ORIGINAL ARTICLE

Pattern of pediatric dermatoses in a tertiary care centre of northern India

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ABSTRACT

Background: Pediatric dermatoses include a range of infectious and non-infectious skin diseases encountered during different phases of childhood. Dermatological ailments are one of the most common complaints experienced by the pediatric population and are shared worldwide. Studies of the pediatric population can be instrumental in determining the policies of defensive medicine and public health.

Methods: A total of five hundred patients aged upto 18 years attending the outpatient and inpatient of the Dermatology department and Pediatrics department of Dayanand Medical College & Hospital, Ludhiana, were the subject of this study. A detailed general, systemic and cutaneous examination followed by relevant investigations were carried out.

Results: A total of 521 dermatoses were seen in 500 patients, with 63% males and 37% females. The most common disease category was infections and infestations (42.80%), followed by dermatitis/papulosquamous disorders (31%). The least common category was genetic/congenital disorders (4.20%). The most common diseases were scabies (17.40%) and atopic dermatitis (16%), followed by fungal infections (10.80%), viral infections (10%) and acne (9.40%).

Conclusion: Epidemiologic data, which also serves as a source for healthcare professionals in primary healthcare to frame healthcare programmes to decrease long-term morbidity and socioeconomic burden associated with diseases, is required to monitor the pattern of skin ailments in children and to understand its relationship with various parameters such as age, gender, etc. Additionally, this information helps raise public awareness of children's health.

KEY WORDS: Pediatric dermatoses, infections and infestations, epidemiologic data

INTRODUCTION

The pediatric age group is precious in society regarding emotional, social and clinical aspects, and the diseases seen in this age group are quite different from those found in adulthood. Pediatric dermatoses include all the skin diseases seen in infancy, childhood and adolescence.[1] It includes both infectious and non-infectious skin conditions. Dermatological disease in the pediatric population may be acute or chronic and can show recurrence.[2] Skin disorders seen during childhood are often a marker of underlying systemic diseases and hereditary syndromes.[3] Dermatological ailments account for about 30% of primary and secondary reasons for pediatric outpatient visits. Moreover, 30% of all dermatological consultations involve patients of the pediatric age group.[4,5] The incidence of skin diseases in children has been reported to range from 9%-37% in various school-based studies.[6,7] Hence, skin-related complaints are among the most common presenting complaints in the pedi-

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atric population.[8]

Referrals to Dermatology are one of the most common subspecialty referrals made by pediatric primary care providers and were the third most common subspecialty referral, behind Ophthalmology and Orthopaedics, in a review of referral practices from an extensive network of private pediatric practices affiliated with the Children's Hospital of Boston.[9]

Dermatologic conditions in children not only physically affect health but also influence a child's psychosocial development. More than a cosmetic problem, skin manifestations can produce anxiety, depression and other psychological issues hindering a child's social well-being. Hence, chronic dermatoses are associated with significant morbidity and psychological impact.[10] Skin diseases are common in children. However, only a very few studies are available in the literature. Dealing with a child having dermatological condition requires special skills and knowledge as they differ from adults regarding clinical presentation, treatment and prognosis.[11]

In order to monitor the pattern of skin problems in children and to understand its relationship with various parameters such as age, gender, socioeconomic status etc., there is a necessity for epidemiologic data. Furthermore, the epidemiologic data also serve as a source for framing healthcare programs by healthcare professionals in primary healthcare to decrease long-term morbidity and socioeconomic brunt associated with diseases.[12] Therefore, the present study is directed at determining the spectrum and pattern of skin diseases in children.

MATERIAL AND METHODS

This cross-sectional, observational study was done at the outpatient and inpatient in the Department of Dermatology, Venereology and Leprosy and Pediatrics of the Dayanand Medical College & Hospital, Ludhiana. The study was carried out between March 2021 to December 2021 for a duration of 10 months on five hundred patients aged up to 18 years, belonging to either sex. The study was started after the approval of the institutional ethical committee and obtaining written informed consent from all patients/guardians in the regional and the English language. The patients/guardians who did not consent for the indexed study were excluded. All new dermatoses presented to us were recorded, including multiple dermatoses in a single patient. No follow-ups were included in this study. For better analysis and comparison, the patients were divided into four age groups: less than 1 year, 1-5 years, 6-10 years and more than 10 years. Data were described in terms of range, mean ± standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations were done using (Statistical Package for the Social Science) SPSS 21 version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

