

# Nail involvement in alopecia areata: A descriptive cross sectional study

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## Abstract

**Background** Alopecia areata (AA) is an autoimmune disorder that affects the pilar follicles and results in hair loss on the scalp and other parts of the body. In some cases, nails may also be affected before or after hair loss, particularly in severe cases. Different nail change patterns exist even after therapy and hair regrowth. This study aimed to identify the pattern of nail changes in alopecia areata patients.

**Methods** This cross sectional study was conducted at Dermatology Department, BVH, Bahawalpur, from 6th July 2019 to 5th January 2020. A total of 103 patients with alopecia areata, 25-55 years of age and both genders were included. Patients undergoing chemotherapy for any malignancy, pregnant females and known cases of Diabetes Mellitus, Tuberculosis and Chronic renal failure were excluded. After taking informed consent, all patients were evaluated for the severity of alopecia areata (mild/moderate/severe) and different nail changes.

**Results** Mean ages of patients was 34.81 + 7.09 years in which 81 (78.34%) were between 25 to 40 years of age. Out of 103 patients, 55 (53.40%) were males and 48 (46.60%) were females with male to female ratio of 1.1:1 . The nail changes were found to be pitting in 63 (61.17%), longitudinal ridging in 27 (26.21%) and dystrophy in 13 (12.62%).

**Conclusion** This study concluded that nail changes observed in alopecia areata patients were pitting, longitudinal ridging and dystrophy.

## Key words

Alopecia areata; Nail changes; Pitting.

## Introduction

Alopecia areata is a T cell mediated autoimmune disorder. It is a condition with high prevalence (1.7%)<sup>1</sup> with no known and definite etiology. It accounts for 2% of all new cases dermatological outpatient visits in the United Kingdom and the United States.<sup>2</sup> Alopecia areata can equally affect people of any ethnicity, gender or profession. The average age of onset in alopecia

areata is 23 years.<sup>3</sup> However it can affect any age group. People who have a genetic predisposition are more likely to develop this T-cell mediated autoimmune illness. The disease course is highly variable, where periods of remission and relapse do not follow any particular timeline usually.

Different schools of thoughts have attributed different factors to the causation of alopecia areata over the years and there has been a great deal of research and thought going on to find the likely cause of alopecia areata. In one study, Yang et al showed 8.6% of patients had positive family history of AA,<sup>4</sup> which is compatible with a polygenic mode of inheritance. It is now

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widely acknowledged that AA is an autoimmune illness that affects just certain organs and has both a hereditary tendency and an environmental cause. Any person regardless of age and gender is at risk.<sup>2</sup> Only a fraction of people have a history of other autoimmune diseases like vitiligo and thyroid disease. Non scarring circular patches of alopecia with little “exclamation mark” hairs at the periphery are typically used for clinical diagnosis. An increased number of telogen follicles and inflammatory lymphocytic infiltration in the peribulbar region area observed in a skin biopsy of the affected area.<sup>5</sup>

In 10-66% of all AA cases, nail involvement may occur before or after hair loss, and it may continue even after treatment and hair growth. Extreme AA is associated with nail alterations, which occurs in 15.4% of AA universalis cases.<sup>6</sup> The existence of nail abnormalities in AA is generally recognized as a sign of the disease’s severity and possibly a reflection of a more resistant disease.

The clinical evidence for alopecia areata in Asians is limited. We were unable to find any research on the effects of alopecia areata on patient’s nails in Pakistani database. The purpose of this study was to establish a procedure for adequate screening and therapy for individuals who had nail changes concomitant with alopecia areata in order to lessen their morbidity by identifying the pattern of nail changes in local community of people with alopecia areata.

## **Methods**

From July, 2019 to January, 2020; the Department of Dermatology at Bahawal Victoria Hospital in Bahawalpur conducted this descriptive, cross-sectional study. After approval from ethical review committee, 103 patients of

both genders aged 25-55 years with alopecia areata of >1 month duration were included in the study by non-probability, consecutive sampling method. Pregnant females and patients with diabetes mellitus, tuberculosis, chronic renal failure, those taking chemotherapy for any malignancy and not willing to participate were excluded from the study.

