Section: Dermatology

Original Research Article

CLINICO-EPIDEMIOLOGICAL STUDY OF DERMATOSES AMONG PAEDIATRICS POPULATION

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Abstract

Background: Skin diseases in children, from birth to 13 years, significantly impact health and psychological well-being, leading to considerable morbidity in the pediatric population. This study aims to identify the pattern of dermatoses among pediatric patients attending the dermatology department and to compare direct and referred cases, including emergency referrals. **Materials and Methods:** A hospital-based, observational cross-sectional study was conducted on 535 pediatric patients up to 13 years of age between November 2018 and February 2020. Detailed clinical history, dermatological examination, and necessary laboratory investigations were performed. Statistical analysis was done using SPSS version 26.0. **Result:** Out of 535 children, 49.9% came directly to the dermatology department, while 50.09% were referrals. Males (54.39%) slightly outnumbered females (45.6%). Infections were the most common dermatoses (32.14%), followed by allergic and eczematous disorders (18.87%), infestations (14.57%), and hypersensitivity disorders (9.71%). Fungal infections (19.06%) were predominant among infections, with Tinea corporis being the most frequent (4.9%). Scabies (13.6%) was the most common infestation. Congenital dermatoses, genodermatoses, and vascular disorders were more prevalent in referrals. **Conclusion:** Infections and infestations formed the majority of pediatric dermatoses, emphasizing the need for better hygiene and infection control measures. Complicated cases like congenital and genodermatoses were primarily referred for specialist care.

INTRODUCTION

Pediatric dermatoses, encompassing skin diseases occurring from birth up to 13 years of age, represent a significant public health concern due to their prevalence and the morbidity they cause among children.[1] Skin disorders in children can not only cause considerable physical discomfort but also have psychological implications, impacting a child's quality of life, social interactions, and self-esteem. The burden of skin diseases in children is high, with up to 30% of all visits to pediatricians involving dermatological issues and 30% of visits to dermatologists involving pediatric patients.[2] Understanding the epidemiology and clinical patterns of pediatric dermatoses is crucial for developing effective prevention, treatment strategies, and health interventions aimed at reducing morbidity.Pediatric dermatoses vary considerably in their clinical presentation, treatment, and prognosis when compared to adult skin diseases, necessitating specialized approaches to diagnosis and management. The etiology of pediatric skin disorders is influenced by a variety of factors, including genetic predispositions, environmental exposures, climate, dietary habits, and hygiene practices.[3] Socioeconomic status plays a pivotal role in the prevalence and pattern of pediatric dermatoses, with children from lower socioeconomic backgrounds being disproportionately affected by infections and infestations due to poor hygiene, overcrowding, and limited access to healthcare.[4]

In developing countries like India, the prevalence of pediatric skin diseases ranges from 8.7% to 35%, according to school-based surveys.[5] Children from economically disadvantaged families are particularly vulnerable to infectious dermatoses such

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as scabies, fungal infections, and bacterial pyodermas, which are often exacerbated by poor living conditions.[6] This highlights the need for targeted public health interventions focusing on improving hygiene, nutrition, and healthcare access for these populations. Pediatric skin differs from adult skin in several key ways, which can influence the type and severity of dermatological conditions. Children have a thinner epidermis, a less developed immune system, and immature skin barrier functions, making them more susceptible to infections, allergies, and irritants.[7] Moreover, the functional maturity of sebaceous and sweat glands is not fully developed in young children, which can lead to conditions like miliaria. These physiological differences underscore the need for specialized approaches in the diagnosis and treatment of pediatric skin diseases. Pediatric dermatoses can broadly be classified into several categories, including infectious, allergic, and eczematous conditions; infestations; hypersensitivity disorders; and congenital, genetic, or vascular dermatoses.[8] Infections such as fungal, bacterial, and viral diseases are the most common dermatoses in children, particularly in resource-limited settings. Among these, fungal infections like Tinea corporis are the most frequent, followed by bacterial infections like impetigo, and viral infections like hand, foot, and mouth disease.

