Original Research Article

To study the rate of HIV Sero-positivity in paediatric patients with high risk clinical profile

Tarsem Singh[1], Navreet Kaur Natt[2]*, Sneh Prabha Goel[1]

[1]Department of Paediatrics, LLRM medical college, Meerut, Uttar Pradesh, India
[1]Department of Pharmacology, Government Medical College, Amritsar, Punjab, India

*Correspondence:
Dr. Navreet Kaur Natt,
E-mail: reetnatt@gmail.com

ABSTRACT

Background: Understanding the magnitude and clinical profile of pediatric HIV is essential for the clinicians and policy makers. The study was aimed to determine the rate of HIV seropositivity in pediatric patients with high risk clinical profile, study the clinical presentations and the mode of transmission of HIV in children.
Methods: This prospective hospital-based study to screen 244 children aged 18 months to 12 years with high risk clinical profile for HIV seropositivity was carried out for a period of 1 year.
Results: Of the 244 children screened, the commonest clinical features associated with high risk profile were failure to thrive in 200 (81.97%), persistent fever in 151 (61.89%), chronic diarrhoea in 76 (31.15%), cough >1month 112 (45.90%) patients. HIV seropositivity was reported in 11/244 (4.51%) patients; with failure to thrive in 10/11 (90.90%), chronic diarrhoea in 09/11 (81.81%), seborrheic dermatitis in 2/11 (18.18%) patients followed by persistent cough, severe malnutrition, oral thrush, generalized lymphadenopathy and recurrent bacterial skin infections in 1 patient each out of 11(9.09%). Chronic diarrhoea was a significant independent clinical risk factor for predicting HIV seropositivity (Chi^2 = 13.81, p<0.001, Odds ratio=11.15). The probability of HIV seropositivity increased significantly with the number of risk factors concomitantly present, with 30% seropositivity in those with four clinical risk factors (Chi^2 =32.89, D. F=1, P<0.001). The parents of all seropositive children were seropositive.
Conclusions: The probability of HIV infection in a child depends upon the nature and number of clinical manifestations present. All HIV positive children h HIV positive parents in this study indicating vertical transmission.

Keywords: Clinical profile, High risk, Pediatric HIV, Seropositivity

INTRODUCTION

Pediatric human immune deficiency virus (HIV) infection represents one of the most significant issues of public health concern globally. With an estimated 3.4 million children living with HIV worldwide; 3, 30000 (280 000-380 000) new HIV infections and 2,30000 (200 000-270 000) HIV-related deaths occurred among children in 2011.[1] The global epidemic needs to be tackled with utmost priority.

In most of the countries, there is sparse surveillance data on paediatric HIV, restricted mostly to in utero exposure, intra-partum infection and some survival data for children infected with HIV through mother-to-child transmission (MTCT).[2] Although several studies have been carried out to determine the association of HIV infection with various clinical manifestations in African countries, there are a few studies that have investigated this aspect in Indian children.[3-9] Due to lack of data on paediatric epidemics, the policy makers have to rely on the general

assumptions and estimates that may not be applicable to all contexts.

Earlier, pediatric population seemed to be at the periphery of AIDS epidemic, but the situation is rapidly changing now. The ratio of infected men to women is fast approaching 1:1. Most of the HIV infected women are of child bearing age and are a source of infection for pediatric population.[10] In developing countries such as India, the number of cases of pediatric HIV infection continue to rise due to increasing prevalence of HIV infection in women and ineffective measures for prevention of vertical transmission because of poor access to anti-retroviral medication and safe breast milk substitute. Routine HIV testing for all pediatric patients is not feasible considering the economic and psychological reasons involved. Clinically directed selective screening of high risk children is a plausible option to diagnose maximum cases with optimum utilization of resources. Hence, the present study was undertaken to assess the HIV seropositivity rate in children with high risk clinical profile and analyse the clinical profile in which HIV seropositivity is likely.

