

# Clinico-Immunological Profile of Children Infected with HIV Through Vertical Transmission, in Southern India

PRAVEEN R SHAHAPUR<sup>1</sup>, INDIRA BAIRY<sup>2</sup>

## ABSTRACT

**Background:** Karnataka, being “High Prevalent State” of southern India, the HIV infection among antenatal women has crossed 1%. There are very few reports available with CD4 count and stage wise clinical spectrum among children. The clinical spectrum among HIV infected infants and children vary in different areas of the world. Hence it is important to know the spectrum of opportunistic infections and their respective CD4 count among HIV infected children of our locality.

**Materials and Methods:** The opportunistic infections among 31 paediatric seropositive patients were evaluated. These all patients were classified as per CDC guide lines into stage I, stage II, and stage III based on CD4 counts of > 1000cells/μl, 500-999

cells/μl, <500cells/μl respectively. The opportunistic infections were diagnosed by standard laboratory investigations. Clinical spectrum presented by each stage children was documented.

**Results:** Children in stage I were 5(16.1%), stage II 14(45.1%) and stage III 12(38.7%). Oral candidiasis (29%) was the commonest, followed by recurrent respiratory tract infection (25.8%), tubercular lymphadenitis (16.1%) and chronic diarrhoea (12.9%).

**Conclusion:** The present study showed the children with higher CD4 count had few infections and children with lower CD4 count presented with multiple opportunistic infections. This study also showed vertical transmission as the sole mode of transmission.

**Keywords:** CD4 Count, Clinical spectrum, Paediatric HIV, Southern India

## INTRODUCTION

India is the home to the third largest number of people living with HIV in the world [1]. The vast majority of HIV infections in India spread through sexual transmission (85.6%) [1]. The shift of the epidemic from high risk groups like sexually active and injectable drug users, to low risk groups like married monogamous women, led to increasing HIV infection among children [2]. Nearly five per cent of infections are attributable to parent-to-child transmission. It is estimated that 70,000 children below the age of 15 are living with HIV in India and 21,000 children are infected every year through parent-to-child transmission [3]. In India, there are 1,20,000 AIDS orphans. The HIV infection among antenatal women has crossed 1%, [4] and Karnataka is “High Prevalent State”. The confirmation of HIV diagnosis in infant is difficult because the routine screening test only detect presence of maternal antibodies. Infants and children with confirmed HIV Infection need a baseline CD4 count (absolute count & CD4%) to initiate Antiretroviral therapy (ART). Children differ from adults as they have higher rate of viral replication hence high viral load and higher rate of CD4 cell destruction [5]. There are reports available regarding paediatric HIV infection, but very few reports are available with CD4 count and stage wise clinical spectrum. The clinical spectrum among HIV infected infants and children vary in different areas of the world. Hence, we undertook a study of paediatric HIV infection with their CD4 count and respective clinical spectrum in southern districts of Karnataka, India.

S.No	Diseases / Infection	Number of patients (n=14)
1	Tubercular lymphadenitis	5 (35.7%)
2	Hepatomegaly with oral thrush	5 (35.7%)
3	Recurrent respiratory tract infection	4 (28.5%)

[Table/Fig-1]: HIV seropositive paediatric cases with CD4 count between 500-999 cells/μl

## MATERIALS AND METHODS

An observational cross-sectional study of HIV infected children presenting to Kasturba Medical College. Manipal for confirmation of diagnosis and monitoring of CD4 and CD8 counts were performed. Institutional ethical committee clearance was taken and ethical committee clearance number: MUEC/12/2007. A total of 35 HIV seropositive paediatric cases were included in the present study. HIV sero-status was confirmed as per National AIDS Control Organization guidelines [6]. The HIV status of infants < 18 months age and born to HIV seropositive mothers were positive by ELISA method only and could not be confirmed by virological tests (HIV-RNA or HIV-DNA). The detailed history was taken with special reference to parental serostatus, risk factors, sibling history, ART history of the mothers during pregnancy and socio-demographic characteristics. Evaluation of whole blood CD4 count of the HIV seropositive patients was done as per the NACO guidelines [7]. We used Capcellia CD4/CD8 whole blood assay for detection of CD4/CD8 T lymphocytes which is an enzyme immunoassay and provides absolute counts of CD4 and CD8 T cell counts in peripheral blood. All these patients were classified as per CDC guide lines [8] into stage 1, stage 2, and stage 3 based on CD4 counts of > 1000cells/μl, 500-999cells/μl, < 500cells/μl respectively. The thorough clinical examination assisted with detailed laboratory investigations were carried out for all children. The opportunistic infections were diagnosed by standard laboratory investigations. Clinical spectrum presented by each stage children was documented.

Clinical diagnosis was supplemented with laboratory investigations. The child with diarrhoea for more than 14 days and signs of dehydration was diagnosed as chronic diarrhoea. Recurrent respiratory tract infection was diagnosed based on cough, fever, findings of crepitations and chest X-ray, such 2 episodes of infection in one year or 3 episodes over any period of time. Tuberculosis was

Sl N	Diseases / Infection	Number of patients (N=12)
1	HIV encephalopathy	1 (8.3%)
2	Chronic diarrhoea with oral thrush	2 (16.6%)
3	Cryptosporidial diarrhoea	2 (16.6%)
4	Recurrent respiratory tract infections	4 (33.3%)
5	CSOM, lymphadenopathy, chronic diarrhoea, oral thrush and hepatomegaly	1 (8.3%)
6	Pyoderma	1 (8.3%)
7	Parotitis, lymphadenopathy, oral thrush.	1(8.3%)

**[Table/Fig-2]:** HIV seropositive paediatric cases with CD4 counts < 500 cells/ $\mu$ l

diagnosed presumptively by physical findings lymphadenopathy, malnutrition and chest X-ray showing hilar lymphadenopathy.

