Journal of Pakistan Association of Dermatologists. 2024;**34(3)**:678-684.

Original Article

Seasonal rhythm of pediatric dermatoses in Pakistani population: An observational study

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Abstract

Objective Epidemiological surveys to analyse the patterns of dermatoses in pediatric population are very important for adequate health care management and planning. Seasonal variations provide an insight into possible pathogenic mechanisms involved in disease process. The objective of the study is to analyze the effect of seasonal variations in pediatric dermatoses at a tertiary care hospital in Lahore.

Methods This was an observational study, conducted in the Dermatology outdoor of Services Hospital Lahore. All children of both genders less than 18 years of age were included in this study. The pattern of dermatoses was assessed in four seasons. The data was analyzed using SPSS ver. 20.0 Role of effect modifiers was analyzed using Chi Square test.

Results 2216 children were managed in OPD. Infestations (32.94%) were the commonest dermatoses, followed by infections (23.82%) and eczemas (18.55%). Most of the cases in all categories of dermatoses were seen during summer season (47.20%) especially infections and infestations, followed by spring (27.03%), autumn (20.13%), and winter (5.64%). The difference of pattern among dermatoses was statistically significant (p value 0.00). Scabies was the most common dermatosis (28.52%) followed by atopic eczema (12.17%) and tinea corporis (3.88%).

Conclusion Seasons have significant impact on pattern of pediatric dermatoses reflecting an aetiopathogenic role in causation of these diseases.

Key words
Seasonal rhythm; Pediatric dermatoses; Pakistani population.

Introduction

According to a UNICEF report published in 2021, Pakistan has a population of 212 million and nearly 45% are children under the age of 18 years.[1] The 2017 census of Pakistan showed that 40.3% of our population belongs to the pediatric age group.[2] Globally skin diseases are very common in pediatric population. Many children present to the outpatient department of many private as well as government hospitals. Pediatric dermatoses are seen by both pediatricians and dermatologists throughout the world.[3,4] Among all the outpatient visits to a pediatrician, 30% of patients had dermatological involvement and similarly, 30% of all visit to a dermatology OPD involved children.[5] Inspite of the high prevalence of skin diseases in children and their high disease burden, they have not been prioritized in the development of health policies. But if the skin diseases at outpatient departments are properly managed then they can decrease the economic burden of hospitals and improve a patient's quality of life.[6] A study conducted in 2013 showed that skin diseases were the 4th leading cause of disease burden and

Manuscript
Received on: December 28, 2023
Accepted on: June 23, 2024
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the 18th leading cause of disability globally.[7]

Pediatric skin disorders vary in their presentations, treatments and prognoses from those of adult dermatoses. Some pediatric dermatoses are transient, requiring one or two visits to OPD like infections and infestations. Whereas some dermatoses are chronic requiring long term follow up visits like connective tissue diseases and genodermatoses. The patterns of skin diseases vary in different parts of the world and even different regions of the same country. Climate is an important factor in influencing this variation. A study conducted in Iran, from 2019 to 2020, concluded that acne, eczema, wart, seborrheic dermatitis, nevus, vitiligo, lentigo and dermatophytoses presented most during winters, whereas atopic dermatitis was more frequent during the spring and winter. Similarly, actinic keratosis and lichen planus showed peak during summers, however, infections, including viral, bacterial, and fungal diseases, were more frequent during the winter months.[6] Another study in India showed that infections and infestations were the most common dermatoses (46.3%), followed by dermatitis and eczema (20.24%). The majority of dermatoses were recorded in summer (41.37%), followed by winter (33.37%) and rainy season (25.25%).[8]

Despite high prevalence and high disease burden, pediatric dermatosis are much less prioritized and only a few specialized healthcare facilities are available for this fragile population. As currently no local study is available to describe the seasonal variations in skin disorders among children in our population, we conducted this study to describe the seasonal variations in pediatric dermatoses seen at a dermatology outpatient clinic of tertiary care hospital in Pakistan and to compare our data with data around the globe.

Methods

This study was a longitudinal observational study conducted in the Department of Dermatology, Services hospital Lahore. All children under 18 years of age presenting to the outpatient department of Dermatology, from 1st July 2023 to 30th June 2023, were included in this study. Each patient underwent complete history taking and complete physical examination, clinical diagnosis was made and where required necessary investigations were carried out.

