

## A study on clinical presentation of children with HIV infection in correlation with CD4 count at art centre Warangal

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### Abstract

**Aim & Objective:** To understand the Clinical presentation of HIV and understand the correlation of CD4 count in children less than 14yrs at ART centre Warangal. **Methodology:** It was Prospective observational study, A total of 103 children were enrolled in to the study who were attending the ART centre Out Patient Department for their medical problems and routine follow up. Children who used to visit ART CENTER WARANGAL for their medical illness, regular follow up, between January 2020 and June 2021 were evaluated. An informed consent was taken from guardians. All children having manifestations of different systems, history taken, subjected to clinical examination findings noted. CD4 counts from previous records collected. **Results:** In the present study, most of the children attending our center are in between 7 – 12 yrs. Mean age of presentation is 10.859yrs. There is huge difference of distribution from rural to urban. Most common symptoms are fever, cough, not gaining weight, persistent diarrhea. In this study 80.5% (83) of children are symptomatic and 19.4% (20) of children are asymptomatic. Out of 21 asymptomatic children mean CD4 count is 1331.19/cu. and out of 82 symptomatic children mean CD4 count is 649.54/cu.mm. Here p-value is <0.001, which is highly significant. **Conclusion:** The present study indicates strong correlation of CD4 count with the condition of child (symptomatic/ asymptomatic) which means the asymptomatic children have appropriate CD4 counts for their respective age and symptomatic children have a decline in CD4 counts.

**Keywords:** HIV, CD4 count, Childrens, ART centre, Asymptomatic

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### Introduction

Being world's 2<sup>nd</sup> largest populated country India also bears 2<sup>nd</sup> largest cohort of HIV infected persons. As per WHO 2018 statistics, people living with HIV is 37.9 million globally of which 1.7 million (nearly 4.6%) are children under 15 years. The total new infections in 2018 are 1.7 million among which children are 160,000. Total deaths due to HIV 770,000 includes 100,000 deaths in children. Each day some 1500 children under 15 years of age become infected with HIV, an estimated 90% of whom live in sub-Saharan Africa. Steady expansion of services aimed at preventing mother to child transmission slowly brought down the incidence. "Treat all policy" adopted by WHO in 2016 significantly improved quality of life of people living with HIV [1,2]. Children living with HIV worldwide, most of whom acquired the virus in utero, during birth or while being breastfed, ways of contracting HIV that can be prevented. For many children infected with HIV, the chances of survival are slim. Without HIV care, including antiretroviral therapy, the progression of HIV infection in children is particularly aggressive, one half of them die before their second birthday. Yet paediatric HIV is almost entirely preventable. It has been virtually eliminated in high-income countries, where the ready availability of HIV prevention, testing and treatment services has lowered mother to-child transmission rates to less than 2% and boosted

the survival rates of HIV-infected infants (more than 80% of whom now live past the age of six). For example, in United States the new infections brought down to less than 100 annually by 2003 [3].

This study is aimed at observing the clinical presentation of HIV in children attending ART centre Warangal, in correlation with CD4 count. The clinical features of the HIV in children are different from adults. Most common presentation in Children are Fever, Cough, Chronic Diarrhea, Weight loss, Generalised Lymphadenopathy, Hepatosplenomegaly [3,4].

### Aim & objectives

- To understand the Clinical presentation of HIV in children less than 14yrs at ART centre Warangal.
- To understand the correlation of CD4 count.

### Materials and methods

#### Place of study

ART centre WARANGAL

#### Study population

A total of 103 children were enrolled in to the study who were attending the ART centre Out Patient Department for their medical problems and routine follow up. Careful history and physical examination noted and necessary laboratory assessment done.

#### Study design

Prospective Observational Study.

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**Selection criteria****Inclusion criteria**

Children presenting with HIV manifestations, Aged less than 14 years.

**Exclusion criteria**

Children more than 14 yrs

The parents/guardians of affected children who have refused to give consent.

**Statistical Methods**

Descriptive version of SPSS 7.3 software used to analyze the data

**Sample Size**

103 cases.

**Duration of the Study**

January 2020- June 2021

**Method of collection of data**

Children who used to visit ART CENTER WARANGAL for their medical illness, regular follow up, between January 2020 and June 2021 were evaluated. An informed consent was taken from guardians. All children having manifestations of different systems, history taken, subjected to clinical examination findings noted. CD4 counts from previous records collected.

**Results**

In this study total 103 children are included. All of them are below 14yrs. Of them males are 54 and females are 50.

**Table 1: Age distribution in HIV Cases**

Age	Frequency	Percent
1-6 Years	12	11.7
7-12 Years	48	46.6
>12 Years	43	41.7
Total	103	100

Most of the children attending our center are in between 7 – 12 yrs. Newborns with HIV infection if not treated properly will die within first 2 yrs of life. Those who are infected in intra uterine life will also have rapid progression of disease and they may die early[3]. So the children now attending ART center came across all these phases of their lives. Mean age of presentation is 10.859yrs (mean age distribution in males is 11.16 years and females is 10.54 years).