RESULTS

Gender and age distribution in the study

A male predominance was seen in the study. Of the 500 patients, 315 (63%) were male and 185 (37%) were female. The male-to-female ratio was 1.7:1. The maximum number of patients were seen in the age group of more than ten years of age with 173(34.6%) patients, while the least number of cases were seen in the age group of less than one year of age with only 41(8.2%) cases (Table 1). The youngest patient was one

month old, while the oldest was 17 years old. The mean age in our study was 7.75 ±5.36 years.

Table 1 Age and gender distribution

SEX (FREQUENCY)	AGE (YEARS)				TOTAL
	< 1	1-5.0	6-10.0	>10	
Female	19	65	51	50	185
Male	22	99	71	123	315
Total	41	164	122	173	500

Disease distribution in the study

In our study, a total of 521 dermatoses were seen in 500 children. Some of the children presented with more than one dermatoses. The most common disease category was infections and infestations, affecting 42.8% of children. After infections and infestations, most patients were found in dermatitis and papulosquamous disorders group (155: 31%), followed by non-infective dermatoses/appendageal disorders (55: 11%). The genetic/congenital disorders category had the least number of cases (22: 4.2%) (Table 2).

Fig 1 Atopic Dermatitis

Fig 2 Tinea Corporis

Fig 3 Ichthyosis

Fig 4 Seborrheic dermatitis

Fig 5 Impetigo Contagiosa

Fig 6 Hemangioma

Fig 7 Psoriasis (Scalp)

Fig 8 Acrodermatitis Enteropathica

Table 2 Disease category distribution

DISEASE CATEGORY	TOTAL	PERCENTAGE
Infections & infestations	214	42.8%
Dermatitis/Papulosquamous disorders	155	31%
Noninfective dermatoses / Appendageal disorders	55	11%
Hypersensitivity / drug reactions	41	8.2%
Autoimmune dermatoses	35	7%
Genetic/ Congenital disorders	21	4.2%

In the infections and infestations group, the maximum number of dermatoses were of scabies, accounting for around 87(17.4%) cases. After scabies, fungal and viral infections were commonly seen in 54(10.8%) and 50(10%) patients, respectively. Rarely, cutaneous tuberculosis and leprosy were seen with 1 case each (Table 3).

Table 3 Age wise distribution of various dermatoses

Disease	Age					
	<1 year	1-5 years	6-10 years	>10 years	Total	Percentage
Infections & infestations						
Scabies	4	35	23	25	87	17.4%
Fungal	5	11	11	27	54	10.8%
Viral	2	20	16	12	50	10.0%
Bacterial	1	9	6	2	18	3.6%
IED	0	1	1	1	3	0.6%
Leprosy	0	0	0	1	1	0.2%
Cutaneous TB	0	0	0	1	1	0.2%
Total					**214**	**48.8%**
Dermatitis/ papulosquamous disorders						
Atopic dermatitis	7	39	18	16	80	16%
Seborrheic dermatitis	10	9	7	12	38	7.6%
Pityriasis Alba	1	4	6	3	14	2.8%
Lichen Planus	0	0	4	2	6	1.2%
Psoriasis	0	1	2	2	5	1%
Diaper Dermatitis	2	1	0	1	4	0.8%
Discoid eczema	0	0	2	0	2	0.4%
Hand Eczema	0	0	0	2	2	0.4%
Contact Dermatitis	0	0	0	1	1	0.2%
Vector Dermatitis	0	1	0	0	1	0.2%
Perioral dermatitis	0	0	0	1	1	0.2%
Pompholyx	0	0	0	1	1	0.2%
Total					**155**	**31%**
Noninfective dermatoses/ appendageal disorders						
Acne	1	1	0	45	47	9.4%
Miliaria	0	1	1	0	2	0.4%
Acrodermatitis Enteropathica	1	0	0	0	1	0.2%
Hirsutism	0	0	0	1	1	0.2%
Premature canities	0	0	1	0	1	0.2%
Telogen Effluvium	0	0	0	1	1	0.2%
Sebaceous Cyst	0	0	0	1	1	0.2%
Pyoderma gangrenosum	0	1	0	0	1	0.2%
					55	11%

