

## Original Research Article

# The prevalence and pattern of pediatric dermatoses in a tertiary care center at Garhwal, Uttarakhand, India

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### ABSTRACT

**Background:** Analysis of skin diseases in the pediatric population and its trends reflects the health and nutritional status of a community. This study aimed to evaluate the prevalence and pattern of skin diseases in children registered at the Dermatology OPD department of Hemawati Nandan Bahuguna Teaching Base Hospital, Srikot over a period of 1 year.

**Methods:** A prospective cross-sectional descriptive analysis was conducted at the Dermatology OPD department of HNB teaching hospital to determine the pattern of dermatoses in children aged 0 days to 17 years, between 1 April 2017 and 31 March 2018. Cases with incomplete data, non-compliant to treatment and patients whose primary lesions are altered by the application of topical medication, not related to the existing disease were excluded from the study. The results were entered and tabulated in MS-excel sheet and descriptive analysis was done.

**Results:** Out of 23,359 outpatients 6,274 (26.85%) were of a pediatric age with a male to female ratio of 1.2:1. The majority of the children belonged to young teens and teenagers (2377;37.88%). Majority of pediatric dermatoses belonged to Infectious group (1373;21.88%) followed by Disorders of skin appendages (1087;17.33%) and Infestations (722;11.5%). The three most common diagnoses were Scabies (694;11.06%) followed by Fungal infections (568;10.43%) and Acne vulgaris (398;6.34%).

**Conclusions:** This study showed the current pattern of pediatric dermatoses in Garhwal region of Uttarakhand with a high frequency of infection and infestations with young teen and teenagers as the identified focus group for the need of intervention.

**Keywords:** Acne, Fungal infection, Infections, Infestations, Pediatric dermatoses

### INTRODUCTION

Pediatric dermatology is a branch of dermatology that deals with the diagnosis, treatment, and prevention of skin diseases in children aged less than 16 years.<sup>1</sup> Skin diseases in children require a separate focus as there are differences in their presentation, management, and prognosis from adult dermatoses. Probable determination of prevalence of dermatoses in pediatric age group has been achieved by epidemiological and institutional researches done which are representative of large

geographical areas. As per WHO and individual researchers, the prevalence of common skin conditions in children is 9-87%.<sup>2</sup> In various parts of India, the prevalence of pediatric dermatosis in school-based surveys are 8.7-35%.<sup>3,4</sup> From Dehradun, Uttarakhand; the prevalence of 4.6% of skin diseases in the pediatric age group was reported by Roy et al.<sup>5</sup>

The epidemiological data in Indian studies are based on pattern of pediatric dermatosis in school age group, urban and rural community-based studies and tertiary hospitals.

Also, the pattern and prevalence of skin diseases have geographic distribution; different in rural and urban regions and hilly regions; also vary with age, year and each season. The pattern of dermatosis has changed from malnutrition and pyoderma to predominantly eczemas in recent years.

Skin diseases constitute 30% of all out-patient visit to a pediatrician and 30% of all visits to a dermatologist involve children.<sup>6,7</sup> Pediatric skin conditions can be transient, chronic or recurrent, rarely lethal. Most of the cutaneous illness that arises from intrinsic genetic abnormalities have onset in pediatric age group.<sup>8</sup> If Chronic, the dermatoses have significant morbidity and psychosocial impact. Also, the status of health, hygiene and personal cleanliness of a society can be judged from the prevalence of skin illnesses in children of the community.

Studies done by foreign researchers have shown atopic dermatitis as the most common dermatosis followed by viral infections and pigmented nevi; while studies from developing countries have infections and infestations as the most common pediatric dermatoses.<sup>9-14</sup> Factors such as climatic, cultural, socioeconomic and racial factors; difficult access to water, overcrowding, and malnutrition, low hygiene, and illiteracy influences prevalence and pattern of skin diseases.<sup>2,15</sup>

As no previous work regarding the prevalence and pattern of pediatric dermatoses was available from this hilly region of Uttarakhand, this study was conducted with an aim to evaluate the prevalence and pattern of dermatological conditions in pediatric patients presenting to dermatology out-patient department at Hemawati Nandan Bahuguna Teaching base hospital at Srikot, Uttarakhand conducted over a period of 1 year.

