ORIGINAL RESEARCH ARTICLE

NATIONAL JOURNAL NJMR MEDICAL RESEARCH

Clinico-Epidemiological Study of Scalp Dermatosis at Tertiary Care Centre in Central India

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DOI:
10.55489/njmr.150220251049

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Date of Submission: 14/12/2024
Date of Acceptance: 20/02/2025
Date of Publication: 01/04/2025

Funding Support:
None Declare

Conflict of Interest:
The authors have declared that no conflicts of interest exist.

How to cite this article:
Khan R, Rathoriya SG, Singhal R, Sharma S, Dhurve AK. Clinico-Epidemiological Study of Scalp Dermatosis at Tertiary Care Centre in Central India. Natl J Med Res 2025;15(02):82-91.
DOI: 10.55489/njmr.150220251049

ABSTRACT

Background: The human scalp, with its high follicular density and significant sebum production, is uniquely susceptible to a various dermatological condition. Common scalp disorders, including seborrheic dermatitis, psoriasis, tinea capitis, scalp folliculitis, and allergic contact dermatitis, each present with overlapping symptoms such as pruritus, scaling, inflammation, and hair loss, complicating accurate diagnosis and treatment. While global awareness of the impact on personal appearance and social interactions is increasing, research specifically focusing on scalp dermatoses in India remains limited.

Methods and materials: This hospital-based observational study, conducted over one year (from September 2023- august 2024) with Institutional Ethics approval, aimed to investigate scalp dermatoses in patients from the Dermatology Outpatient Department. All patients with scalp disorders were included after informed consent, with a detailed history and physical examination conducted.

Results: The study included 152 patients with scalp dermatoses, consisting of 90 males (59.2%) and 62 females (40.8%). The most affected age group was 21-30 years, accounting for 51.31% of cases (n=78). The parietal region was the most frequently affected area, seen in 64.4% of cases. Among the various scalp dermatoses, autoimmune conditions were the most prevalent (28.93%), with alopecia areata being the most common (22.36%).

Conclusion: Scalp dermatoses are common and can significantly impact physical and mental health, lowering self-esteem and quality of life. Conditions like dandruff and alopecia cause visible changes, leading to emotional distress. This study highlights the need for accurate diagnosis and treatment to address both the physical and psychological aspects of these conditions.

Keywords: Scalp dermatoses, Alopecia, Psoriasis, Autoimmune Conditions, Pruritus

INTRODUCTION

The human scalp is a distinctive anatomical area with a high follicular density and significant sebum production, contributing to its unique physiological and clinical characteristics. It is comprised of numerous terminal hair follicles, the scalp's dense network of follicles, reside primarily in the subcutaneous tissue. This high-density network fosters a warm, moist environment which further aids in thermal insulation but simultaneously renders the scalp susceptible to various dermatological conditions.

Common scalp disorders include seborrheic dermatitis, psoriasis, and tinea capitis, scalp folliculitis, and allergic

Publisher: Medsci Publications [www.medscipublications.com] ISSN: 2249 4995 Official website: www.njmr.in

contact dermatitis; each presenting with overlapping symptoms such as pruritus, scaling, inflammation, and hair loss, which complicates accurate diagnosis and subsequent treatment.[1,2]

Globally, scalp health is increasingly recognized for its impact on personal appearance and social interactions. The visibility of the scalp and hair, coupled with the challenges in following treatments effectively, underscores the need for specialized approaches in managing scalp conditions.[3] In the Indian scenario, while there is considerable research on various dermatological conditions, a comprehensive study focusing specifically on different scalp dermatoses remains limited.

Central India, with its diverse climate and population, presents a unique setting for examining these conditions. Factors such as climate variations, socioeconomic status, and regional practices may influence the prevalence and manifestation of scalp disorders.[4,5] This study seeks to deliver a comprehensive clinical analysis of scalp dermatoses in patients from Central India, filling gaps in the current literature and providing insights to enhance management strategies.

MATERIALS AND METHODS

The current study was hospital based descriptive observational study carried over the period of 1 year (September 2023- august 2024) after approval by Institutional Human Ethics Committee. All patients presenting with scalp dermatoses attending Dermatology Outpatient Department (OPD) were included in the study after taking informed written consent. Patients those who were having scalp dermatoses but falls under the exclusion criteria were excluded from the study. The enrolment of patients was based on population variability, research time constraints and convenience sampling method.

A thorough and detail history was obtained from each patient, covering the age of onset, duration, distribution, progression of lesions, and the presence of similar lesions over other areas of body. Associated symptoms, comorbidities, and aggravating factors as well as treatment history were recorded.

General examination and systemic examination were done and any variation in findings was recorded. Routine investigations like complete blood count, renal and liver function test, urine routine & microscopy, chest Xray, ECG, serum electrolyte and other relevant laboratory investigations were carried out. Dermoscopy and skin biopsy were conducted wherever necessary.

Inclusion criteria: All the participants attending dermatology outpatient department suffering from scalp dermatoses were included for study.

