

FREQUENCY AND CLINICAL FEATURES OF HUMAN IMMUNODEFICIENCY VIRUS (HIV) IN CHILDREN AT CDF HOSPITAL, HYDERABAD

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ABSTRACT

Objective: To determine the frequency and clinical features of Human Immunodeficiency Virus (HIV) infection among children at CDF Hospital, Hyderabad.

Study Design: Descriptive cross-sectional study.

Place of Study and Duration: The study was carried out in Department of Pediatrics, Bilawal Medical College, CDF Hospital, Hyderabad for six months.

Methods: A total of 30 HIV-positive children aged 1 month to 12 years were enrolled using a non-probability consecutive sampling technique. All children with HIV infection, regardless of sex, were recruited for the study. HIV antibody testing and polymerase chain reaction (PCR) were used to confirm HIV infection based on age-specific testing criteria. Clinical symptoms such as weight loss, fever, diarrhea, chronic cough, change of voice, recurrent upper respiratory tract infections and recurrent pneumonia were evaluated using predefined operational criteria. Data were analyzed using SPSS version 23. Descriptive statistics were used and frequencies and percentages computed for categorical variables.

Results: In the study 30 children with HIV were recruited. The average age of the subjects was 5.6 ± 3.2 years. Of the participants 17 (56.7%) were male and 13 (43.3%) were female. The vertical route of HIV infection was the most frequent mode of HIV acquisition, with 20 (66.7%) children infected through the vertical route. The most common clinical findings were fever (20 children, 66.7%), weight loss (18 children, 60.0%) and recurrent upper respiratory infections (15 children, 50.0%). Co-infections occurred in 12 (40.0%) children and anemia was found in 19 (63.3%) children.

Conclusion: Constitutional and respiratory symptoms were common in pediatric HIV infection, especially fever, weight loss and respiratory tract infections.

KEYWORDS: Child; HIV Infections; HIV Seropositivity; Pediatrics.

INTRODUCTION

Delayed diagnosis and low levels of access to treatment and prevention services continued to drive high levels of morbidity and mortality, especially for children, and Human Immunodeficiency Virus (HIV) infection remained a significant public health concern around the world. Pediatric HIV infection was different from adults as children were often infected through mother-to-child transmission, and their immune systems were immature and often led to rapid disease progression. There have been significant improvements in recent years in the ability to diagnose HIV early in life, access to antiretroviral therapy (ART) and integrated paediatric HIV care which have significantly improved the prospects of survival for children living with HIV [1].

Pediatric HIV continued to place a heavy burden on the world with millions of children at risk, particularly in LMIC countries, where HIV prevention, testing, and treatment services were suboptimal. Epidemiological diagnosis and early initiation of ART were identified as critical measures needed to minimize HIV-related problems and promote better health outcomes in children [2]. Comprehensive knowledge of the entire picture of HIV disease progression, immune suppression, nutrition challenges, and opportunistic infections was essential in the clinical management of HIV in children because of how they affected the clinical presentation and response to treatment [3].

The use of ART early has transformed the way that HIV is managed in children by decreasing mortality, maximizing recovery of the immune system and preventing disease progression. The studies showed that early treatment resulted in improved virological suppression and developmental outcomes in children compared to those

who initiated therapy later in the course of disease [4]. Nevertheless, despite advances in therapeutic care, children with HIV continued to have problems with adherence to therapy, toxic effects of drugs and HIV infection complications [5].

Opportunistic infections and inflammatory diseases due to immune failure had a strong impact on pediatric HIV associated morbidity. The most frequent clinical signs of affected children were respiratory infections, TB, gastrointestinal problems, and growth retardation – especially in resource poor areas [6]. Knowledge of the clinical spectrum of HIV infection in children was thus crucial in early detection and effective management of children with HIV [7].

International guidelines called for improved results for children who are exposed to or infected with HIV through enhancing HIV prevention, early infant diagnosis, pediatric testing and ongoing monitoring [8]. Global HIV data also showed that while improvements had been made in the areas of new HIV infections among children, significant gaps continued to exist in regions with regard to access to PMTCT and paediatric treatment services [9]. UNICEF also noted that child-focused HIV interventions are still needed to facilitate early detection, initiation into care, and comprehensive care [10].

This study was carried out as there was little hospital-based evidence on the prevalence and clinical manifestations of HIV infection in children in Hyderabad. Most of the previous studies had been centric and there was a lack of local data about the presentation of HIV in children and associated clinical manifestations as well as HIV disease patterns. Hence this study was aimed at assessing the prevalence and clinicodemographic features of HIV in children visiting the CDF Hospital, Hyderabad and to provide evidence to help in early detection, effective management of HIV disease, and better care of children with HIV.

METHODS

The study was descriptive cross-sectional study which was conducted in the Department of Pediatrics, Bilawal Medical College, CDF Hospital, Hyderabad. The study was conducted for 6 months. The objective of the study was to identify the prevalence and characteristics of Human Immunodeficiency Virus (HIV) in children who attended CDF Hospital, Hyderabad.

