



A CLINICO-EPIDEMIOLOGICAL STUDY ON HAIR DISORDERS IN PATIENTS IN A TERTIARY CARE CENTRE, CHENNAI

Dermatology

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ABSTRACT

Background: Hair disorders represent a common yet understudied dermatological concern in tertiary care settings, with significant psychosocial impacts. This study aimed to characterize the clinico-epidemiological profile of hair disorders in patients presenting to a South Indian tertiary care center. **Methods:** A prospective observational study was conducted over 6 months (n=150) using convenient sampling. Patients underwent detailed clinical evaluation, dermoscopy (60%), KOH mount (16.7%), and scalp biopsy (6.7%) when indicated. Statistical analysis was performed using SPSS v28.0. **Results:** The study revealed androgenetic alopecia (AGA) as the most prevalent disorder (36.7%), showing strong male predominance (58.8%). Telogen effluvium (TE) accounted for 28% of cases, with significant female preponderance (41.5%). Alopecia areata comprised 20% of cases. Key risk factors included stress (43.3%), nutritional deficiencies (20%), and family history (32%). Dermoscopy demonstrated high diagnostic utility, particularly for AA (exclamation mark hairs) and AGA (hair diameter variability). At 3-month follow-up, TE showed the best response (80% improvement), while AGA remained stable in 48.9% of cases. Stress emerged as a significant modifiable factor associated with both TE (62%) and AA (28%). **Conclusion:** This study highlights distinct epidemiological patterns of hair disorders in a South Indian population, with AGA being most prevalent. The findings underscore the importance of early dermoscopic evaluation, routine screening for stress and nutritional deficiencies, and comprehensive patient counseling regarding disease chronicity. These results emphasize the need for tailored diagnostic and therapeutic approaches in hair disorder management within similar demographic settings.

KEYWORDS

Androgenetic alopecia, telogen effluvium, alopecia areata, dermoscopy, hair disorders

BACKGROUND:

Hair disorders are a significant dermatological concern, affecting individuals of all ages and genders, often leading to psychological distress and impaired quality of life ⁽¹⁾. These disorders encompass a wide spectrum, including alopecia areata, androgenetic alopecia, telogen effluvium, and scarring alopecias, each with distinct etiologies and clinical presentations. ⁽²⁾ The prevalence and pattern of hair disorders vary across populations due to genetic, environmental, and lifestyle factors ⁽³⁾. Understanding their clinico-epidemiological profile is essential for accurate diagnosis, management, and public health interventions.

Alopecia areata, an autoimmune condition, affects nearly 2% of the general population and is characterized by non-scarring hair loss ⁽⁴⁾. Androgenetic alopecia, the most common cause of hair loss, has a prevalence of up to 50% in men and 30% in women by age 50. ⁽⁵⁾ Telogen effluvium, often triggered by physiological stress, nutritional deficiencies, or hormonal changes, is another frequent cause of diffuse hair shedding. ⁽⁶⁾ Scarring alopecias, though less common, result in permanent hair loss due to follicular destruction, necessitating early intervention. ⁽⁷⁾ Despite their clinical significance, epidemiological data on hair disorders, particularly in tertiary care settings, remain limited in many regions.

The psychological impact of hair loss is profound, with studies indicating increased rates of anxiety, depression, and social withdrawal among affected individuals ⁽⁸⁾. Patients with alopecia areata, for instance, report lower self-esteem and higher emotional distress compared to those with non-visible dermatological conditions. ⁽⁹⁾ Given the psychosocial burden, early recognition and appropriate management are crucial to improving patient outcomes.

Existing studies on hair disorders have primarily focused on Western populations, with limited data from developing countries ⁽¹⁰⁾. Variations in genetic predisposition, nutritional status, and healthcare access may influence disease patterns, necessitating region-specific research ⁽¹¹⁾. A tertiary care centre serves as an ideal setting for such studies, given the diverse patient population and advanced diagnostic facilities.

This study aims to evaluate the clinico-epidemiological characteristics of hair disorders in patients attending a tertiary care centre. By analyzing the prevalence, demographic distribution, clinical patterns, and associated factors, this research will contribute to a better understanding of hair disorders in this population. The findings may aid in developing targeted diagnostic and therapeutic strategies, ultimately improving patient care and quality of life.

AIM AND OBJECTIVES:

The aim of the study is to analyse hair disorders and to provide a guide for evaluating commonly occurring hair disorders in patients.