METHODS

This prospective hospital-based study was carried out for a period of one year in the Department of Pediatrics and department of Pathology and Microbiology, Lala Lajpat Rai Memorial Medical College/Sardar Vallabh Bhai Patel Hospital, Meerut, Uttar Pradesh, India. Permission was obtained from institution's ethical committee. Two hundred forty-four high risk children aged eighteen months to twelve years, admitted in the Pediatric ward or attending the Pediatric out patient department of the hospital, were included in the study.

The selection of children in the present study was based on "WHO revised clinical classification of HIV in infants and children, 2006" and as these manifestations have been reported to be associated with the seroprevalence rate in other studies or are considered to be highly specific manifestation for HIV infection.[7-9,11] The criteria included fever for one month or more, chronic diarrhoea exceeding one month, severe malnutrition, persistent cough for more than one month, oral thrush, generalized lymphadenopathy, hepatomegaly, repeated bacterial infections, generalized dermatitis, chronic parotid swelling and disseminated tuberculosis.

The nature and purpose of the study was explained to the parents in detail. Pre-test counselling was provided and this consisted of information on the link between the high risk behaviour and HIV infection, technical aspects of screening and the possible personal, medical, social, psychological and legal implications of being found either positive or negative. After obtaining an informed consent from the parents or guardians, detailed history was taken. After thorough clinical examination, findings were recorded in the proforma. Routine and relevant investigations were performed in all cases. Next the patients were subjected to HIV testing by initial ELISA test. If the first test result was positive, it was confirmed by second ELISA using a different kit. The serum sample testing positive for HIV antibodies in both the tests was reported as HIV positive. If the first ELISA shows equivocal results, a second ELISA was performed on the same blood sample, which if negative, child was labelled HIV negative. But if again equivocal, a third blood sample obtained after minimum of 2 weeks duration and was tested by ELISA testing. If third sample was negative, the child was labelled as HIV negative.[12,13] In HIV positive cases, parents and sibling were screened to know the mode of transmission. Counselling was done to assess the psychosocial aspect of HIV positivity.

RESULTS

High risk children

Of the 244 children screened, age distribution was as in Figure 1. One hundred thirty-eight were males while one hundred six were females giving ratio of 1.3:1. High risk occupation (driver) in parents was present in 10 (4.10%) parents, while there was history of contact with tuberculosis in as high as 78 (31.97%) cases.

Table 1: HIV sero-status in relation to each clinical risk factor.

Clinical manifestations	HIV seropositive (percent out of n)	HIV seronegative (percent out n)	Total (n)
Failure to thrive (n=200)	10 (5.00)	190 (95)	200
Fever for more than one month (n=151)	00 (00.0)	151 (100.0)	151
Chronic diarrhoea (n=76)	09 (11.84)	67 (88.16)	76
Persistent cough	01 (0.89)	111 (99.11)	112
Severe malnutrition (n=144)	01 (0.69)	143 (99.31)	144
Oral thrush (n=12)	1 (8.33)	11 (91.67)	12
Generalized lymphadenopathy (n=26)	1 (3.85)	25 (96.15)	26
Hepatomegaly(n=66)	00 (00)	66 (100)	66
Repeated common systemic infections (n=12)	01 (8.33)	11 (91.67)	12
Seborrheic dermatitis (n=10)	02 (20)	08 (80)	10
Recurrent bacterial skin infections (n=2)	01 (50)	01 (50)	2
Disseminated tuberculosis	00 (00.00)	78 (100)	78
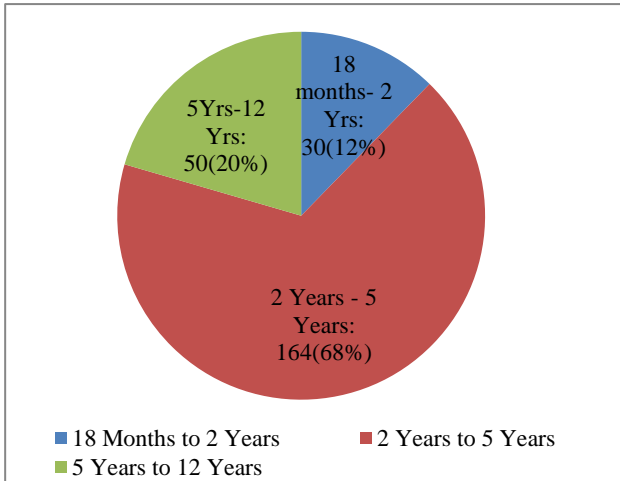
Figure 1: Age wise distribution of high risk children.