Exclusion criteria: Patients having scalp lesions secondary to systemic illness like hypothyroidism, hyperthyroidism, nutritional deficiency, polycystic ovary disease, diabetes mellitus, chronic kidney disease, patient on chemotherapy or radiotherapy as well as trauma, burn injuries and malignancy were excluded from study.

RESULTS

This study included a total of 152 patients with scalp dermatoses, comprising 90 males (59.2%) and 62 females (40.8%). The incidence of these dermatological scalp conditions was notably higher in males compared to females, with a male-to-female ratio of 1.3:1.

The age group most frequently affected was 21-30 years, accounting for 51.31% of the cases (n=78) due to peak hormonal activity and exaggerated immune response in this age group. Also, individuals of this age group are more physically active, leading to increased sweating and oil production on the scalp. **Table 1** illustrates the distribution of various scalp dermatoses by age and sex.

Table 1: Distribution of cases according to age and gender

Age(years)	Cases (%)	Male	Female
0-10	11 (7.2)	6	5
11-20	15 (9.86)	8	7
21-30	78 (51.31)	44	34
31-40	20 (13.15)	14	6
41-50	10 (6.57)	7	3
51-60	10 (6.57)	5	5
>60	8 (5.26)	6	2
Total	152 (99.92)	90	62

Table 2: Distribution of cases according to occupation

Occupation	Cases (%)
Job	42 (27.6)
Students	30 (19.7)
Farmers & Labourer	22 (14.47)
Housewives	20 (13.15)
Retired	20 (13.15)
Others	18 (11.84)

Table 3: Distribution of cases according to duration

Duration	Cases (%)
0-3 months	11 (7.2)
3-6 months	22 (14.4)
6-12 months	56 (36.84)
1-5 year	49 (32.23)
>5 year	14 (9.2)

Most patients belonged to middle (59.8%) socioeconomic backgrounds, followed by lower income group (34%) and upper income group (6.5%). Poor hygiene practices, limited access to treatment, and greater levels of pollutants and allergens might be linked to lower socioeconomic backgrounds, contributing present scalp conditions being more prevalent in that group.

A)

B)

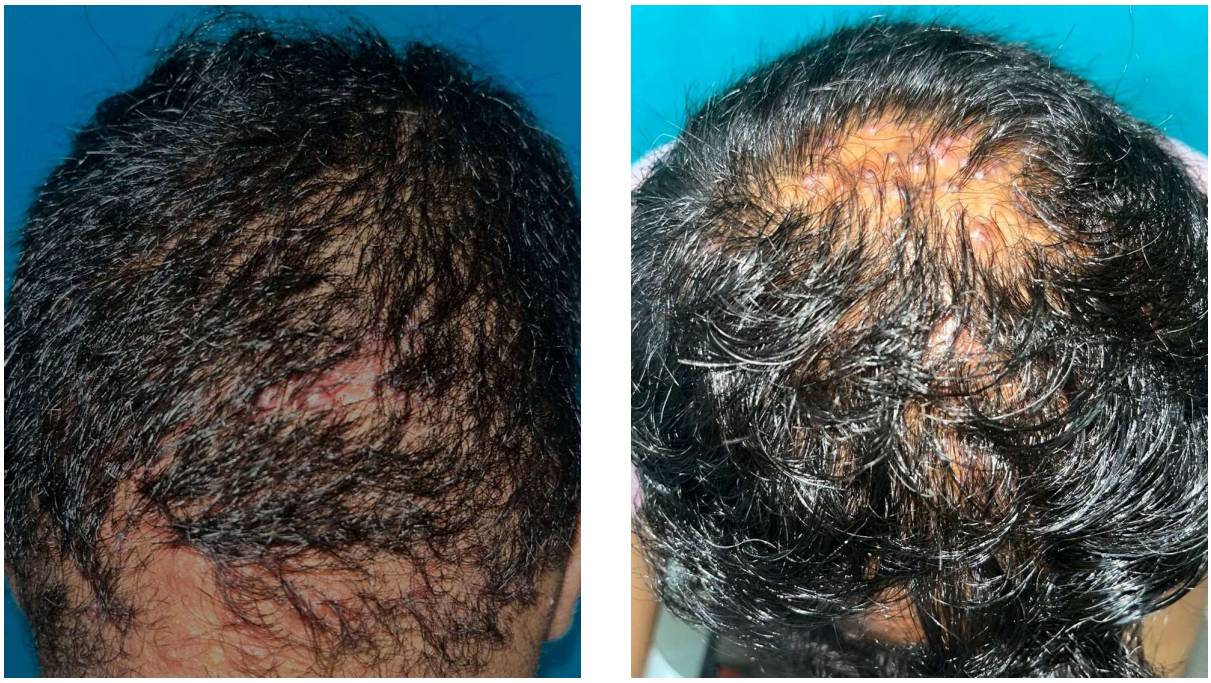
C)

D)

Figure 1: A) Seborrheic dermatitis B) Tinea capitis C) Alopecia areata D) scalp psoriasis