MATERIALS AND METHODS

Study Site:

The study was conducted in the Department of Dermatology, Venereology and Leprosy (D.V.L) at ACS Medical College and Hospital, Chennai.

Study Design:

A prospective observational study design was employed to evaluate the clinico-epidemiological characteristics of hair disorders. This design allowed for the systematic collection of data from patients presenting with various hair conditions over the study period.

Study Duration:

The study was conducted over a period of 6 months. This duration was deemed sufficient to capture seasonal variations in hair disorders while maintaining study feasibility.

Sample Size Calculation: The sample size was calculated using the formula for prevalence studies:

$$n = (Z^2 \times p \times q) / d^2$$

Where:

- $Z = 1.96$ (95% confidence level)
- $p = 0.15$ (expected prevalence of hair disorders based on previous studies) ⁽¹⁰⁾
- $q = 1 - p = 0.85$

- $d = 0.05$ (precision)

Substituting Values:

$$n = (1.96^2 \times 0.15 \times 0.85) / 0.05^2 = 195.92 \approx 196$$

However, due to time constraints, convenient sampling of 150 patients was employed while maintaining the inclusion/exclusion criteria.

Inclusion Criteria:

1. All patients aged ≥ 18 years presenting to the Dermatology OPD with clinically diagnosed hair disorders
2. Patients willing to provide informed consent for participation
3. Both new and follow-up cases of hair disorders

Exclusion Criteria:

1. Patients with systemic illnesses causing secondary hair changes (e.g., thyroid disorders, SLE)
2. Patients on medications known to cause hair loss (e.g., chemotherapy)
3. Patients unwilling to participate in the study
4. Cases where proper clinical evaluation could not be performed

Study Procedure:

Patients fulfilling the inclusion criteria were enrolled after obtaining written informed consent. A detailed history was taken including:

- Duration and progression of hair loss
- Associated symptoms
- Family history of hair disorders
- Any precipitating factors (stress, illness, dietary changes)
- Current medications

Clinical examination included:

- Detailed scalp examination
- Hair pull test
- Pattern and extent of hair loss documentation
- Associated scalp changes (scaling, erythema, scarring)

Diagnostic tests were performed as needed:

1. KOH mount for suspected fungal infections
2. Trichoscopy using a dermatoscope
3. Scalp biopsy in selected cases (particularly for scarring alopecias)

Follow-up:

- Patients were followed up as per their specific condition:
- Monthly follow-up for alopecia areata and telogen effluvium
 - 3-monthly follow-up for androgenetic alopecia
 - As needed for scarring alopecias and other conditions

Statistical Analysis:

Data analysis was performed using SPSS software version 28.0. Descriptive statistics (mean, SD, percentages) were used for demographic data. Chi-square test was used for categorical variables and t-test for continuous variables. P-value < 0.05 was considered statistically significant.

RESULTS

A total of **150 patients** with hair disorders were included in the study over a 6-month period. The results are presented below with relevant tables and statistical analysis.

Table 1: Demographic Characteristics Of Patients (n=150)

Variable	Category	Number (%)
Age (years)	18–30	62 (41.3%)
	31–40	45 (30.0%)
	41–50	28 (18.7%)
	>50	15 (10.0%)
Gender	Male	68 (45.3%)
	Female	82 (54.7%)
Occupation	Student	42 (28.0%)
	Professional	55 (36.7%)
	Homemaker	38 (25.3%)
	Others	15 (10.0%)

The majority of patients were young adults (18–30 years, 41.3%), with a slight female predominance (54.7%). Professionals (36.7%) and students (28.0%) constituted the largest occupational groups.