**Table 2: Age distribution in Gender**

Sex	Mean(years)	Std. Deviation	t-test	p- value
Male	11.16	3.2607	0.947	0.346
Female	10.54	3.3879		
Total	10.859	3.3214		

**Table 3: Gender distribution in HIV Cases**

Gender	Frequency	Percent
Male	53	51.5
Female	50	48.5
Total	103	100

**Table 4: Rural/ Urban distribution in HIV Cases**

	Frequency	Percent
Rural	75	72.8
Urban	28	27.2
Total	103	100

There is huge difference of distribution from rural to urban. 75 (72.8%) children from rural areas and only 28 (27.2%) children are from urban areas, as it coincides approximately with rural to urban population ratio in India. Awareness about HIV/AIDS control programmes may be more in urban areas.

Most of the children presented with multiple complaints at a time. Most common symptoms are fever, cough, not gaining weight, persistent diarrhea.

**Table 5: Presenting symptoms**

Sl. No.	Symptom	Frequency	Percentage
1	Fever	58	56.3%
2	Persistent cough	47	45.6%
3	Not gaining weight	38	36.9%
4	Persistent diarrhea	24	23.3%
5	Skin lesions	13	12.62%
6	Oral ulcers	12	11.65%
7	Ear discharge	12	11.65%
8	Parotid enlargement	3	2.91%
9	Altered behaviour	1	0.9%
10	Asymptomatic	21	20.4%

On clinical examination, most common signs present in these children are malnutrition, pallor, lymphadenopathy, hepatosplenomegaly, oral thrush, isolated hepatomegaly, isolated splenomegaly, parotitis, clubbing, CNS manifestation.

**Table 6. Signs at presentation**

Sl. No.	Sign	Frequency	Percentage
1	Under weight	62	60.2%
2	Pallor	45	43.7%
3	Gen. lymphadenopathy	50	48.5%

4	Hepatosplenomegaly	28	27.2%
5	Hepatomegaly only	6	5.82%
6	Splenomegaly only	6	5.82%
7	Oral thrush	21	20.4%
8	Parotitis	3	2.9%

**Table 7: Pattern of presentation of children in relation to their chronologic age at the time of visit**

Age	Asymptomatic	Percent	Symptomatic	Percent
1-6 Years	3	2.9	9	8.7
7-12 Years	7	6.8	41	39.8
>12 Years	10	9.7	33	32.03
Total	20	19.4	83	80.5

In this study 80.5% (83) of children are symptomatic and 19.4% (20) of children are asymptomatic. Children in 1 – 6 yrs age 2.9% children are asymptomatic and 8.7% children are symptomatic. In 7 -12 yrs age group 6.8% are asymptomatic and 39.8% are symptomatic. In 12 – 14 yrs age group 9.7% of children are asymptomatic and 32.03% children are symptomatic. There are more number of symptomatic children in 7 – 12 yrs age group and more number of asymptomatic children in 12 -14 yrs age group.

**Table 8: Association between clinical Stage and recent CD4 counts**

Stage	< 200	200-499	500-999	≥1000	Total
Stage I	1(1%)	1(1%)	7(6.80%)	11(10.70%)	20
StageII	3(2.90%)	18(17.50%)	35(34%)	14(13.60%)	70
StageIII	2(1.90%)	7(6.80%)	0(0%)	2(1.90%)	11
Stage IV	0(0.0%)	2(1.90%)	0(0%)	0(0%)	2

Out of 103 children most of the children, 70, are in stage 2, only 13 children are in stage 3&4 cumulatively. Only 20 children are in stage 1 disease. There are 25 children with no immunosuppression. But in these children 2 of them are suffering from opportunistic infections. The clinical staging of these 2 children is not correlating with CD4 counts. In children with mild immunosuppression all of them are in clinical stage 1&2. There are no children with stage 3 or stage 4 disease with mild immunosuppression. Out of 28 Children with moderate immunosuppression 7 of them are with stage 3 disease and 1 is with stage 4 disease. There are total 6 children with severe immunosuppression. Overall clinical staging is significantly correlating with CD4 count.