The clinical profile of the children as in Table 1 showed failure to thrive/rapid weight loss was the commonest presenting complaint and was found in 200 (81.97%) children. Fever and chronic diarrhoea both more than one month were present in 151 (61.89%) and 76 (31.15%) of the screened children respectively. Persistent cough more than one month was present in as high as 112 (45.90%) patients. Generalized lymphadenopathy, oropharyngeal candidiasis, repeated systemic infections and seborrhoeic dermatitis were present in 26 (10.66%), 12 (4.92%), 12 (4.92%) and 10 (4.10%) patients respectively.
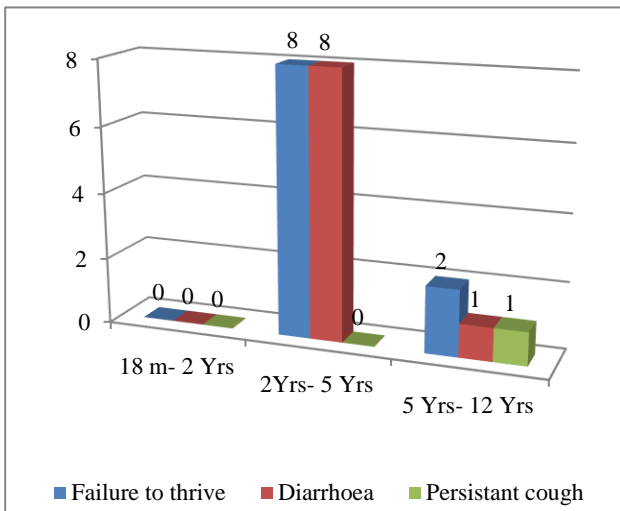
Figure 2: Chief presenting complaints in HIV Positive children.

Among the HIV seropositive children, failure to thrive/rapid weight loss was the commonest presenting complaint and was found in 10(90.90%) children. Chronic diarrhoea of more than 1 month was present in 09(81.81%) of the screened children. Persistent cough of more than 1 month was present in only 1 (9.09%) patients. Patients with recurrent bacterial skin infections and seborrheic dermatitis showed higher specificity with

seropositivity of 1/2(50%) and 2/10(20%) respectively. The age wise distribution of the presenting complaints were as shown in Figure 2.

As shown in Table 2, chronic diarrhoea was a significant independent clinical risk factor for predicting HIV seropositivity. Children with chronic diarrhoea were at 11.15 times greater risk of being HIV seropositive compared to those who did not have diarrhoea.

Table 2: Chronic diarrhoea compared to other risk factors.

| HIV Status	Positive	Negative
Chronic diarrhoea present	9	67
Chronic diarrhoea absent	2	166
Total	11	233

Chi^2 = 13.81, p<0.001, Odds ratio=11.15

Table 3: HIV sero-positivity in relation to number of risk factors.

