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Trend of HIV Seropositivity among Children at Teaching Tertiary Care Hospital in North India

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Authors' contributions

This work was carried out in collaboration between all authors. Authors RA and PY designed the study. Author PY compiled the data retrospectively. Authors RA and PY wrote the protocol and the first draft of the manuscript. Authors RA, PY and VK managed the literature searches, discussion and revision of the manuscript. Author UC managed the investigational and administrative part of the manuscript part. All authors read and approved the final manuscript.

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Data Article

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ABSTRACT

Aim: The aim of this study is to ascertain the burden and trend of HIV sero-positivity among children attending ICTC in a teaching tertiary care hospital.
Study Design: Retrospective study.
Methodology: HIV seropositivity among children of age group 18 months- 14 years was determined by serological tests for HIV antibodies among children enrolled in ICTC of a teaching tertiary care hospital from Jan 2011 - Dec 2013 as per NACO guidelines.
Result: Of 2529 children tested for HIV infection, 10.4% were found to be seropositive. Statistically significant ($p < 0.05$) fall in the seropositivity was observed over the three years study period. In all the three years male children were more seropositive than female children (1.78:1). Most of the children were serodiagnosed late in our study, with mean age of 5.30 years / 63.64 months.
Conclusion: Our study reports a declining trend of sero-positivity (from 13.1% to 9.8%) among children attending ICTC. But the prevalence is still high (>9%) which calls for re-intensified efforts on health education and risk control programme.

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Keywords: HIV; AIDS; NACO; children; paediatric; ICTC; sex ratio; seropositivity.

1. INTRODUCTION

Human Immunodeficiency Virus (HIV) continues to be a major global public health issue, having claimed more than 34 million lives so far. In 2014, 1.2 [1.0–1.5] million people died globally from HIV-related causes. There were approximately 36.9 [34.3–41.4] million people living with HIV at the end of 2014 with 2.0 [1.9–2.2] million people becoming newly infected with HIV in 2014 worldwide [1]. The HIV prevalence trend has witnessed significant decline among antenatal clinic attendees considered proxy for general population (0.49% in 2007 to 0.35% in 2012- 2013). Although the prevalence of HIV infection has declined in India but due to large population it stands third, in terms of absolute numbers of people living with HIV, next only to South Africa and Nigeria [2]. Heterosexual contact is the predominant mode of transmission among adults in India with an increasing number of women of childbearing age becoming infected with HIV. Consequently, children in India are increasingly getting infected, primarily from vertical transmission [3,4,5]. The vast majority of children born to HIV- infected mother acquire the infection in utero, at the time of delivery or postnatal through breast feeding [6]. Paediatric HIV is a major world health problem, which is progressing at an alarming rate. Data as per UNAIDS states that 2,40,000 new HIV infections occurred among children (0–14 years) in low- and middle-income countries in 2013 [7]. Children less than 15 years of age accounted for 7% (1.45 lakh) of all infections with an estimated to have around 14,500 new HIV infections among children in India in 2011 [2].

The knowledge of HIV infection among children is important as it will cause a parallel increase in heterosexual transmission and the number of infected women of a child bearing age. Although a lot of work has been done in different parts of world regarding extent and magnitude of paediatric HIV infection, there is a paucity of data on paediatric HIV infection in India. The HIV epidemic in India is heterogeneous in its distribution and disease burden is not same everywhere. This study is therefore an attempt to investigate the recent trend and magnitude of paediatric HIV infection in children attending Integrated Counselling and Testing Centre (ICTC).

2. MATERIALS AND METHODS

This is a retrospective analysis of the data from January 2011 to December 2013 done in ICTC, Department of Microbiology, Pt B.D. Sharma PGIMS Rohtak, a premier tertiary teaching hospital in North India and a referral hospital for Haryana and beyond. Case records of all the children in the age group of 18 months to 14 years, who were either walk-in clients or referred by clinicians, during the above mentioned study period were retrieved. Children <18 months of age were not included in the study as facility of DNA PCR for confirmation of reactive cases was not available. Written informed consent from parents or legal guardians was obtained before testing. Pre-test and post- test counselling was provided to all the parents or guardians accordingly and relevant demographic data was recorded. Blood sample was drawn by venepuncture and HIV testing was done as per National AIDS Control Organisation (NACO), India guidelines. Three HIV rapid test kits were used which were based either on different antigen or different principle. First test kit was of highest sensitivity. Samples with first test reactive were further confirmed with two other HIV tests with higher specificity. The HIV test kits utilized in the laboratory for the testing of these samples were provided by the NACO through Haryana State AIDS Control Society (HSACS). Details of the kits used in the study is mentioned in the Table 1. The sensitivity and specificity of different kits was provided by the manufacturer.

