



CLINICO-EPIDEMIOLOGICAL SPECTRUM OF HAIR AND SCALP DISORDERS IN PEDIATRIC PATIENTS: A CROSS-SECTIONAL OBSERVATIONAL STUDY

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ABSTRACT

Background: Hair and scalp disorders are among the most prevalent dermatological conditions affecting the pediatric population, carrying significant psychosocial and medical implications. Despite their prevalence, epidemiological data from South India remain limited. **Objectives:** To describe the clinical spectrum of hair and scalp disorders in children under 18 years and to examine the influence of sociodemographic factors including age, gender, and socioeconomic status on disease distribution. **Methods:** A cross-sectional observational study was conducted over 18 months (April 2024 – September 2025) at PES Institute of Medical Sciences and Research, Kuppam. A total of 102 children below 18 years presenting with hair and scalp complaints were enrolled using purposive sampling and diagnoses were established using different investigations such as KOH mount, Wood's lamp examination, Gram stain, and culture where applicable. **Results:** Females (63.72%) predominated than males. The most common diagnosis was tinea capitis (40.19%), followed by alopecia areata (18.62%), pediculosis capitis (16.67%), psoriasis (5.88%), seborrheic dermatitis (5.88%), and iron deficiency anaemia (5.88%). Infectious disorders accounted for 59.80% of cases and were common among children of lower socioeconomic classes. **Conclusion:** Infective etiologies dominate pediatric scalp disorders in lower socioeconomic groups in South India. Early diagnosis, targeted public health measures with a specific dermatologic national policy, and improved hygiene awareness and infrastructure are essential to reduce morbidity in this population.

KEYWORDS : Pediatric dermatology, tinea capitis, alopecia areata, pediculosis capitis, scalp disorders, socioeconomic status, South India

INTRODUCTION

Proper development of hair and scalp in children contributes to their identity, self-esteem, and social interactions. One of the common concerns among children are hair and scalp disorders as they are of cosmetic or aesthetic relevance and often carry significant psychosocial, emotional, and developmental implications.¹ They encompass a broad spectrum of clinical presentations, ranging from self-limited, benign conditions like tinea capitis to manifestations related to systemic illness such as cicatricial alopecia in scleroderma.

Several factors such as age, gender, socioeconomic status, nutritional status, genetics, autoimmunity, and environmental factors affect the patterns and risk factors of the prevalence and severity of hair and scalp disorders. For instance, some disorders such as seborrheic dermatitis show age related pattern. SD is more prevalent in less than 1 year of age and after puberty, while tinea capitis is more common in children between 4-10 years of age group. Some disorders such as tinea capitis, pediculosis capitis, and scabies are more prevalent in lower socioeconomic status due to poor hygiene, overcrowding, lack of access to clean water and healthcare services.¹

Hair and scalp disorders are often overlooked in health care planning and research methods in spite of their prevalence. Lack of epidemiological studies related to hair and scalp disorders limits our understanding of disease patterns, risk factors, and long-term outcomes and hence, efforts to implement effective prevention and management strategies are hindered. However, study of such disorders contributes immense information about the cultural and psychosocial aspects of communities. Though community-based studies are important, a hospital based dermatological observational studies provide data regarding the diseases in particular community and also useful in diagnosing rare diseases such as congenital disorders which often require subject expertise.

MATERIALS AND METHODS

Study Design and Setting: The study was a cross-sectional observational study done at the Dermatology, Venereology and Leprosy department, ER department, and pediatrics department at PES Institute of Medical Sciences and Research, Kuppam for a time duration of 18 months between April 2024 to September 2025 on 102 children who were of the age group <18 years. The patients were

chosen based on criteria described below. The study was started after ethical clearance from the institution and obtaining consent from parents of children or their legal guardians after clearly explaining the information regarding the present study. Data of all these patients was collected and grouped according to statistical analysis.

Participants: A total of 102 children below 18 years of age presenting with hair and/or scalp disorders were enrolled using purposive sampling. Inclusion criteria required willingness to provide informed consent and an age below 18 years. Children in whom disease morphology was modified by chronic topical therapy were excluded. Sample size was calculated based on the Conti et al.² (2016) reference study.