Several studies have documented seasonal variations in the prevalence of pediatric skin diseases, with certain conditions peaking during specific seasons. For instance, infections and infestations tend to be more prevalent during winter months, possibly due to overcrowding and reduced hygiene during colder periods.[9] In contrast, hypersensitivity disorders like papular urticaria are more commonly observed during the rainy season, as increased mosquito activity during this period leads to a higher incidence of insect bites. Additionally, sweat and sebaceous gland disorders, such as miliaria and acne, are more frequent during summer months due to excessive heat and humidity, which exacerbate sweating and clogging of sweat ducts.Another important aspect of pediatric dermatology is the pattern of referrals from other medical specialties. Dermatological conditions in children are often first encountered by pediatricians or general practitioners, who may refer more complex cases to dermatologists for specialized care. Studies have shown that a significant proportion of pediatric patients with skin diseases are referred from departments like pediatrics, emergency medicine, and internal medicine.[10] Referral patterns can vary depending on the healthcare setting and the complexity of the cases being managed. For instance, congenital dermatoses, genodermatoses, and vascular disorders are more likely to be referred to dermatologists, as these conditions often require specialized diagnostic and therapeutic approaches.[11]The referral process is essential for ensuring that children with complex or uncommon skin diseases receive timely and accurate diagnoses. However, it also highlights the need for better training of primary care physicians and pediatricians in recognizing and managing common pediatric dermatoses, as many of these conditions can be effectively treated at the primary care level. Improved interdisciplinary collaboration between pediatricians and dermatologists can help optimize patient outcomes and reduce unnecessary referrals.

Employees' State Insurance Corporation (ESIC) hospitals in India serve a unique patient population, predominantly composed of insured workers earning up to INR 21,000 per month and their dependents. These hospitals provide a valuable setting for studying pediatric dermatoses, as they cater to a specific socioeconomic group that may be more vulnerable to skin diseases due to factors like poverty, overcrowding, and limited access to healthcare. Despite this, there is limited research on the pattern of pediatric dermatoses in ESIC hospitals, and even less data on the types of skin diseases seen in children referred from other departments.[12]This study aims to fill this gap by analyzing the pattern of dermatoses among pediatric patients presenting to the dermatology department of an ESIC hospital and comparing cases that come directly to dermatology with those referred from other departments, including emergency referrals. Understanding these patterns can inform healthcare strategies for improving the management of pediatric dermatoses, particularly in economically disadvantaged populations.

Pediatric dermatoses represent a significant burden on healthcare systems, particularly in developing countries, where socioeconomic factors exacerbate the incidence and severity of skin diseases. Understanding the epidemiological patterns of these conditions is essential for developing targeted interventions that can improve healthcare outcomes for children. This study contributes to the growing body of research on pediatric dermatology by exploring the prevalence, referral patterns, and seasonal variations of dermatoses in a unique patient population attending ESIC hospitals.

Aims and Objective

The aim of this study is to analyze the pattern of pediatric dermatoses in children presenting to the dermatology department, comparing cases referred from other departments to those arriving directly. The objective is to identify prevalent skin conditions and assess any differences in complexity between direct and referred cases.

MATERIALS AND METHODS

Study Design: This observational cross-sectional hospital-based study was conducted at a tertiary care center from November 2018 to February 2020. A total of 535 pediatric patients, aged from birth to 13 years, were enrolled after obtaining ethical clearance from the hospital's medical ethics and research committee. Detailed history, clinical examinations,

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and necessary laboratory investigations, including KOH smear and skin biopsy, were performed to diagnose dermatoses. The study compared the pattern of skin diseases between cases referred from other departments and those presenting directly.

Inclusion Criteria

Pediatric patients aged from 1 month to 13 years presenting with skin diseases were included in this study. Both direct visits to the dermatology department and referrals from other departments, including emergency cases, were considered. Informed consent from parents or caregivers was obtained before enrollment. Children from all socioeconomic backgrounds under the care of Employees State Insurance Corporation (ESIC) services were eligible for participation, ensuring a broad representation of cases seen in a tertiary care setting.

