



# A Clinico-Epidemiological Profile of HIV Infected Children Attending ART Centre: A Hospital Based Study

Raghavendra Nagaraju<sup>1</sup>, RachgondaGurupada Viveki<sup>2</sup>

**Financial Support:** None declared

**Conflict of Interest:** None declared

**Copy Right:** The Journal retains the copyrights of this article. However, reproduction is permissible with due acknowledgement of the source.

## How to cite this article:

Nagaraju R, Viveki RG. A Clinico-Epidemiological Profile of HIV Infected Children Attending ART Centre: A Hospital Based Study. Natl J Community Med 2019;10(10):531-535

## Author's Affiliation:

<sup>1</sup>Assistant Professor, Dept. of Community Medicine, MVJ Medical College & Research Hospital, Bangalore; <sup>2</sup>Professor and Head, Dept. of Community Medicine, Belagavi Institute of Medical Sciences, Belagavi

## Correspondence

Dr. R G Viveki  
rgviveki@gmail.com

**Date of Submission:**13-02-19

**Date of Acceptance:**21-10-19

**Date of Publication:**31-10-19

## ABSTRACT

**Introduction:** The socio-demographic characteristics of children with Human Immunodeficiency Virus (HIV) infection are different than the other children of the same age. HIV infection has been studied extensively in adults but pediatric age group is relatively new field.

**Objectives:** To study the socio-demographic profile, clinical spectrum and its association with immunodeficiency among HIV infected children.

**Methodology:** The study was conducted among HIV positive children aged 0-14years, attending ART Centre of Belagavi Institute of Medical Sciences (BIMS) Hospital, Belagavi. Socio-demographic information was collected, clinical parameters were assessed and CD4 count was recorded.

**Results:** The study included 180 HIV infected children (112 boys, 68 girls). Prevalence of orphan hood was 73.3%. The prevalence of opportunistic infection was 42.2% with Tuberculosis (17.3%) being the most common opportunistic infection. Majority of the study participants (45.0%) were in WHO clinical stage I followed by stage II (23.9%), stage III (19.4%) and stage IV (11.7%). Immunodeficiency was seen in 42% of them. Clinical staging of the study participants was significantly associated with presence of opportunistic infections and immunodeficiency.

**Conclusion:** High prevalence of orphan-hood might lead to significant health consequences. Opportunistic infections increased with immunodeficiency.

**Keywords:** HIV, Children, ART, Opportunistic infection, Clinical stage, CD4 count

## INTRODUCTION

HIV infection poses tremendous challenges to health globally. According to world health organization (WHO), by 2017 an estimated 36.9 million people were living with HIV worldwide, 1.8 million People were newly infected with HIV and 9, 40,000 people died from AIDS related illnesses. Children (<15yr) living with HIV accounts for an estimated 1.8 million of which 1, 80,000 children were newly infected with HIV and 1, 10,000 children died due to AIDS related illnesses.<sup>1</sup> By 2015, India has 21.17 lakh people living with HIV with

adult prevalence (15-49yrs) of 0.26%. In Karnataka there were 1, 99,060 people living with HIV with adult prevalence of 0.45%. In India 1,38,456 children (<15yr) were living with HIV, with prevalence of 6.54% and 7,526 deaths due to AIDS related illnesses.<sup>2</sup>

The socio-demographic characteristics of children with HIV infection are different than the other children of the same age group. Children live with parents who are infected with HIV or might have lost one or both parents to AIDS and are orphaned. An increasing number of households are headed

by children and end up being their family's principal wage earners. Orphaned children are vulnerable to abandonment by extended family, abuse, malnutrition, lack of healthcare, schooling and early entry into child labor. Family which is primary source of protection and support to child's need is disrupted.<sup>3</sup>

Opportunistic infections (OIs) and associated complications account for a considerable proportion mortality among HIV infected individuals. Appropriate management of OIs is as important as antiretroviral therapy (ART) in preventing mortality and morbidity among HIV-infected persons. The incidence of OI depends on the level of immunosuppression and on the endemic prevalence of the causative agent. In the West, the incidence of OIs has markedly declined, but they contribute significantly to the morbidity and mortality in developing countries.<sup>4</sup> Children differ from adults as they have higher rate of viral replication hence high viral load and higher rate of CD4 cell destruction.<sup>5</sup> There are reports available regarding paediatric HIV infection, but very few reports are available with CD4 count and clinical spectrum.<sup>6</sup> Hence this study of socio-demographic profile and clinico-immunological profile of HIV positive children was undertaken.