Number of risk factors present	No. of cases	HIV positive cases N (%)	HIV negative cases (n=233)
One	100	2 (2.00)	98 (98.00)
Two	98	1 (1.02)	97 (98.98)
Three	26	2 (7.69)	24 (92.31)
Four	20	6 (30.00)	14 (70.00)
Total	244	11 (4.51)	233 (95.49)

Chi^2 =32.89, D.F=1, P<0.001

As number of risk factors that were concomitantly present increased the probability of HIV seropositivity also increased significantly. The rate of seropositive was 30% in those who had four clinical risk factors. This is in contrast to lower figures obtained with lesser number of risk factors as shown in Table 3.
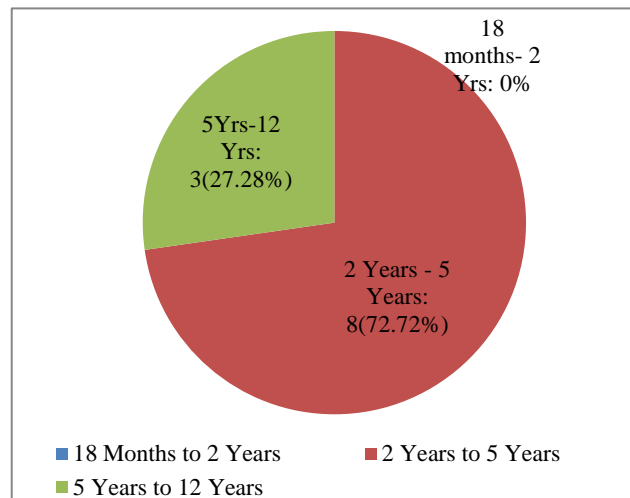
Figure 3: Age wise distribution of HIV positive children.

HIV seropositive children

As shown above, HIV screening was done in all (244) patients and of these 11(4.51%) patients were reported to be positive by using WHO-UNAIDS strategy II. The age distribution of the HIV seropositive patients was as shown in Figure 3.

There were 6 male and 5 females giving a male to female ratio of 1.3:1. The parents and siblings of HIV positive children were screened by ELISA test. The parents of all seropositive children were found seropositive while sibling of only one (9.09%) patient was found positive. Thus, the probable source of infection was vertical transmission from parents.

DISCUSSION

HIV infection has become one of the greatest pandemics ever. The disease has evolved in both magnitude and diversity with profound health impact on affected pediatric population. Early diagnosis of HIV infection in a child is helpful in providing supportive care and in instituting prophylactic therapy. At the same time undertaking workup for the diagnosis of HIV involves the costs associated with testing and counselling. Although the antibody-based tests are comparatively inexpensive, counselling involves huge costs and is considered to be time consuming and emotionally draining on staff.[14]

Apart from this, the parents have to undergo tremendous psychological stress till a negative test result is obtained. Routine HIV testing is not a feasible option considering the economic and psychological cost involved. Clinically directed selective screening to diagnose HIV infection is the only way to achieve the dual objective of diagnosing maximum number of subjects without wasting resources in an undue manner. However, for this physicians should be aware of the quantum of risk of HIV infection associated with a particular manifestation in the community that they serve. However, such data regarding Indian children is scarcely available.

In our study, the overall seropositive rate in high risk children was 4.51%. This high rate cannot be considered to reflect the seropositive rate in the population or even in pediatric population. However, the high rate found indicates that selectively directed screening has been able to facilitate the diagnosis of HIV infection in high risk children. Based on WHO Revised Clinical Classification of HIV in infants and children, 2006, twelve clinical risk factors were included with chronic diarrhoea, oral candidiasis and disseminated tuberculosis associated with higher seropositivity rate of HIV infection; chronic parotid swelling and recurrent bacterial skin infections being highly specific for childhood HIV infection; prolonged fever, severe malnutrition, persistent cough, dermatoses, repeated common infections, generalized lymphadenopathy and hepatomegaly being common clinical features seen in children.[11]

However, children without HIV infection also presented with diseases that have similar clinical features. This phenomenon is probably related to high prevalence of malnutrition, poor hygiene, inadequate sanitary facilities and preponderance of infectious diseases in our country. We did not encounter even a single case with parotid swelling. This indicates that these signs are uncommon in sick children, whether HIV positive or otherwise. The fact that we only studied children over the age of 18 months and have not undergone invasive diagnostic procedures for confirming the diagnosis of pneumocystis Carini pneumonia has resulted in our inability to diagnose even a single case of PCP.

