in the second to fourth decades, and affecting both sexes equally.[1] AA frequently co-occurs with several autoimmune and psychological conditions, such as thyroid diseases, lupus erythematosus, vitiligo, and anxiety.[4] Atopic dermatitis is more prevalent in severe and early-onset cases.[1]

Clinically, AA presents as localized hair loss patches, often on the scalp (90% of cases), exhibiting exclamation mark hairs at the periphery.[5] The affected area appears smooth, with normal skin color, lacking scaling or follicular changes, and rarely showing shades of red or peach.[6] AA classification encompasses various patterns including patchy, reticulate, ophiasis, totalis, universalis, and the newly proposed extensive alopecia areata (EAA).[7] Nails display alterations in 10-15% of cases, manifesting as pitting, ridging, discoloration, and more.[7]

Severity categorization involves mild (≤3 patches or limited to eyelashes/ eyebrows), moderate (multiple patches or a >3 cm patch without totalis/ universalis), and severe (totalis/ universalis).[8] Dermoscopy, a noninvasive technique,[9] aids AA diagnosis by revealing black dots, tapering hairs, broken hairs, yellow dots, and short vellus hairs.[10] Beyond diagnosis, dermoscopy can also gauge disease severity. Despite available studies on AA's clinical profile, research exploring dermoscopic findings and their correlation with severity is lacking, especially in our region. This study aims to investigate both the clinical and dermoscopic aspects of AA.

Aims and objectives

1. To comprehensively investigate the clinical presentation of alopecia areata among patients seeking care at the Department of Dermatology, Venereology, and Leprology, Karnataka Institute of Medical Sciences, Hubli.

2. To meticulously analyze the diverse dermoscopic manifestations exhibited by individuals affected by alopecia areata within this patient cohort.

3. To establish a definitive correlation between distinct dermoscopic patterns and the varying degrees of disease severity observed in cases of alopecia areata.

Material and methods

This is a descriptive cross-sectional study and was conducted within an ethical framework. Data collection spanned one year from the date of ethical committee approval. The study was carried out at Karnataka Institute of Medical Sciences Hubballi.

A minimum of 100 patients, diagnosed with alopecia areata, were included from the dermatology department of Karnataka Institute of Medical Sciences Hubballi.

Patients of all ages and genders with a clinical diagnosis of alopecia areata who provided informed written consent were included.

Patients who were declined participation included those with different types of alopecia, and those undergoing treatment for alopecia areata.

After ethical committee approval (No: KIMS:ETHICS COMM: 412: 2020-21, dated 22-01-2021), eligible patients were enrolled based on inclusion criteria and informed consent. Detailed history, clinical examination, and epidemiological data were collected, including age, gender, occupation, presenting

complaints, onset age, symptom duration, progression, nail symptoms, associated complaints, and medical history. Morphological aspects of the lesions were recorded, and clinical evaluation was performed to assess severity. Dermoscopic features were captured using a handheld dermoscope, and routine/ special investigations were conducted. Data were meticulously recorded in an Excel spreadsheet.

Data analysis was conducted using SPSS (Statistical Package For Social Sciences) version 20.

Results

In the 100 patients with alopecia areata, ages ranged from 4 to 65 years. The age range of 21-30 exhibited the highest frequency, followed by 11-20 and 31-40 years. Most patients fell within the 11 to 40 years range. The mean age at presentation was 24.5±13.4 years.

Among the patients, 55% were males and 45% were females, resulting in a male-to-female ratio of 1.2:1. Notably, males were predominant in the 21-50 age group.

Hair loss was the chief complaint for all 100 patients. Thirteen patients reported itching along with hair loss.

A majority (70%) of patients developed alopecia areata in the six months preceding their visit. Sixteen patients had experienced the condition for six months to a year, while six had onset two years prior.

The mean age of onset was 24.5±13.4 years. 36% of patients had their first alopecia areata episode between ages 21 and 30. Additionally, four patients experienced onset after the age of 50.

Almost a quarter (19%) of the patients had a prior history of alopecia areata. Among them, eight patients had only one relapse (42.1%), while five and six patients had two and three relapses, respectively.

