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Frequency of Autoimmune Disorders in Patients of Alopecia Areata: A Cross-sectional Survey

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ABSTRACT

Objective: To evaluate the frequency of autoimmune disorders in alopecia areata patients.

Materials and Methods: The study enrolled 200 patients diagnosed with alopecia areata, ranging in age from 18 to 65 years. Each participant was evaluated for the presence of autoimmune conditions—such as autoimmune thyroid disorders, vitiligo, systemic lupus erythematosus (SLE), and psoriasis—using both clinical examination and relevant laboratory investigations.

Results: Out of the 200 patients of alopecia areata, autoimmune disorders were identified in 25% (n=50). The most frequent disorder was hypothyroidism, observed in 30 patients (15%). Other disorders included vitiligo in 11 patients (5.5%), systemic lupus erythematosus (SLE) in 5 patients (2.5%), hyperthyroidism in 4 patients (2%) and psoriasis in 3 patients (1.5%).

Conclusion: Alopecia areata is commonly linked with various autoimmune conditions, with hypothyroidism being the most prevalent. These findings underscore the importance of screening alopecia areata patients for autoimmune comorbidities, particularly thyroid disorders.

Keywords: Alopecia Areata, Hypothyroidism, Lupus Erythematosus, Systemic, Psoriasis, Vitiligo

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INTRODUCTION

Hair loss is referred to as alopecia in medical literature, irrespective of the underlying etiology. It is not simply limited to the scalp but may also be present elsewhere on the body. The average person has more than 500,000 hairs on their head when they are born. Anagen phase (the phase of growth), catagen phase (the period of rest), and telogen phase (the phase of shedding) are the three distinct phases of hair cycle.[1] Alopecia can either be scarring or non-scarring. Amongst the non-scarring type, alopecia areata is one of the commonly encountered conditions in the dermatology outpatient department.[2] Alopecia areata is commonly characterized by well-demarcated patches of hair loss on the scalp and other hair-bearing areas, frequently accompanied by characteristic exclamation mark hairs. If left untreated, alopecia areata may progress to "alopecia totalis", involving complete scalp hair loss, or "alopecia universalis", characterized by total loss of body hair.[3, 4] It has been reported that this condition has potentially life-threatening psychological impacts on the patient and such individuals have a high risk of committing suicide.[5]

Alopecia areata can manifest at any stage of life, from infancy to late adulthood, with peak incidence occurring between 15 and 29 years of age. Approximately 44% of individuals with alopecia areata experience disease onset before the age of 20. Fewer than 30% of alopecia areata cases have an onset after the age of 40.[2]

Although the exact pathogenesis of alopecia areata remains unclear, it is widely recognized as a T-cell-mediated autoimmune disorder that predominantly occurs in genetically susceptible individuals.[3] The immune response targets an unidentified autoantigen within the hair follicle. The peribulbar inflammatory infiltrate is mainly composed of oligoclonal, autoreactive T lymphocytes.[4]

Studies have shown that there is some association of autoimmune disorders with alopecia areata.[6] However, previous studies have reported a wide variation in the incidence of autoimmune disorders among alopecia areata patients. For instance, one study reported the frequency to be 55.8% out of which the frequency of vitiligo and autoimmune thyroid disease was 4.2% each.[7] Contrary to this, another study reported a frequency of only 12.4%, with autoimmune thyroid disease (6.8%) being majorly associated autoimmune condition along with SLE (2%).[8] Another study reported a 2.5% prevalence of psoriasis among individuals with alopecia areata.[9]

There is limited data on autoimmune diseases within the Pakistani population, and even fewer studies have explored their association with alopecia areata. Therefore, the objective of our study was to assess the prevalence of autoimmune disorders among patients with alopecia areata in a Pakistani cohort. The findings aim to assist dermatologists in making informed decisions regarding routine screening for autoimmune conditions in alopecia areata patients, particularly in resource-constrained settings.

MATERIALS AND METHODS

A cross-sectional survey was performed at the Department of Dermatology, Fauji Foundation Hospital Rawalpindi. A total of 200 patients were enrolled in the study using non-probability consecutive sampling technique. The study duration was 6 months. Sample size was calculated considering an estimated prevalence of 55.8%, absolute precision of 7% and 95% confidence level.[7] The study included patients of either gender, aged 18 to 65 years who had been clinically diagnosed with alopecia areata by a senior consultant. Patients with scarring alopecia, androgenetic alopecia, those having any signs of inflammation, and patients on systemic or local medication for alopecia areata in the past 4 weeks were excluded.