A total of 2216 patients were registered for this study. Informed consent was taken. Each patient's demographic and clinical details were recorded on a predesigned proforma. The following parameters were studied: age distribution, distribution of dermatoses in groups, frequency of skin diseases, patterns and percentages of different dermatoses according to different age groups. Age was specified in 4 groups; neonates (birth up to 28days), infants (29 days to < 1 year), children (one year to <12 years) and adolescents (12 years to <18 years). Another important parameter studied was pattern of pediatric dermatoses with seasonal variations. Seasons were specified meteorologically as: winter (November to January), spring (February to April), summer (May to July), autumn (August to October). Majority of the cases were diagnosed clinically. In a few cases, where required, labs like KOH scrapping and skin biopsy were performed.

SPSS version 20.0 was used for data entry and analysis. Data was stratified for age, gender and type of skin diseases to see the role of effect modifiers. To check post stratification significance, Chi Square test was used. A p-value of $\leq$0.05 was taken as statistically significant.

Results

A total of 2216 patients were enrolled in this study. **Table 1** shows age and sex distribution. There were 1090 (49%) males and 1126 (51%)

Table 1 Age and Gender distribution of patients.

Age Groups	*Gender*		*n (%)*
	Male	*Female*	
Neonate	5	2	7 (0.3%)
Infant	91	71	162 (7.3%)
Child	693	743	1436 (64.8%)
Adolescents	301	310	611 (27.57%)
Total	1090 (49%)	1126 (51%)	2216 (100%)

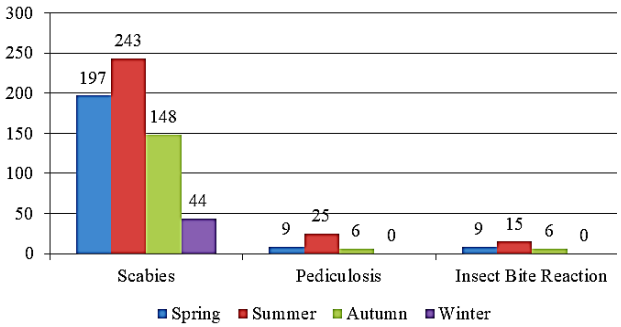

Figure 1 Pattern of infestations in different seasons.

females. Most of the patients were children (age group of 2 years up to less than 12 years) comprising 64.8% of total patients presented. Patients above the age of 12 years constituted 27.57% of total registered cases while patients less than 1 year of age were 7.3%.

Data regarding frequency and patterns of dermatoses according to seasonal variations were analysed **(Table 2)**. For simplification of data, dermatoses were broadly classified into 12 groups including infestations (scabies, pediculosis and insect bite reaction), infections (bacterial, viral, fungal, tuberculosis and sexually transmitted skin infections), inflammatory dermatosis (psoriasis, lichen planus, etc.) and others. Miscellaneous group included less commonly seen dermatoses like vitiligo, keloids, aphthous ulcers, post burn scars, pyoderma gangrenosum, lymphangioma circumscriptum, amyloidosis, dark circles and non-healing ulcers etc.

Infestations (32.9%) were the most common group of dermatoses seen, followed by infections (23.82%), eczema (18.54%), miscellaneous (7.44%) and sweat and sebaceous disorders (7.20%). Most of the cases in all categories of dermatoses were seen during summer season (47.2%), followed by spring (27.0%), autumn (20.1%) and winter (5.64%). This difference of pattern among dermatoses was statistically significant (p value=0.001).

Among infestations, scabies was the commonest dermatosis (28.52%), followed by pediculosis, insect bite reactions, leishmaniasis etc. Scabies was common in summers because of co-sleeping sharing common air conditioner or room cooler, vacations, frequent travelling and visiting **(Figure 1)**.

Among infections, fungal infections (9.84%) were the most common including tinea corporis, pityriasis versicolor, tinea capitis, tinea pedis, tinea mannum etc. Fungal infections were seen most commonly during summers showing that heat and humidity favors fungal growth. Second most common group of infections were viral infections including warts, chicken pox, herpes, etc. Viral infections were a little more common in spring as compared to winter because change in weather makes children more vulnerable to viral infections. Bacterial infections comprising of furunculosis, impetigo, folliculitis and others were more common in summer. Very few cases of infections presented to our OPD in winters **(Figure 2)**.