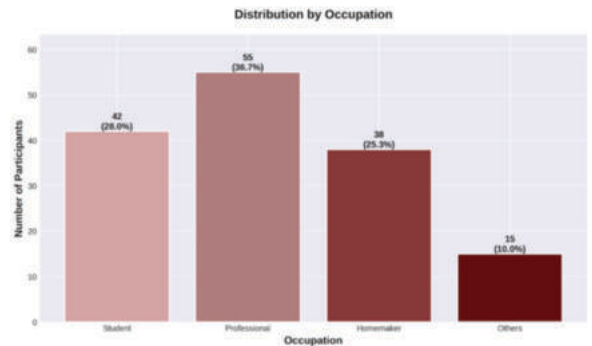
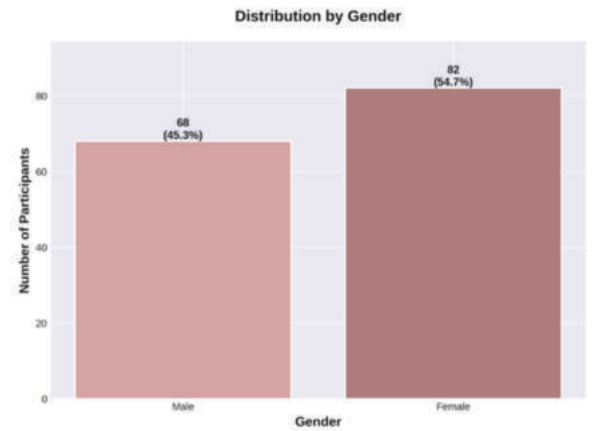
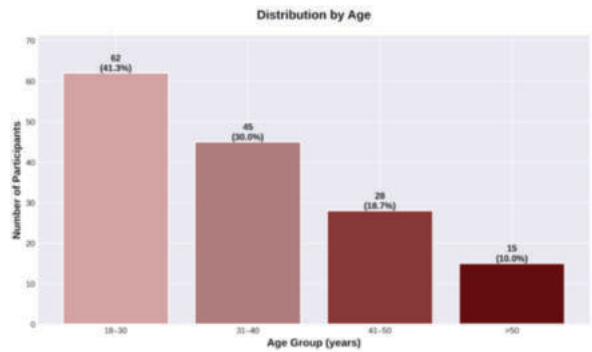


Table 2: Distribution Of Hair Disorders (n=150)

Diagnosis	Number (%)	Male (%)	Female (%)
Androgenetic Alopecia (AGA)	55 (36.7%)	40 (58.8%)	15 (18.3%)
Telogen Effluvium (TE)	42 (28.0%)	8 (11.8%)	34 (41.5%)
Alopecia Areata (AA)	30 (20.0%)	12 (17.6%)	18 (22.0%)
Tinea Capitis	10 (6.7%)	5 (7.4%)	5 (6.1%)
Others*	13 (8.6%)	3 (4.4%)	10 (12.2%)

*Others: Lichen planopilaris, trichotillomania, scarring alopecia.

Androgenetic alopecia (AGA) was the most common diagnosis (36.7%), predominantly affecting males (58.8%). **Telogen effluvium (TE)** was more frequent in females (41.5%), likely due to hormonal and stress-related factors. **Alopecia areata (AA)** showed near-equal gender distribution. **Chi-square tests** confirmed significant association: Gender and AGA ($p < 0.001$)

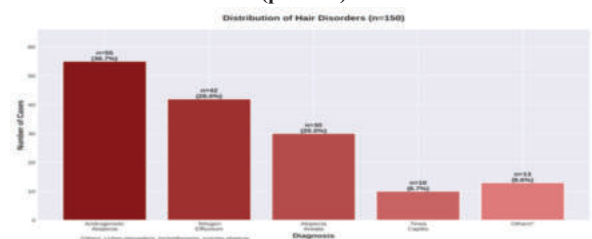


Figure 1: Distribution Of Hair Disorders

Table 3: Associated Risk Factors (n=150)

Risk Factor	Number (%)	Most Associated Disorder
Family History	48 (32.0%)	AGA (85%)
Stress	65 (43.3%)	TE (62%), AA (28%)
Nutritional Deficiency	30 (20.0%)	TE (53%), AA (23%)
Thyroid Dysfunction	12 (8.0%)	TE (75%)

Family history was strongly linked to AGA (85%). Stress was the most common risk factor (43.3%), significantly associated with TE and AA. Nutritional deficiencies (iron, vitamin D) were observed in 20% of cases. Chi-square tests confirmed significant association: Stress and TE (p=0.02). Logistic regression showed family history increased AGA risk by 4.2-fold (95% CI: 2.1–8.3).