Figure 2: A) DLE lesions over scalp

B) Shuster's sign



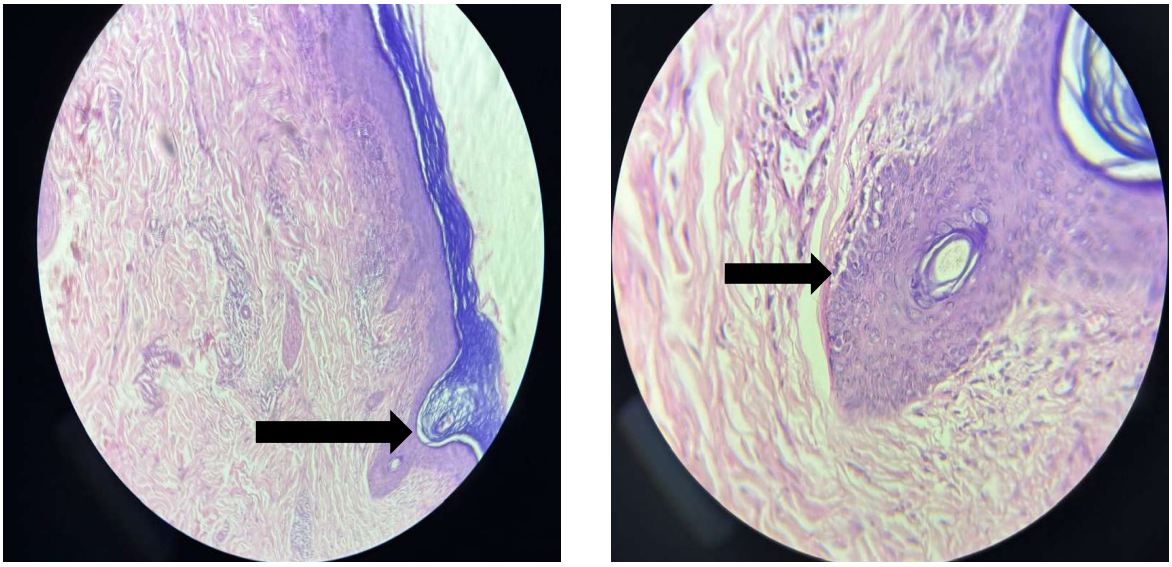
A) B)

Figure 3: Keratosis follicularis spinulosa decalvans showing A) Multiple papular lesions with scarring alopecia B) Atrophic scarring and alopecia over vertex

Table 4: Various scalp dermatoses of study

Scalp dermatoses	Male (92)	Female (62)
Inflammatory Dermatoses (29, 16.43%)		
Scalp Psoriasis (15, 9.86%)	10 (10.9%)	5 (8.1%)
Chronic Plaque Psoriasis (5,3.2%)	3 (3.3%)	2 (3.2%)
Lichen Plano-Pilaris (2, 1.31%)	1 (1.1%)	1 (1.6%)
Airborne Contact Dermatitis (2, 1.31%)	2 (2.2%)	0 (0%)
Keratosis Follicularis Spinulosa Decalvans (1,0.65%)	1 (1.1%)	0 (0%)
Infectious Dermatoses (34, 22.34 %)		
Tinea Capitis (15, 9.86%)	8 (8.7%)	7 (11.3%)
Pityriasis Capitis (10, 6.57%)	4 (4.3%)	6 (9.7%)
Pediculosis Capitis (4,2.63%)	0 (0%)	4 (6.5%)
Verruca Vulgaris (2, 1.31%)	2 (2.2%)	0 (0%)
Scalp Folliculitis (2, 1.3%)	2 (2.2%)	0 (0%)
Chicken Pox (1,0.65%)	1 (1.1%)	0 (0%)
Autoimmune Disorders (44, 28.93 %)		
Alopecia Areata (34, 22.36%)	22 (23.9%)	12 (19.4%)
Discoid Lupus Erythematosus (5,3.28%)	3 (3.3%)	2 (3.2%)
Vitiligo (2, 1.97%)	1 (1.1%)	1 (1.6%)
Pemphigus Vulgaris (1, 0.65%)	1 (1.1%)	0 (0%)
SLE (2,1.33%)	0 (0%)	2 (3.2%)
Cicatricial Alopecias (9, 5.91%)		
Acne Keloidalis Nuchae (3, 1.9%)	3 (3.3%)	0 (0%)
Folliculitis Decalvans (2, 1.31%)	1 (1.1%)	1 (1.6%)
Pseudopelade of Brocq (3,1.97%)	1 (1.1%)	2 (3.2%)
Frontal Fibrosis Alopecia (1, 0.65%)	0 (0%)	1 (1.6%)
Non-Scarring Alopecias (27, 17.74%)		
Androgenetic Alopecia (17, 11.18%)	12 (13%)	5 (8.1%)
Telogen Effluvium (5, 3.28%)	2 (2.2%)	3 (4.8%)
Tractional Alopecia (5, 3.28%)	1 (1.1%)	4 (6.5%)
Psycho-cutaneous dermatoses (3, 1.97%)	(0%)	(0%)
Trichotillomania (3, 1.97%)	2 (2.2%)	1 (1.6%)
Physiological (4, 2.63%)		
Cradle Cap (4, 2.63%)	2 (2.2%)	2 (3.2%)
Miscellaneous (4, 2.63%)		
Erythroderma (3, 1.97%%)	2 (2.2%)	1 (1.6%)
Nevus Sebaceous (1,0.65%)	1 (1.1%)	0 (0%)