Thirteen patients exhibited itching and seven reported decreased sleep. Some patients mentioned burning sensation and scaling alongside hair loss.

Stress was observed in 21 patients. The mean age of AA onset in stressed patients was 32.7 years, significantly higher than the 21.6 years in those without stress ($p < 0.001$).

Of the 100 patients, 36% had undergone treatment. Common treatments included topical steroids (24 patients) and ayurvedic approaches (13 patients). Out of the treated patients, 17 showed no improvement, while 19 displayed some improvement.

Atopy was present in 7% of the patients (7 out of 100), involving atopic dermatitis, bronchial asthma, or allergic rhinoconjunctivitis.

Atopy was more prevalent in patients with onset under 20 years of age, only one patient above 40 had atopy. The mean age of AA onset was 20.6±14 years with atopy and 24.2±13.4 years without, showing no significant early onset with atopy ($p=0.52$).

Ten patients (10%) had co-morbidities, excluding atopy. Thyroid disease was most common (4 patients), followed by diabetes, hypertension, dyslipidemia, rheumatoid arthritis, and renal calculi. Seven patients had atopic dermatitis, and one had nummular eczema at presentation.

Eleven patients had a family history of alopecia areata, with no significant difference in mean onset age between patients with and without a family history ($p=0.78$). Nineteen patients'

Figure 1 Clinical picture showing ophiasis pattern of alopecia areata.

Figure 2 Clinical picture showing alopecia universalis.

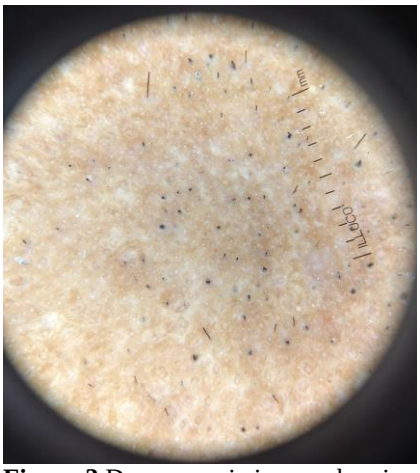

Figure 3 Dermoscopic image showing black dots.

family members had multiple comorbidities. Thyroid disorder was most common (7 patients), followed by diabetes, hypertension, atopy, and bronchial asthma.

Scalp was most commonly affected (84%), with the parietal region most prevalent (46 patients). Some form of body hair involvement was seen in 37 patients across extremities, trunk, beard, moustache, eyebrows, and eyelashes.

Almost half (49%) had lesions 3 cm or less, while 7 patients had lesions larger than 10 cm. Patterns included ophiasis, Sisaipho, alopecia totalis, and alopecia universalis. Oval (72%) and circular (15%) shapes were most common.

Sixty-one patients had three or fewer patches, 22% had 4-6 patches, and four had ≥ 10 lesions. The most common type of involvement was multiple patches (43 patients), followed by single patches (39 patients). Other patterns included ophiasis **(Figure 1)**, Sisaipho, alopecia totalis, and alopecia universalis **(Figure 2)**.

No significant association was found between pattern and atopy. Disease severity was categorized as mild (39%), moderate (52%), or severe (9%).

In this study, 26.5% of patients with nail involvement had mild disease, 47.1% of patients had moderate disease and 26.5% had severe disease. Nine patients (100%) with severe disease showed nail involvement. This difference was statistically significant (p value<0.001) **(Table 1)**.

Pitting was seen in 88.9% of the patients with severe AA compared to only 15.4% and 21.2% of patients with mild and moderate AA and this difference was statistically significant (p value <0.001). One patient with severe AA had trachyonychia which was statistically significant (p value- 0.006). Other nail findings noted were longitudinal ridging and longitudinal melanonychia **(Table 2)**.

No statistically significant difference was found in family history among severity groups (p=-0.05).

Table 1 Relationship between nail changes and severity of alopecia.