## MATERIALS & METHODS

This Hospital based observational study was conducted among HIV positive children aged 0-14 years of age who were on Anti-Retroviral Therapy (ART) attending ART Centre of Belagavi Institute of Medical Sciences (BIMS) Hospital, Belagavi for a period of 12 months from January 2015 to December 2015.

**Selection criteria:** Children aged 0-14 years, who are confirmed of having HIV infection and are on Anti-Retroviral Therapy (ART) were included in the study. All those children whose complete details were not known/ could not be accessed and parents/ guardians of children not willing to participate in the study were excluded.

Sample size was estimated by considering the prevalence of clinical manifestations in HIV infected children.<sup>7</sup> Calculated sample size was 138. However, the present study included 180 cases. Children attending ART Centre of BIMS Hospital, Belagavi who fulfilled selection criteria were studied. Each child had a unique ART number. Hence repetition was avoided and every child was studied only once during the study period

After obtaining consent, data was collected from parents or guardians of study participants by using a structured, pre-validated, questionnaire. Infor-

mation regarding Socio-demographic profile (age, religion, education, monthly income, and parental history), immunization history, and disease (HIV) related history was collected. The clinical profile of child was evaluated by taking detailed history of present illnesses and thorough clinical examination of the child was done. Immunological profile (Recent CD4 count) of the child was collected from case records of ART Centre.

Statistical analysis was done using Microsoft excel sheet 2007 and SPSS version 22. The categorical data was expressed in terms of rates, ratios and percentages while continuous data was expressed as mean  $\pm$  standard deviation. Chi square test was used to test the association between different qualitative variables. At 95% CI a probability value (p value) of  $\leq 0.05$  was considered as statistically significant.

**Ethical Clearance:** The study was approved from Institutional Ethics Committee BIMS, Belagavi. Permission to conduct the study was obtained from head of the institute and Nodal Officer and Medical Officer of Anti-Retroviral Therapy (ART) Centre of Belagavi Institute of Medical Sciences (BIMS) Hospital, Belagavi.

## RESULTS

This present study included 180 HIV infected children of which boys were 112 (62.2%) and girls were 68 (37.8%) with boys to Girls ratio of 1.65:1. The study participants were of the age group 0-14 years. The mean age (in years) of study participants was  $11.11 \pm 2.87$  SD. Table 1 describes the socio-demographic profile of the study participants. In this study, majority of the study participants 167 (92.7%) were Hindu's. More than half of the study participants 115 (63.9%) belonged to rural area. More than half of them 101 (56.1%) were doing primary education. More than 3/4th of study participants 143 (79.4%) belonged to class 5 socioeconomic status according to modified BG Prasad classification. Prevalence of orphan hood was 73.3% (132). Only 75 (41.7%) of the study participants had completely immunized. The mean age at the time of diagnosis of HIV status was  $5.5 \pm 3.37$  years. Majority 51 (28.3%) of the study participants were diagnosed to have HIV infection at the age of 3-5 years, followed by 0-2 years 47 (26.1%) which is shown in Table 2. Majority of study participants 70 (38.9%) were on ART since last 2 years followed by 3-5 years 59 (32.78%). The mean age of study participants at the time of presentation to the ART Centre was  $5.5 \pm 3.3$  years of age. Table 3 shows the duration of ART in study participants.

**Table 1: Socio-demographic profile of the study participants**

Variables	Boys (n=112) (%)	Girls (n=68) (%)	Total (n=180) (%)
<b>Age group</b>			
0-5year	05 (4.5)	03 (4.4)	08 (4.4)
6-10years	28 (25.0)	25 (36.8)	53 (29.4)
11- 14years	79 (70.5)	40 (58.8)	119 (66.2)
<b>Religion</b>			
Hindu	106 (94.6)	61 (89.7)	167 (92.7)
Muslim	6 (5.4)	6 (8.8)	12 (6.7)
Christian	0	1 (1.5)	1 (0.6)
<b>Type of area</b>			
Rural	69 (61.6)	46 (67.6)	115 (63.9)
Urban	43 (38.4)	22 (32.4)	65 (36.1)
<b>Educational status</b>			
Pre-primary	1 (0.9)	3 (4.4)	4 (2.2)
Primary	60 (53.6)	41 (60.3)	101 (56.1)
Secondary	45 (40.2)	24 (35.3)	69 (38.3)
Drop out	2 (1.8)	0	2 (1.1)
Not enrolled	4 (3.6)	0	4 (2.2)
<b>Socio-economic status</b>			
Class 2	2 (1.8)	0	2 (1.1)
Class 3	3 (2.7)	2 (2.9)	5 (2.8)
Class 4	19 (17.0)	11 (16.2)	30 (16.7)
Class 5	88 (78.6)	55 (80.9)	143 (79.4)
<b>Orphan status</b>			
Non-orphans	31 (27.7)	17 (25.0)	48 (26.7)
Paternal orphan	37 (33.0)	26 (38.2)	63 (35.0)
Maternal orphan	4 (3.6)	8 (11.8)	12 (6.7)
Double orphans	40 (35.7)	17 (25.0)	57 (31.7)
<b>Immunized till date</b>			
Yes	46 (41.1)	29 (42.6)	75 (41.7)
No	66 (58.9)	39 (57.4)	105 (58.3)