Figure 4: Frontal fibrosing alopecia



A) B)

Figure 5: H & E examination of DLE showing A) lymphocytic infiltrates and follicular destruction 10x magnification B) 40x magnification)

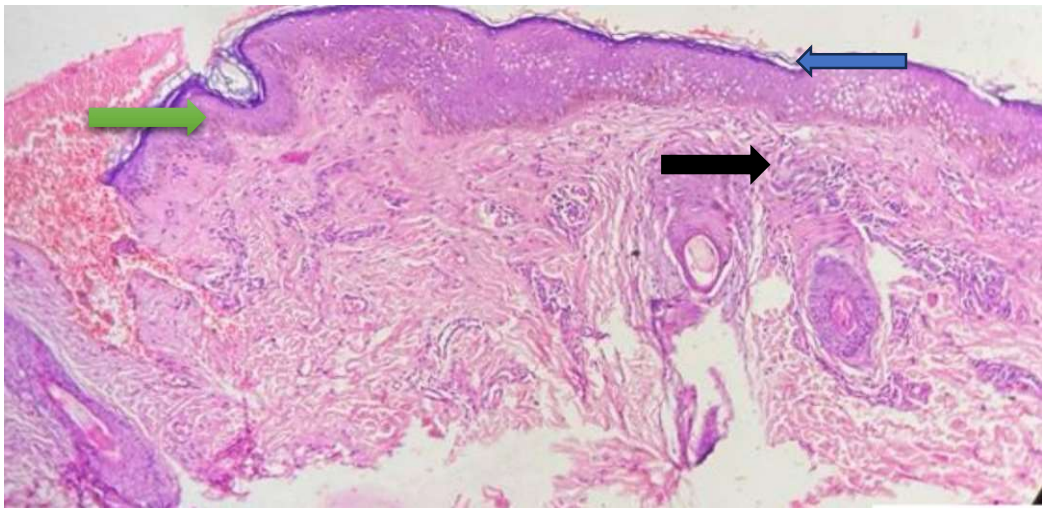


Figure 6: H & E examination of KSFD showing: basket weave ortho and hyperkeratosis (blue arrow), follicular plugging (green arrow) and upper dermis showing perivascular chronic inflammatory infiltrates (black arrow)

