

Prevalence of HIV in blood donors

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ABSTRACT

Background: Nepal is categorized as a country with 'concentrated' epidemic of HIV. Nepal Red Cross Society, Blood Transfusion Service has implemented considerable efforts to supply the safe blood and blood products according to the increasing demand. A trend analysis might prove valuable to understand the outcome and appropriately plan for further improvements in providing safe blood supply. The study aimed to assess the trends of HIV seroprevalence over the six years in nationwide and in urbanized setting of Kathmandu Valley.

Methods: This is a retrospective study conducted among Nepalese blood donors through the years 2001-2007. Serum samples were tested using third generation ELISA tests, strictly following the instructions of manufacturers. The donors' information was collected through the donor record register through the respective Blood Transfusion Services.

Results: The overall seroprevalence of HIV among the total blood donors in nation wide and in Central Blood Transfusion Service (CBTS), Kathmandu through the six years of review (from 2001-2007) was 0.33% and 0.4% respectively. A significant decreasing trend in HIV seroprevalence was observed both in nationwide and in Central Blood Transfusion Service, Kathmandu ($P < 0.001$).

Conclusion: The analysis of trends in HIV seroprevalence among blood donors through the year 2001- 2007 showed a significantly decreasing trend, probably due to the cumulative effect of increasing awareness of HIV and improved screening system for safe blood donation. However, an abrupt increase in demand of blood supply was associated with significant increase in seroprevalence in the year 2005/2006.

Key words: nepalese blood donors, seroprevalence, trends

INTRODUCTION

HIV is the leading global health problem of considerable socioeconomic fatality. The AIDS Epidemic update of 2007 has shown a decrease in global HIV prevalence and it is reported that the seroprevalence of HIV has been leveling off in many countries and is decreasing in Sub-Saharan Africa.¹ The first case of AIDS in Nepal was reported in 1988.² As of December 2007, National Center for AIDS and STD Control (NCASC) has officially confirmed

10,546 HIV positive cases and 1,610 confirmed cases of AIDS in Nepal. Among the total 10,546 HIV positive cases, 24 (0.23%) cases are described to be associated with blood transfusion or organ transplantation.³ UNAIDS has estimated the adult (15-49 years) HIV prevalence rate of 0.5% by the end of 2005 in general population whereas the number of people living with HIV in the same time has been estimated to be 74,000.⁴ UN Nepal information platform has reported that over the last few years HIV/AIDS epidemic in Nepal has gained

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ground and Nepal has progressed from a low prevalence country to one with 'concentrated' epidemics.⁵ Most of the HIV infections in Nepal have been caused by HIV-1 though recently seroevidence of HIV-2 has been reported from Bhairahava, Nepal.⁶ A situation analysis study of HIV/AIDS has reported that the young people in mobile populations, female sex workers, men who have sex with men, injecting drug users and children as the most vulnerable to HIV/AIDS in Nepal.⁷ Around 10 years ago, Nepal was described as a country having comparatively lower prevalence of HIV/AIDS compared to other countries in Southeast Asia. Seasonal migration to Indian Cities for seeking job and sexual trafficking across a porous Indian border, fuelled by recent political insurgency, has raised Nepal's HIV prevalence second highest in the region after India.^{8,9} So far, the prevalence of HIV among the high risk groups (mobile populations, female commercial sex workers, men who have sex with men, injecting drug users) in Nepal has been reported to be range from 2.3-68%.¹⁰⁻¹³

This study was conducted to assess the trends in HIV seroprevalence over last six years among Nepalese blood donors population nationwide and in urbanized settings of Kathmandu Valley.

METHODS

This is a retrospective study conducted in Nepal Red Cross Society, Central Blood Transfusion Service. All blood donors, donating blood through the year 2001-2007, in Blood Transfusion Services, hospital units or in mobile camps organized all over Nepal were reviewed. Blood donors were informed that their blood would be used for mandatory screening of TTIs but the samples would be tested anonymously and confidentiality would be strictly maintained as per the guidelines of NRCS, BTS. Blood donors were selected for donation according to the criteria of BTS based on National Guidelines for Blood Transfusion Services. Sera from blood donors were

tested for detection of Anti HIV1 and 2 antibodies by third generation Enzyme linked Immunosorbent Assay (ELISA) (HIV TRI-DOT Test, J. Mitra and Co, India, Enzygnost Anti HIV ½, and Dade Behring, Germany). Initial reactive samples were tested in duplicate. Repeatedly reactive results were considered Seropositive for HIV. The data was entered in Microsoft excel spreadsheet collecting the information through standard records coordinating with regional, district chapter, emergency BTS and hospital units. Statistical analysis including Cochran- Armitage test for linear trend and multiple pairwise comparisons (Tukey procedure) was performed using the statistical software 'Winpepi ver 3.8'.