Severity of AA	*Nail change*		*P value*
	No	*Yes*	
Mild	30 (45.5%)	9 (26.5%)	<0.001
Moderate	36 (54.5%)	16 47.1%)	
Severe	0	9 (26.5%)	
Total	66 (100%)	34 (100%)	

Table 2 Comparison of individual nail changes with severity of AA.

Nail changes		*Severity of AA*			*P value*
		Mild	*Moderate*	*Severe*	
		n (%)	*n (%)*	*n (%)*	
Pitting	No	33 (84.6%)	41 (78.8%)	1 (11.1%)	<0.001
	Yes	6 (15.4%)	11 (21.2%)	8 (88.9%)	
Longitudinal ridging	No	37 (94.9%)	47 (90.4%)	8 (88.9	0.69
	Yes	2 (5.1%)	5 (9.6%)	1 (11.1%)	
Trachyonychia	No	39 (100%)	52 (100%)	8 (88.9%)	0.006
	Yes	0 (0	0 (0	1 (11.1	
Longitudinal melanonychia	No	38 (97.4%)	50 (96.1%)	9 (100%)	0.81
	Yes	1 (2.6%)	2 (3.8%)	0	

Table 3 Dermoscopic findings in patients with AA.

Dermoscopic findings	*Number*	*Percentage*
Black dots	84	84.0
Yellow dots	19	19.0
Broken hairs	79	79.0
Tapering hairs	19	19.0
Short vellus hairs	37	37.0

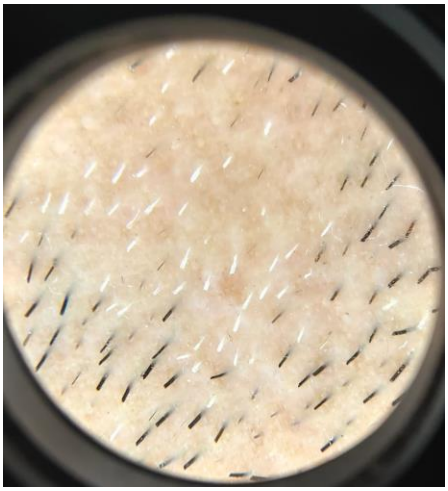

Figure 4 Dermoscopic image showing broken hair.

Figure 5 Dermoscopic image showing tapering hair and yellow dots.

No significant difference was found in atopy prevalence among severity groups (p=0.78).

Dermoscopic findings included black dots **(Table 3; Figure 3)** (84%), broken hairs **(Figure 4)** (79%), short vellus hairs (37%), yellow dots (19%), and tapering hairs (19%) **(Figure 5)**.

Yellow dots were notably associated with severe AA ($p < 0.001$). Other dermoscopic findings showed no significant associations with severity **(Table 4)**.

Anemia was observed in 4 patients, and thyroid dysfunction in 7, with newly detected cases noted. Diabetes was seen in 3.8% of patients with moderate AA. No significant associations were found between anemia, diabetes, thyroid disease, and severity of AA.

Discussion

In this study, the age distribution among patients diagnosed with alopecia areata encompassed a wide range, spanning from 4 to 65 years. This spectrum closely aligns with previous studies; for instance, Sharma *et al.*[7] identified an infant as young as 8 months and an individual as old as 65 years affected by alopecia areata. Goh *et al.*'s research revealed an even broader age range of 2 to 90 years, with a mean age of 36.3 years.[11] Our study demonstrated a mean age of presentation at 24.5±13.4 years, which is consistent with Mane *et al.*'s average age of 26.85 years at

Table 4 Comparison of dermoscopic findings with severity of AA.