The present study will help in formulating strategies to improve nutrition, primary health care, and skin hygiene, etc. and provision of health services in Garhwal, Uttarakhand. The present study will also enhance previous knowledge of pattern and trend of pediatric dermatoses in the affected children, especially in this part of the country in India, which has a lot of temperature variations within a year including humid and hot climate which is followed by very cold climate.

## **METHODS**

A prospective cross-sectional descriptive analysis was conducted at the dermatology OPD department of HNB teaching hospital to determine the prevalence and pattern of dermatoses in children aged 0 days to 17 years, between 1 April 2017 and 31 March 2018. This region is a tropical region with humid summers.

The Hemwati Nandan Bahuguna (HNB) Teaching Hospital is the associated hospital to Veer Chandra Singh Garhwali Government Institute of Medical Science and

Research. It serves people of four districts of Uttarakhand namely Tehri Garhwal, Rudraprayag, Chamoli, and parts of Pauri Garhwal. This tertiary care center is in a remote hilly region at Srikot, Uttarakhand, India on Badrinath highway.

The Dermatology unit of the HNB Teaching Hospital has combined outpatient clinic for Dermatology, Venereology & Leprology where most of the pediatric patients are seeking medical advice on their own or brought by guardians and rest referred by the pediatric department and various other hospitals. This is the only dermatology facility in Garhwal hills serving nearly 25 lac population. Being a teaching tertiary hospital, the policy of department is to allow patients an easy access to the outpatient clinic directly without a referral. In the present study, all registered cases new and old were included. Cases with incomplete data, non-compliant to prescribed treatment and patients whose primary lesions are altered by application of topical medication, not related to the existing disease were excluded from the study.

The diagnosis was grouped into 16 categories; any diagnosis, which didn't fit into these categories was included in the miscellaneous group. The 16 categories included infection, disorder of skin appendages, infestations, pigmentary disorder, papulosquamous and keratinization disorders, hypersensitivity disorder, eczema and dermatitis, mixed dermatoses (more than 1 dermatitis simultaneously), photo dermatoses, nevi and skin tumors, nutritional deficiency disorders, drug reactions, connective tissue disorder, vesiculobullous disorders and miscellaneous group.

For each individual patient, a detailed history and clinical examination were done. Also, appropriate laboratory investigations like KOH, gram stain, AFB stain, woods lamp, histopathological studies among others were done wherever required.

Data were recorded in a predesigned performa for analysis and interpretation. For analysis, data were divided into four age groups of children that included 0-1 year (infants), 1-5 years (toddlers and pre-school children), 6-11 years (middle childhood) and 12-17 years (young teen and teenagers). The results were entered and tabulated in MS-excel sheet and descriptive analysis was done.

This study has been approved by the Institutional Ethical Committee of Veer Chandra Singh Garhwali Government Institute of Medical Science and Research.

## **RESULTS**

Out of total 23,359 patients visiting the dermatology outpatient department, 6,274 (26.85%) were of a pediatric age with a male to female ratio of 1.2:1. 48 pediatric dermatoses were excluded as they did not fulfill the

inclusion criterion. 209 patients had more than one dermatosis, a total of 6628 dermatoses were recorded. Most frequent presenting age group were young teens and teenagers (2377;37.88%). Age distribution of patients is shown in figure 1.

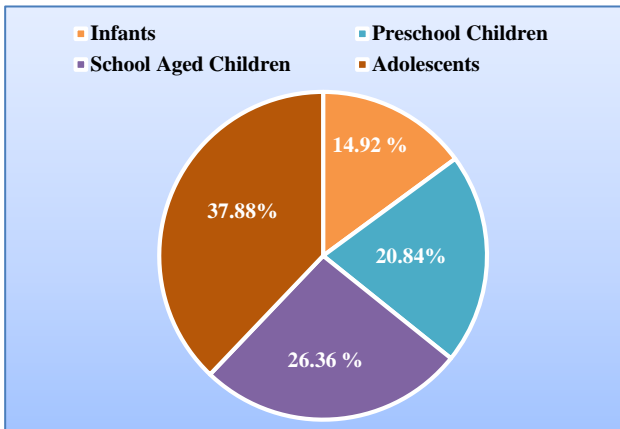


Figure 1: Age distribution of pediatric dermatosis.