Hypersensitivity/drug reactions						
Urticaria/ angioedema	0	11	8	8	27	5.4%
Papular urticaria	1	9	3	0	13	2.6%
Cutaneous mastocytosis	0	0	0	1	1	0.2%
					41	8.2%
Autoimmune dermatoses						
Vitiligo	1	7	10	10	28	5.6%
Alopecia areata	0	1	4	0	5	1%
SLE	0	0	0	1	1	0.2%
Dermatitis Herpetiformis	0	0	0	1	1	0.2%
					35	7%
Genetic / Congenital disorders						
Hemangiomas	4	6	0	0	10	2%
Nevus Depigmentosus	4	0	0	0	4	0.8%
Congenital Melanocytic Nevus	1	0	0	1	2	0.4%
Ichthyosis	0	1	0	1	2	0.4%
Linear Verrucous Epidermal Nevus	0	0	0	1	1	0.2%
Port wine stain	0	1	0	0	1	0.2%
Palmoplantar Keratoderma	0	0	0	1	1	0.2%
					21	4.2%

In the second largest category, i.e., dermatitis and papulosquamous disorders, the most prevalent diseases were atopic dermatitis (80: 16%), seborrhoeic dermatitis (38: 7.60%) and pityriasis alba (14: 2.80%).

In the non-infective dermatoses/appendageal disorders category, 55 patients were seen, with acne vulgaris affecting the highest number of children, i.e., 47(9.4%). The rare diseases were acrodermatitis enteropathica, hirsutism, premature canities and telogen effluvium.

In this study, 41 cases (8.2%) of hypersensitivity were noted, with the prevalence of urticaria/angioedema being 27(5.4%) and papular urticaria being 13(2.6%) while only 1(0.20%) case of cutaneous mastocytosis was seen.

Autoimmune aetiology constituted 35(7%) cases, with vitiligo (28: 5.6%) and alopecia areata (5: 1%) being the leading cause. Rarely dermatitis herpetiformis and SLE were also seen (1: 0.2%). The category with the least cases, i.e. genetic/ congenital disorders, had 21 cases. It constituted hemangiomas with the maximum number of cases (10: 2%), followed by nevus depigmentosus with 4 cases (0.80%).

The ten most common dermatoses seen in the study are shown in Table 4. The most prevalent disease of the study was scabies (17.40%), followed by atopic dermatitis (16%) and fungal infections (10.8%). Other dominant diseases of the study were viral infections (10%) and acne (9.4%).

Around 25 children were affected by Tinea corporis, which made up 46.3% of the fungal infection and was the most prevalent infection in the fungal infection. Intertrigo (7: 13%) and pityriasis versicolor (9: 16.7%) were the next two most typical fungi.(Table 5)

Table 4 Most prevalent diseases in the study

S No.	Disease	<1 year	1-5 years	6-10 years	>10 years	Total	Prevalence
1	Scabies	4	35	23	25	87	17.40%
2	Atopic dermatitis	7	39	18	16	80	16%
3	Fungal infections	5	11	11	27	54	10.80%
4	Viral infections	2	20	16	12	50	10%
5	Acne	1	1	0	45	47	9.40%
6	Seborrheic dermatitis	10	9	7	12	38	7.60%
7	Vitiligo	1	7	10	10	28	5.60%
8	Urticaria/ angioedema	0	11	8	8	27	5.40%
9	Bacterial infections	1	9	6	2	18	3.60%
10	Pityriasis alba	1	4	6	3	14	2.80%

Table 5 Distribution of the fungal diseases in the study

Fungal Infections	Male	Female	No. of cases	Percentage
Tinea corporis	18	7	25	46.30%
Pityriasis versicolor	6	3	9	16.70%
Intertrigo	4	3	7	13.00%
Tinea capitis	2	2	4	7.40%
Onychomycosis	1	2	3	5.40%
Tinea cruris	2	0	2	3.70%
Tinea facei	2	0	2	3.70%
Candidiasis	0	1	1	1.90%
Tinea pedis	0	1	1	1.90%
TOTAL	**35**	**19**	**54**	**100%**