Dermoscopic findings		*Severity of AA*			*P value*
		Mild	*Moderate*	*Severe*	
		n (%)	*n (%)*	*n (%)*	
Black dots	No	6 (15.4%)	8 (15.4%)	2 (22.2%)	0.87
	Yes	33 (84.6%)	44 (84.6%)	7 (77.8%)	
Yellow dots	No	36 (92.3%)	43 (82.7%)	2 (22.2%)	<0.001
	Yes	3 (7.7%)	9 (17.3%)	7 (77.8%)	
Broken hairs	No	8 (20.5%)	11 (21.2%)	2 (22.2%)	0.99
	Yes	31 (79.5%)	41 (78.8%)	7 (77.8%)	
Tapering hairs	No	32 (82.1%)	42 (80.8%)	7 (77.8%)	0.95
	Yes	7 (17.9%)	10 (19.2%)	2 (22.2%)	
Short vellus hairs	No	14 (35.9%)	17 (32.7%)	6 (66.7%)	0.15
	Yes	25 (64.1%)	35 (67.3%)	3 (33.3%)	

presentation.[12.] Interestingly, the mean age of onset of alopecia areata in this study was 24.5±13.4 years, compared to Mane *et al.*'s observation of 25.15 years.[12] Further analysis unveiled a minor discrepancy in age of presentation between genders. Females exhibited a slightly earlier age of onset (23.6±16.2 years) compared to males (24.2±10.8 years), a non-significant difference similarly observed by Sharma *et al*.[7]

Our investigation unveiled a peak frequency of alopecia areata cases in the age group of 21-30 years (33%), followed by the 11-20 and 31-40 year ranges (21%). These findings resonate with studies conducted in Northern India and western Odisha, which also noted the highest incidence of the condition among individuals aged 20-29 years and 21-30 years respectively.[7,13]

Among the current study's participants, 8% were aged above 40, with merely four individuals surpassing the age of 50. Notably, this trend of alopecia areata being less prevalent among those above 50 was observed by Sharma *et al.* and Yang *et al.* as well.[7,14]

The current study identified a male-to-female ratio of 1.2:1, mirroring the findings of Nikhil N *et al*. In contrast, some studies exhibited an equal distribution of alopecia areata among both sexes, while others reported a female predominance. This variance underscores the complexity of sex distribution patterns in alopecia areata.

Regarding the duration of illness, this study revealed that 70 out of 100 patients presented within the first 6 months of disease onset. This concurs with Sharma *et al.*'s research,[7] where 62.1% of patients sought medical attention within the initial 6 months. Interestingly, Ranawaka *et al.* found that 82.2% of patients had a disease duration of less than 6 months, with 46.8% within the first month and 35.4% between 2 to 6 months.[15]

In terms of relapses, nearly 19% of the patients had a history of previous episodes. Among these, the majority experienced only one relapse, while a smaller subset had more than two. Hegde *et al.*'s study revealed a similar trend, with 38.6% of their participants reporting at least one relapse.[16]

Stress emerged as a notable factor in the current study, with 21% of patients having experienced stressful events prior to the onset of alopecia areata. This aligns with findings from Manolache *et al;* who observed that over 65% of cases experienced stress-related events, highlighting the potential role of stress in precipitating alopecia areata.[17] A comparable conclusion was reached by Nikhil N *et al;* where

stress was identified as a triggering factor in 24.7% of their patients. Notably, our study associated stress with a later onset of alopecia areata, an insight in alignment with Nikhil N *et al.*'s observations.[18]

Regarding treatment history, 36% of the patients in our study had previously undergone some form of treatment. Topical steroids were the most frequently utilized treatment modality, followed by various other approaches like topical tacrolimus, phototherapy, and oral medications. Ayurvedic treatment was pursued by a subset of patients. Out of these, 17 showed no improvement while 19 experienced some degree of improvement.

In terms of atopic association, 7% of our study population had concomitant atopy. This mirrors the findings of Mishra *et al;*[13] although studies by Barahmani *et al.*[19] and Sreevas *et al.*[20] reported higher rates of atopy. Interestingly, the age of onset of alopecia areata was not significantly influenced by the presence of atopy in our study, in contrast to the earlier onset observed in patients with atopy by Muller and Winkelmann and Ikeda.[21,22]

Comorbidities were also explored, with thyroid disease, anemia, and diabetes mellitus being the most frequently associated conditions. These findings are in line with prior research, where thyroid disease was particularly prevalent. Notably, thyroid disease was more common in females and displayed a trend towards increased prevalence with higher disease severity.

