

# Referrals from Paediatric Department with Respiratory Symptoms having Skin Lesions

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## ABSTRACT

**Introduction:** Paediatric patients with respiratory symptoms having skin lesions are often referred from Paediatric to Dermatology Department. Knowledge about skin and respiratory manifestations will lead to early diagnosis and proper management by the doctors of both the specialties. These dermatological conditions may or may not be related to respiratory illness or may hence be part of total disease process or may be completely separate entity. The aim of this study was to find out skin manifestations of various respiratory diseases and analyse dermatological disorders in children referred from Paediatric Department having respiratory symptoms.

**Methods:** An observational cross sectional hospital based study involving inpatients and outpatients referred from Paediatrics to Dermatology Department having respiratory illness and skin lesions was undertaken between January 2019 to December 2020. Details of skin disease were recorded. The descriptive statistical analysis was expressed in frequency and percentage and Chi square test was applied to determine significance among variables.

**Results:** Total 437 patients were included in the study. The most common diagnosis made by Paediatric {160 (36.6%)} and Dermatology Departments {246 (56.2%)} was viral exanthema followed by atopic dermatitis {77 (17.6%)}. Out of total 65 patients who suffered from bronchial asthma, 59 (90.7%) patients had atopic dermatitis.

**Conclusions:** Significant paediatric patients with respiratory illnesses have concomitant skin lesions. There is very high percentage of patients having atopic dermatitis among those who had asthma and hence clearly depicts relation between the two diseases.

**Keywords:** Asthma; Atopic Dermatitis; Respiratory Disorders; Skin Lesions



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## INTRODUCTION

Paediatric patients with respiratory symptoms having skin lesions are often referred from Paediatric Department to Skin Department for consultations and management. Children may suffer from a primary skin disease or a coexisting respiratory disorder or may have a primary systemic disorder with cutaneous manifestations.<sup>1</sup> These patients suffer from various conditions which include bronchial asthma, atopic dermatitis (AD), viral infections involving upper respiratory tract infections like measles, rubella, varicella and other conditions all of which may also have skin lesions. A recent study of 9417 children using the National Health Interview Survey found that AD was also linked to increased risk of a variety of extracutaneous infections including streptococcal pharyngitis, viral upper respiratory infection, influenza, pneumonia, sinus infections and varicella.<sup>2</sup>

It has been noted in various studies that there is a relative inability of the doctors of other specialties to diagnose skin conditions accurately and hence patients are referred. This generally leads to marked changes in diagnoses and treatment after dermatology consultation.<sup>3</sup> Knowledge about skin and respiratory manifestations will lead to early diagnosis and proper management by the doctors of both the specialties.<sup>4</sup>

This study was conducted to find out the types of diseases referred from Paediatric Department and their correlation with dermatological disorders. It was intended to find whether these dermatological conditions were related to respiratory illness or not and hence were a part of total disease process or whether these skin conditions had no relation with respiratory symptoms. This is a novel study done in Nepal. Even though studies have been done with a particular disease but study on children having respiratory symptoms with skin lesions has not been done in Nepal. Hence this study will give new dimensions in early detection of skin disease with respiratory illness. The aim of this study was to find out skin manifestations of various respiratory diseases and analyse dermatological disorders in children referred from Paediatric Department having respiratory symptoms.

## METHODS

This was an observational cross sectional hospital based study. All the referred inpatients and outpatients from Paediatric Department to Department of Dermatology, Shree Birendra Hospital, Chhauni suffering from respiratory illness and having skin lesions between January 2019 to December 2020 were included in the study. Details of skin disease with associated respiratory symptoms were recorded. Patients with positive findings were treated in the department after examination and needful investigations. Those patients who attended Dermatology OPD without referral from Paediatric Department or who didn't have respiratory symptoms were excluded from the study. Definite pattern of types of skin lesions, distribution of lesions and their evolution in the disease process was observed. Informed consent and ethical clearance was taken from Institution Review Board (Ref no.245 reg.366). The statistical analysis was done using SPSS (Statistical Package of Social Sciences) Version 20.0 Statistical Analysis Software. The descriptive statistical analysis of the study was done after the collection of data and results were expressed in frequency and percentage and Chi square test was applied to determine significance among variables.

## RESULTS

A total of 437 patients participated in the study, out of which 206 (47.1%) were males and 231 (52.9%) were females. There were 46 (10.5%) infants, 83 (19%) toddlers, 105 (24%) school children, 144 (33%) preadolescents and 59 (13.5%) adolescents. Total 315 (72.0%) patients had lesions on the skin which were associated to their respiratory disorders and 120 (28.0%) patients had skin lesions which were not related to respiratory disease. Patients with most common diagnosis referred by Paediatric Department was viral exanthema 160 (36.6%), followed by upper respiratory tract infection (URTI) 102 (23.3%), chest infection 91 (20.8%), asthma 65 (14.9%), and pulmonary tuberculosis (PTB) 19 (4.3%). Distribution of the patients according to age and diagnosis is depicted in the table below (Table 1).