Assumption

Precision	= 0.05 (5%)
Z-value for 95% CI	= 1.96
Expected prevalence	= 0.0719 (7.19%)

Formula

$$n = \frac{Z_{1-\alpha/2}^2 \cdot p(1-p)}{d^2}$$

Calculation

$$n = \frac{1.96^2 \cdot 0.0719(1 - 0.0719)}{0.05^2} = 102$$

Data Collection and Investigations: Initially, clinical examination was done to determine the type, site, morphology, and distribution of lesions and also associated features such as scaling, erythema and hair shaft changes, which was followed by suitable direct examination with the involvement of instruments such as Wood's lamp examination, Gram stain, bacterial culture, Tzanck smear, and others if possible. Then a detailed history regarding the onset and duration of the lesions and any relevant history of systemic illness was obtained. For the confirmation of some lesions, few reagents were used. Then the data is grouped according to age, gender and socioeconomic status of children.

Statistical Analysis: The collected data was entered into MS Excel 2019 version and further analyzed using SPSS (version 23.0; SPSS Inc., Chicago IL, USA) software. For descriptive analysis, the categorical variables was analyzed by using frequency and

percentages and the continuous variables was analyzed by calculating mean ± Standard Deviation. Appropriate graphs were included wherever necessary.

RESULTS

Demographic Characteristics:

The study enrolled 102 children: 37 males (36.28%) and 65 females (63.72%). The majority belonged to the above-10-years age group (54.90%), followed by 1–5 years (22.54%), 5–10 years (20.59%), and below 1 year (1.96%). With respect to socioeconomic distribution, 38.23% belonged to the lower class, 25.49% to the upper lower class, 17.64% to the lower middle class, 10.78% to the upper middle class, and 7.84% to the upper class.

Table 1. Demographic Distribution of Study Participants (n = 102)

Characteristic	Category	n	%
Gender	Male	37	36.28%
	Female	65	63.72%
Age Group	< 1 year	2	1.96%
	1–5 years	23	22.54%
	5–10 years	21	20.59%
	> 10 years	56	54.90%
Socioeconomic Status	Upper	8	7.84%
	Upper Middle	11	10.78%
	Lower Middle	18	17.64%
	Upper Lower	26	25.49%
	Lower	39	38.23%

Disease Spectrum: Tinea capitis was the most prevalent diagnosis (40.19%), followed by alopecia areata (18.62%), pediculosis capitis (16.67%), psoriasis (5.88%), seborrheic dermatitis (5.88%), and iron deficiency anaemia (5.88%). Less frequent conditions included bacterial folliculitis (1.96%), hypothyroidism (1.96%), localized scleroderma (0.98%), aplasia cutis congenita (0.98%), and nevus sebaceous (0.98%). By disease category, infective disorders dominated (59.80%), followed by hair disorders inclusive of alopecia areata and nutritional alopecias (19.60%), inflammatory diseases (11.76%), nutritional disorders (6.86%), and congenital disorders (1.96%).

Table 2. Distribution of Diagnoses (n = 102)

Diagnosis	n	%	Category
Tinea Capitis	41	40.19%	Infective
Pediculosis Capitis	17	16.67%	Infective
Bacterial Folliculitis	2	1.96%	Infective
Alopecia Areata	19	18.62%	Hair Disorder
Seborrheic Dermatitis	6	5.88%	Inflammatory
Psoriasis	6	5.88%	Inflammatory
Iron Deficiency Anaemia	6	5.88%	Nutritional
Hypothyroidism	2	1.96%	Nutritional
Localized Scleroderma	1	0.98%	Inflammatory
Aplasia Cutis Congenita	1	0.98%	Congenital
Nevus Sebaceous	1	0.98%	Congenital