Exclusion Criteria: Children with pre-existing chronic systemic diseases or immunocompromised conditions were excluded from the study, as these could confound the dermatological findings. Additionally, patients who were undergoing treatment for skin diseases elsewhere, or those with incomplete medical records, were also excluded. Cases in which consent from parents or caregivers was not obtained were omitted. This exclusion ensured that only cases with primary dermatoses were studied, allowing for a more accurate analysis of the dermatological patterns.

Data Collection: Data were collected from pediatric patients through a structured proforma, which included demographic information, detailed medical history, clinical examination findings, and results of relevant laboratory investigations. All enrolled patients underwent dermatological examinations by qualified specialists. Laboratory tests such as KOH smear, bacterial cultures, and skin biopsies were performed where necessary. Data regarding the source of referral, clinical diagnoses, and treatment history were also recorded to compare patterns between direct and referred cases.

Data Analysis: Data were analyzed using SPSS version 26. Descriptive statistics, such as frequencies and percentages, were used to summarize categorical variables, while continuous variables were presented as mean ± standard deviation. The Kolmogorov-Smirnov test was used to assess the normality of the data. For comparisons between direct and referred cases, chi-square tests were applied to categorical variables, and independent t-tests or Mann-Whitney U tests were used for continuous variables, depending on data distribution. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations: This study was conducted in accordance with the ethical standards outlined by the medical ethics and research committee of the hospital. Informed written consent was obtained from the parents or legal guardians of all pediatric patients. The privacy and confidentiality of the patients were strictly maintained, and participation was voluntary. No harmful interventions were used, and all procedures followed clinical guidelines to ensure patient safety. The study complied with the Declaration of Helsinki's ethical principles for medical research involving human subjects.

RESULTS

The study included 535 pediatric patients, aged 1 month to 13 years, who presented to the dermatology department or were referred from other hospital departments. The demographic characteristics, clinical findings, and dermatological patterns are detailed in the tables below. The analysis provides insights into the most common types of dermatoses and significant differences between direct and referred cases.

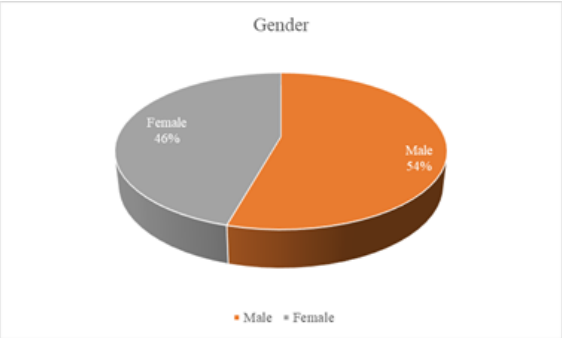

Figure 1: Distribution of patients according to sex

The study included 535 pediatric patients, with a slight male predominance (54.39%). Most children (30.28%) were between 5-10 years old. A significant proportion (71.9%) belonged to the lower middle socioeconomic class. This demographic suggests that pediatric dermatoses predominantly affect school-aged children, particularly from economically disadvantaged backgrounds, reflecting their vulnerability to infections.

Infections were the most common dermatoses (32.14%), followed by allergic/eczema (18.87%) and infestations (14.57%). Fungal infections were the dominant type of infectious dermatoses. This highlights the importance of addressing hygiene and environmental factors, which significantly contribute to children's high prevalence of infectious and infestation-related skin conditions.

Dermatoses showed distinct seasonal variations. Infections (14.9%) and infestations (7.1%) were more prevalent in winter, while hypersensitivity (4.2%) and pigmentary disorders (2.8%) increased during the rainy season. The data suggest that seasonal factors like humidity and crowding in winters significantly affect the prevalence of pediatric dermatoses, emphasizing the need for targeted preventive measures.