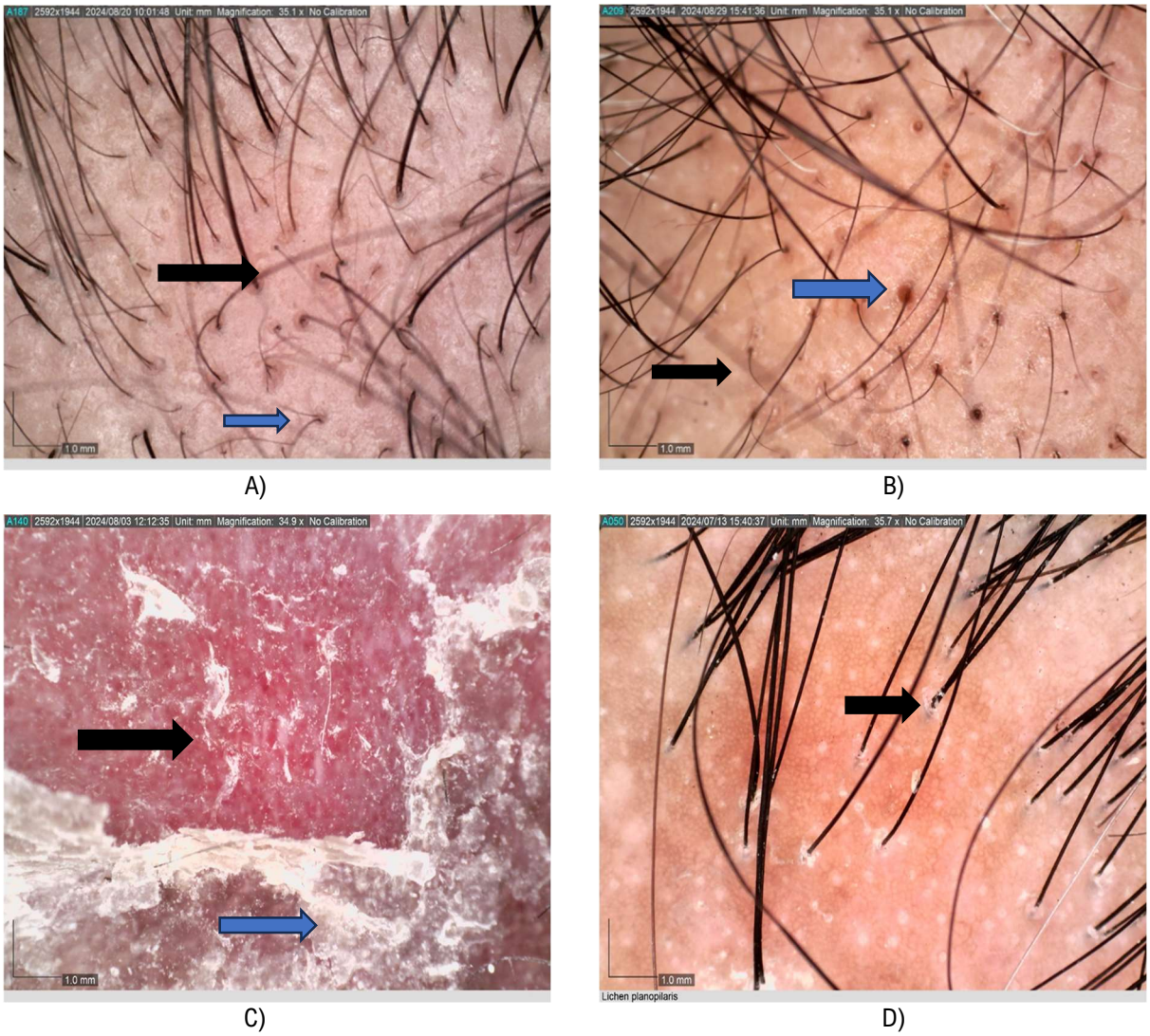


Figure 7: Trichoscopy of Androgenetic alopecia showing A) terminal hair (black arrow) and vellus hair (blue). B) Miniaturized hair (black arrow) and brown peripilar sign (blue). Trichoscopy of Psoriasis showing C) red dots and globules (black arrow) and silvery white scaling (blue arrow) D) Lichen plano pilaris showing peripilar cast (black arrow)

Table 5: Dermoscopic findings of common scalp dermatoses

Pattern	Conditions
Alopecia Areata (n=34)	Exclamation mark hair (52%), black dots (58%), yellow dots (81%), short vellus hairs (30%)
Androgenetic Alopecia (n=17)	Miniaturized hairs (100%), Increased vellus: terminal hair ratio (61%), empty follicles (38%), brown peripilar sign (61%)
Psoriasis (n=20)	Red dots and globules (75%) Silvery white scales (85%), Auspitz sign (50%)
Tinea capitis(n=15)	Perifollicular scaling (53.3%), Comma hair (86.6%), broken hairs (46.6%)
Trichotillomania (n=3)	Perifollicular haemorrhage (100%), broken hairs at multiple levels (100%)
Lichen planopilaris (n=3)	Peripilar cast (100%) Diffuse pink background of erythema (66.6%)
Discoid Lupus Erythematosus (DLE) (n=5)	White rossettes (42.8%), Diffuse pink background of erythema, follicular plugging (71.4%)
Verruca vulgaris (n= 2)	Papillary projections (100%), red dots (100%), exophytic hyperkeratosis (50%)
Acne keloidalis nuchae (n=4)	Perifollicular erythema (75%), Perifollicular pustules (50%) and white halo (50%) surrounding hair follicles.
Pediculosis capitis (n=4)	Viable knit with brownish structure (100%), translucent empty white case (100%), excoriations marks (25%)
Pseudopelade of brocq (n=3)	Honeycomb pigmentation (33%), ivory white patch (100%)
Folliculitis decalvans (n=2)	Faint reddish-light background with hairs emerging in groups of 2-3 with focal peripilar casts(100%). White dots (50%)
Vitiligo (n=2)	White structureless areas (100%), perilesional and perifollicular hyperpigmentation (66%)