**Table 2: Distribution of study participants according to age at the time of diagnosis of HIV**

Age at Diagnosis of HIV	Boys (n=112) (%)	Girls (n=68) (%)	Total (n=180) (%)
0-2years	27 (24.1)	20 (29.4)	47 (26.1)
3-5years	31 (27.7)	20 (29.4)	51 (28.3)
6-8years	29 (25.9)	15 (22.1)	44 (24.4)
9-11years	19 (17.0)	9 (13.2)	28 (15.6)
12-14years	6 (5.4)	4 (5.9)	10 (5.6)

**Table 5: Association between WHO Clinical staging and presence of opportunistic infection and Immunodeficiency**

Variables	WHO Clinical Staging				Chi-square value	P Value
	Stage 1 (n=81) (%)	Stage 2 (n=43) (%)	Stage 3 (n=35) (%)	Stage 4 (n=21) (%)		
<b>Opportunistic Infections</b>						
Present	3 (3.9)	26 (34.2)	28 (36.8)	19 (25.0)	<b>95.649</b>	<b>p&lt;0.05</b>
Absent	78 (75.0)	17 (16.3)	7 (6.7)	2 (1.9)		
<b>Immunodeficiency</b>						
Absent	81 (77.1)	19 (18.1)	4 (3.8)	1 (1.0)	<b>117.87</b>	<b>p&lt;0.05</b>
Present	0	24 (32.0)	31 (41.3)	20 (26.7)		

Table 4 describes the clinico-Immunological profile of the study participants. Most common symptom was generalized weakness/ anorexia followed by

**Table 3: Distribution of study participant's according to the duration of Anti-Retroviral Therapy (ART)**

Duration of ART In Children	Boys (n=112) (%)	Girls (n=68) (%)	Total (n=180) (%)
0-2years	43(38.4)	27(39.7)	70(38.9)
3-5years	34(30.4)	25(36.8)	59(32.8)
6-8years	31(27.7)	12(17.6)	43(23.9)
9-11years	4(3.6)	3(4.4)	7(3.9)
12-14years	0	1(1.5)	1(0.6)

**Table 4: Clinico-Immunological profile of study participants**

Current Illness	Boys (n=112)	Girls (n=68)	Total (n=180)
<b>Opportunistic Infections</b>			
Scabies	12(10.7)	4 (5.9)	16 (8.9)
Recurrent URTI	8 (7.1)	3 (4.4)	11 (6.1)
Tuberculosis	23(20.5)	8 (11.8)	31 (17.3)
Oral Candidiasis	8 (7.1)	1 (1.5)	9 (5)
Persistent Fever	6 (5.4)	3 (4.4)	9 (5.0)
Persistent Diarrhea	3 (2.7)	4 (5.9)	7 (3.9)
LRTI	3 (2.7)	3 (4.4)	6 (3.3)
URTI & Otitis	6 (5.4)	0	6 (3.3)
Molluscum Contagiosum	2 (1.8)	1 (1.5)	3 (1.7)
<b>Clinical Manifestations</b>			
Angular cheilitis	5 (4.5)	10(14.7)	15 (8.3)
Dental caries	9 (8)	11 (16.1)	20 (11.1)
Parotid swelling	8 (7.1)	9 (13.3)	17 (9.4)
Impetigo	1 (0.9)	0	1 (0.6)
Nail changes	17 (15.2)	13 (19.1)	30 (16.7)
Pallor	87 (77.7)	54 (79.4)	141 (78.3)
Lymphadenopathy	9 (8.1)	6 (8.8)	15 (8.3)
<b>WHO Clinical staging</b>			
Stage 1	49 (43.8)	32 (47.1)	81 (45.0)
Stage 2	24 (21.4)	19 (27.9)	43 (23.9)
Stage 3	25 (22.3)	10 (14.7)	35 (19.4)
Stage 4	14 (12.5)	7 (10.3)	21 (11.7)
<b>Immunodeficiency</b>			
Mild	16 (14.3)	12 (17.6)	28 (15.6)
Advanced	18 (16.1)	8 (11.8)	26 (14.4)
Severe	15 (13.4)	6 (8.8)	21 (11.7)

