

## Original Research Article

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# A clinico epidemiological study of pediatric dermatoses of HIV infected children in a tertiary care hospital of North Bengal

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## ABSTRACT

**Background:** Pediatric Human immunodeficiency virus (HIV) infection and its dermatological manifestation has emerged a serious burden globally including India. Dermatological manifestations are unique in pediatric HIV infection and related to CD4 cell count and its percentage. The study was carried out to assess the cutaneous manifestation of HIV positive pediatric patients and its correlation with CD4 cell count in eastern part of India below 12 years of age.

**Methods:** This analytic epidemiological study with prospective observational design was carried among 30 HIV positive children below 12 years of age in our institution over a period of one year.

**Results:** Total 30 HIV infected children were studied among male 23 (76.67%) and female 7 (23.33%). Age ranged from birth to 12 years with mean was  $6.39 \pm 2.48$  years. The skin lesions are highest in 3-6 yrs age group 12 (40%) and 33.33% of them had CD4 counts between 500-750 while 3.33% had CD4 counts above 1500. 27 patients (90%) were received ART and 3 (10%) patients were without ART. Nine distinct patterns of lesions: abscess (3), furuncles (1), maculopapular rash (2), papular (7), pruritic (10), plaque (3), soreness of tongue (2), pustules (1) and red scaly (1) were detected. 46.67% pain (14), 40.0% itching (12) and 13.33% burning sensation (4) were the main symptoms and 20.0% face (6), 16.7% oral cavity (5), 20.0% hands (6), 10.0% abdomen (3) and 33.3% legs (10) were principal site of involvement. 13 different skin lesions: fungal infection (3), furuncles (1), urticaria (4), scabies (5), prurigo (5), measles (1), molluscum contagiosum (1), abscess (3), venous leg (1), pyoderma (1), atopic dermatitis (1), chicken pox (2) and glossitis (2) were diagnosed.

**Conclusions:** Various dermatological manifestations are common with pediatric HIV infection and sometime are the first clinical presentation that is well correlated with CD4 cell count and its percentage.

**Keywords:** Dermatological manifestation, CD4 count, Pediatric HIV/AIDS infection

## INTRODUCTION

Pediatric HIV infection has emerged a major burden globally including India and 3.5 million women of childbearing age have been infected with HIV-1 with 3000 additional women become infected every day.<sup>1</sup> It has been estimated 145000 children <15 years of age got infected

by HIV/AIDS and about 22,000 new infections occur annually of which 7% pediatric new cases in India.<sup>1</sup> The established modes of transmission of HIV-1 infection in children are through vertical transmission during the antepartum and intrapartum as well as postpartum periods from mother to infant, contact through exposure to infected blood and sexual contact.

HIV infection affects almost all systems of the human body including dermatological system. Different types of dermatological manifestations help us to identify the disease early and also assess its severity. Cutaneous manifestations of HIV infection in children include a wide variety of infectious, inflammatory disorders and rarely neoplasms. These disorders tend to be more severe, persistent and resistant to treatment.<sup>2</sup> In some children cutaneous disease may be the presenting symptom of HIV-related illness.<sup>3</sup> CD4 cell count and CD4 cell percentage are key markers for determining disease progress and the risk for opportunistic infection (OI) in HIV- infected patients.<sup>4</sup> The incidence, severity, and number of skin lesions increase as immune function deteriorate. Furthermore, there is a correlation between the increasing number and severity of mucocutaneous lesions and declining immunity as mirrored by CD4+ count.<sup>4,5</sup> The most common skin manifestations of HIV/AIDS in children are fungal infections.<sup>6,7</sup> Inflammatory lesions, fungal, viral, and bacterial skin manifestation are more common in children who have HIV/AIDS compared with their healthy counterparts. Mucocutaneous lesions in HIV/AIDS include extensive oral candidiasis, dermatophytosis, pruritic papular dermatitis, and lesions associated with nutritional deficiencies.

There is a scarcity of literature relating to dermatological manifestation of HIV in India especially in the Eastern region. So, the present study will determine the dermatological manifestation of pediatric HIV patients and its severity and pattern correlated with CD4 cell counts below 12 years of age. This study will also determine the variation of dermatological changes in relation to gender and different religions.

## METHODS

It is an analytical epidemiological study. Prospective observational design. The study was conducted in indoor and outpatient department of pediatric and dermatology of North Bengal Medical College, Darjeeling, West Bengal. Study duration was one year from July 2017 to June 2018.

All pediatric HIV patients (up to 12 years of age) who attended the outpatient or inpatient department of pediatric and dermatology department.