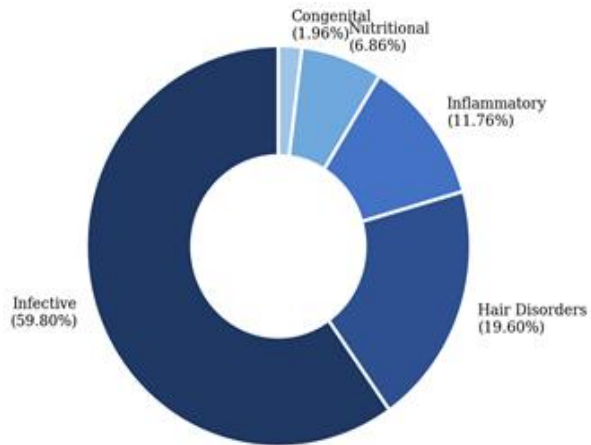


Figure 1. Distribution of participants by broad disease category (n = 102).

Socioeconomic and Age-Specific Patterns:

Table 3: Distribution Of Children According To Type Of Disease And Socioeconomic Status

Disease	Upper	Upper Middle	Lower Middle	Upper Lower	Lower	Total
Pediculosis capitis	00	2	2	4	9	17 (16.67%)
Tinea Capitis	3	5	4	12		41 (40.19%)
Alopecia Areata	3	2	6	6	2	19 (18.62%)
Bacterial Folliculitis	0	0	0	0	2	2 (1.96%)
Nevus Sebaceous	1	0	0	0	0	1 (0.98%)
Psoriasis	0	1	2	2	1	6 (5.88%)
Seborrheic Dermatitis	1	1	2	1	1	6 (5.88%)
Iron Deficiency Anemia	00	0	1	1	4	6 (5.88%)
Localised Scleroderma	00	0	1	0	0	1 (0.98%)
Aplasia Cutis	00	0	0	0	1	1 (0.98%)
Hypothyroidism	00	0	0	0	2	2 (1.96%)

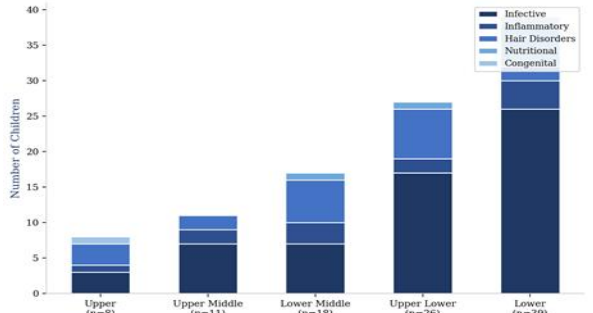


Figure 2. Disease category distribution across socioeconomic status groups.

In the present study, a total of 17 cases of pediculosis capitis were recorded. Of them, 2 cases each were recorded from upper middle and lower middle class. 4 cases were recorded from upper lower class and 9 cases were recorded from lower class. With respect to tinea capitis, 41 cases were recorded. Of them, 3 cases were reported from upper class, 5 cases were recorded from upper middle class, 4 cases were noted from lower middle class, 12 cases were recorded from upper lower class, and 17 cases were from lower class. With respect to alopecia areata, 3 cases were recorded from upper class. 2 cases were reported from upper middle class, 6 cases each from upper middle and lower middle class, and 2 cases were recorded from lower class. Bacterial folliculitis is reported in only 2 cases from lower class. 1 case of nevus sebaceous was reported from upper class. 1 case each of psoriasis is recorded from upper middle and lower class. 2 cases each were reported from lower middle and upper lower classes. With respect to seborrheic dermatitis, 1 case is observed from upper, upper middle, upper lower and lower class, and 2 cases are reported from lower middle class. With respect to iron deficiency anemia, 1 case each was recorded from lower middle and upper lower class, and 4 cases were recorded from lower class. Localized scleroderma is reported in only one case. Only 1 case of aplasia cutis is recorded from lower class. And 2 cases of hypothyroidism were reported from lower class.