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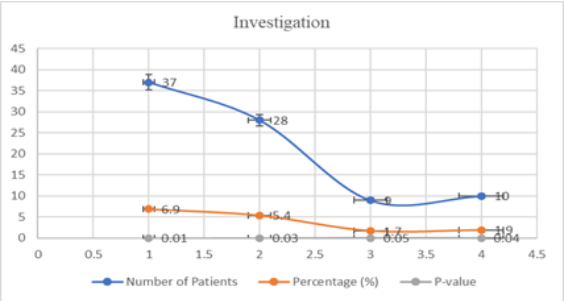

Figure 2: Diagnostic Investigations

Infections were common across both direct (16.82%) and referred (15.32%) cases. However, congenital disorders were significantly higher in referrals (2.2%). Referred cases generally involved more complex conditions, while direct visits primarily presented with less severe but common dermatoses like scabies and fungal infections, indicating the need for specialist intervention in referred cases.

Tinea corporis was the most common fungal infection, while scabies was the dominant infestation. Referrals had a higher proportion of complex conditions like vitiligo (18%) compared to direct visits (4%). These findings underscore the necessity for specialized care in referred cases, as they often involve chronic or difficult-to-treat skin disorders.

Investigations such as KOH smear (6.9%) and Gram stain (5.4%) were crucial for diagnosing fungal and bacterial infections, while skin biopsies were less frequently required (1.7%). The need for simple, cost-effective diagnostic tests highlights their importance in managing common infections, particularly in resource-limited settings where pediatric dermatoses are prevalent.

Table 1: Demographic Characteristics.

Variable	Number of Patients	Percentage (%)
Gender		
Male	291	54.39
Female	244	45.61
Age Group		
0-1 year	85	15.89
1-5 years	128	23.93
5-10 years	162	30.28
10-13 years	160	29.91
Socioeconomic Status		
Lower middle class	385	71.9
Lower class	150	28.1

Table 2: Dermatological Conditions by Type

Condition Category	Number of Patients	Percentage (%)
Infections	172	32.14
Allergic/Eczematous	101	18.87
Infestations	78	14.57
Hypersensitivity	52	9.71
Papulosquamous	22	4.11
Pigmentary	22	4.11
Congenital Malformations	12	2.24
Genodermatoses	6	1.12
Nail/Hair Disorders	6	1.12

Table 3: Seasonal Variation in Dermatological Conditions.

Condition	Winter (%)	Summer (%)	Rainy (%)	P-value
Infections	14.9	7.0	10.2	0.03
Infestations	7.1	2.6	4.9	0.02
Hypersensitivity	3.9	1.5	4.2	0.05
Papulosquamous	3.1	0.6	0.4	0.01
Pigmentary Disorders	2.8	0.8	0.6	0.04

Table 4: Comparison of Direct and Referred Cases.

Condition	Direct (%)	Referred (%)	P-value
Infections	16.82	15.32	0.39
Allergic/Eczematous	11.6	7.2	0.02
Infestations	9.7	4.2	0.01
Hypersensitivity	1.9	3.6	0.04
Congenital Disorders	0.0	2.2	0.01

Table 5: Common Dermatological Diagnoses

Condition	Number of Patients	Direct (%)	Referred (%)	P-value
Tinea corporis	26	16	10	0.05
Impetigo	31	19	12	0.03
Scabies	73	23	50	0.01

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Papular Urticaria	29	10	19	0.04
Vitiligo	22	4	18	0.01

DISCUSSION

The present study offers a comprehensive evaluation of the pattern of pediatric dermatoses among 535 children aged between 1 month and 13 years, focusing on understanding the differences between direct and referred cases.[13] The study sheds light on the prevalence of various skin conditions, their seasonal variations, and the role of socioeconomic factors. In interpreting the findings, assessing their alignment with existing literature and exploring the practical significance of these results in improving pediatric dermatological care, particularly in under-resourced populations, is crucial.