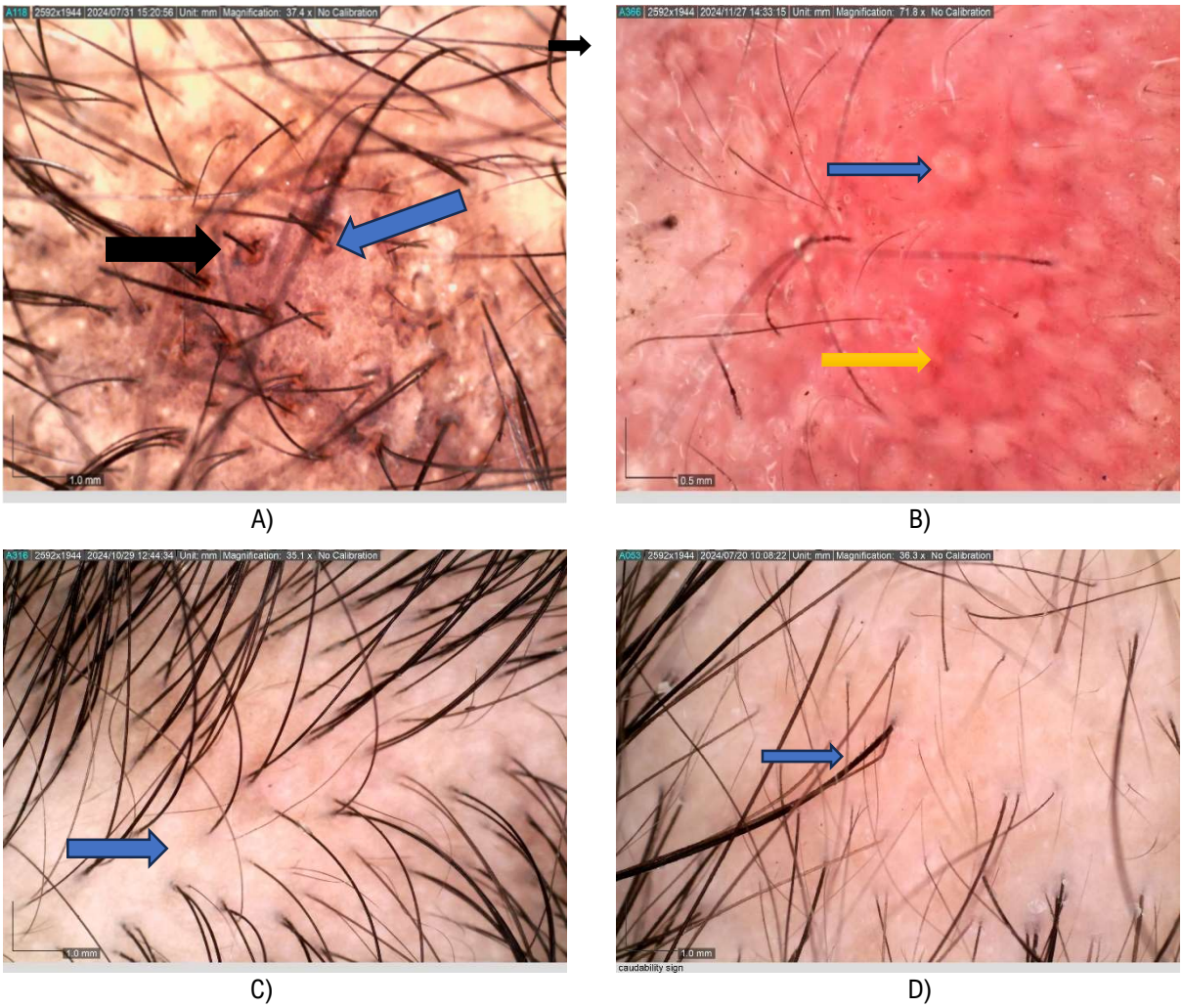


Figure 8: Trichoscopy of A) Trichotillomania showing perifollicular haemorrhage (black arrow) and broken hairs a t multiple level (blue arrow). B) DLE showing follicular plugging (black arrow), white globules (blue arrow) and red dots (yellow arrow) C) Telogen effluvium showing empty follicles (blue arrow) and increased interfollicular distance. D) Coudability sign in Alopecia. (blue arrow)

Table 6: Histopathological findings

Disease	Histopathological Findings
Discoid Lupus Erythematosus (DLE)(n=5)	Hyperkeratosis (100%), interface dermatitis (85%), vacuolar degeneration of the basal layer (85%), follicular plugging (71%), depigmentation (57%)
Lichen Planopilaris (LPP) (n=2)	Lymphocytic infiltrate (100%), interface dermatitis (100%), follicular destruction (66%), scarring (66%)
Pseudopelade of Brocq(n=3)	Lymphocytic infiltrate (100%), follicular destruction (66%), fibrosis (66%), squamous metaplasia (33%)
Folliculitis Decalvans(n=2)	Lymphocytic and neutrophilic infiltrates (100%), perifollicular inflammation (100%), scarring (50%)
Acne Keloidalis Nuchae(n=2)	Follicular hyperkeratosis (100%), lymphocytic infiltrate (100%), neutrophilic micro abscesses (50%), keloid-like scarring (75%)
Keratosis Follicularis Spinulosa Decalvans(n=1)	Mild basket weave ortho and hyperkeratosis (100%), keratin plugging (100%) and dilated infundibulum (100%), perivascular chronic inflammatory infiltrate (100%)

Additionally, the study examined patient occupations, revealing that the majority were employed (27.6%), followed by students (19.7%), as detailed in **Table 2**.

The significant proportion of patients (36.84%) experienced scalp dermatoses lasting between 6 to 12 months, as shown in **Table 3**.

The most affected area of scalp dermatoses was the parietal region (64.4%), followed by the frontal (21.7%), occipital (7.89%), and temporal regions (5.92%). The parietal region of the scalp was most frequently affected because it has a higher density of sebaceous (oil-producing) glands, thicker, denser hair, and the ability to trap

moisture, sweat, and oils providing favourable environment for growth of fungi.