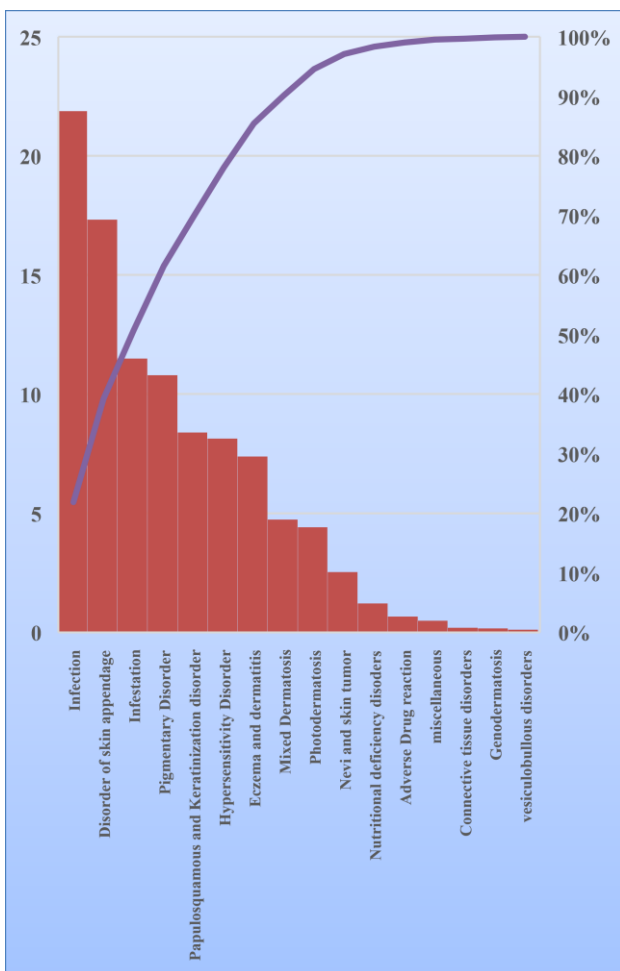


Figure 2: Frequency distribution of groups of pediatric dermatosis.

In the present study, different types of cutaneous lesions seen were categorized according to etiology. Majority of

pediatric dermatoses belonged to Infections group (1373;21.88%) followed by Disorders of skin appendages (1087;17.33%) and Infestations (722;11.5%). The frequency distribution of a group of pediatric dermatosis is shown in Figure 2.

The three most common individual diagnosis were scabies (694;11.06%), fungal infections (568;10.43%) and acne vulgaris (398;6.34%). Pattern of top ten pediatric dermatoses are shown in Figure 3.

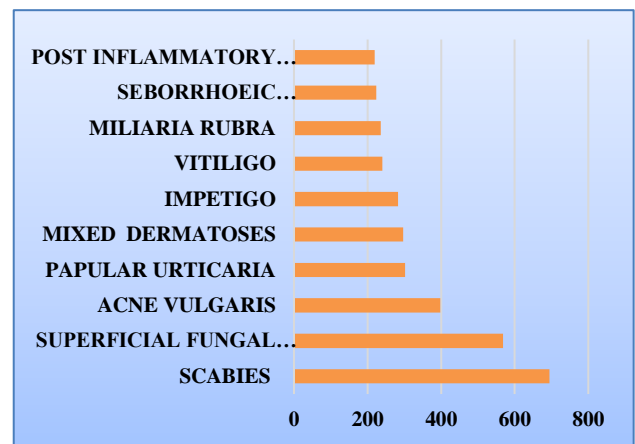


Figure 3: Distribution of individual pediatric dermatosis.

Table 1: Pattern of Infections and Infestations (n=2095).