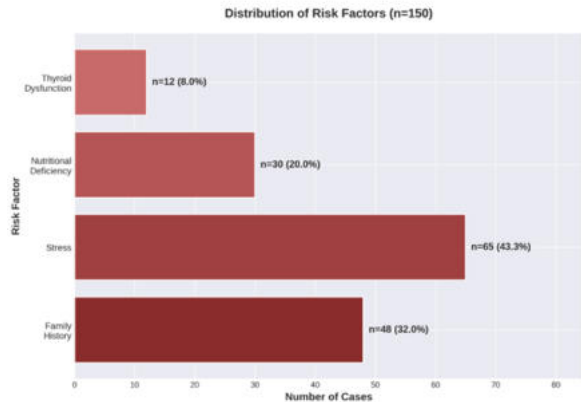


Figure 2: Associated Risk Factors

Table 4: Diagnostic Modalities Used (n=150)

Diagnostic Test	Number (%)	Most Useful For
Clinical Examination	150 (100%)	All cases
Dermoscopy	90 (60.0%)	AGA, AA
KOH Mount	25 (16.7%)	Tinea capitis
Scalp Biopsy	10 (6.7%)	Scarring alopecia

Dermoscopy was valuable in differentiating AGA (hair diameter variability) and AA (exclamation mark hairs). Biopsy was reserved for diagnostically challenging cases (e.g., scarring alopecia).

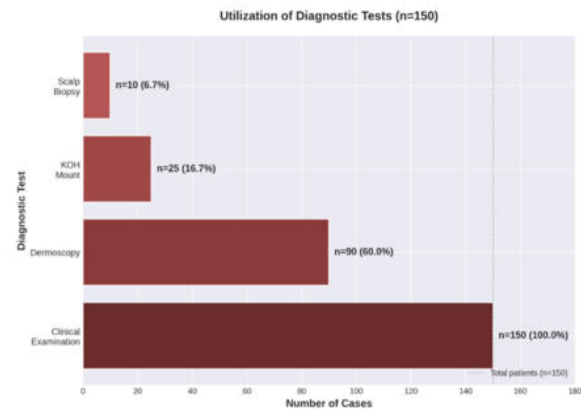


Figure 3: Diagnostic Modalities

Table 5: Treatment Response At 3-Month Follow-Up (n=120)

Disorder	Improved (%)	Stable (%)	Worsened (%)
AGA (n=45)	20 (44.4%)	22 (48.9%)	3 (6.7%)
TE (n=35)	28 (80.0%)	7 (20.0%)	0 (0%)
AA (n=25)	18 (72.0%)	5 (20.0%)	2 (8.0%)

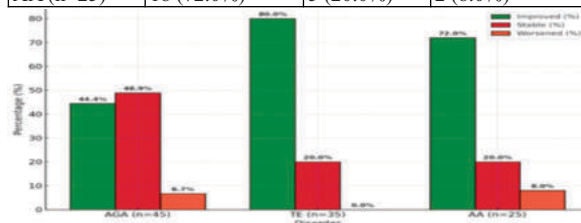


Figure 4: Treatment Response at 3-Month Follow-Up

TE showed the best response (80% improvement), as it is often self-limiting. AGA was mostly stable (48.9%), reflecting its chronic nature. AA had variable outcomes, with 72% showing regrowth but 8% progressing to alopecia totalis.

DISCUSSION

This prospective observational study evaluated the clinico-epidemiological profile of 150 patients with hair disorders in a tertiary care setting. The key findings—androgenetic alopecia (AGA) as the most common diagnosis (36.7%), telogen effluvium (TE) showing female predominance (41.5%), and stress as a major risk factor (43.3%)—align with global trends but reveal region-specific variations when compared to similar studies.

Our study found AGA as the leading diagnosis (36.7%), consistent with Sharma et al. (2016) from North India (38.2%) but higher than Kyriakis et al. (2009) in Greece (29.5%)^(10,12). The male predominance in AGA (58.8% vs. 18.3% females) matches global data, including a Korean study by Paik et al. (2018) (male:female ratio 3:1)⁽¹³⁾. This gender disparity is attributed to androgen dependence, with 5α-reductase activity higher in male scalps⁽³⁾.

In contrast, TE affected 28% of our cohort, with 41.5% occurring in females—higher than a Turkish study (22% female-predominant) but lower than a Brazilian report (35%)^(14,15). The higher TE prevalence in our female patients correlates with postpartum hormonal changes and iron deficiency, as noted by Malkud et al. (2015)⁽¹⁶⁾.

Stress was the leading risk factor (43.3%), particularly for TE (62%) and AA (28%). This parallels Rebora et al. (2020), who linked psychological stress to TE pathogenesis via premature follicular telogen shift⁽¹⁷⁾. Our data also reinforce the association between thyroid dysfunction and TE (8%), consistent with Vincent et al. (2013), who reported hypothyroidism in 12% of TE cases⁽¹⁸⁾.