Table 1. Details of the test kits used in the study

Sr. no	Name	Manufacturer	Principle of test	Sensitivity	Specificity
1.	Comb-AIDS	J. Mitra & Co. Pvt. Ltd.	Dot immunoassay	100%	99.9%
2.	Pareekshaktriline	Bhat bio-tech India Ltd.	Lateral flow immunochromatography	100%	99%
3.	Tridot	J. Mitra & Co. Pvt. Ltd.	Immunodiffusion	100%	100%

2.1 Statistical Analysis

Data analysis was done using Software Package for Social Sciences (SPSS) statistic version 19 for Windows. The chi square ($\chi 2$) test was used to evaluate the association between seropositivity rates and the age groups and p value of < 0.05 was considered statistically significant.

3. RESULTS

A total of 2529 children between 18months- 14 years comprising of 1545 male and 984 female children were screened during this study. The overall prevalence of HIV seropositivity in these three years was 10.4% with HIV-1 was the only viral serotype that was detected. Out of total 635, 857 and 1037 children tested, 83(13.1%), 79(9.21%) and 102(9.8%) were sero-positive for HIV in years 2011, 2012 and 2013 respectively as shown in Fig. 1. This trend of seropositivity over the three years was statistically significant with p value <0.05.

Fig. 2 shows gender wise distribution of HIV seropositive children. The HIV seropositivity was constantly high in male than female children in all three years but the difference was not statistically significant (p value >0.05).

Table 2 shows the age group wise distribution of seropositive children. The seropositivity rate was highest in the age group of >18 months- 05 years (22%), followed by age group >05-10 years and minimum in age group >10-14 years. However, this difference of seropositivity in various age groups was statistically insignificant (p value >0.05).

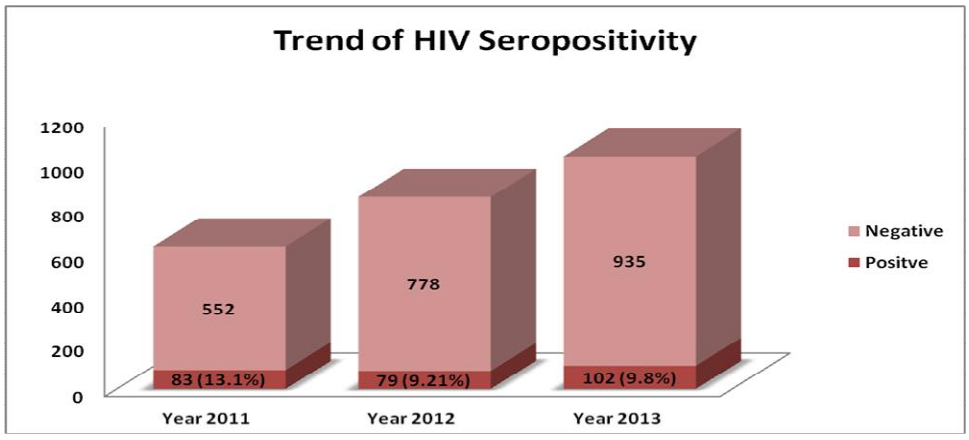

Fig. 1. Trend of HIV seropositivity
(Chi square -6.474, degree of freedom (dof) -2, p=0.039)