DISCUSSION

Gender and Age Distribution:

Consistent with various studies such as Younis et al.³ (2020), who demonstrated a female to male ratio of 1:0.8, and Venkata Subba Reddy et al.⁴ who reported a female preponderance of 51.4%, this study also showed a higher female percentage of 63.72%. High representation of females when compared to males can be attributed to better health seeking behaviour due to greater cosmetic significance of hair disorders in girls and also higher prevalence of pediculosis capitis due to longer hair and head-to-head contact. With respect to age of children, those with age of more than 10 years (54.90%) were recorded which is consistent with the age-specific epidemiology of most common specific diagnoses. For instance, though tinea capitis is peaked in the 4-10-year range, our study insisted that significant number of children had persistent disease even into the adolescent age group.

Tinea Capitis:

High endemicity of Tinea capitis is observed in our study (40.19%), which is comparable to other South Indian studies such as Gopal and Karthikeyan et al.⁵ (17%), Gupta et al.⁶ (47.4%), and other broader South Asian reviews (40-60%). Out of these cases, a marked socio-economic distinction could be made as 41.4% of cases were from lower class, which typically links tinea capitis to overcrowding, shared grooming equipment, poor personal hygiene, limited health-care access, and warm climates. Early treatment with antifungals is needed to avert long-term complications such as kerion formation and permanent cicatricial alopecia.

Alopecia Areata:

Alopecia areata was observed in 18.62% of children, particularly in females and older children, which reflects other studies such as Bhardwaj et al.⁷ (20.4%) and Sharma et al.⁸ (23.9%). However, our study supported a significant prognostic marker: age below 10 years which is associated with more severe and chronic disease. Our study also demonstrated higher prevalence among children above 10 years of age, and also, the distribution was found across different socioeconomic classes that underlines the autoimmune pathophysiology of this disease, independent of hygiene and infectious causes.

Pediculosis Capitis:

Pediculosis capitis was recorded in 16.67% of children, all female. This is consistent with other studies such as Bhatia et al.⁹ (20.2%) and other regional South Asian studies^{10,11} (15-45% prevalence) that reflects the increasing prevalence with age, prolonged exposure in school settings and growing hair length. Upper socioeconomic class did not reveal any cases which can be attributed to maternal education, grooming practices, and role of health awareness.

Inflammatory Disorders:

Both Seborrheic dermatitis and psoriasis were recorded in 5.88% of population each in the above-10 years age group. This is consistent with the hormonal evidence among adolescent seborrheic dermatitis and rising incidence of psoriasis through adolescence. However, infantile cradle cap was not observed in our study, which reflects the higher focus of our study on older children and under representation of neonates. And also, higher prevalence of psoriasis is also observed in other hospital-based series from India like Dogra et al.¹² (4.4%).

Nutritional and Congenital Disorders:

Nutritional disorders such as Iron deficiency anemia and Hypothyroidism were reported mainly from three lower socioeconomic classes, which underscores deprivation of nutritional health among children. Consistent with global estimates of 2-3%, congenital lesions such as aplasia cutis congenita and nevus sebaceus were observed in 1.96% of population each, which highlights the importance of routine neonatal dermatological examination.

CONCLUSION

Timely and proper development of hair and scalp disorders is necessary for regular social interactions among children, development of self-esteem, and self-identity. Any deviation in functional or anatomical aspects of its normal development leads to various abnormalities, thereby leading to significant distress, social-stigma, and long-term psychosocial impact. Though clinical presentation may vary from self-limiting symptoms to irreversible cicatricial symptoms, every case of hair and scalp disorder must be treated with utmost care because of profound psychological effects on children. However, a proper national policy related to skin disorders is almost non-existent in developing countries where these disorders are overlooked. Hence, systematic evaluation and analysis of prevalence and characteristics of hair and scalp disorders is necessary to understand disease burden.

LIMITATIONS

Our study is single-centre design with relatively small sample size, which effects the ability to generalise the findings to broader regional population. Purposive sampling may introduce selection bias. Study duration can be prolonged to include higher number of children. Treatment outcomes were not assessed because of lack of long-term follow-up.

- **Conflict of Interest:** None declared.
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- **Ethical Approval:** Institutional Human Ethics Committee, PES Institute of Medical Sciences and Research, Kuppam

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