Third most common group was eczemas, among which atopic eczema was seen most frequently

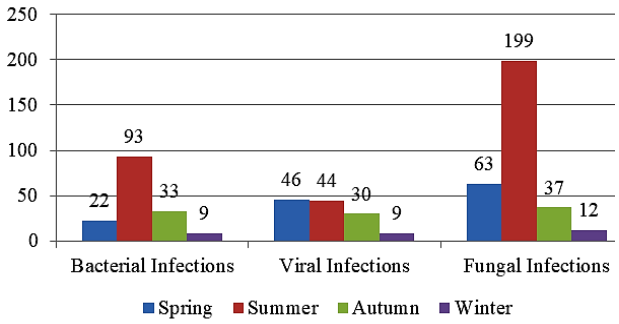

Figure 2 Pattern of infections in different seasons.

Table 2 Pattern of dermatoses according to seasons.

Dermatoses group	*Seasons*				*Total (%)*	*P value*
	Winter	*Spring*	*Summer*	*Autumn*		
Infections	29	126	277	96	528 (23.8%)	
Infestations	46	223	290	171	730 (32.9%)	
Inflammatory dermatoses	4	11	56	24	95 (4.3%)	
Eeczemas	19	114	203	75	411 (18.5%)	
Connective tissue disorder	0	0	5	4	9 (0.4%)	
Genodermatoses	0	4	16	5	25 (1.1%)	0.001
Hair and nail disorders	3	19	34	10	66 (3.0%)	
Sweat and sebaceous	11	39	77	32	159 (7.2%)	
Nevi	0	5	3	1	9 (0.4%)	
Immunobullous	1	1	3	2	7 (0.3%)	
Drug reaction	0	2	8	2	12 (0.5%)	
Miscellaneous	12	55	74	24	165 (7.4%)	
Total (%)	125(5.6%)	599(27.03%)	1046(47.20%)	446(20.13%)	2216 (100%)	

(12.18%) followed by seborrheic eczema and urticaria. According to the study, atopic eczema most frequently presented in summer season, followed by spring and autumn **(Figure 3)**. Probably, because children have more time to play outside and they more exposed to dust, pets, pollen etc. in summers. Those with exacerbations in spring also presented during summer because they get time to visit a hospital in their summer vacations instead of their regular school days.

Miscellaneous group included 50 cases of vitiligo presenting over a period of one year followed by keloids, aphthous ulcers and post burn scars. Others included amyloidosis, breast cyst, melasma, xanthoma, epidermoid cyst, lymphangioma circumscriptum, xerosis, periorbital hyperpigmentation, freckles, addisonian pigmentation, non-healing ulcer, post-Inflammtory hyperpigmentation, skin tag, acanthosis nigricans, pyoderma gangrenosum, prurigo nodularis, Henoch Schonlein Purpura (HSP), mucocele, telengiectasia, keratoderma and infantile haemangioma.

In sweat and sebaceous group, acne and miliaria were most common and both had peeks in summer. No case of miliaria was reported during winter. Other dermatoses in this group included hidradenitis suppurativa, dermoid cyst and epidermoid cyst.

Discussion

The pattern of skin diseases varies globally among different countries and even within various regions of the same country. Malnutrition, poor hygiene, overcrowding, and low socio-economic status are important factors contributing to variation of skin diseases in developing countries. Incidence of skin diseases may be affected by multiple climatic factors such as light, cold, heat, humidity and sunlight. The prevalence of the dermatoses in each region may be affected by the climate either directly or indirectly.[3]

In the current study, infestations (32.9%) were the commonest, followed by infections (23.82), eczema (18.54%), miscellaneous (7.44%) and sweat and sebaceous group (7.12%). These

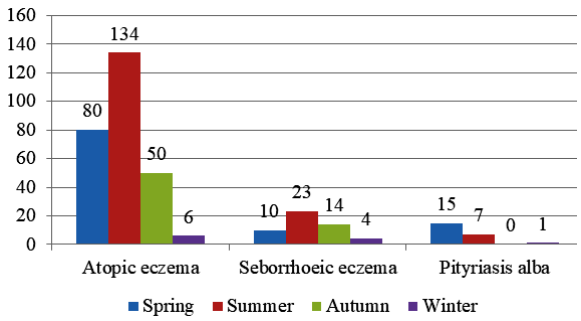

Figure 3 Pattern of eczemas in different seasons.

results were similar to another study carried out in India in 2019[8] which showed that infections and infestations (46.34%), were the most common type of dermatoses found, followed by eczematous dermatoses (20.24%), papulosquamous disorders (6.21%), pigmentary disorders (5.24%), and genetic disorders (3.53%). Their study also showed that the majority of dermatoses were recorded in summer (41.37%), winter (33.37%) and rainy season (25.25%). These findings were also similar to our study.