Cryptosporidiosis was confirmed by modified acid-fast staining. CT scan showed atrophy of brain with multifocal hypodense areas in deep white matter, suggesting HIV encephalopathy.

## RESULTS

Four out of 35 cases were of less than 18 months of age and 31 were of 2 to 5 years of age group. The age range was 10 months to 58 months. (Mean and Median 2.9 years). Males and females were 19 and 16 respectively. Vertical transmission was the only mode of transmission in our study group. All the children had both parents HIV seropositive. Twelve children lost their one parent because of HIV related complications and one child had lost both the parents. Only four mothers had received ART during their antenatal period. Four patients of less than 18 months of age had their CD4 count >1500 cells and were asymptomatic. These patients sero-status may be because of maternal Immunoglobulin G. Hence the opportunistic infections among remaining 31 paediatric sero-positive patients were evaluated. Oral candidiasis (29%) was the commonest, followed by recurrent respiratory tract infection (28.5%), tubercular lymphadenitis (16.1%) and chronic diarrhoea (12.9%). Out of four Chronic diarrhoea cases two were Cryptosporidial infections and remaining two were of unknown aetiology.

Among 31 HIV seropositive children between 2-5 years of age group, five patients were in stage I, 14 patients were in stage II and 12 patients were in stage III.

Five children with CD4 count > 1000 cells (stage I) had only constitutional symptoms.

Fourteen HIV seropositive children with CD4 count in between 500-999 (Stage II) had one or other clinical presentations as shown in [Table/Fig-1].

Twelve paediatric HIV seropositive cases had CD4 count < 500 cells/ $\mu$ l (Stage III), presented with different opportunistic infections as shown in [Table/Fig-2].

## DISCUSSION

The early initiation of antiretroviral therapy among HIV infected children is very important otherwise they can rapidly deteriorate and die. The World Health Organisation recommends CD4 count monitoring every six months and viral load testing only when capacity exists [9]. Hence we used only CD4 count as immunological marker and their respective disease spectrum for that count was documented.

Out of 35 paediatric HIV cases, 4 patients were below the age of 18 months, asymptomatic and with CD4 count more than 1500 cells. As per CDC guidelines for paediatric HIV classification for children younger than 13 years, the CD4 count above 1500 cells in children below the age of 12 months of age indicates no evidence of immune suppression [10].

Compared to other studies, the present study showed vertical transmission as the sole mode of transmission. As there was no

case of blood transfusion or its products related to HIV transmission in the present study. Some studies reported patients acquiring HIV infection by multiple blood transfusions that vary from 8.1% to 39.1% [11-13].

The opportunistic infections among 31 paediatric seropositive patients evaluated, oral candidiasis (29%) was the commonest, followed by recurrent respiratory tract infections (25.8%), tubercular lymphadenitis (16.1%) and chronic diarrhoea (12.9%). Various studies on clinical manifestations of HIV infected children showed tuberculosis as a common opportunistic infection [14-16], but our study showed oral candidiasis as reported by Madhivanan et al., too [17]. The opportunistic infections among HIV infected children differs from place to place based on local prevalence of the pathogens. Diarrhoea is a common cause of morbidity and mortality in HIV infected children. The incidence of chronic or recurrent diarrhoea in HIV infected children has varied from 7% [17] study to 30.99% [4] but in our study, the incidence of chronic diarrhoea was 12.9%.

In the present study 25.8% cases presented with recurrent respiratory tract infections. Pneumocystis carinii pneumonia and Lymphoid Interstitial Pneumonia (LIP) were not seen in our patients. This finding is in accordance with other Indian studies. This may be because of wide spread use of PCP prophylaxis in HIV infected mothers and children.

Patients of 2-5 years age group were 31. Out of which 5(16.1%) children with CD4 count >1000 were asymptomatic and considered to be immunologically competent. Other 14(45.1%) cases were moderately immunosuppressed with CD4 count in between 500-999 and 12 (38.7%) cases were severely immunosuppressed with CD4 count of less than 500 cells.

In moderately immunosuppressed paediatric patients, different disease spectrum of varied severity was observed. Epidemiologic evidence for bimodal presentation of symptoms in paediatric HIV infection has been reported previously. Possible explanations for this include the biologic phenotype of the acquired virus [18], increased susceptibility of neonatal cord blood monocytes to HIV infection [19] and possible in-utero infection of fetal thymocytes, leading to more rapid decline in CD4 count [20].

In severely immunosuppressed group, two cases had CD4 count less than 200 cells/ $\mu$ l and had multiple opportunistic infections. One patient who lost both the parents presented with Chronic Suppurative Otitis Media, lymphadenopathy, chronic diarrhoea, oral thrush and hepatomegaly and had CD4 count of 180 cells. This clearly shows the clinical correlation of CD4 count with severe immunosuppression. Each 1 case of HIV encephalopathy, pyoderma and parotitis and each 2 cases of recurrent respiratory tract infections, chronic diarrhoea, candidiasis, bronchopneumonia and Cryptosporidial diarrhoea were documented.

## CONCLUSION

Knowledge of clinical manifestations in this part of country along with their respective CD4 count will help clinicians meet the management challenges presented by HIV infected children.

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**PARTICULARS OF CONTRIBUTORS:**

1. Professor, Department of Microbiology, BLDE University's Shri.B.M.Patil Medical College Bijapur, Karnataka, India.
2. Professor, Department of Microbiology, Director Student Affairs, Manipal University, Manipal, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Praveen R. Shahapur,  
Professor, Department of Microbiology, BLDE University's Shri.B.M.  
Patil Medical College Bijapur-586103, Karnataka, India.  
Phone: +09448356474, E-mail: drprshahapur@yahoo.co.in

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