Infections	Occurrence
Bacterial Infections	1373 (21.88%)
Impetigo	189 (3%)
Furunculosis	114 (1.81%)
Mycobacterial Infections	109 (1.74%)
Cellulitis	07 (0.11%)
Ecthyma	03 (0.05%)
Abscess	01 (0.01%)
Fungal infections	655 (10.44%)
Tinea capitis	110 (1.75%)
Tinea corporis	322 (5.13%)
Pitryasis Versicolor	220 (3.5%)
Candidiasis	3 (0.05%)
Viral infections	195 (3.11%)
Molluscum contagiosum	73 (1.16%)
Warts	96 (1.53%)
HSV	2 (0.03%)
Herpes Zoster	4 (0.06%)
Varicella	3 (0.05%)
Viral exanthem	8 (0.13%)
HFMD	9 (0.14%)
Infestations	722 (11.5%)
Scabies	694 (11.06%)
Pediculosis Capitis	28 (0.44%)

Among the infective dermatosis, Fungal infection (655;47.7% of all infectious dermatosis) was the most

common entity followed by bacterial (423;30.8%) and viral dermatosis (195;14.2%). Fungal infection was most common in adolescents, bacterial infection was most common in preschool-aged children and viral infections were of nearly equal prevalence in all pediatric age groups.

Table 1 shows the pattern of infections and infestations. All the fungal infections were superficial, and no case of deep fungal infection was seen. Out of bacterial infections, impetigo was the commonest entity (189;13.76%) followed by furunculosis (114;8.30%) and

mycobacterial infections (109;7.93%). Impetigo and furunculosis were predominantly seen in pre-school group and mycobacterial infections were predominant in adolescents. Among parasitic infestations, scabies was the most common entity (96.12%) and was predominantly seen in adolescent age group (42.79%). Out of 109 mycobacterial infections, leprosy was seen in the majority (102;93.58%). 7 cases of cutaneous tuberculosis (lupus vulgaris and tuberculosis verrucosa cutis) were seen. Table 2 shows commonest skin disorders amongst children according to age group.

**Table 2: Commonest skin disorders amongst children according to age group.**

Ranking	Age distribution			
	1 year	1-5 years	5-11 years	11-17 years
	Infants	Toddlers and pre-school	Middle childhood	Teen and teenagers
First	Impetigo	Scabies	Superficial fungal infection	Scabies
Second	Furunculosis	Superficial fungal infection	Scabies	Superficial fungal infections
Third	Seborrheic dermatitis	Allergic contact eczema	Allergic contact eczema	Acne vulgaris

Borderline tuberculoid leprosy was most diagnosis among leprosy cases. Leprosy was more common in the adolescent age group. Among the Parasitic infections (11.5% of the study population), Scabies (694;11.06%) was the most common followed by Pediculosis capitis (28;0.44%). Acne vulgaris constituted 6.34% of total disorders, predominantly seen in the adolescent age group with a female to male ratio of 1.3:1. The pattern of eczematous disorders is depicted revealed seborrheic eczema (224;3.57%) to be more common, followed by allergic contact eczema (109;1.74%) and atopic eczema (43;0.68%). Seborrheic eczema predominated in adolescents followed by infants.

Allergic contact eczema and atopic eczema predominated in school-aged and preschool-aged children respectively. Pityriasis Alba predominated in pre-school and school-aged children.

Vitiligo was a most common disorder of pigmentation seen (240;3.82%) followed by post-inflammatory hyperpigmentation, post-inflammatory hypopigmentation, and freckles/ lentigenes. Vitiligo was most common in preschool and school-aged group. Among the hypersensitivity disorders, Papular urticaria (302;4.81%) was the most common entity followed by acute urticaria and chronic urticaria. Psoriasis (200;3.19%) and Ichthyosis Vulgaris were the two most common papulosquamous and keratinization disorders.

Abnormal responses to light were seen in 277 cases (4.42% of all dermatoses) during the period of study. The polymorphic light eruption was the most common photodermatoses (211;3.36%).

Among the Nevi and skin tumors, Melanocytic nevus was the commonest which predominantly reported in adolescents followed by strawberry hemangioma which predominantly reported in infants. Among nutritional deficiency diseases: phrynoderma (45;0.72%) was the commonest by Acrodermatitis enteropathica.

There were 42 cases of Drug reaction seen in the study population (0.66% of all dermatoses). No single case of drug reaction was reported in infants. Genetic dermatoses and bullous disorders were 0.11% and 0.17% of all pediatric dermatosis. Amongst, all connective tissue disorders, morphea was commonest (0.14%).