Prevalence of Dermatological Conditions: Our study revealed that infections were the most common pediatric dermatoses, accounting for 32.14% of cases, followed by allergic/eczema-related conditions (18.87%) and infestations (14.57%). This aligns with several studies conducted in similar socioeconomic settings, where infections are typically the dominant dermatological condition. For instance, a study by Chitapuret al.in North Kerala found that infections and infestations comprised 54.5% of pediatric dermatoses, with fungal infections being the most common type.[14] Similar findings were reported by Sailajaet al., where infections were the most frequently observed condition among children.[15] These similarities indicate that poor hygiene, overcrowding, and limited access to healthcare are key contributing factors to the high prevalence of infectious dermatoses in economically disadvantaged regions.However, the slightly lower percentage of infections in our study compared to some other reports may be attributed to the nature of the sample population. Since the study was conducted at an ESIC hospital, where patients are primarily from insured families earning up to INR 21,000 per month, our patients' healthcare access and awareness levels might be somewhat better compared to completely underprivileged populations. This would lead to a lower prevalence of infections and infestations compared to studies conducted in slums or rural areas, where access to healthcare is significantly restricted.

Socioeconomic and Demographic Factors: Most children in our study belonged to the lower middle socioeconomic class (71.9%). This is consistent with other studies that suggest a strong correlation between lower socioeconomic status and higher incidences of pediatric dermatoses. Children from disadvantaged backgrounds are more exposed to factors that exacerbate skin diseases, such as poor sanitation, lack of access to clean water, and overcrowding. Infectious dermatoses, such as scabies and fungal infections, were particularly prevalent in our study, and these conditions are well-documented to thrive in environments where hygiene standards are low.[16]Another study also supports male predominance in our study (54.39%). Studies conducted by Bidarkaret al.observed similar male-to-female ratios in their study populations.[17] The slight male predominance can be explained by cultural and societal factors, where male children in many regions are given more attention and are more likely to be taken to the hospital for treatment compared to females. While biological factors do not strongly support gender disparities in the occurrence of pediatric dermatoses, societal norms appear to play a role in the increased male presentation in hospital-based studies.

Seasonal Variations: The study found notable seasonal variations in the prevalence of pediatric dermatoses. Infections (14.9%) and infestations (7.1%) were more common during winter months, while hypersensitivity disorders (4.2%) and pigmentary disorders (2.8%) were more frequent in the rainy season. This is consistent with the findings of Shimrayet al., who also reported a higher incidence of infectious diseases during colder months due to overcrowding and closer physical contact in poorly ventilated living conditions.[18] Additionally, with its high humidity, the rainy season provides favorable conditions for the spread of hypersensitivity conditions like papular urticaria as mosquito activity increases, leading to a higher incidence of insect bites.In contrast, Vathsalaet alfound a higher incidence of acne and miliaria during the summer, particularly in tropical climates, where excessive heat and humidity exacerbate conditions involving sweat and sebaceous glands.[19] A similar observation in our study supports the notion that environmental factors, particularly temperature and humidity, play a significant role in the etiology of pediatric dermatoses. The difference in seasonality between various studies can often be attributed to geographical location and climate, which influences the prevalence and exacerbation of certain skin conditions.

Direct vs. Referred Cases: One of the most significant findings of our study is the comparison between direct and referred cases. While infections were the most common dermatoses in both groups, the complexity of cases differed significantly. Referred cases were more likely to involve congenital dermatoses (2.2%) and genodermatoses (1.1%), requiring specialized dermatological care. Direct cases, on the other hand, were more likely to present with infections (16.82%) and infestations (9.7%), which are relatively simpler to diagnose and treat at the primary care level. This pattern aligns with the findings of Garcíaet al., who observed that referrals to dermatologists are often prompted by more complex or rare conditions beyond the diagnostic or treatment capacity of general practitioners or pediatricians.[20]The higher incidence of congenital and genetic disorders in

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referred cases highlights the need for interdisciplinary collaboration in pediatric dermatology. Conditions like genodermatoses are often chronic and require long-term management, necessitating specialized care.[21] This emphasizes the importance of equipping pediatricians with the knowledge and tools to identify cases that require early referral to dermatology specialists, particularly for conditions that might have significant systemic involvement, such as epidermolysis bullosa or tuberous sclerosis.