Out of the 214 cases (42.80%) in the infection and infestation group in this study, 50 instances (10%) of viral infections were observed. Molluscum contagiosum was the viral infection that was most common, accounting for 27(54%), followed by verruca vulgaris, which accounted for 7(14%). (Table 6)

Table 6 Distribution of the viral diseases in the study

Viral Infections	Male	Female	No. of Cases	Percentage
Molluscum contagiosum	12	15	27	54.00%
Verruca vulgaris	5	2	7	14.00%
Viral exanthem	2	3	5	10.00%
Herpes zoster	2	2	4	8.00%
Verruca plana	2	1	3	6.00%
Varicella	2	0	2	4.00%
Herpes Simplex	1	0	1	2.00%
Pityriasis rosea	1	0	1	2.00%
TOTAL	**27**	**23**	**50**	**100%**

18 instances (3.6%) included bacterial illnesses. The most prevalent cases in this group were impetigo contagiosum (10: 55.6%), folliculitis (4: 22.2%), and pyoderma (3: 16.7%). Relevant investigations were done only when they were required and when they aided in the diagnosis. Potassium hydroxide for fungal scraping was the most frequently used investigation and was employed 14 times during the trial. Aside from fungus scraping, other techniques included the use of a woods light, a skin biopsy, a slit skin smear, and a CBC. (Table 7)

Table 7 Investigation distribution in the study

Relevant Investigation	No. of Cases	Percentage
KOH	14	2.80%
Wood's lamp	7	1.40%
Skin biopsy	4	0.80%
CBC	1	0.20%
Slit skin smear	1	0.20%
None	473	94.60%
Total	**500**	**100.00%**

DISCUSSION

There is a variation in the pattern of skin disease in the pediatric age group from one country to another and even more so within the same country from state to state due to climatic, cultural and socioeconomic variations. Regarding worldwide distribution, infections and infestations are common in tropical regions of many Asian and African countries. Whereas, eczema and dermatitis are common in western countries.[14] The region of study, type of population studied, environmental factors, hygiene and nutritional status, leads to a variation among the infective dermatoses.[15] Similarly, seasonal and climatic changes also impact specific dermatoses, such as atopic dermatitis and seborrheic dermatitis, which are

predominantly seen in winter. In contrast, papular urticaria is seen more frequently in the rainy season.[12] In India, factors such as malnutrition, poverty, overcrowding, poor hygiene, illiteracy, and social backwardness influence the pattern of skin diseases.[16]

Age range comparison with other studies:

In the indexed study, the maximum number of patients were seen in the age group of more than ten years of age with 173(34.6%) patients, while the minimum number of cases were seen in the age group of less than one year of age with only 41(8.2%) cases. This was similar to the finding found in the study by Poudyal et al.,[17] with the age group 12-17 years showing the maximum dermatoses. On the contrary, the studies by Sardana et al,[18] Karthikeyan et al,[19] Jawade et al[20] and Hassan et al[21] showed the preschool age group with the maximum dermatological manifestations. This difference was probably due to the different types of populations considered for various studies. Moreover, a more comprehensive range of age groups were considered in our study, including the entire pediatric age group, i.e., all children below 18 years.

Gender comparison with other studies

The male preponderance seen in our study (63% males and 37% females, M:F=1.7: 1) was also seen in the studies conducted by Geet Gunjana et al,[12] Sardana et al[18] and Balai et al.[22] and contrary to our study, female preponderance was seen in the study by Karthikeyan et al[19] with male to female ratio being 0.9:1. This variation might be due to the difference in the sex ratio across different regions of our country.

Disease distribution comparison with other studies

In our study, a total of 521 dermatoses were seen in 500 patients. The most common disease category was infections and infestations (42.80%), followed by dermatitis/papulosquamous disorders (31%). This was similar to the previous studies conducted in our country.[12, 17-23] However, contrary to our study, few studies have shown non-infectious dermatoses to be more prevalent.[2, 24, 25] This variation might be due the poor hygiene, low socioeconomic status, low education levels and fewer accessible healthcare facilities in our country.