The sample size was determined using the WHO sample size calculator taking HIV prevalence in children as 22.7%, Margin of error at 15% and Confidence interval as 95%. From these parameters, a minimum sample size of 30 children was needed. Non-probability consecutive sampling technique was used for recruitment of the study participants.

Children aged one month to 12 years of both sexes who have been diagnosed with HIV infection in the past using ELISA test kit were studied. Parents or legal guardians who did not consent for their children to participate in the study were excluded. All enrolled children's parents/caregivers were asked to sign a written informed consent after reading and understanding the aim, procedures and purpose of the study.

Collection of data was done in a pre-designed proforma. Demographic and clinical data were collected such as age, sex, height, weight, ethnicity, history of HIV infection, history of HIV transmission, history of other co-infections, parents' education status, residential status and family income. All children registered were clinically evaluated and relevant laboratory investigations were performed including complete blood count, serum immunoglobulin levels and HIV RNA polymerase chain reaction (PCR). The HIV infection was confirmed using HIV antibody testing (Determine® HIV-1/2) in children >18 months of age, and DNA PCR testing in children ≤18 months of age, especially when the mothers were identified as HIV-antibody positive.

Primary outcome variables consisted of clinical features of pediatric HIV infection including weight loss, fever, diarrhea, chronic cough, voice change, frequent upper respiratory tract infections and frequent pneumonia. Clinical and historical evaluation of weight loss. Fever was taken to be a temperature above 100.4°F (38°C). A child with more than 3 watery stools in a day was deemed to be suffering from diarrhea. Chronic cough was considered as cough that lasted for longer than 4 weeks. Change in voice was detected when the child's voice was husky or there was stridor. Recurrent upper respiratory tract infection was defined as having at least two episodes of upper or lower respiratory infection in a year. Recurrent pneumonia was defined based on WHO criteria which included fast breathing and/or chest indrawing with age-specific respiratory rate cutoffs (children 2–11 months: >50 breaths/minute; children 1–5 years: >40 breaths/minute).

All data collected were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 23. The Shapiro–Wilk test was used to check the normality of quantitative variables (age, height, weight and family income). A p-value >0.05 was used to determine normal distribution of variables. Normally distributed continuous variables were reported as mean and SD, and non-normally distributed continuous variables were reported as median and IQR. Categorical data such as demographic characteristics, presenting complaints, HIV history, mode of transmission, co-infections, and parent education, residential status, and clinical features of HIV were reported as frequencies and percentages.

Stratification was used to control for potential effect modifiers such as age, gender, family income, ethnicity, history of HIV, mode of HIV transmission, co-infections, parental education and residential status. Post-stratification analysis was conducted by the chi-square test (or Fisher's exact test as appropriate). A p-value of <0.05 was considered statistically significant.

RESULTS

The study included 30 children who had a diagnosis of Human Immunodeficiency Virus (HIV). The mean age of the participants was 5.6 ± 3.2 years and more children were aged 1-5 years (46.7%). Males were more often involved than females in a ratio of about 1.5:1. Demographic and clinical characteristics of children enrolled in the study are presented in **Table 1**. Among the 30 HIV-positive children, 17 (56.7%) were males and 13 (43.3%) were females. Most children (46.7%) were between the ages of 1-5 years. When asked about their residential status, 18 (60.0%) children came from urban areas, and 12 (40.0%) from rural areas. Sixteen (53.3%) children had positive family history of HIV. The most frequent mode of transmission was vertical transmission with 20 (66.7%) children.

Table 1: Demographic and baseline characteristics of HIV-positive children (n=30)

Variables	Frequency (n)	Percentage (%)
Age group		
1 month-<1 year	4	13.3
1-5 years	14	46.7
6-12 years	12	40.0
Mean age (years)	5.6 ± 3.2	—
Gender		
Male	17	56.7
Female	13	43.3
Residential status		
Urban	18	60.0
Rural	12	40.0
Positive family history of HIV	16	53.3
Mode of transmission		
Vertical transmission	20	66.7
Blood transfusion	6	20.0
Unknown	4	13.3

Table 2 shows the prevalence of clinical characteristics in HIV-infected children. The most common clinical finding was fever (20/66.7%) followed by weight loss (18/60%). There were 15 (50.0%) children with recurrent upper respiratory tract infections, 13 (43.3%) with chronic cough and 10 (33.3%) with recurrent pneumonia. The least frequent clinical manifestation was change of voice and was observed in 5 (16.7%) children.

Table 2: Frequency of clinical features among HIV-positive children (n=30)

Clinical features	Frequency (n)	Percentage (%)
Weight loss	18	60.0
Fever	20	66.7
Diarrhea	11	36.7
Chronic cough	13	43.3
Change of voice	5	16.7
Recurrent upper respiratory tract infection	15	50.0
Recurrent pneumonia	10	33.3

Laboratory results and clinical associations of study participants are shown in **Table 3**. Anemia was seen in 19 (63.3%) children and lymphopenia in 14 (46.7%) children. Twenty-one (70.0%) participants had increased serum immunoglobulin levels. There were 12 (40.0%) children with co-infections, the most common co-infection being TB.