### Inclusion criterion

All pediatric HIV patients diagnosed by 3 positive ELISA and DNA PCR (where applicable) attended the tertiary centre (up to 12 years of age). Those pediatric HIV patients whose parents have given the consent for participation in the study.

### Exclusion criterion

HIV infected children without dermatological manifestation and any pre-existing skin lesion.

### Study tools

Predesigned and pretested interview schedule. Consent form. Relevant medical records or documents. Microsoft excels datasheet.

### Study technique

Ethical Approval. Written consent of the individual. Interview with parents of study subjects. Sending samples (blood) for testing. Data collection and analysis.

The study was conducted following necessary clearance from hospital ethics committee and data were collected after taking consent from parents. Dermatological changes are confirmed by a dermatologist of our institution and any suspected lesions are confirmed by relevant investigations (blood and skin biopsy).

### Statistical method

Data were organized and presented by using the principles of analytical statistics (Microsoft excel and Statistical package for social sciences (SPSS) software version 20). P value less than 0.05 it has been considered as significant.

## RESULTS

The study was conducted among 30 children and mean age was  $6.39 \pm 2.48$  years. The male respondent was 23 (76.67%) and female was 7 (23.33%) respectively. Dermatological manifestations were highest in 3-6 years group affecting 12 (40%) followed by children aged 6-9 affecting 10 (33.33%) and 0-3 years and 9-12 years each having 4 children (13.33%) respectively (Table 1).

**Table 1: Age and sex distribution of the children among study group.**

Age (years)	Male	Female	Total	%
<b>0 - 3</b>	3	1	4	13.33
<b>3 - 6</b>	11	1	12	40.00
<b>6 - 9</b>	6	4	10	33.33
<b>9 - 12</b>	3	1	4	13.33
<b>Total</b>	23	7	30	100

The mean CD4 count of the Hindu Patients was 758 (p value 0.72634) and that of Muslim patients was 679 (p value 0.56192) whereas the mean CD4 counts for both the religion were 737 (statistically insignificant). The analysis shows that the mean CD4 count of Hindu patients is 11.63% more than that of Muslim patients (Figure 2). Fungal infection was associated with mean CD4 of 383 which was much lower than the mean CD4 counts (737) of the all diagnoses.

27 (90%) patients were with antiretroviral therapy (ART) and remaining 3 (10%) were without ART and 33.33% of

them had CD4 counts between 500-750 which was the most common (Table 2). Pain (46.67%) was the most frequent symptom and legs (33.3%) were the commonest

presenting site of dermatological manifestation in pediatric HIV patients (Table 4, 5).

**Table 2: Comparison of CD4 counts with or without ART among HIV positive patients.**

CD4 Count	With		Without		Total	%
	ART	ART	ART	Patients		
<b>&lt;250</b>	1	1		2		6.67
<b>250-500</b>	5	0		5		16.67
<b>500-750</b>	9	1		10		33.33
<b>750-1000</b>	7	0		7		23.33
<b>1000-1250</b>	2	1		3		10.00
<b>1250 -1500</b>	2	0		2		6.67
<b>Above 1500</b>	1	0		1		3.33
<b>Total patients</b>	27	3		30		100.00

**Table 3: Diagnosis of different skin lesions with CD4 counts and frequency.**

Diagnosis	CD4 Counts				Mean CD4 Counts	Frequency	P value Significant (<0.05)
<b>Fungal Infection</b>	150	410	588		383	3	<0.00001
<b>Furuncles</b>	556				556	1	0.52218
<b>Urticaria</b>	668	1050	1200	1735	1163	4	0.00244
<b>Scabies</b>	360	900	960	960	1306	897	0.20408
<b>Prurigo</b>	16	516	325	622	870	470	0.034
<b>Measles</b>	1341				1341	1	0.03156
<b>Molluscum contagiosum</b>	556				556	1	0.52218
<b>Abscess</b>	455	654	890		666	3	0.65994
<b>Venous leg</b>	1072				1072	1	0.23404
<b>Pyoderma</b>	907				907	1	0.5485
<b>Atopic dermatitis</b>	312				312	1	0.13104
<b>Chicken Pox</b>	550	750			650	2	0.65994
<b>Glossitis</b>	650	776			713	2	0.90448

**Table 4: Presenting symptoms of HIV positive patients with skin lesions.**

Symptoms	Frequency	Percentage
<b>Pain</b>	14	46.67
<b>Itching</b>	12	40
<b>Burning sensation</b>	4	13.33
<b>Total</b>	30	100

The study also revealed that 22 (73%) pediatric patients were Hindu and 8 (27%) patients were Muslim by religion (Figure 1).