A total number of 98 patients were diagnosed as varicella in the Paediatric Department out of which

**Table 1.** Distribution of the patients according to age and diagnosis in the Paediatric Department

Age Group	Asthma (n = 65)	Chest Infection (n = 91)	URTI (n = 102)	PTB (n = 19)	Viral Exanthema (n = 160)	Total N = 437
Infant	15 (23%)	5 (5.4%)	18 (17.6%)	0 (0%)	8 (5%)	46
Toddler	17 (26.1%)	22 (24.1%)	18 (17.6%)	0 (0%)	26 (16.2%)	83
School Going	11 (16.9%)	25 (27.4%)	22 (21.5%)	2 (10.5%)	45 (28.1%)	105
Preadolescent	17 (26.1%)	27 (29.6%)	33 (32.3%)	10 (52.6%)	57 (35.6%)	144
Adolescent	5 (7.6%)	12 (13.1%)	11 (10.7%)	7 (36.8%)	24 (15%)	59

maximum were in the preadolescent group 35 (35.7%). Similarly most common diagnosis made by Dermatology Department which was associated with respiratory symptoms was viral exanthema 246 (56.2%) followed by AD 77 (17.6%). Other diagnosis not related to respiratory symptoms were scabies 36 (8.2%), acne vulgaris (AV) 23 (5.3%), diaper dermatitis 15 (3.4%), acute urticaria 13 (3%), drug rash 10 (2.3%), portwine stain 9 (2.1%), hand, foot and mouth disease (HFMD) 8 (1.8%) and cutaneous candidiasis 8 (1.8%). Distribution of the patients according to age and diagnosis in Dermatology Department is depicted below (Table 2).

Out of 98 patients who were diagnosed as varicella in the Paediatric Department, 95 (96.9%) patients were diagnosed varicella in Dermatology Department. Comparison of the diagnosis made at

Department of Paediatrics with that made at Department of Dermatology has been depicted as follows (Table 3).

Out of 437 patients, 160 (36.6%) were diagnosed as viral exanthema in Paediatric Department and 246 (56.2%) were diagnosed as viral exanthema in Dermatology Department and there was significant difference in the diagnosis made in Paediatric Department as compared to Dermatology Department. Chi square test was applied and p value was < 0.001. And of those 160 patients who were diagnosed as viral exanthema in Paediatric Department 62 (38.5%) patients had maculopapular rash with fever and cough. A total of 95 (21.7%) patients of total 437 patients were diagnosed varicella in both the Departments and these patients had erythematous papules, vesicles and pustules on the skin with erosions on oral mucosa. Out of 102

**Table 2.** Distribution of the patients according to age and diagnosis done in Dermatology Department

Disease	Infant	Toddler	School Going	Preadolescent	Adolescent
AD (n = 77)	15 (19.4%)	23 (29.8%)	18 (23.3%)	20 (25.9%)	1 (1.32%)
Scabies (n = 36)	2 (5.5%)	3 (8.3%)	7 (19.4%)	18 (50%)	6 (16.6%)
AV (n = 23)	0 (0%)	0 (0%)	0 (0%)	7 (30.4%)	6 (16.6%)
Cutaneous candidiasis (n = 8)	2 (25%)	5 (62.5%)	1 (12.5%)	0 (0%)	0 (0%)
Viral Exanthema (n = 246)	17 (6.9%)	42 (17%)	75 (30.5%)	85 (34.5%)	27 (10.9%)
Diaper dermatitis (n = 15)	8 (53.4%)	7 (46.6%)	0 (0%)	0 (0%)	0 (0%)
Portwine Stain (n = 9)	2 (22.2%)	3 (33.3%)	0 (0%)	2 (22.2%)	2 (22.2%)
Drug rash (n = 10)	0 (0%)	0 (0%)	2 (20%)	5 (50%)	3 (30%)
Urticaria (n = 13)	0 (0%)	0 (0%)	2 (15.4%)	7 (53.8%)	4 (30.8%)
Total (N = 437)	46 (10.5%)	83 (18.9%)	105 (24%)	144 (32.9%)	59 (13.5%)