Table 3: Laboratory findings and associated conditions among HIV-positive children (n=30)

Variables	Frequency (n)	Percentage (%)
Anemia	19	63.3
Lymphopenia	14	46.7
Raised serum immunoglobulin levels	21	70.0
Presence of co-infection	12	40.0
Tuberculosis	7	23.3
Recurrent bacterial infections	5	16.7

Table 4 shows the association between selected demographic factors and clinical manifestations of HIV infection. Children aged 1-5 years had a higher number of fever and recurrent respiratory infections than others, but the difference was not statistically significant. Likewise, there was no significant difference between males and females when it comes to clinical features, although male children had more weight loss and chronic cough.

Table 4: Association of demographic characteristics with clinical features of HIV infection

Variables	Clinical feature present n (%)	Clinical feature absent n (%)	p-value
Age group			
1 month–<1 year	3 (75.0)	1 (25.0)	0.421
1–5 years	11 (78.6)	3 (21.4)	
6–12 years	9 (75.0)	3 (25.0)	
Gender			
Male	14 (82.4)	3 (17.6)	0.352
Female	10 (76.9)	3 (23.1)	
Mode of transmission			
Vertical transmission	17 (85.0)	3 (15.0)	0.216
Other modes	7 (70.0)	3 (30.0)	

DISCUSSION

The present study assessed the prevalence and clinical aspects of Human Immunodeficiency Virus (HIV) in children in CDF Hospital, Hyderabad. Results showed that fever, loss of weight and frequent respiratory tract infections were the common clinical presentations in HIV-positive children. Vertical transmission was found to be the main transmission method, underscoring the ongoing need for continuity of care for prevention of mother-to-child transmission (PMTCT) and early infant diagnosis (EID) services.

The majority of people were vertically infected with HIV in the current study, which was consistent with previous evidence showing that the main route of pediatric HIV infection is through vertical transmission. While the PMTCT strategies have come a long way, Mofenson et al. stressed that there was still much work to do to ensure a full coverage of prevention, with particular needs in resource-limited settings to improve early diagnosis and linkage to care [11]. Likewise, international studies have documented that pediatric HIV care must continually be improved in terms of testing, starting on treatment, and retaining in care to decrease childhood morbidity and mortality [12].

Fever was the most common clinical feature and was followed by weight loss and recurrent respiratory infections. These findings were similar to those of earlier studies reporting fever, failure to thrive, respiratory infections, and opportunistic infections as typical manifestations in children with HIV. Cotton and Violari found that immune suppression in children with HIV was often associated with recurrent infections and a delay in growth, and that clinical signs and symptoms should be recognised early on [13]. Bamford et al. also noted that respiratory symptoms, chronic infections and constitutional symptoms were important clinical signs which should trigger HIV assessment in children [14].

In the current study, anemia, lymphopenia, and co-infections were observed and they were the immunological consequences of HIV infection. Children with HIV associated immune deficiency were vulnerable to recurrent bacterial infections, TB and other opportunistic infections. The most recent WHO recommendations highlighted that children and adolescents should be regularly clinically monitored, immunologically assessed, and started on ART early to reduce the risk of HIV-related complications [15]. Moreover, UNAIDS reports showed that while there had been progress in global coverage of HIV treatment in children, there were significant gaps in diagnosis and access to full paediatric care [16].

The findings were consistent with previous studies that the management of paediatric HIV is a multi-disciplinary approach, including early detection, laboratory confirmation, nutritional assessment, infection prevention and long-term ART monitoring. With many developments in the current treatment of paediatric HIV, survival is now a concern, but adherence to treatment, drug problems and late presentation are significant issues [17]. Integrated HIV services for children and adolescents and ongoing monitoring have also been increasingly highlighted as key strategies for improving clinical outcomes in recent evidence [18–20].

The study gave local hospital-based evidence on the prevalence and clinical picture of HIV in children in Hyderabad. Reliability of findings was increased through use of a structured data collection approach, standardized operational definitions, and evaluation of multiple clinical manifestations. This study had a number of limitations. There were limited sample size and this study was performed at a single centre, which limited the generalizability of the results. Due to the cross-sectional design, long-term outcomes, disease progression and treatment response could not be assessed. Moreover, socioeconomic and adherence to treatment were not examined in detail.

To establish a regional HIV infection pattern, future multicentre study with a larger sample size should be carried out. To reduce the morbidity associated with HIV, regular screening of high-risk children, strengthening of PMTCT activities, early infant diagnosis and improved access to paediatric ART services are recommended.

CONCLUSION

The study concluded that common clinical manifestations observed among the HIV positive children at CDF Hospital, Hyderabad were fever, weight loss and recurrent respiratory infections. Vertical transmission continued to be the most common route of infection. To reduce disease burden and increase the clinical success of children with HIV, early diagnosis, timely initiation of treatment and comprehensive HIV care for children is necessary.

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