The maximum frequency of among all diagnoses were Scabies and Prurigo, which were associated with 5 (17%)

for each with mean CD4 counts 897 and 470 whereas furuncles, measles, venous leg, pyoderma and atopic dermatitis was made exactly once (3% each) with mean CD4 counts 556, 1341, 1072, 907 and 312 respectively (Table 3, Figure 3). None of the skin lesions were statistically significant except fungal infection, urticaria, prurigo and measles lesions that were statistically significant ( $p<0.05$ ). Among the nine distinct skin lesions, Pruritic lesion was 10 (33.33%) most frequent presentation (Figure 4).

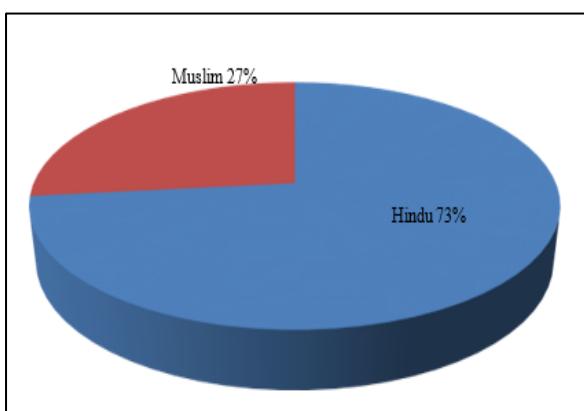
## DISCUSSION

Pediatric HIV infection is a key problem in both developed and developing countries in the world.<sup>3</sup> The pattern of HIV infection and the socio-demographic profile of victims

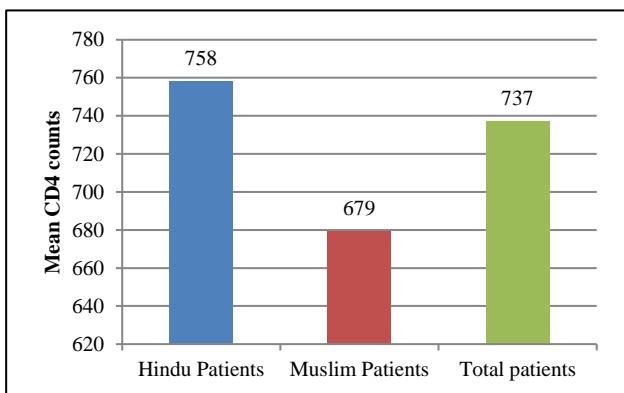
differ from time to time and vary from place to place requiring manifold studies in different times and places.<sup>8</sup>

**Table 5: Sites, frequency and percentage of dermatological lesions.**

Sites	Frequency	Percentage
<b>Face</b>	6	20.0
<b>Oral cavity</b>	5	16.7
<b>Hands</b>	6	20.0
<b>Abdomen</b>	3	10.0
<b>Legs</b>	10	33.3
<b>Total</b>	30	100



**Figure 1: Distribution of patients based on religion.**

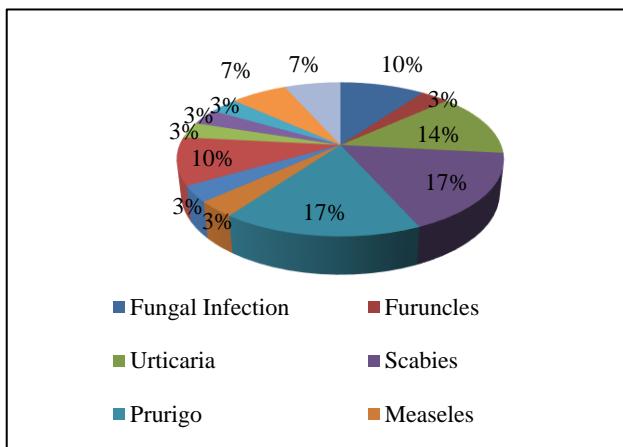


**Figure 2: Mean CD4 count in relation to race.**

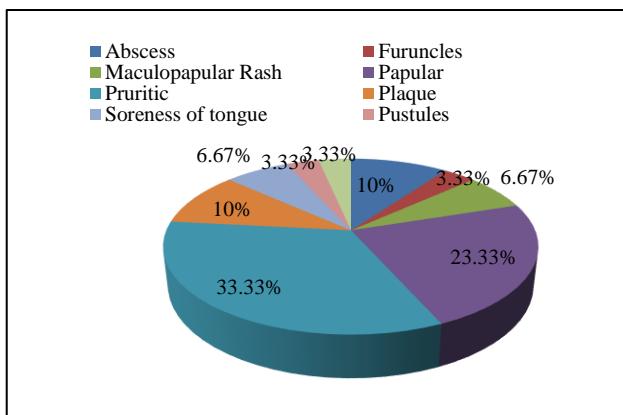
There is scarcity of literature on this subject from West Bengal especially its northern region which has a special geographic structure making it unique for the state.<sup>3,7,9</sup> Since NBMC and H is the only medical college and tertiary care hospital in the entire North Bengal, it has a large catchment area which also includes patients from neighboring states and even countries like Bhutan, Nepal and Bangladesh.