Some other low-frequency dermatoses of various etiologies were grouped together in a miscellaneous group (31;0.49% of all dermatoses). The miscellaneous group comprised of aphthous ulcer, granulomatous cheilitis, mucosal cysts, scrotal/fissured tongue, lipomatosis, erythema nodosum. Apart from female predominance in pigmentary disorders, disorders of skin appendages, eczema, photodermatoses, nutritional deficiency dermatosis, and connective tissue group; all other groups had male predominance.

**DISCUSSION**

In this study prevalence of pediatric dermatoses was 26.85% with a male to female ratio of 1.2:1. Similar male preponderance was seen in a study by Roy et al (1.16:1) and Sacchidanand S et al (1.17:1).<sup>5,15</sup> Other studies have female predominance for pediatric skin conditions.<sup>1,16-18</sup>

There was variation in the prevalence of dermatoses among the age groups in present study with the most frequent presenting age group as a young teen and teenagers (2377;88%). Similar findings were seen by Reddy et al (48%).<sup>17</sup> Sacchidanand S et al (33.21%) and Sayal et al (41.3%) observed 5-11 years (middle childhood) is the most common age group.<sup>15,19</sup> This variation in prevalence and gender may be due geographical, cultural practices and differences in environment and socioeconomic status and also predominant concerns for the male gender.

Infections were the most common pediatric dermatosis seen present study (21.88%); various other authors have reported similar pattern from India.<sup>17,19-23</sup> However, in the few studies done by foreign researchers' eczema is the predominant dermatosis.<sup>9,11-13</sup> Higher prevalence of infections in this study may be attributed to poor hygienic and sanitary conditions, lack of knowledge attitude practice.

Scabies was the most common infestation, the most common causes of skin disease (11.6%) and the most common type of parasitic infestation (96.12%) in this study. Previous researchers have found prevalence from 5.1% to 22.4%.<sup>16,18,24</sup> In the present study, the prevalence of parasitic infestation was 0.45% ,which is similar to the study by Rao et al (0.5%) and Jawade SA et al (0.45%).<sup>25,26</sup> In a study from Garhwal Uttarakhand, Negi et al had Pediculosis capitis prevalence of 22.6%.<sup>18</sup> Other studies in India, the prevalence of Pediculosis capitis was 20.4-51.37%.<sup>27,28</sup>

In the present study, Fungal infection (655;47.7% of all infectious dermatosis) was the most common entity followed by bacterial (423;30.8%) and viral dermatosis (195;14.2%). Fungal infections were commonly seen by Sayal et al while Bacterial infections were found as commonest by Karthikeyan et al (47.13%) and Balai et al (13.72%).<sup>16,19,24</sup> Viral infections outnumbered other infections in a study done by foreign researchers.<sup>11,13</sup> The variation among infectious dermatosis can be due to the type of population studied, hygiene and nutritional status.

Out of bacterial infections, impetigo was the commonest entity (189;13.76%) followed by furunculosis (114;8.3%) and mycobacterial infections (109;7.93%). Most studies report impetigo as commonest pediatric bacterial dermatosis.<sup>9,17,19,20,29</sup> Poor hygiene, overcrowded environment and itchy skin conditions predispose to bacterial infections.

In present study, leprosy was the most commonly diagnosed mycobacterial infections (93.58%) with type borderline leprosy most common; most commonly seen in adolescent age group. Prevalence of leprosy was 1.74% of all dermatosis and shows a decreasing trend with respect to previous researchers.<sup>25,30</sup> Similar to the present study, Borderline leprosy was reported as most frequent in the study by Singhal et al.<sup>30</sup>

In post-elimination era, leprosy cases continue to present in India which is quite alarming. Of the eczematous disorders, seborrheic dermatitis was the commonest, a finding similar to other studies. Balai et al found atopic dermatitis (55.31%) and Sardana et al found seborrheic dermatitis (10.49%) as most frequent eczematous disorder in their study.<sup>23,24</sup> Prevalence of eczema depends upon individual predisposition and geographic allergen variation.

Genodermatoses were seen in 0.17% of patients in the present study. Our data (11;0.17%) is less than Indian studies.<sup>16,18,31</sup> In the present study, most common genodermatoses encountered was ichthyosis, similar to study by Yasmeen et al.<sup>32</sup> Higher prevalence in other studies is due to consanguineous marriages prevalent in their region. Also, the prevalence of Genodermatoses is usually under-reported in India due to lack of database and poor follow-up.