Figures in the parenthesis indicate percentage.

fever, cough and diarrhea. The prevalence of opportunistic infection was (76) 42.2% with Tuberculosis 31(17.3%) being the most common opportun-

istic infection followed by scabies, recurrent URTI, oral candidiasis etc. Most common clinical manifestation was pallor followed by dental caries, parotid enlargement etc. Majority of the study participants 81(45.0%) were in WHO clinical stage I. Nearly 75(42%) of them had immunodeficiency. The mean CD4 count of the study participants was  $735.1 \pm 532.2$  cells/mm<sup>3</sup>. WHO Clinical staging of the study participants was significantly associated with the presence of opportunistic infections and the presence of immunodeficiency, which is shown in Table 5.

## DISCUSSION

This present study included HIV infected children of age 0-14years old. Of which, more than half of them 66.2% were of 11-14years of age group. Similar finding was seen in a study by Meenal Gupta et.al.<sup>8</sup>The mean age (in years) of study participants was  $11.11 \pm 2.87$  SD. Which was slightly high compared to other studies<sup>9, 3</sup>. Boys to Girls ratio was 1.65:1 which was similar to other studies<sup>3, 9, 10, 11</sup>. More than half of the study participants (63.9%) belonged to rural area. This was the same as seen in a study done in Punjab<sup>8</sup> and several other studies.<sup>12, 13</sup> More than 3/4th of study participants (79.4%) belonged to class V socioeconomic status, whereas several other studies<sup>11, 13, 14</sup> showed that majority of them were in Class IV. The prevalence of orphan-hood was 73.3%, which was very high compared to studies conducted in Nigeria (36.4%)<sup>15</sup> and North India (39.15%).<sup>3</sup> In this study, 41.7% of the study participants were completely immunized with respect to their age. This was high compared to a study done in Madhya Pradesh<sup>13</sup> wherein only 33% were completely immunized. The mean age of study participants at the time of presentation to the ART Centre was  $5.5 \pm 3.3$  years of age. It was 6.7years, 8.2 years and 8.63 years in studies conducted in Delhi<sup>11</sup>, Maharashtra<sup>16</sup> and East Godavari<sup>17</sup> respectively.

The prevalence of TB was 17.3%, which was similar to a study done in Maharashtra.<sup>16</sup>Whereas a study done in Chennai<sup>10</sup> had 63% prevalence of TB. Majority of the study participants (45.0%) were in WHO clinical stage I followed by stage II (23.9%), stage III (19.4%) and stage IV (11.7%). Similar finding was found in several studies.<sup>18, 19</sup> Majority of the study participants had mild immunodeficiency (15.6%) followed by advanced (14.4%) and severe immunodeficiency (11.7%). Similar result was seen in many studies.<sup>14, 18</sup>Whereas in few other studies<sup>17, 19</sup> majority of the study participants had severe immunodeficiency. The mean CD4 count of the study participants was  $735.1 \pm 532.2$  cells/mm<sup>3</sup>. Similar result was seen in few studies done in North India<sup>7</sup> and Bengaluru.<sup>20</sup>

## CONCLUSION

Majority of the study participants were rural residents with low socio-economic status. There was high prevalence of orphan hood and low levels of complete immunization which might lead to significant health consequences. With the use of ART, opportunistic infections had come down improving the clinical stage and immunity.

## LIMITATIONS

A complete picture of clinical profile and opportunistic infections could not be elicited as this was one-time cross-sectional study and only OPD patients attending the ART Centre were studied who were comparatively healthier and stable. A prospective follow up study would have been ideal.

**ACKNOWLEDGEMENTS:** The authors would like to thank the Director, Dr. S.T. Kalsad for granting permission to do the study, Dr. A B Halappanavar and Mrs. SunandaHalki (statistician) for their guidance and support.