RESULTS

In this retrospective study, 524,328 blood donors in nationwide and 200,673 donors in CBTS were reviewed. The overall seroprevalence of HIV among the total blood donors in the nation wide data was 0.33% (95% CI= 0.31-0.34%). Majority of the donors were males (89.2%). A statistically significant decreasing trend in HIV seroprevalence was observed through the year 2001/2002-2006/2007 (Cochran-Armitage test for linear trend, Chi Square = 100.77, P <0.001) (Table 1). The overall seroprevalence of HIV among the blood donors in CBTS, Kathmandu was 0.4% (95% CI= 0.36-0.42%). A statistically significant decreasing trend of HIV seroprevalence was observed among blood donors in CBTS through the year 2001/2002-2006/2007 (Cochran-Armitage test for linear trend, Chi Square = 150.8, P <0.001) (Table 2). The data shows a steadily decreasing trend except in the year 2005/2006, where a significant increase in the seroprevalence rate than in the previous year was observed for both CBTS, Kathmandu and Nationwide HIV trends (Figure 1). The significance in difference of seroprevalence rate in different years was tested by the multiple pairwise comparisons (Tukey procedure) (Table 3).

Table 1. Seroprevalence of HIV among blood donors in the Nationwide data

| Year | Total Donors | Males | Females | HIV Seropositive | Seroprevalence (%) |
|-----------|--------------|-------|---------|------------------|--------------------|
| 2001/2002 | 72,459 | 92.03 | 7.97 | 316 | 0.44 |
| 2002/2003 | 73,758 | 90.91 | 9.09 | 323 | 0.44 |
| 2003/2004 | 76,647 | 89.78 | 10.22 | 281 | 0.37 |
| 2004/2005 | 82,677 | 85.59 | 14.3 | 183 | 0.22 |
| 2005/2006 | 103,067 | 88.6 | 11.4 | 383 | 0.37 |
| 2006/2007 | 115,720 | 88.4 | 11.6 | 215 | 0.18 |
| Total | 524328 | 89.2 | 10.8 | 1701 | 0.33 |

Table 2. Seroprevalence of HIV among blood donors in the CBTS data

| Year | Total donors | HIV Seropositive | Seroprevalence (%) |
|--------------|---------------|------------------|--------------------|
| 2001/2002 | 28,991 | 183 | 0.63 |
| 2002/2003 | 31,229 | 185 | 0.6 |
| 2003/2004 | 30,054 | 150 | 0.5 |
| 2004/2005 | 31,293 | 87 | 0.27 |
| 2005/2006 | 35,347 | 106 | 0.29 |
| 2006/2007 | 43,759 | 72 | 0.16 |
| Total | 200673 | 783 | 0.4 |

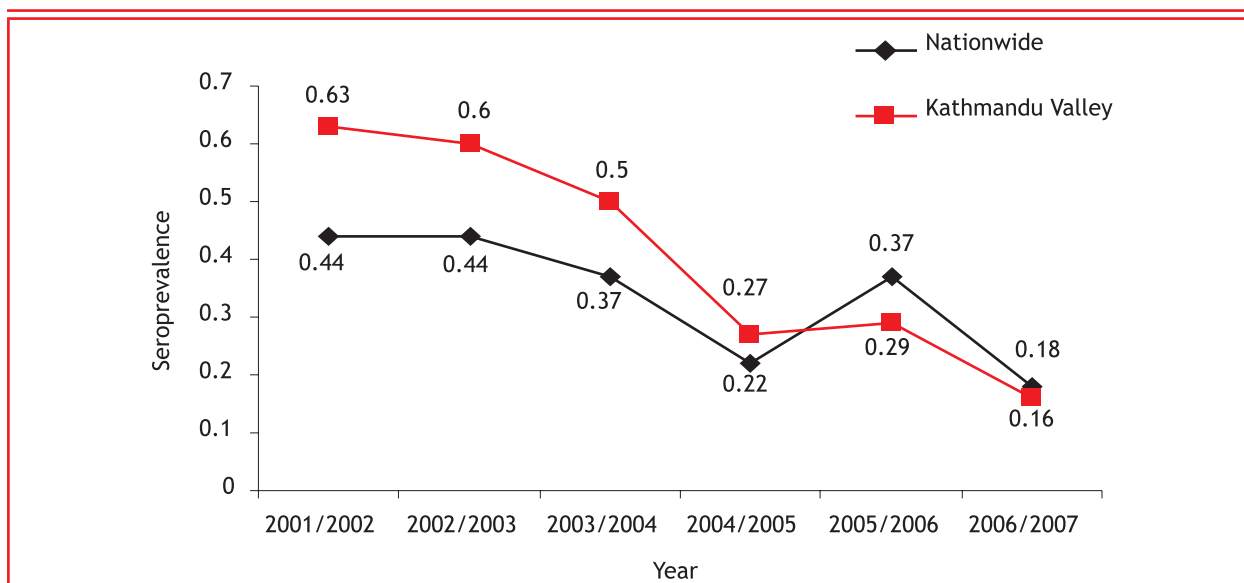


Figure 1. Trends in HIV seroprevalence

Table 3. Multiple pairwise comparisons for testing significance of difference in HIV Seroprevalence rates.