After taking informed consent, all patients were evaluated for severity of alopecia areata where 25% area of scalp involvement was considered mild, 26-50% area involved was considered moderate and 51-75% area involvement was considered severe. Then all patients were evaluated by the researcher for different nail changes where pitting was defined as depressions in the surface of the nail, Longitudinal ridging was referred to as tiny raised lines or ridges that run up and down the length of the nail and Dystrophy: nails becoming fragile, making them susceptible to splitting and cracking (assessed on clinical examination). Patients with 76-99% area of scalp involved were labeled as having alopecia areata totalis.

Data was entered and analysed using computer program SPSS version 20.0. Age of the patients and duration of alopecia areata were presented as mean and standard deviation. Gender, severity of alopecia (mild/ moderate/ severe/ alopecia totalis) and different nail changes (pitting/ longitudinal ridges/ dystrophy) were presented as frequency and percentage. Effect modifiers like age, gender, duration of alopecia areata and severity of alopecia areata (mild/moderate/severe) were controlled by stratification and post-stratification. Chi square test was applied to see the effect of these on nail changes. P-value  $\leq 0.05$  was considered as significant.

## **Results**

Age range in this study was from 25 to 55 years

**Table 1** Stratification of nail changes with respect to age groups.

	25-40 years (n=81)	41-55 years (n=22)	P- value
Pitting			
Yes	47	16	0.210
No	34	06	
Longitudinal Ridges			
Yes	23	04	0.334
No	58	18	
Dystrophy			
Yes	11	02	0.574
No	70	20	

**Table 2** Stratification of nail changes with respect to gender.

	Male (n=55)	Female (n=48)	P- value
Pitting			
Yes	34	29	0.884
No	21	19	
Longitudinal Ridges			
Yes	13	14	0.524
No	42	34	
Dystrophy			
Yes	08	05	0.529
No	47	43	

with mean age of 34.81±7.09 years. Majority of the patients i.e. 81 (78.34%) were between 25 to 40 years of age. Out of 103 patients, 55 (53.40%) were males and 48 (46.60%) were females with male to female ratio of 1.1:1. Duration of disease was 6 months in 66.99% patients and >6 months in 33.01% patients with mean duration of disease being 6.28±2.42 months. Severity of alopecia was mild, moderate and severe in 46.60%, 32.04% and 13.59% patients respectively. Alopecia totalis was found in 7.77% patients. In our study, the nail changes in alopecia areata patients were found to be pitting in 63 (61.17%), longitudinal ridging in 27 (26.21%) and dystrophy in 13 (12.62%).

**Tables 1** and **2**, respectively, indicate the stratification of nail alterations based on age groups and gender.

**Table 3** and **4** have shown the nail changes with respect to duration of disease and severity of

**Table 3** Stratification of small changes with respect to duration of disease.

	<6 months (n=69)	>6 months (n=34)	P- value
Pitting			
Yes	42	21	0.884
No	27	13	
Longitudinal Ridges			
Yes	19	08	0.524
No	50	26	
Dystrophy			
Yes	08	05	0.529
No	61	29	

**Table 4** Stratification of nail changes with respect to severity of alopecia.

	Mild (n=48)	Moderate (n=33)	Severe (n=14)	Totalis (n=08)	P- value
Pitting					
Yes	32	17	08	06	0.450
No	16	16	06	02	
Longitudinal Ridges					
Yes	12	11	04	00	0.286
No	36	22	10	08	
Dystrophy					
Yes	04	05	02	02	0.544
No	44	28	12	06	

alopecia areata respectively.