In this study, nevi and skin tumors constituted 2.53% of all pediatric cases with melanocytic nevus being most common and reported commonly in adolescent age group. Senthilkumar et al and Reddy et al found melanocytic nevi in 0.96 % and 1.4% of pediatric cases.<sup>17,33</sup> A higher prevalence (9-19.5%) was seen by foreign researchers.<sup>34,35</sup> This may be due to the genetic predisposition of the European population to melanoma. Only 1-2% of all Skin tumors excised from infants and children are malignant, do not require excision and only follow up.<sup>36</sup>

Nutritional deficiency disorders were seen in 1.22% of children, which is less than studies by Negi et al (17.5%), Singh (5.38%) and Jawade SA et al (3.82%).<sup>18,21,25</sup> This may reflect better nutritional status and nutrition awareness in this region. In the present study among nutritional deficiency diseases: phrynoderma (45;60.26%) was the commonest followed by Acrodermatitis enteropathica. Phrynoderma was seen most commonly as a nutritional deficiency skin disease in the study by Jawade SA et al and Reddy et al in contrast to Acrodermatitis enteropathica in the study by Javed et al from Karachi.<sup>17,25,29</sup> Shortcomings of the present study are seasonal pattern and trends of pediatric dermatoses could not be studied due to the limited duration of the study. Also confounding factors and their association with the occurrence of pediatric dermatosis could not be studied in this study.

Pediatric dermatoses data in various studies in Uttarakhand is shown in Table 3. This study brings out a unique pattern of pediatric dermatoses in Garhwal Uttarakhand with a high frequency of dermatoses like infections, infestations, and eczema. Proper documentation of cases without any missed cases was the strength of the present study. The results of the present study can be extended to the community in this region as this is the only dermatology facility available in this Garhwal Uttarakhand.

In this study, certain research gaps are identified in pediatric dermatoses in Garhwal region of Uttarakhand. Association of pediatric dermatosis and comorbidity,

knowledge, practice and risk factors and blood profile need to be evaluated with future studies.

**Table 3: Pediatric dermatosis data in various studies conducted in Uttarakhand.**

	The present study in Garhwal Uttarakhand	Roy S et al <sup>5</sup>	Negi KS et al <sup>18</sup>	Rawat <sup>37</sup>
Pediatric cases in number	6274	1012	1754	1712
Male to female Ratio	1.2:1	1.16:1	1.16:1	1.45:1
Age studied	Day 0 to 18 years	0 to 18 years	0-14 years	Preschool (day 1 05 years)
Most common dermatoses (of all cases)	Infections and Infestations (33.39%)	Infection and infestations (50.9%)	Infections and infestations (50%)	Infection and Parasitic Dermatitis (50.29%)
Second most common dermatosis (of all cases)	Disorders of skin appendage (17.33%)	Dermatitis (16.9%)	Pyoderma (15.6%)	Eczema (18.16%)
Most common bacterial infection	Impetigo (13.76%)	Impetigo (5.43%)	Acne vulgaris (2%)	Impetigo (4.85%)
Fungal infections	10.44%	12.35%	4.3%	12.85%
Most common infestation	Scabies (11.06%)	Scabies (19.7%)	Pediculosis capitis (22.6%)	Scabies (14.95%)
Most common eczema	Seborrheic Dermatitis (3.57%)	Atopic dermatitis (6.42%)	-	Atopic Dermatitis (6.48%)
Acne	6.34%	3.5%	2%	-
Vitiligo	3.82%	6.7%	2.9%	4.50%
Nutritional disorders	1.22%	-	17.5%	0.93%
Genetic disorders	0.11%	1.9 %	-	0.86%

This study showed the current pattern of pediatric dermatoses in Garhwal region of Uttarakhand with a high frequency of infection and infestations. Also, young teen and teenagers were identified as the focus group for the need of intervention. Strengthening community dermatology, training of pediatricians and health workers in pediatric dermatology and awareness of skin care, nutrition and hygiene can bring down the prevalence of dermatoses and associated myths in the community.

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