Alopecia areata's characteristic pattern of involvement primarily encompassed the scalp, with 84% of patients experiencing this manifestation. The parietal region emerged as the most frequently affected site, followed by the occipital, frontal, and temporal regions. Additionally, some patients exhibited involvement of body hair, with beard and eyebrows being the primary sites of extracranial involvement.

Lesion characteristics revealed that nearly half of the patients had lesions measuring 3 cm or less, with a few individuals experiencing larger lesions. Lesion shapes were predominantly oval or circular, while the number of lesions varied, with the majority presenting with three or fewer patches.

The most common pattern of alopecia areata observed was multiple patches (43%), followed by single patches (39%). The less common ophiasis and sisaipho patterns were noted in a small subset of patients. Totalis and universalis patterns were observed in 3 and 5 patients respectively, with EAA seen in 1 patient.

In the conducted study, nail involvement was identified in 36% of the participants. Among the various nail observations, the most prevalent was fine nail pitting, observed in 25 patients. Additionally, 7 patients exhibited longitudinal ridging, 1 showed trachyonychia, and 3 presented longitudinal melanonychia. This pattern was consistent with findings from Gandhi *et al*.[23] who reported nail changes in 44% of patients. Notably, the primary alteration observed in both studies was superficial nail pitting, seen in 28% of cases.[46] Similar outcomes were noted in investigations by Hegde *et al*. and Mane *et al;* wherein pitting was the dominant nail alteration associated with alopecia areata.[12,16] Nonetheless, a study by Mishra *et al*. revealed nail involvement in only 10% of patients.[13]

The current research revealed a higher prevalence of nail findings in cases of multiple patchy alopecia areata (39.5%) compared to single patch presentations (18%). Correspondingly, Gandhi *et al*. also found a

stronger association between nail involvement and the multifocal subtype of alopecia areata (68%), contrasting with the focal subtype where nail changes were absent.[23]

In a retrospective analysis of 200 patients, Kasumagic-Halilovic and Prohic demonstrated that severe forms of alopecia areata (alopecia totalis and alopecia universalis) exhibited more frequent nail changes (54.8%), compared to circumscribed alopecia areata (19%).[24] In our investigation, nail involvement was observed in all cases (100%) of severe alopecia areata, whereas only 27.4% (25 out of 91 patients) with mild to moderate alopecia areata exhibited such changes. This discrepancy was statistically significant (p value < 0.001).

Among patients with severe alopecia areata, 88.9% displayed pitting, in contrast to 15.4% and 21.2% in the mild and moderate groups, respectively. This distinction was statistically significant (p value <0.001), suggesting pitting as an indicator of disease severity. Notably, one patient with severe alopecia areata demonstrated trachyonychia, also showing statistical significance (p-value=0.006). Although longitudinal ridging and longitudinal melanonychia were noted, they did not exhibit a statistically significant association with the severity of alopecia areata. A similar observation was made by Sharma *et al;* who found that nail changes were more prevalent in cases of severe alopecia areata.[7]

The presence of associated medical conditions, like anaemia, diabetes mellitus, and thyroid disorders, were investigated. Our study identified a prevalence of thyroid dysfunction in 7 patients, consisting of both overt and subclinical hypothyroidism. Interestingly, the prevalence of these conditions did not exhibit statistically significant correlations with the severity of alopecia areata in our study.

Within our research, dermoscopic examination unveiled several prominent findings. The most prevalent observation was black dots, evident in 84% of patients, followed by broken hairs in 79%, short vellus hairs in 37%, and both yellow dots and tapering hairs each noted in 19% of cases. These outcomes parallel the investigations conducted by Hegde *et al;* where black dots (84%) were predominant discovery, while tapering hairs were the least frequent, observed in only 18.67% of patients.[16]

However, in studies by Mane *et al;* the most frequent dermoscopic discovery was yellow dots, identified in 81.8% of patients, followed by black dots in 67.7%. Conversely, tapering hairs were the least common finding, observed in 12.1%, a pattern consistent with our study.[12] Inui *et al*. also emphasized yellow dots as the most prevalent dermoscopic finding. Their work revealed that yellow dots and short vellus hairs were sensitive markers for diagnosing alopecia areata (AA), while black dots, tapering hairs, and broken hairs served as specific markers, positively correlating with disease activity and severity. Inui *et al*. also found that black dots and yellow dots exhibited a positive correlation with AA severity, while short vellus hairs correlated negatively with both disease activity and severity.[10]