This study was done among 30 patients (3 inpatient and 27 outpatient) with male to female ratio was 3.3: 1 and 1.9% of total pediatric admissions, thus reflecting the incidence of HIV infection in children. Males were more prone to

develop HIV related dermatoses than female that correspond to the study conducted by Nair et al in Kerala also showed male predominance with 44 males (67.69%) and 21 females (32.31%), the male: female ratio being 2:1.<sup>10</sup>



**Figure 3: Frequency distribution of different skin lesions among HIV positive.**



**Figure 4: Frequency distribution of clinical pattern skin lesions among HIV positive patients.**

We found most common mode of HIV transmission was mother to child (56.4%), comparable to the study by Nair et al in India also explores the MTCT was the most frequent mode of transmission and was documented in 73.7% of patients.<sup>10</sup> George (2014) had also reported similar transmission method of HIV from mother to child. Probable transmission through blood transfusion and use of non-disinfected hairdressing implements such as clippers, shaving blades and scissors was also recorded in 4.8% each while in 3.9% of cases transmission was most probable due to use of non-sterile/ reused needles. Sexual abuse/activities were constituted the mode in 3.4% while the source was unidentified in 6.4%. Non-MTCT routes of HIV exposure via unsterilized scissors usage and tattooing was found to be higher in older age categories.<sup>11</sup>

The mean age of dermatological presentation of pediatric HIV infection in our study was  $6.39 \pm 2.48$  years. We also

found skin lesions were seen maximally 11 (48%) among male patients in 3-6 years of age group whereas 4 (57%) among female children had their ages in 6-9 years. The study revealed 6.67% pediatric HIV patients had CD4 counts less than 250, 16.67% of the patients had CD4 counts in the range of 250-500, 33.33% of them had CD4 counts between 500-750, most common, 23.33% had 750-1000, 10% had 1000-1250, 6.67% of them had CD4 counts between 1250-1500 whereas only 3.33% of the patients had CD4 counts above 1500. Of the 30 patients 2 patients had CD4 counts less than 250 (one each with ART and without ART) and 5 patients had CD4 counts between 250-500 with ART. The mean CD4 count of Hindu patients was 11.63% more than that of Muslim patients in this study but the cause was unknown. We observed 13 distinct skin lesions: fungal infection, furuncles, urticaria, scabies, prurigo, measles, molluscum contagiosum, abscess, venous leg, pyoderma, atopic dermatitis, chicken pox and glossitis. Their manifestations were well co-related with CD4 counts. The fungal infection was active in relatively low CD4 counts such as 150, 410 and 588 with a mean of 383 only and it was inversely proportional to CD4 counts. Scabies and prurigo 5 (17%) each with mean CD4 count 897 and 470 respectively were frequent skin lesions. Nine distinct clinical lesions were detected: abscess, furuncles, maculopapular rash, papular, pruritic, plaque, soreness of tongue pustules and red scaly of which pruritic lesion was the commonest (33.33%). Legs, hands, face and oral cavity were the frequently affected sites and pain, itching, burning sensation, fever and malaise were the presenting symptoms.

The profile of pediatric HIV cases in the present study was specific to the geographic region catered by the study place. The pattern of HIV infection and the socio demographic profile of cases in the present study was a reflection of the geography of this region and the various socio-cultural practices prevalent in this region. So, the study can be used to formulate essential steps in prevention and diminishing the prevalence of pediatric dermatoses of HIV infected children in North Bengal and adjacent regions to a great extent.

#### **Limitations**

This study was done in small sample size (n=30) with one year follow up period so we might miss some delayed skin manifestations and may not reflect the actual scenario of the community as it was hospital-based study. Adverse drug reaction related to ATR on dermatological manifestation was not taken into consideration.

#### **CONCLUSION**

Dermatological manifestations are quite common and may be the first clinical presentation of pediatric HIV infection that well correlated with CD4+ counts. Males are more affected than female by HIV. Scabies, prurigo, urticaria and fungus infections are frequent dermatological

manifestation. Pruritic skin lesion being the common followed by papular skin lesion.

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