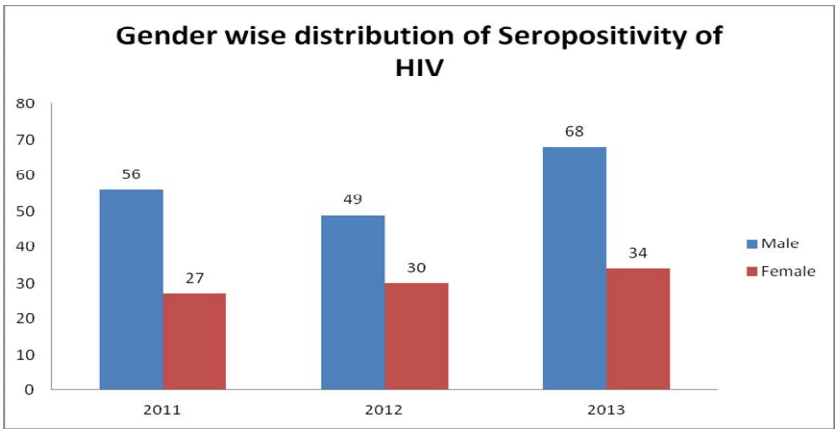

Fig. 2. Gender wise distribution of HIV seropositivity
Chi square -0.626, dof-2, p=0.7312

Table 2. Age group wise distribution of seropositivity of HIV

Age group	2011	2012	2013
18 m- 5 yrs	39	29	43
>5 - 10 yrs	27	22	32
>10 - 14 yrs	17	28	27

Chi square -4.694, dof-4, p=0.320

4. DISCUSSION

The overall seropositivity among paediatric age group observed in this study was 10.4%. Although actual prevalence of paediatric HIV infection in India is unknown, a wide range has been reported in literature. Quite higher rate of seropositivity of 20% has been reported by Bavdekar et al. [8]. Seropositivity of 11.2%, 8.9% and 8.18% was observed by Karande et al. [9], Parthasarathy et al. [10] and Agarwal et al. [11] respectively, is in accordance with the present study. Other workers have reported lower rates of seropositivity of 5.4% and 2.3% [12,13]. This difference in the prevalence may be due to different patient selection criteria followed by different authors. Moreover this difference in seropositivity of HIV among paediatric population reflects the seropositivity status in general population of that area.

In the present study, the number of attendees at ICTC has increased from 635 to 1037 but HIV seropositivity has declined from 13.1% to 9.8% in year 2011 and 2013 respectively. This fall in seroprevalence may be attributed to the effectiveness of the Prevention of Parent to Child Transmission (PPTCT) program by NACO, which was started in 2002. The different targeted interventions by National AIDS Control Programme along with increased involvement of Non- Government Organisations has increased awareness in general population and promoted safer sex practises, treatment of sexual and reproductive tract infections, safe blood transfusion services along with early diagnosis of HIV and early institution of anti retroviral therapy in pregnant females has ultimately lead to a parallel decrease in seropositivity in children.

In our study, attendance of male children ICTC exceeded that of female children by 561 (22%). This difference in sex ratio among attendees can be attributed to gender bias still prevailing in Indian society. In all three years, male children were more seropositive than female children. However this observation was insignificant statistically. Sex ratio for seropositive population was 1.78:1. Other studies conducted by Indian authors had also reported higher HIV seropositivity in male children [14,15,16]. However, studies conducted outside India had shown female predominance [17,18].

The children included in the study for HIV screening were of age 18 months to 14 years and majority of children were screened at more than five years of age. Mean age of diagnosis was 5.30 years / 63.64 months. Most of them were therefore diagnosed late. Late diagnosis has also been reported by various Indian studies as well as studies conducted outside India [15,19,20]. In contrast, a Nigerian teaching hospital has reported a lower mean age of diagnosis [21]. HIV seropositivity was highest in the age group of 18 months- 05 years. As majority of infection in children are acquired by vertical transmission.

5. CONCLUSION

Current HIV scenario in children is grim. Our study reports there is declining trend of sero-positivity (from 13.1% to 9.8%) among children attending ICTC. But the prevalence is still high (>9%) which calls for re-intensified effort on health education and risk control programme. Effective PPTCT programs, good diagnostic facilities and accessible and affordable ART are the need of the hour. To increase awareness among infected as well as general population so that they don't indulge in high risk behaviour and future transmission can be prevented.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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