| For CBTS, Kathmandu | | | For Nationwide | | |
|----------------------|----------------|---------|----------------------|----------------|---------|
| Pair (Years) | Rates per 1000 | P-value | Pair (Years) | Rates per 1000 | P-value |
| 2001/2002, 2004/2005 | 6.3, 2.8 | <0.001 | 2001/2002, 2004/2005 | 4.4, 2.2 | <0.001 |
| 2001/2002, 2005/2006 | 6.3, 3.0 | <0.001 | 2001/2002, 2006/2007 | 4.4, 1.9 | <0.001 |
| 2001/2002, 2006/2007 | 6.3, 1.6 | <0.001 | 2002/2003, 2003/2004 | 4.4, 2.2 | <0.001 |
| 2002/2003, 2004/2005 | 5.9, 2.8 | <0.001 | 2002/2003, 2006/2007 | 4.4, 1.9 | <0.001 |
| 2002/2003, 2005/2006 | 5.9, 3.0 | <0.001 | 2003/2004, 2004/2005 | 3.7, 2.2 | <0.001 |
| 2002/2003, 2006/2007 | 5.9, 1.6 | <0.001 | 2003/2004, 2006/2007 | 3.7, 1.9 | <0.001 |
| 2003/2004, 2004/2005 | 5.0, 2.8 | <0.001 | 2004/2005, 2005/2006 | 2.2, 3.7 | <0.001 |
| 2003/2004, 2005/2006 | 5.0, 3.0 | <0.001 | 2005/2006, 2006/2007 | 3.7, 1.9 | <0.001 |
| 2003/2004, 2006/2007 | 5.0, 1.6 | <0.001 | | | |
| 2004/2005, 2006/2007 | 2.8, 1.6 | <0.001 | | | |
| 2005/2006, 2006/2007 | 3.0, 1.6 | <0.001 | | | |

DISCUSSION

The overall seroprevalence of HIV among the blood donors significantly decreased from 0.44% to 0.18% in nationwide and 0.63% to 0.16% in CBTS, Kathmandu between 2001/2002 to 2006/2007. The decline in HIV seroprevalence rates might be due to the cumulative effect of increasing public awareness about HIV, implementation of stringent donor selection by blood transfusion services, self-deferral by high risk individuals and increased detection of HIV positive cases due to increased accessibility to HIV testing services like voluntary counselling and testing (VCT). The blood donors are the adult population within the age groups of 18-60 years, so prevalence in other age groups is missed in such studies, however it is generally accepted that the prevalence in the blood donors if interpreted cautiously can provide insight to the epidemic condition in general population. In the nationwide analysis, a significant increase in the seroprevalence rate was seen in the year 2005/2006 and importantly this is the year which experienced the first abrupt increase in the demand of blood and blood products (Table 1). Slightly higher seroprevalence rate was observed in the urbanized setting of Kathmandu Valley (0.4%), which alone experienced about 40% of the total demand of blood supply in the country during the study period. The rate of decrease of seroprevalence in the Kathmandu Valley was relatively higher (0.039 percent per year) than in Nationwide (0.024 percent per year).

Similar to our study, a statistically non significant decreasing trend in HIV seroprevalence among blood donors was reported from New Delhi, India through the year 2002 to 2005 and the overall seroprevalence was also fairly higher than in Nepal.¹⁴ Totally in contrast to our study, a significantly increasing trend in HIV seroprevalence among blood donors was reported from the African country, Mali.¹⁵ The overall seroprevalence of HIV among Nepalese blood donors during the period of past six years estimated in this study was similar to the data reported from various cities in the neighboring country India.¹⁶⁻¹⁸ Much higher seroprevalence of HIV among blood donors than observed in present study has been reported from African countries.¹⁹⁻²³ The overall seroprevalence of HIV among blood donors as revealed by this study was quite higher than reported in other studies among blood donors by Gupta et al. in Ludhiana of India, Rahaman et al. in Pakistan, Kakepoto et al. in Pakistan.²⁴⁻²⁶ Such differences in seroprevalence rate might be due to geographical variation, condition of epidemic, donor selection criteria and by performance characteristics of test kits as well as diagnostic algorithms used in each study.

CONCLUSION

The analysis of trends in HIV seroprevalence among blood donors through the year 2001- 2007 showed a significantly decreasing trend, both in nationwide and CBTS data. The decreasing trends might be due to the cumulative effect of increasing awareness of HIV and implementation of improved screening system for safe blood collection.

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