Alopecia (36.84%) and scaling disorders of the scalp (32.23%) were the most prevalent disease categories observed in the study. Common conditions included alopecia areata (22.36%), scalp psoriasis (13.15%), tinea capitis (9.86%), pityriasis capitis (6.57%), and androgenic alopecia (11.18%), as detailed in **Table 4**.

Common dermoscopy findings for various scalp dermatoses were also observed and are detailed in **Table 5**. Skin biopsies were performed in 53 patients to confirm the diagnosis of scalp dermatoses and their histopathological findings are summarised in **Table 6.**

DISCUSSION

This study found slight male predominance was observed, reflected with male-to-female ratio of 1.3:1 among patients with scalp dermatoses, with a significant prevalence in the 21-30 (51.3%) age group. In the study of scalp dermatoses by Aravamuthan et al., who reported that male patients constituted a significant majority with a male to female ratio of 1.8:1 [6]. Kalam et al. also noted similar trends, with males accounting for 54.5% of patients with scalp dermatoses in their group 1, also young adults, particularly those aged 15-30, were significantly affected.[7] Among the 152 patients, 52 (34.21%) reported pruritus of the scalp as a prevalent symptom which is supported by Aravamuthan et al who reported itching (53.5%) being the most common presenting symptom in their study on scalp dermatoses.[6] In our study, the most affected area among patients with scalp dermatoses was the parietal region, accounting for 64.4% of cases. The predominance of the parietal region aligns with the findings of Pillai et al., who also reported a significant prevalence of scalp conditions localized to parietal area.[8]

This study identified several common conditions affecting patients with scalp dermatoses. Alopecia areata was the most prevalent, occurring in 22.36% of patients, followed by scalp psoriasis at 13.15% whereas Pillai et al reported psoriasis being most common (33.3%) in scalp dermatoses.[8]

Alopecia areata: The total number of patients with alopecia areata in our study was 34(22.3%) out of which 22(14.4%) were males and12(7.8%) were females. Most of the patients with alopecia areata belonged to the age group of 5-20 years (52.9%). The parietal (38.2%) and occipital regions (29.4%) of the scalp were commonly involved (67.6%). Based on extent of AA, multilocularis (50%) was most common followed by monolocularis (44.1%), subtotalis and totalis (2.9% each). In our study, patchy AA was most common pattern seen.

In a study by Achar A et al, total 410 patients were included, with 50.2% males and 49.8% females, with the mean age of 26.5 year and they found multilocularis patches to be the commonest (59.5%) followed subsequently by monolocularis (32.4%) and according to the pattern of involvement, 83.7% (343/410) cases had patchy AA.[9]

Psoriasis: In our study total of 20(13.15%) patients were of psoriasis out of which 15 were exclusively scalp psoriasis and 5cases were chronic plaque psoriasis. Out of 20 cases, 65% were male and 35% were female, resulting in a male-to-female ratio of 1.85:1. Nearly 60% of cases were from age group 21-40 years. The most common symptom in psoriasis was pruritus (85%) followed by scaling (80%).

In compared to study conducted by Sekar Set al. nearly 65% of the study participants were in the age group of 21 to 40 years, also 55% males and 45% females, resulting in a male-to-female ratio of 1.2:1. The initial site of involvement was scalp in 13(32.5%). The predominant symptom noted was pruritus in 62.5% followed by pruritus and burning sensation in 25% cases.

Androgenetic alopecia: We studied 17(11.18%) patients of androgenetic alopecia with male predominance (2.4:1) and most frequently affected age group was 21-40 years (64.7%). Study conducted by Sakhiya J et al also had similar findings with male preponderance (79%) and majority (42.8%) of patients were primarily from the 21-30 years age group.[12]

Tinea Capitis: In our study Tinea capitis was most common among the 1-10 year of age group with slightly male preponderance8(53.3%). A study conducted by Bhat YJ noticed Tinea capitis being equally predominant (29.33% each) in the 3–6 and 6–9years age groups with a male preponderance of 2.26: 1. Like our observations, Bhat YJ also noticed that grey patch tinea capitis was the most common variant among all the cases.[10]

Pityriasis capitis: In present study, (10)6.57% patients had pityriasis capitis with female preponderance. A maximum number of patients (40%) represented 21–30 years of age group, followed by 30% in the 31-40 years of age group. Scaling (100%) was the most common symptom followed by dryness (70%) and itching (60%) in current study. In the study of Jain S and Mahalakshmi K, majority were females and most common age group affected was 20-30 years, also 61.66% patients had scaling, 54.16% had dryness and 52.5% had itching on day of presentation.[11]

Discoid Lupus erythematosus: In our study, scalp DLE was found in 5(3.28%) patients with female-to-male ratio was 1.5:1, with a mean age of 29.6 ± 7.2 years. The most commonly affected site was the frontal region (57.14%), followed by the temporal area (28.5%) of the scalp. Contrary to our study, Bhardwaj et al observed that 27% patients presented with DLE of the scalp, with female-to-male ratio of 7.6:1. Mean age of active DLE was 30.3 ± 8.75 years and 42.3% cases had localized DLE with temporal (84.61%) and occipital (80.76%) being the most common site of involvement.[12]