**Table 3.** Comparison of the diagnosis made at Department of Paediatrics with that made at Department of Dermatology

Diagnosis by Department of Dermatology	Diagnosis by Department of Paediatrics					
	Asthma	Chest infection	Viral exanthema	URTI	PTB	Total
AD	59 (90.7%)	13 (14.2%)	0 (0%)	5 (4.9%)	0 (0%)	77
Scabies	2 (3%)	21 (23%)	1 (0.62%)	11 (10.7%)	1 (5.2%)	36
AV	3 (4.6%)	8 (8.7%)	2 (1.25%)	5 (4.9%)	5 (26.3%)	23
Cutaneous candidiasis	0 (0%)	5 (5.4%)	0 (0%)	3 (2.9%)	0 (0%)	8
Viral exanthem	0 (0%)	31 (34.0%)	155 (96.8%)	60 (58.8%)	0 (0%)	246
Diaper dermatitis	0 (0%)	7 (7.6%)	0 (0%)	8 (7.8%)	0 (0%)	15
Portwine stain	0 (0%)	4 (4.3%)	0 (0%)	5 (4.9%)	0 (0%)	9
Drug rash	1 (1.5%)	0 (0%)	2 (1.25%)	0 (0%)	7 (36.8%)	10
Urticaria	0 (0%)	2 (2.1%)	0 (0%)	5 (4.9%)	6 (31.5%)	13
Total	65	91	160	102	19	437

patients who were diagnosed URTI in Paediatric Department 60 (58.8%) were diagnosed as viral exanthema in Dermatology Department.

## DISCUSSION

This study was conducted to find out the skin manifestations of various respiratory diseases and to analyse the dermatological disorders in children referred from Paediatric Department having respiratory symptoms. Skin manifestations among respiratory illness in children are common. Moleyar VS and Noojibail A classified skin disorders with lung involvement into the following categories<sup>4</sup>:

1. Congenital / developmental disorders with cutaneous and pulmonary manifestations
2. Primary dermatological diseases with pulmonary manifestations
3. Primary pulmonary diseases with cutaneous manifestations
4. Miscellaneous conditions involving skin and lungs
5. Skin changes due to drugs used to treat respiratory diseases

A total of 437 participants who were referred from Paediatric Department having respiratory symptoms and skin lesions were involved in this study and we tried to find out about miscellaneous conditions involving these two systems. It was also

noted that out of all the 437 patients who were referred to our department, 315 (72.0%) had various skin conditions which were related to respiratory disorders. The main conditions which were related were bronchial asthma and atopic dermatitis, chest infection and upper respiratory tract infections with viral exanthema.

It has been shown in various studies that asthma and AD are closely related. It is also noted that patients with AD have an increased risk of asthma.<sup>5</sup> It is mainly attributed to genetic risk variants and environmental factors.<sup>6,7</sup> There is a shared immune response in asthmatic and AD patients with type 2 immunity and raised IgE levels and this may to some extent explain their coexistence.<sup>8,9</sup> We found that out of 65 patients who suffered from asthma 59 (90.7%) had AD and 13 (14.2%) patients who suffered from AD also had chest infections. Even though chest infection alone may not be responsible for triggering or causing AD but it has been shown in various studies that patients having asthma and AD are more prone to infections. The main features of skin manifestations in AD patients were erythematous papules with excoriations which involved mainly flexural areas. Involvement of face was mainly noted in toddlers. Generalised dryness of skin was seen in these patients.

The most common condition after viral exanthema referred from the Paediatric Department was URTI {102(23.3%)} and out of these, 60 (58.8%) suffered from viral exanthema. A total of 246 (56.3%) patients were diagnosed as viral exanthema in our department, whereas a total of 160 (36.7%) patients were diagnosed as viral exanthema in the Paediatric Department (p value < 0.001). The patients usually first present in the Paediatric Department with sore throat and fever which is followed by skin rash and out of 102 patients who were diagnosed URTI in Paediatric Department, 60 (58.8%) were diagnosed as viral exanthema in our department. Discrepancy in the diagnosis of between Paediatric Department and Dermatology Department could be either because the patients come to Dermatology Department one to three days after referral from Paediatric Department which leads change in dermatologic clinical picture or it could be due to a lack of knowledge about correlation between skin rash and respiratory symptoms. These patients had maculopapular lesions, fever and cough.