This study found that most of the dermatoses were seen in 2-12 years age group. However, a study in Iran in 2021 showed that most patients (35.75%) belonged to the age group of 1-4 years. Our study showed that majority of patients presented during summers, however, their study showed that most of the patients presented in winter (34.39%) as compared to summer (25.03%), spring (21.15%), and autumn (19.43%). Their study also depicted that papulosquamous and eczematous disorders were the most common dermatoses along with adnexal disease, disorders of pigmentation, and viral infections groups during all seasons.[6] This difference was probably due to ethnic and cultural differences between the two populations.

Another study, in India in 2022,[9] showed that 53% of patients belong to the age group of 6-10 years of age, similar to this study. However their study obseved that infections were the commonest dermatoses (47%) followed by eczema (31%) and appendageal disorders in 5.15% of patients.

This study showed that the most common disease seen in pediatric population was scabies (28.52%). It was more prevalent in summers because in summer vacations, there is more travelling and get-togethers as well as overcrowding in rooms because of common room coolers and air conditioners.

Table 3 Frequency of various dermatoses.

Dermatoses	*Number of cases (n)*	*(%)*
Infestations		
Scabies	632	28.52
Pediculosis	40	1.80
Insect bite reaction	30	1.35
Others	9	0.40
Total	711	32.90
Bacterial Infections		
Impetigo	70	3.16
Frunculosis	46	2.08
Folliculitis	20	0.90
Others	17	0.77
Total	153	6.90
Viral Infections		
Warts	71	3.20
Chicken Pox	42	1.90
Herpes	18	0.81
Others	26	1.17
Total	157	7.08
Fungal Infections		
Tinea Corporis	86	3.88
P Versicolor	38	1.71
Tinea Capitis	29	1.31
Others	65	2.93
Total	218	9.84
Total of all infections	528	23.82
Eczemas		
Atopic eczema	270	12.18
Seborrhoeic eczema	51	2.30
Urticaria	50	2.26
Others	40	1.81
Total	411	18.5
Miscellaneous		
Vitiligo	50	2.25
Keloid	21	1.22
Aphthous ulcers	8	0.36
Post burn scars	8	0.36
Pyoderma gnagrenosum	7	0.32
Keratoderma	6	0.27
Others	56	2.52
Total	165	7.44
Sweat and sebaceous gland disorders		
Acne	129	5.82
Miliaria	21	0.95
Others	9	0.41
Total	159	7.2

However, a study in Peshawar found that the prevalence of scabies escalated over the study period i.e. 3.8% in 2012 to 4.23% in 2014. The greatest frequency of scabies (28%) was

observed in winter. The reason for this observation was prolonged stay indoors due to harsh weather conditions which increased the chances of person-to-person transmission.[10] Another study from Pakistan showed scabies to be more prevalent during winters.[11]

Among infections, fungal infections were the most common in the pediatric population, followed by viral and bacterial infections. Most cases of fungal infections presented in the summer season. But a study in Iran in 2021, showed that all infections including fungal, viral and bacterial were more common in winters as compared to summers.[6] Another study showed similar results to ours that fungal infections in geriatric population also increased in summer season.[12] Similarly, a study in Brazil showed that majority of cases of bacterial infections presented in summer time.[13]

Among eczemas, atopic dermatitis was most common dermatoses (12.18%) followed by seborrheic dermatitis and urticaria in children presenting to our OPD. Most of the patients of atopic dermatitis presented to us in summers. However a study in Brazil showed that atopic dermatitis patients were more commonly presented during winters.[13] Several studies showed that seborrheic dermatitis was more common in winter, which is contrary to our study results which showed that most patients of seborrheic dermatitis presented to us in summers.[14,15]

Several studies showed that cases of acne vulgaris increased in summer similar to our findings.[16-18]

Limitations The limitation of this study was that it was carried out for one year, further studies should be done over a few years so that more data is available. Moreover, multicentric studies should be done.

Conclusion

Seasons have significant impact on patterns of pediatric dermatoses reflecting their underlying aetiopathogenic role in causation of these diseases. Prevention and therapeutic strategies in combating seasonal effects on these disorders may help in alleviating these disorders in this fragile group of patients. However more prospective studies are needed to have better understanding of seasonal variations in the pediatric as well as adult population in different regions of Pakistan.

Declaration of patient consent The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship None.

Conflict of interest Authors declared no conflict of interest.

Authors' contribution

HT, AA, HJ: Study design, acquisition of data, manuscript writing, final approval of the version to be published

SB, AN, FA: Analysis and interpretation of data, critical review, final approval of the version to be published.

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