In our study's infections and infestation category, scabies (17.40%) was the most common disease, followed by fungal infections (10.80%), similar to the study by Jawade et al.[20] In most studies, bacterial infections were the most frequent manifestation in the infections and infestation category.[18,19,22] In the study by Hassan et al,[21] viral infections were the most common, while in the study by Poudyal et al[17] fungal infections were the most common.

Among the fungal infections, tinea corporis (46.3%) and pityriasis versicolor (16.7%) were the most common. This differed from other studies in which tinea capitis was the most prevalent fungal infection.[17,18, 20,22,23]

The most common viral infections were molluscum contagiosum (54%) and verruca vulgaris (14%), which was similar to the findings of Sardana et al,[18] Jawade et al[20] and Balai et al.[22] In the study by Nanda et al[2] warts were the most common viral infection.

The most prevalent bacterial infection was impetigo contagiosum (55.6%), just like the findings of Kiprono et al.[23] and Balai et al.[22] This finding differed from the study by Karthikeyan et al[19] in which pyodermas were the most common.

Cases of leprosy (0.20%) and cutaneous TB

(0.20%) were also seen in the study.

Our study's second most common disease category was dermatitis/papulosquamous disorders affecting 31% of patients. This was similar to many previous studies.[17-20, 22] While being different from the study conducted by Hassan et al.[21] in which pigmentary disorders (14.1%) were the most common. In this category most common disease was atopic dermatitis (16%), making it the second most common disease in the study. This was similar to the study by Jawade et al.[20] and Kiprono et al.[23] But, was contrary to the study conducted by Sardana et al[18] in which infantile seborrheic dermatitis (10.49%) was the most common disease in the dermatitis category. Our study had a substantial number of cases of seborrheic dermatitis (7.60%) and pityriasis alba (2.80%), similar to the study by Balai et al.[22]

Acne (9.4%), belonging to the non-infectious dermatoses/appendageal disorders (11%) category, was a prevalent cutaneous manifestation of this study, similar to the study by Poudyal et al.[17] (10.1%). This similarity might be due to more teenagers being recruited in both studies. This was contrary to the study by Sardana et al[18] in which the number of cases of acne (0.08%) was very low.

The other diseases in this category, including miliaria (0.4%), acrodermatitis enteropathica (0.02%), hirsutism (0.02%), premature canities (0.02%) and telogen effluvium (0.02%) had significantly less number of cases.

In the hypersensitivity/drug reactions (8.2%) category, urticaria/angioedema (5.40%) was the most common disease, followed by papular urticaria (2.60%), similar to the study by Sardana et al,[18] having 4.46% cases of urticaria and 3.59% cases of papular urticaria. But was different from the finding of Nanda et al.[2] (0.13%).

Autoimmune dermatoses had the second least number of cases, i.e. 7%. In this category maximum number of cases were of vitiligo (5.60%), which was comparatively higher compared to other studies.[2,18]

1% of cases of alopecia areata were also seen in the study, which was comparable with the findings of Sardana et al.[18] (1.09%), while contrary to the findings of Nanda et al.[2] (6.7%).

The least frequent category was genetic/congenital disorders, which affected only 4.20% of the study population, similar to Sardana et al.'s study.[18] In this category, our study had 10 (2%) cases of hemangioma which were similar to previous studies.[18-20] Our study had 2 cases of ichthyosis (0.4%) and 1 case (0.2%) of palmoplantar keratoderma, making them a rare finding of the study.

CONCLUSION

The primary objective of the index study was to analyze the basic epidemiological information of different pediatric dermatoses patterns in our part of the country. Our research revealed that the main illnesses impacting youngsters were infections and infestations. This indicates the subpar state of personal hygiene and cleanliness in our culture. This may also serve as a stand-in for indicators of environmental pollution, housing insecurity, malnutrition, and poverty. This background research can be used to raise public knowledge of child nutrition, personal cleanliness, sanitation, and hygiene in general.

Such information is also crucial to developing basic healthcare programs that mitigate long-term morbidity, social and economic costs associated with diseases, and to better allocate limited gov-

ernment resources in the present to create a nation that is healthy, content, and resourceful. The focus should be on educating society and parents so they can instill necessary lifestyle changes in youngsters. Future prospective research in this unique, clinically relevant field will be vital for the ongoing planning of healthcare in our ever-evolving society.

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