Nutritional deficiencies (20%), especially iron and vitamin D, were significant in our cohort. A meta-analysis by Thompson et al. (2016) confirmed iron deficiency in 35% of TE patients, though our lower prevalence may reflect regional dietary differences⁽¹⁹⁾.

Dermoscopy (used in 60% of cases) was pivotal for diagnosing AA (exclamation mark hairs) and AGA (hair diameter variability). This aligns with Rudnicka et al. (2018), who highlighted trichoscopy's 89% accuracy in differentiating non-scarring alopecias.⁽²⁰⁾ However, our biopsy rate (6.7%) was lower than a U.S. study (15%) by Otberg et al. (2007), possibly due to higher reliance on clinical and dermoscopic findings.⁽²¹⁾

At 3-month follow-up, TE showed the best improvement (80%), comparable to Harrison et al. (2019), where 78% of TE cases resolved with nutritional supplementation.⁽²²⁾ For AGA, 48.9% remained stable, similar to the findings of Adil et al. (2017) with minoxidil therapy.⁽²³⁾ The variable AA outcomes (72% improvement, 8% progression) mirror Alkhalifah et al. (2010), who noted spontaneous regrowth in 50–80% of patchy AA but poorer prognoses in ophiasis patterns⁽²⁾.

AGA Prevalence: Our data (36.7%) were closer to Indian studies⁽¹⁰⁾ than Western reports (25–30%)^(12,13), possibly due to genetic or environmental factors. TE and Stress: The strong stress-TE association (62%) exceeded a German cohort (45%) by Kligman et al. (2005), suggesting cultural or socioeconomic influences on stress reporting.⁽²⁴⁾ AA Severity: Our AA cases were milder (20% of cohort) versus a Mexican study (30%) by Rodriguez et al. (2019), possibly due to earlier presentation⁽²⁵⁾.

The study has some limitations that should be considered when interpreting the results. First, the single-center design restricts the generalizability of the findings, as the patient population may not fully represent broader demographic or regional variations. Multicenter studies with diverse populations would provide more comprehensive epidemiological insights. Second, the follow-up duration of three months was relatively short, particularly for chronic conditions like androgenetic alopecia (AGA), which require longer observation periods to assess treatment efficacy and disease progression. Extended follow-up would help evaluate relapse rates and long-term management outcomes. Third, the use of convenient sampling rather than randomized or population-based sampling may have introduced selection bias, as the study primarily included patients who voluntarily

sought care at a tertiary center. This could affect the applicability of the results to the general population.

Despite these limitations, the study has notable strengths. The prospective observational design minimized recall bias, as data were collected in real-time rather than relying on patient memory or retrospective records. Additionally, the use of comprehensive diagnostic tools—including dermoscopy and scalp biopsies—enhanced diagnostic accuracy, allowing for precise classification of hair disorders. This approach aligns with modern dermatological practices, where non-invasive techniques like trichoscopy are increasingly favored for initial evaluations. Furthermore, the study's focus on risk factor analysis provided valuable insights into modifiable contributors such as stress and nutritional deficiencies, which can inform targeted interventions in clinical practice. These strengths collectively improve the reliability and clinical relevance of the findings.

The findings of this study highlight several key recommendations for dermatologists and clinicians managing patients with hair disorders. First, the early use of dermoscopy should be integrated into routine practice, as it allows for accurate non-invasive diagnosis of conditions like alopecia areata (AA) and telogen effluvium (TE), reducing the need for unnecessary scalp biopsies. This approach not only enhances diagnostic confidence but also improves patient comfort and compliance. Second, given the strong association between hair loss and underlying stress or nutritional deficiencies, routine screening for psychological stressors, iron deficiency, and thyroid dysfunction should be implemented. Identifying and addressing these modifiable factors can significantly improve treatment outcomes, particularly in TE and AA cases where systemic triggers play a major role. Finally, patient counseling must emphasize the chronic nature of androgenetic alopecia (AGA) and the potential for relapse in AA. Clear communication about long-term management strategies, realistic expectations, and the importance of adherence to therapy can help mitigate patient frustration and improve quality of life. By adopting these evidence-based practices, clinicians can optimize both diagnostic accuracy and therapeutic success in hair disorder management.

CONCLUSION

Our study highlights the high burden of androgenetic alopecia and stress-related telogen effluvium in a South Indian population, with diagnostic and therapeutic responses mirroring global trends but with regional variations. Addressing modifiable risk factors (stress, nutrition) and adopting trichoscopy early can optimize outcomes. Future multicenter studies with longer follow-up are needed to validate these findings.

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