## REFERENCES

1. WHO: Summary of the global HIV epidemic. Available at: [http://www.who.int/hiv/data/2017\\_summary-global-hiv-epidemic.png?ua=1](http://www.who.int/hiv/data/2017_summary-global-hiv-epidemic.png?ua=1). Retrieved on: 12/08/2018
2. India HIV estimations 2015. Technical report. NACO & NIMS ICMR, Ministry of Health & Family Welfare. Gov't of India. Available at: <http://www.naco.gov.in/sites/default/files/India%20HIV%20Estimations%202015.pdf> Retrieved on: 12/08/2018
3. Chauhan RC, Singh N. Socio-demographic profile of HIV infected children accessing care at pediatric clinic of a tertiary level hospital in North India. *Int J ContempPediatr*. 2014; 1(1):20-23.
4. Guidelines for Prevention and Management of Common Opportunistic Infections/ Malignancies among HIV-Infected Adult and Adolescent. NACO. Ministry of Health & Family Welfare. Gov't of India. May 2007. Available at: <http://www.naco.gov.in/sites/default/files/>. Retrieved on: 12/08/2018
5. Mothi SN, Karpagam S, Swamy VH, Mamatha ML, Sarvode SM. Paediatric HIV--trends & challenges. *Indian J Med Res*. 2011; 134:912-9.
6. Shahapur PR, Bairy I. Clinico-Immunological profile of children infected with HIV through vertical transmission, in Southern India. *J ClinDiagn Res* 2014; 8(6):09-11.
7. Lodha R, Upadhyay A, Kapoor V, Kabra SK. Clinical Profile and Natural History of Children with HIV Infection. *Ind J of Ped*. 2006; 73: 201-204.
8. Gupta M, K.J.P.S. Puri1, Singh K, Malhotra S. The road less travelled: A social and demographic profile of HIV- infected children accessing care at tertiary care centre in North India. *Egyptian Dermatology Online Journal*. 2013; 9(4):1-10.
9. Madiba S, Mokwena K. Profile and HIV diagnosis disclosure status of children enrolled in a pediatric antiretroviral

- program in Gauteng province, South Africa. *Southeast Asian J Trop Med Pub Health*. 2013; 44(6):1010-1020.
10. S. Rajasekaran, L. Jeyaseelan, K. Raja, N. Ravichandran. Demographic & clinical profile of HIV infected children accessing care at Tambaram, Chennai, India. *Indian J Med Res*. 2009; 129:42-49.
  11. Bhattacharya M, Rajeshwari K, Saxena R. Demographic and Clinical Features of Orphans and Nonorphans at a Pediatric HIV Centre in North India. *Ind J Ped*. 2010; 77:627-631
  12. Solunke VN, Kamble MB, Suryawanshi AR, Saple P, Tiwari MM, Bhete SB et.al, Clinical Profile and Prevalence of Opportunistic Infection in HIV Patients Attending Pediatric Department. *Int Med J*. 2014; 1(2):69-74.
  13. Ambey R, Sahu S, Sharma A, Gupta R, Goyal B. Assessment of Nutritional Status of HIV Positive Children in Antiretroviral Therapy Center: A Study from Central India. *Int J of Pediatr Res and Pract*. 2015; 1(1):7-11.
  14. Dundigalla C, Chidugulla SK, Ashwani N, Divya BP, Dundigalla P. Study of Prevalence Of Malnutrition In HIV Positive Children and Its Correlation With Cd4 Count. *IOSR J of Denl and Med Sci*. 2015; 14(12):50-57.
  15. Oladokun R, Brown B, Aiyetan P, Ayodele O, Osinusi K. Comparison of sociodemographic and clinical characteristics of orphans and non-orphans among HIV positive children in Ibadan, Nigeria. *Int J Inf Dis*. 2009; 13:462-468.
  16. Lingayat AM, Kamble P. Study of clinical profile of CD4 count and outcome in children with HIV/AIDS below 12 years. *Indian J of Basic and Applied Med Res*. 2015; 4(2):535-541.
  17. Manikyamba D, Jhancy M, Satyavani A, Prasad AK. Mode of Transmission and Clinical Profile of HIV in Children, East Godavari District, A.P. *Int J of Sci Res*. 2015; 4(5):699-701.
  18. Gomber S, Kaushik JS, Chandra J, Anand R. Profile of HIV infected children from Delhi and their response to antiretroviral treatment. *Indian Pediatrics*. 2011; 48:703-707.
  19. Jesson J, Masson D, Adonon A, Tran C, Habarugira C, Zio R et.al. Prevalence of malnutrition among HIV-infected children in Central and West-African HIV-care programmes supported by the Growing up Programme in 2011: A cross-sectional study. *BMC Infectious Dis*. 2015; 15(216):1-12.
  20. Sanjeeva GN, Sukanya V, Govindaraj M, Shivananda. Clinical profile, treatment response, and outcome of HIV-TB co-infected children. *Pediatric Infectious Dis*. 2013(5):3-8.