**Table 9: The CD4 cell counts of HIV-infected children in different age category in no. (%)**

Age	< 200	200-499	500-999	≥1000	Total
1-6 Years	1(1%)	3(2.90%)	3(2.90%)	5(4.90%)	12(11.70%)
7-12 Years	2(1.90%)	12(11.70%)	20(19.40%)	14(13.60%)	48(46.60%)
>12 Years	3(2.90%)	13(12.60%)	19(18.40%)	8(7.80%)	43(41.70%)
Total	6(5.80%)	28(27.20%)	42(40.80%)	27(26.20%)	103(100%)

Out of 6 children in 1- 6 yrs age group 5 children having CD4 count of >1000/cmm, 3 children having CD4 count of 500 – 999, 3 children having CD4 count of 200 – 499 and 1 child has <200/cmm. Out of 48 children in 7 – 12 yrs age group 14 children having CD4 count of >1000/cmm, 20 children having CD4 count of 500 – 999, 12 children having CD4 count of 200 – 499 and 2 children having <200/ cmm. Out of 43 children in 12 – 14 yrs age group 8 children having CD4 count of >1000/cmm, 19 children having CD4 count of 500 – 999, 13 children having CD4 count of 200 – 499 and 3 children having <200/ cmm.

Out of 103 children 40.8% (42) children are with mild

immunosuppression, 27.2% (28) children with moderate immunosuppression and 5.8% (6) children are with severe immunosuppression.

The variation in CD4 counts with age and clinical presentation of children at their visit to ART center are presented. While advancing with chronological age CD4 count is gradually decreasing, both are in negative correlation. This negative correlation is more in asymptomatic children and less in symptomatic children. Pearson correlation coefficient for asymptomatic  $r = -0.339$ ,  $p\text{-value} = 0.066$  and for symptomatic  $r = 0.064$ ,  $p\text{-value} = 0.285$

**Table 10: Mean distribution of CD4 cells in stages**

Stage	Frequency	Mean	SD	95% Confidence Interval for Mean		F-value	p-value
				Lower Bound	Upper Bound		
Stage1	19	1284.47	603.627	993.53	1575.41	11.302	<0.001**
Stage 2	70	726.1	421.82	625.52	826.68		
Stage3	11	438.55	315.04	226.9	650.19		
Stage4	2	256	2.828	230.59	281.41		
Total	102	789.88	514.049	688.91	890.85		

In Table 6, mean CD4 count in Stage 1 disease is 1284.4 with lower bound 993.53 and upper bound 1575.41. In Stage 2 disease mean CD4 is 726.1 with lower bound 625.52 and upper bound 826.68. In Stage 3 disease mean CD4 is 438.55 with lower bound 226.9 and upper bound 650.19. In Stage 4 disease mean CD4 is 256.0 with lower bound 230.59 and upper bound 281.41. The  $p\text{-value} < 0.001$ , highly significant at 5% level of significance.

**Table 11: Mean distribution of CD4 cells in Asymptomatic and symptomatic cases**

	N	Mean	Std. Deviation	t-value	p-value
Asymptomatic	21	1331.19	486.143	6.396	<0.001**
Symptomatic	82	649.54	421.509		

Out of 21 asymptomatic children mean CD4 count is 1331.19/cu.mm with Standard Deviation of 486.143 and out of 82 symptomatic children mean CD4 count 649.54/cu.mm with Standard Deviation of 421.509. here p-value is <0.001, which is highly significant. According to table 11 p<0.05 which indicates strong correlation of CD4 count with the condition of child (symptomatic/ asymptomatic) which means the asymptomatic children have appropriate CD4 counts for their respective age and symptomatic children have a decline in CD4 counts.

**Table 12: Distribution of HIV infected mothers**

Mother HIV	Frequency	Percent
Yes	94	91.3
No	2	1.9
Not Known	7	6.8
Total	103	100

Mothers of 103 children with HIV 94(91.3%) mothers were diagnosed as HIV+ve, 2 mothers were HIV-ve and 7 mothers' status was not known. 2 of those children born to HIV-ve mothers, one child has the history of frequent i.m injections by local unqualified practitioner and cause of infection of the second child could not find.

**Table 13: Distribution of Anemia in HIV cases**

Anemia	Frequency	Percent
Yes	45	43.7
No	58	56.3
Total	103	100

**Table 14: Distribution of Deliveries**

Deliveries	Frequency	Percent
NVD	90	87.4
LSCS	9	8.7
Unaware about mode of delivery	4	3.9
Total	103	100

Out of 103 deliveries 87.4% (90) were Normal Vaginal Deliveries (NVD), 8.7% (9) were LSCS and could not find the mode of delivery of rest of the 4 cases.

**Table 15: Gender distribution in stages**

Stage	Male	Female
Stage 1	9(8.70%)	11(10.70%)
Stage 2	38(36.90%)	32(31.10%)
Stage 3	6(5.80%)	5(4.90%)
Stage 4	0(0.0%)	2(1.90%)

Stage 2 disease males constitute 36.9% and females constitute 31.1%. Stage 1 disease males constitute 8.70% and females constitute 10.70%. Stage 3 disease males constitute 5.80% and females constitute 4.90%. Stage 4 disease males constitute 0% and females constitute 1.9%.