Common Dermatological Diagnoses: The most common diagnoses in our study included Tinea corporis (4.9%), impetigo (5.7%), and scabies (13.6%). These conditions have been widely reported in pediatric dermatological literature as common infections in children, particularly in regions with limited hygiene infrastructure. The prevalence of scabies in our study (13.6%) is similar to that reported by VERMAet al., who found scabies to be the most common infestation in Indian pediatric populations.[22] The high incidence of scabies is indicative of poor hygiene and overcrowded living conditions, which are often associated with lower socioeconomic classes.The slightly lower prevalence of Tinea corporis in our study compared to findings by Ayanlowoetal.(11.76%) may be due to geographical or environmental factors.[23]Dermatophytic infections thrive in humid climates, and variations in prevalence could reflect differences in humidity and temperature between study locations. Additionally, the role of preventive measures, such as improved awareness of personal hygiene and early intervention in fungal infections, could explain the slightly lower prevalence in our study.

Significance of Diagnostic Investigations: In our study, diagnostic investigations such as KOH smears and Gram stains were crucial in confirming cases of fungal and bacterial infections, respectively. KOH smear positivity in 6.9% of cases highlights the importance of simple, cost-effective diagnostic tools in managing common dermatological conditions in children. The low rate of skin biopsy (1.7%) suggests that most pediatric dermatoses can be diagnosed through clinical evaluation and basic laboratory tests, a finding consistent with Cruz-Manzanoet al. study, where 92% of pediatric skin conditions were diagnosed based on clinical evaluation alone.[24]The reliance on simple diagnostic tools has practical implications for resource-limited settings. Given the high burden of infectious dermatoses in such populations, making accurate diagnoses with minimal resources is essential for efficient and cost-effective healthcare delivery. This underscores the importance of equipping primary care settings with basic diagnostic tools and training healthcare providers in their use.

Practical Significance and Implications: The findings of this study have several practical implications for improving pediatric dermatological care, particularly in under-resourced settings like ESIC hospitals. First, the high prevalence of infections and infestations highlights the need for targeted public health interventions, such as promoting personal hygiene and improving living conditions in overcrowded areas. Educational campaigns focused on infection prevention, early diagnosis, and treatment could significantly reduce the burden of these conditions.[25]Second, the significant proportion of referred cases involving congenital and complex dermatoses emphasizes the need for stronger interdisciplinary collaboration between pediatricians and dermatologists. Early identification and referral of these cases can improve patient outcomes and prevent the progression of conditions that could have long-term systemic effects. This is particularly important in ESIC hospitals, where patients may struggle to access specialized care.Third, seasonal variations in the prevalence of pediatric dermatoses suggest that healthcare providers should adopt a proactive, season-specific approach to managing skin conditions. For example, during the rainy season, healthcare professionals could focus on preventing hypersensitivity reactions, while winter months could see increased efforts to manage infections and infestations. This would allow for more efficient resource allocation and targeted interventions that address the most pressing seasonal health concerns.This study contributes valuable insights into the pattern of pediatric dermatoses in a unique socioeconomic setting, comparing direct and referred cases. Our findings align with existing literature on the prevalence of infections and infestations in pediatric populations, highlighting the complexity of cases requiring specialist care. The study underscores the need for targeted public health interventions, interdisciplinary collaboration, and the importance of simple diagnostic tools in managing pediatric skin conditions. Future research could focus on community-based interventions and strategies to improve the early referral of complex dermatological cases.

CONCLUSION

This study highlights the significant burden of pediatric dermatoses, with infections and infestations being the most prevalent. The findings emphasize the importance of socioeconomic factors and seasonal variations in dermatological conditions. Referred cases involved more complex skin disorders, underscoring the need for specialized dermatological care. Improving hygiene, early diagnosis, and referral systems can mitigate the impact of these diseases.

Recommendations

Implement hygiene education programs targeting children and caregivers.

Strengthen interdisciplinary collaboration between pediatricians and dermatologists.

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Develop season-specific preventive strategies to reduce the prevalence of skin infections and hypersensitivity disorders.

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