Examining our findings, black dots were observed in 84.6% of patients with mild and moderate disease, and in 77.8% of severe cases. However, the decrease in occurrence among severe cases did not yield statistical significance (p value=0.87). Comparable to Mane *et al*.'s work, we did not identify a connection between black dots and AA severity. On the contrary, Inui *et al*.'s study indicated a positive correlation between black dots and AA severity.[10,12]

Yellow dots emerged in 77.8% of patients with severe AA, in contrast to 7.7% and 17.3%

among mild and moderate cases, respectively. This disparity was statistically significant (p value <0.001), suggesting yellow dots as a severity marker for AA. This aligns with the conclusions of Inui *et al*. and Sreevas *et al*.[10,20] On the other hand, Mane *et al*.'s research did not uncover a link between yellow dots and AA severity.[12]

Broken hairs and tapering hairs exhibited no correlation with AA severity in our study, consistent with the observations made by Mane *et al*. and Inui *et al*.[10,12] Meanwhile, the presence of short vellus hairs was noted in 64.1%, 67.3%, and 33.3% of mild, moderate, and severe AA cases, respectively. This variance did not reach statistical significance (p value=0.15), consistent with Mane *et al*.'s findings,[12] but contrary to Inui *et al*.'s research, which indicated a negative correlation with disease severity.[10]

While these findings contribute valuable insights into the clinical presentation and dermoscopic features of alopecia areata, it's essential to acknowledge the limitations of our study. The sample size was relatively small, and the study duration was short. However, these initial findings provide a foundation for further research in this area, shedding light on various aspects of alopecia areata's clinical manifestations and associations.

Conclusion

In conclusion, alopecia areata (AA) stands as a chronic, non-scarring hair follicle disorder driven by a T-cell-mediated autoimmune mechanism in genetically predisposed individuals. While environmental triggers play a role, this study's findings underscore its predominance among the younger population with a mild male preponderance. Notably, recurrence occurs in approximately a quarter of cases, and stress has emerged as a factor linked to a delayed onset of AA.

The presence of atopic dermatitis, alongside various co-morbidities including thyroid disease, diabetes mellitus, hypertension, anemia, dyslipidemia, and rheumatoid arthritis, indicates the complex interplay of AA with other medical conditions. Of these, hypothyroidism is the most prevalent thyroid disorder associated with AA, highlighting the need for routine screening for these connections in AA patients.

While a family history of AA was found in 11% of cases, it does not correlate with an earlier onset of the disease. Notably, the patchy pattern is the most common manifestation of AA, primarily affecting the scalp. Nail involvement, specifically nail pitting, is a frequent observation, and more importantly, its presence aligns with the severity of AA.

This study highlights the significance of dermoscopy in AA diagnosis, showcasing its potential as a valuable tool for assessing severity and treatment response. Specifically, yellow dots demonstrated a positive correlation with disease severity, whereas the presence of black dots, broken hairs, short vellus hairs, and tapering hairs were not significantly linked to severity.

In summary, our investigation underscores the multifaceted nature of alopecia areata, its associations with various medical conditions, and the potential clinical applications of dermoscopy in understanding disease severity and progression. As we endeavor to advance our understanding of AA, these findings provide a stepping stone for improved diagnosis, treatment evaluation, and patient management.

Declaration of patient consent The authors certify that they have obtained all appropriate patient consent.

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Conflict of interest Authors declared no conflict of interest.

Authors' contribution

VUN, JB: Study design, manuscript writing, final approval of the version to be published.

CK: Acquisition of data, manuscript writing, final approval of the version to be published.

VMP, AS: Analysis, critical review, final approval of the version to be published.

MP, T, HSS: Manuscript witting, concept and design of the work, critical review, final approval of the version to be published.

JB, RMR: Study design, manuscript writing, final approval of the version to be published.

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