Trichoscopy of scalp dermatoses

In our study, trichoscopy of alopecia are at revealed yel-

low dots in 81% cases followed by black dots in 58%, and exclamation mark hairs in 52% cases, similar findings were seen in the study by Mahmoudi H et al where yellow dots (84.1%) were most common finding followed by vellus hairs in 62.6% cases of alopecia areata.[13]

In our study, most common trichoscopic finding of androgenetic alopecia was miniaturized hairs (100%), followed by increased vellus-terminal ratio (61%), and brown peripilar sign (61%). Study conducted by Kasumagic-Halilovic et al, showed the most common finding in the form of hair thickness heterogeneity (100%), followed by yellow dots (52.88%).[14]

In our study trichoscopic findings in scalp psoriasis were silvery white scaling (85%) followed by red dots and globules (75%), whereas study conducted by Kibar M et al noticed structureless red areas in 64.5%cases and hidden hairs in 61.39% cases.[15]

In our study on tinea capitis, comma hair (86.6%), perifollicular scaling (53.3%) and broken hair (46.6%) were the common dermoscopic changes observed. In contrast to our study, Taweel A et al showed short broken hairs (90.0%), followed by black dots (65.0%), comma shaped hairs (55.0%) as common trichoscopic features of tinea capitis.[16]

In trichotillomania, perifollicular haemorrhage (100%) and broken hairs at multiple levels (100%) were observed whereas in study of Ankad BS et al,common trichoscopic patterns observed were reduced hair density and hairs broken at different lengths (100% each).[17]

In our study peripilar cast (100%) and diffuse pink background of erythema (66.6%) were commonly observed on trichoscopy of LPP, whereas study by Gowda SK et al showed fibrotic white dots (67.5%) absence of follicular opening (56.98) as common trichoscopic features in patients of LPP.[18]

In our study of Discoid lupus erythematosus, follicular plugging was seen in (71.4%) and white rosette were seen in (42.8%) whereas study by Gowda SK et al observed white structure less area (62.04), arborizing vessels (57.83) and follicular plugs (46.98) in DLE cases.[18]

In present study, ivory white patches were seen in all patients of pseudopelade of Brocq with honeycomb pigmentation in 33%, whereas study conducted byThakur BK et al, absent follicular opening,epidermal atrophy and cicatricial white patches were seen in all cases and yellow dots in 50% cases of pseudopelade of Brocq.[19]

Dermoscopy of scalp dermatoses was useful formulate an approach to diagnose the difficult cases as well as to identify the specific and secondary features for better understanding of individual lesion, assessing severity and monitoring progress of scalp lesions in present study.

Histopathology of scalp dermatoses

In our study, histopathological findings of DLE showed hyperkeratosis (100%), interface dermatitis (85%), and vacuolar degeneration of the basal layer (85%), whereas study conducted by Thakur B.K et al showed hair follicle perifollicular lymphocytes in 100%, vacuolar change in the basal layer in 100% and follicular plugging in 88.88% cases of DLE.[19]

In our study histopathology of Lichen plano pilaris showed lymphocytic infiltrate and interface dermatitis in all patients, follicular destruction and scarring in 66% cases whereas study conducted by Tayyebi Meibodi N et al showedmild to moderate lymphocytic, primarily perifollicular (77.3%) and perivascular inflammation (97.7%) in patients of LPP markedly reduced hair density (63.6%), absence of vellus hair (59.1%).[20]

In our study Lymphocytic infiltrate (100%) and follicular destruction (66%) were common histopathological findings observed among patients of Pseudopelade of Brocq whereas study done by Thakur B.K et al found epidermal atrophy, cicatricial white patches and absent follicular opening in 100% and black dots in 50% cases histopathologically.[19]

The histopathological analysis of scalp lesions was a cornerstone in diagnosing difficult cases and also it provided definitive insights that compliment clinical and dermoscopic findings.

CONCLUSION

Scalp dermatoses are common worldwide, affecting millions of people and significantly impacting both physical and mental health. Conditions like seborrheic dermatitis and alopecia can lead to changes in appearance, which often reduce self-esteem, confidence, and overall quality of life. The visible nature of these disorders can result in social embarrassment and emotional distress, highlighting the need for effective diagnosis and treatment.

Due to similar symptoms and signs being shared by many scalp dermatoses, an accurate diagnosis is crucial to identify the specific causes which may further allow clinicians for targeted therapies to enhance dermatological as well as psychological well-being.

This study is important as it raises awareness and we studied the epidemiological, clinical, and histopathological aspects of common scalp dermatoses to enhance diagnostic accuracy of various scalp diseases, emphasizing the need for comprehensive care that addresses both the clinical and emotional aspects of these conditions.

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