Skin rash along with fever is a common finding in children. This may be attributed to a large number of infectious and noninfectious diseases. Skin rashes of various types are common finding in many viral infections.<sup>10</sup> Viral exanthema is a nonspecific rash, commonly characterised by generalised eruption of erythematous papules and / or macules.<sup>11</sup> Usually these rashes are benign and in most of the cases, they are correlated with self-limited disease.<sup>12</sup> Morphology of rashes in patients with febrile exanthema is important which includes shape, size, colour, site and distribution of lesions, progression, tenderness, rise in temperature and desquamation, because this is the basis of making a differential diagnosis clinically. Different viral agents can cause similar skin reactions, while one viral agent may lead to different types of rash.<sup>10</sup>

A total of 95 patients were diagnosed with varicella in both the departments. The patients with varicella

came with fever and multiple erythematous papules, vesicles and pustules. Erosions were also noted in oral mucosa. Sore throat was one of the prominent features in these patients. The most important characteristics of varicella include central distribution, umbilication and presence of different highly pruritic skin rashes.<sup>10</sup>

Our study does have some limitations. Our study has been done in military hospital which caters to military personnel, their dependents and ex army personnels and their dependents and these people belong to better socio-economic strata in Nepal as compared to general population of our country. Hence, the result which we have got may not be representative of the entire scenario of Nepal. We also have not done the follow up of the skin lesions as well as respiratory symptoms, which may have significance. However, we hope that the future larger, multicentric studies on this subject should shed more light upon the correlation between skin and respiratory symptoms in children.

## CONCLUSIONS

Many children with respiratory illnesses have concomitant skin lesions. In regards to skin lesions seen in children in Paediatric Department, it would be more prudent to get further confirmation from Dermatology Department. Viral exanthema and atopic dermatitis were the commonest skin lesions in children with respiratory symptoms referred from Paediatric Department. There is strong correlation between children with bronchial asthma and atopic dermatitis.

## REFERENCES

1. Garg T, Ahmad R, Basu S, Chander R. Clinical spectrum of dermatological disorders in children referred from pediatrics department. *Indian J Paediat Dermatol.* 2019;20:212-8. DOI: 10.4103/ijpd.IJPD\_11\_18

2. Silverberg JI, Silverberg NB. Childhood atopic dermatitis and warts are associated with increased risk of infection: a U.S. population-based study. *J Allergy Clin Immunol.* 2014;133:1041-7. DOI: 10.1016/j.jaci.2013.08.012
3. Mathias RC, Jayaseelan E, Augustine M. Spectrum of pediatric dermatological emergencies at a tertiary care hospital in India: A descriptive study. *Int J Dermatol.* 2013;52:27-31. DOI: 10.1111/j.1365-4632.2011.05247.x
4. Moleyar VS, Noojibail A. Disease with skin and lung involvement: Pulmonologist's perspective. *Med J DY Patil Vidyapeeth.* 2020;13:106-12. DOI: 10.4103/mjdrdypu.mjdrdypu\_62\_19
5. Andersen YMF, Egeberg A, Gislason GH, Skov L, Thyssen JP. Burden of respiratory comorbidities in patients with atopic dermatitis and psoriasis. *Br J Dermatol.* 2017;177(4):145-6. DOI: 10.1111/bjd.15489
6. Paller AS, Spergel JM, Mina-Osorio P, Irvine AD. The atopic march and atopic multimorbidity: many trajectories, many pathways. *J Allergy Clin Immunol.* 2019;143(1):46-55. DOI: 10.1016/j.jaci.2018.11.006
7. Ferreira MA, Vonk JM, Baurecht H, Marenholz I, Tian C, Hoffman JD, et al. Shared genetic origin of asthma, hay fever and eczema elucidates allergic diseasebiology. *Nat Genet.* 2017;49(12):1752-7. DOI: 10.1038/ng.3985
8. Han H, Roan F, Ziegler SF. The atopic march: current insights into skin barrier dysfunction and epithelial cell-derived cytokines. *Immunol Rev.* 2017;278:116-30. DOI: 10.1111/imr.12546
9. Ravnborg N, Ambikaibalan D, Agnihotri G, Price S, Rastogi S, Patel KR, et al. Prevalence of asthma in patients with atopic dermatitis: A systematic review and meta-analysis. *J Am Acad Dermatol.* 2021 Feb;84(2):471-8. DOI: 10.1016/j.jaad.2020.02.055
10. Saffar JM, Rokni GR, Raeasian M. Paediatric Viral Exanthema: A Review Article. *J Pediatr Rev.* 2017;5(2):9487. DOI: 10.5812/jpr.9487
11. Sarkar R, Mishra K, Garg VK. Fever with rash in a child in India. *Indian J Dermatol Venereol Leprol.* 2012;78(3):251-62. DOI: 10.4103/0378-6323.95439
12. Salavastru CM, Stanciu AM, Fritz K, Tiplica GS. A burst in the incidence of viral exanthems. *Indian Dermatol Online J.* 2014 Apr;5(2):144-7. DOI: 10.4103/2229-5178.131083.