**Table 16: Gender distribution in Asymptomatic and symptomatic**

Out of 103 Asymptomatic males 10 (9.7%), Asymptomatic females 11(10.70%), Symptomatic males 43 (41.70%) and Symptomatic females 39 (37.9%)

	Male	Female
Asymptomatic	10(9.70%)	11(10.70%)
Symptomatic	43(41.70%)	39(37.90%)
Total	53(51.50%)	50(48.50%)

**Table 17: CD4 distribution in Asymptomatic and symptomatic**

	< 200	200-499	500-999	≥1000
Asymptomatic	0(0%)	1(1%)	5(4.90%)	15(14.60%)
Symptomatic	6(5.80%)	27(26.20%)	37(35.90%)	12(11.70%)

## Discussion

In present study, male children are 53, female children are 50, which is similar to previous studies. Sebat A Snake[5] et al study reported 51.7% male and 48.3% female % and Ugochukwu EF[6] reported 53.1% male and 46.9% female children in their study.

This study finds that there are more rural than urban children in HIV infected cohort. As per Sunil B Deshmukh et al[7] study, rural children are 57% and urban children are 43%. There may be less awareness of rural population regarding HIV/AIDS control programs, not aware of Anti Retro Viral treatment and more social issues in rural areas than urban areas.

In this study age of first presentation 5.86 yrs. Out of 103, 62 children presented at 1-6 years, 35 children presented at 7-12 years and 5 children presented at 12-14 years. This emphasizes that more efforts should be kept on antenatal screenings and early diagnosis should be made to take appropriate measures for well being of HIV child.

Vertical transmission is the most common route of transmission(91.3%). Nonvertical transmission accounts for only 1.9% and in rest of the 6.8% cases, the mode of transmission is unknown. Again these statistics emphasize the earliest possible antenatal screening for mothers. Usually HIV virus crosses placenta in late pregnancy. But there is considerable possibility of virus crossing in early pregnancy also[3].

Out of 103 mothers, only 9 have undergone Caesarian Section. In normal vaginal delivery, newborn is exposed to maternal fluids and maternal mucosal surface. Uterine contractions also contribute to micro transfusions. So NVD should be avoided and LSCS should be done.

Regarding breast feeding 84 children were breast fed either in the form of exclusive breastfeeding or mixed feeding. This could be another possible cause of vertical transmission.

Vertical transmission can be brought down to <2% with appropriate

preventive measures are taken- more than 16 weeks of ART to mother before delivery, LSCS, Nevirapine prophylaxis to newborn.

Fever is the most common presenting symptom, which is comparable with studies of Shilpa R Shah et al[8] and Sebhat A Snake et al[5]. In this study, 56.3% children were presented with fever followed by cough 47%. The other common symptoms are not gaining weight/ wt loss, chronic diarrhea, ear discharge, skin lesions, parotitis, CNS manifestations.

Undernutrition is the most common sign seen in these children, which is comparable to studies of Shilpa R Shah et al[8], reported 59% under nutrition and Vikas N Solunke, and[9] reported 90.47% of under nutrition. Appropriate nutritional intervention is necessary for these children. In this study under nutrition accounts for 62%, followed by generalized lymphadenopathy, pallor, hepato splenomegaly, skin manifestations, oral thrush, only hepatomegaly, only splenomegaly, parotitis, clubbing, acquired microcephaly.

Most common opportunistic infections in this study are pulmonary tuberculosis followed by oral candidiasis which can be compared with the study of Rajasekaran et al[10], which correlates with this study. Usually pulmonary TB is seen in children with CD4 count <500/cmm<sup>3</sup>, and Pneumocystis pneumonia is usually seen in children with <320/cmm<sup>3</sup>. In this study both the conditions are correlating with CD4 count.

Another finding in this study, with raise in CD4 count weight gain in children is also positive. Children those who are in good adherence with ART has rise in their CD4 count.

#### Conclusion

Mean age of first presentation is 5.86yrs. Most common symptom is fever, most common sign is under nutrition. Most common opportunistic infections are pulmonary tuberculosis, oral candidiasis, which are clinically correlating with CD4 counts. Children with good adherence to ART have shown good weight gain with raise in CD4 count. Adherence to ART is important to improve the quality of life. In the present study has significant correlation with clinical manifestations in HIV infected children and their CD4 counts.

Out of 21 asymptomatic children mean CD4 count is 1331.19/cmm and out of 82 symptomatic children mean CD4 count is 649.54/cmm.

**Conflict of Interest: Nil**

**Source of support: Nil**

The present study indicates strong correlation of CD4 count with the condition of child (symptomatic/ asymptomatic) which means the asymptomatic children have appropriate CD4 counts for their respective age and symptomatic children have a decline in CD4 counts

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