Each participant was provided with a detailed explanation of the study, and written informed consent was subsequently obtained. Demographic characteristics, detailed history and clinical examination were performed. Outcome variables were recorded including SLE, vitiligo, hypothyroidism, hyperthyroidism and psoriasis. Diagnosis of cutaneous disorders was made based on history and clinical examination, while laboratory investigations like thyroid function tests, serum ANA levels, ds-DNA levels and skin biopsy were done where necessary.

Data was analyzed using SPSS software version 22. The numeric variables (age and duration of alopecia) were expressed as mean ± standard deviation. The categorical variables (gender, family history of alopecia, presence of autoimmune disease and type of autoimmune disease)

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were represented as frequency and percentages. Data was stratified based on age, gender, family history of alopecia areata, and disease duration to control for potential effect modifiers. Chi-square test was applied post-stratification to assess statistical significance, with a p-value of ≤ 0.05 considered statistically significant.

RESULTS

Out of the 200 enrolled patients, 64% were females (n=128) and 36% were males (n=72). The mean age of the participants was 35.95 ± 12.71 years, and mean disease duration was 5.47 ± 5.25 weeks. Regarding disease duration, 66% of the patients (n=132) had the condition for less than six weeks, while 34% (n=68) reported a duration of six weeks or more. Age group analysis revealed that 77.5% of the patients were aged between 18-45 years, while 22.5% were aged 46-65 years. Family history was positive in 20% patients of alopecia areata (n=40). These results are shown in the following table.

Table No: 1 Demographic Characteristics of Patients

Parameter		Value
Mean Age (years)		35.95 ± 12.71
Mean Disease Duration (weeks)		5.47 ± 5.25
Gender Distribution	Males (n)	72
	Females (n)	128
Positive Family History (n)		40

In terms of autoimmune comorbidities, hypothyroidism was the most common, found in 15% (n=30), followed by vitiligo in 5.5% (n=11), SLE in 2.5% (n=5), hyperthyroidism in 2% (n=4), and psoriasis in 1.5% (n=3) as shown in the bar graph below

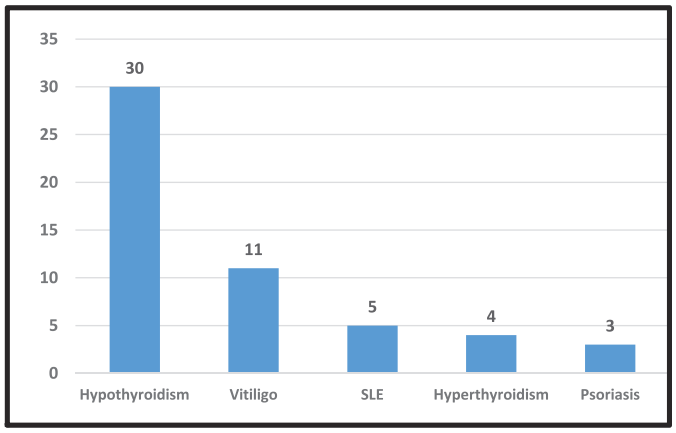

Figure No 1: Graphical Representation of Disease Distribution

The relationship between autoimmune disease presence and factors such as gender, age group, disease duration, and family history of alopecia areata was also examined. A total of 74% of females and 26% of males had autoimmune diseases; however, this difference did not reach statistical significance (p=0.089). 72% of patients with autoimmune diseases were aged 18–45, while 28% were aged 46–65, with a non-significant p-value of 0.282. The duration of alopecia areata (<6 weeks or ≥6 weeks) was found not show a statistically significant relationship with autoimmune disease (p=0.168). However, a statistically significant relationship was observed between positive family history of alopecia areata and the occurrence of autoimmune disorders, with 48% of patients having both a family history and autoimmune disease, compared to only 10.7% without a family history, resulting in a statistically significant p-value of 0.000.