## Discussion

Inflammatory and non-scarring hair loss is widespread, and is called alopecia areata (AA). The clinical appearance of alopecia areata ranges widely from discrete areas of hair loss to full baldness.<sup>7</sup> Alopecia areata (AA) patients often have noticeable nail changes which can have a negative impact on their appearance and their ability to perform daily tasks. When nails grow or change, it can be uncomfortable and even hinder daily life. Even minor cosmetic deformities have the potential to significantly influence a person's standard of living. Nail alterations have a documented prevalence between 7% and 66% with an estimated average prevalence of 30%.<sup>8,9</sup> Evidence suggests that patients with advanced forms of alopecia, such as alopecia areata universalis (AAU) and alopecia areata totalis (AAT), are more likely to

experience nail alterations. Pitting (13.9%) and trachyonychia (8.3%) are most often documented as alterations in the nails of people with AA.<sup>9</sup>

Alopecia areata patients were analysed in this study to identify a trend in nail alterations. The average age of the patients in the current study was  $34.81 \pm 7.09$  years (range: 25-55). Eighty-one (72.34%) patients fell between 25 to 40 age range. Males made up 53.40% of the total, while females made up 46.60% accounting for a male to female ratio of 1.1:1. Nail alterations in alopecia areata patients were observed to include pitting in 63 (61.17%), longitudinal ridging in 27 (26.21%) and dystrophy in 13 (12.62%) of the cases. Pitting was the most common change seen in the nails of alopecia areata patients.

An average prevalence of 30%<sup>8</sup> is reported for the incidence of nail alterations in AA. The most frequently noticed nail abnormalities are diffuse fine pitting, onychodystrophy, crumbling, leukonychia, Beau's lines, longitudinal ridging, and trachyonychia.<sup>10</sup> Many people who experience hair loss also experience gross nail dystrophy. In cases of total or universal alopecia, drastic alterations are more common. Alterations to the nails can occur before, during, or after hair loss. It's possible they'll stick around even if your hair grows back.<sup>11</sup> Extensive research conducted in the northern Indian region, Nail alterations were discovered by Sharma et al. to occur in 20% of persons with AA and more frequently in severe forms of AA (47%).<sup>12</sup> Another study in children found that 30% of patients had altered nails, and that severe alopecia (53%) was more common than circumscribed alopecia (25.2%) in terms of nail involvement.<sup>13</sup>

It has been a major area of research, though the precise timeline of nail modifications in AA remains uncertain. Nails were thought to be

attacked by the same inflammatory cells that attack hair follicles in AA due to their similarities in structure and growth.<sup>14</sup> The intensity and location of a lesion determine how it manifests clinically in patients with AA, including alterations to their nails. Nail pitting, caused by the presence of parakeratotic cells in the nail plate's superficial layers that are easily removable, is the most common nail anomaly in AA. Depressions or pits in the proximal nail matrix are the result of a disruption in the keratinization and maturation process.<sup>8</sup>

Van der Velden et al.<sup>15</sup> has demonstrated that leukonychia is a non pathological variation of the nail that occurs in 65% of healthy people. We also saw leukonychia as a non specific finding in our patient population. Sharma et al<sup>9</sup> introduced terminal "V" nicks of the nail plate as a new change recorded in association with AA. This suggests that leukonychia and distal notching are not diagnostic findings in suffering.

Alopecia areata (AAT) and alopecia areata universalis (AAU) are the most severe forms of alopecia that are associated with nail alterations (AAT). Changes in the appearance of the nails are also more common in AA of young than in adults.<sup>8,11</sup> In one study, females with AA were shown to have significantly high rates of nail alterations (30% vs. 25%,  $P=0.0257$ ) than males with AA.<sup>16</sup> Our findings, which show that more men than women with alopecia areata experience nail alterations, run counter to the findings of these other research.

Sharma et al.<sup>9</sup> analysis of their entire sample revealed a 19.1% prevalence of nail dystrophy, with a greater incidence of 49.4% in the severe types of AA. The authors reported changes in their nails as a possible indicator of more serious forms of alopecia. In the study by Gandhi et al;<sup>17</sup> 44% of AA patients have nail changes and the most common abnormality was pitting seen in

28 (64%) patients, however none of the patient with mild disease showed any nail change.

## Conclusion

This study concluded that the nail changes in alopecia areata patients were found to be pitting in majority of patients, while longitudinal ridging and dystrophy were also seen. Nail changes are important prognostic indicator of disease severity. Thus it is recommended that screening and management of the condition should be done in these particular patients in order to reduce their morbidity.

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