Although chronic diarrhoea, severe malnutrition, persistent cough, recurrent minor infections, disseminated tuberculosis and hepatomegaly without being HIV associated diseases are common manifestations in sick children in our community.[11] Of these high-risk manifestations, only chronic diarrhoea was significant independent risk factor for prediction of HIV infection (P<0.001) in our study.

In our study, HIV seropositivity was 4.51% in high risk children and chronic diarrhoea was significant risk factor for HIV seropositivity, 11.84% (chi^2=13.81, p<0.001). It is notesworthy that Karande et al, also found that oral candidiasis was a significant risk factor in a study conducted in children from Mumbai, India.[7]

Another study by Bavedkar and Agarwal, reported that out of 115 high risk children 23 (20%) were found to be seropositive. The seropositivity rate for various manifestations varied from 9.1% for chronic diarrhoea to 83.3% for seborrheic dermatitis.[8] For three commonest manifestations, fever more than one month, severe malnutrition and hepatomegaly probability of seropositive rate were 18%, 26.1% and 20.8% respectively. A study by Shahab et al, reported a seroprevalence rate of 2% in patients with tuberculosis with 5 out of 250 patients with tuberculosis being HIV positive.[9] Various investigators have identified different independent risk factors for childhood HIV infection. The clinical risk factors studied in include malnutrition, oral candidiasis, pneumonia, adenopathy, and chronic diarrhoea.[15-17]

Whereas, in our study, we found that chronic diarrhoea was a significant risk factor for HIV seropositive status (chi^2=13.81, p<0.001). This indicates that the significant risk factors could vary from community to community. This makes it imperative that studies are carried out to determine these factors in different communities and in different geographical areas. It was also noted that the probability of HIV infection increased progressively and significantly (chi^2=32.89, P<0.001) as the number of risk factors concomitantly present in the child increased. Similarly, Bavedekar and Agarwal reported the relationship between the number of risk factors that were concomitantly present in a child and sero-positivity rate.[8]

The rate of sero-positivity was 80% in those with five clinical risk factors. This is in contrast to lower figures obtained in our study though with lesser number of risk factors. A child with more severe disease or with greater immunosuppression may have more manifestations and this phenomenon could be responsible for the trend referred above.

All HIV seropositive children had seropositive parents indicating mother to child transmission(MTCT) as the most significant route of HIV transmission in pediatric population. This is in coherence with WHO Report on the global AIDS epidemic 2010 which shows MTCT to be associated with 90% of pediatric serpositivity.[18]

The present study had its share of limitations. The study was carried out in high risk children with signs and symptoms of some illness. Hence the results would not be applicable to screening of asymptomatic children. In addition, we did not include children less than 18 months as diagnosing HIV infection in them would have entailed performance of HIV DNA PCR. This was not possible due to financial constraints.

Despite these limitations, the study was able to identify that chronic diarrhoea, recurrent bacterial skin infections, generalized dermatitis and oral thrush showed significant association with HIV infection in children. The study also showed that the probability of diagnosing HIV infection increases with the increase in the number of risk factors present in a child. Our study shows that clinically directed selective screening does have a practical role in diagnosing HIV infection in resource-poor setting. Pediatricians and physicians working in similar situations could use this data to undertake clinically directed screening to diagnose HIV infection in children.

Thus, the probability of HIV infection in a child depends upon the nature and number of manifestations present with chronic diarrhoea being a significant risk factor for seropositivity. All HIV positive children had HIV positive parents indicating vertical transmission from parents to them, showing thereby the importance of screening all antenatal cases and children of HIV positive parents.

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