DISCUSSION

Alopecia areata is a prevalent type of non-cicatricial hair loss that can manifest in various patterns. It can present as a solitary, self-limited episode or recur intermittently over several years. The precise origin of the disease process remains unclear, however substantial evidence supports an autoimmune etiology involving a T-cell-mediated response targeting an unidentified autoantigen within the hair follicle.[10] It is frequently associated with autoimmune conditions, including vitiligo, morphea, systemic lupus erythematosus, lichen planus, Hashimoto's thyroiditis, atopic dermatitis, endemic goiter, Addison's disease and diabetes mellitus.

Our study identified coexisting autoimmune conditions in 25% of patients, with hypothyroidism being the most frequent, affecting 30 patients (15%). In contrast, one study demonstrated that 55.8% patients diagnosed with alopecia areata also had autoimmune disorders.[7] While another study reported a lower frequency of 12.4%, with autoimmune thyroid disease (6.8%) being the most commonly associated condition, followed by SLE (2%).[8] Additionally, another study found the prevalence of psoriasis to be 2.5% in alopecia areata patients.[9]

The majority of enrolled subjects in our study presented with mild alopecia areata, followed by moderate and severe forms, with alopecia totalis being the least frequent. Similar findings were reported by Ahmed et al, who also observed that the mild form was the most

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common clinical presentation.[11] A similar distribution was also identified by Jameel et al and Ejaz et al.[12, 13]

Puavilai et al. reported a relatively low prevalence of thyroid disease (7.2%) among alopecia areata (AA) patients.[14] However multiple studies, including our study, have demonstrated a stronger association between thyroid dysfunction and AA. The link between hypothyroidism and hair changes is well established, though the exact mechanisms remain unclear. Clinical signs such as altered hair texture and hair loss from the eyebrows, scalp and other body areas are common in myxedema. Supporting this, Vrijman et al. identified subclinical hypothyroidism in 16% of 50 AA patients, with anti-thyroglobulin (anti-TG) and thyroid peroxidase antibodies (TPO-Ab) detected in 46% and 48% of patients, respectively.[15] Similarly, Gönül et al. found thyroid function abnormalities in 10% and thyroid autoantibodies in 14.7% of 110 AA patients, indicating a noteworthy relationship between AA duration and autoantibody levels.[16] In another retrospective study, Doğan et al. observed Hashimoto's thyroiditis in 5.6% of 89 euthyroid AA patients, with 27% showing abnormal thyroid function tests—although nearly a quarter of these were clinically insignificant. They also detected anti-TPO antibodies in 9% and elevated anti-TG levels in 3.3% of euthyroid cases.[17] Based on these findings, routine monitoring of thyroid function and autoantibodies is recommended in AA patients, particularly children, even if initial thyroid assessments appear normal.

This study has some limitations. Firstly, it was carried out at a single tertiary care institute, which may restrict the applicability of its findings to the general population. Secondly, the absence of a control group makes it difficult to compare the prevalence of autoimmune conditions in AA patients versus the general population.

Future research should aim to incorporate multi-center participation across diverse geographic and ethnic populations to enhance generalizability. Incorporating a control group would allow for more robust comparisons and better understanding of the relative risk of autoimmune diseases in AA patients.

CONCLUSION

Alopecia areata is frequently associated with autoimmune disorders, with hypothyroidism being the most common. A significant association of a family history of alopecia areata with autoimmune disorders indicates a potential genetic predisposition. These findings underscore the importance of comprehensive screening for autoimmune diseases in individuals with alopecia areata, which could lead to more targeted and effective treatment approaches for managing this disease.

DISCLAIMER:

None.

CONFLICT OF INTEREST

None to declare.

ETHICAL STATEMENT

An ethical clearance letter was obtained from the Ethical Review Board of Fauji foundation Hospital, RWP. Ref no: 728/RC/FFH/RWP.

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AUTHORS CONTRIBUTION

Conception and design of the study: F. Haider
Acquisition of data: A. J Kiyani
Analysis and interpretation of data: R. Najmi, F. Haider
Drafting of the manuscript: F. Haider, S. Khan, A. Anwar
Critical review of the manuscript: A. Anwar. A. J Kiyani
Approval of the final version of the manuscript to be published: F. Haider, A. J. Kiyani, R. Najmi, S. Khan, A. Anwar

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