RESEARCH NOTE

SEROPREVALENCE OF HIV AND HEPATITIS C CO-INFECTION AMONG BLOOD DONORS IN KATHMANDU VALLEY, NEPAL

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Abstract. We assessed the seroprevalence of human immunodeficiency virus (HIV) in different categories of blood donors and the hepatitis C virus (HCV) co-infection rate. A total of 33,255 blood samples were screened for HIV using a third generation ELISA test at the Central Blood Transfusion Service, Nepal Red Cross Society, Kathmandu from December 2006 to September 2007. The seroprevalence of HIV was 0.19% (95% CI= 0.15-0.25) and co-infection with HCV was found in 10.8% (95% CI= 4.4-20.9). There were no significant differences in HIV seroprevalence among the different categories of age, sex, type of donation and time of donation. The study revealed a relatively lower seroprevalence of HIV among blood donors in Kathmandu Valley than reported earlier but a higher HCV co-infection rate. The similar seroprevalence between first time and repeat donors suggests the need for more improved donor education and counselling.

INTRODUCTION

Nepal has been categorized as a country with a "concentrated" epidemic of human immunodeficiency virus (HIV) (UNAIDS, 2004). Although every unit of donated blood is screened for anti-HIV-1 and 2 antibodies, there is the probability of transfusion associated HIV infection due to blood donated during the serologic window period (Folks and Khabbaz, 1998). This risk increases as the prevalence of HIV increases among the blood donor population.

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Globally, 33.2 (30.6-36.1) million people were living with HIV in 2007 (UNAIDS, 2007). The adult HIV prevalence rate was reported to be 0.5% in the general population of Nepal at the end of 2005 (UNDP, 2005). In an earlier study, the seroprevalence of HIV among blood donors in Kathmandu Valley was reported to be 0.3% (Sharma *et al*, 2001). Similarly, the seroprevalence of HIV in blood donors was reported by Gupta *et al* (2004) to be 0.084%, by Mathai *et al* (2002) to be 0.2% and by Singh *et al* (2005) to be 0.54% in neighboring country India.

Hepatitis C virus (HCV) and HIV are transmitted via similar routes making co-infection with these viruses a common event (Horvath and Raffanti, 1994). Studies in North and South India have reported HIV

and HCV co-infection rates of 2.4% and 2.2%, respectively, (Gupta and Singh, 2006; Saravanan *et al*, 2007). The prevalence of HCV among HIV seropositive injection drug users (IDUs) has been reported to be 50 to 90% (Huemer *et al*, 1990; Thomas *et al*, 1996). HCV/HIV co-infection is particularly important because studies suggest that with co-infected individuals progression to cirrhosis occurs more frequently and at a faster rate than with HCV infection alone (Soto *et al*, 1997; Benhamou *et al*, 1999).

A study of HCV/HIV infection in blood donors could provide data useful for formulating the strategies to improve the transfusion safety. In this study we report the seroprevalence of HIV in different categories of blood donors and the presence of co-infection with HCV in Kathmandu Valley, Nepal.

MATERIALS AND METHODS

We carried out a descriptive cross sectional study at the Central Blood Transfusion Service (CBTS), Nepal Red Cross Society (NRCS), Kathmandu, from December 2006 to September 2007. All blood donors selected for donation fulfilling the criteria of the CBTS for donation were included in the study. All donors were informed that their blood would be anonymously tested for transfusion transmitted infections (TTIs) and confidentiality would be maintained per the guidelines of the NRCS, CBTS. Sera from 33,255 blood donors were tested for anti-HIV antibodies using a third generation ELISA test (Enzygnost Anti-HIV 1/2, Dade Behring, Marbug, Germany). Positive samples were retested using another rapid anti-HIV test (HIV TRI-DOT, J Mitra and Co, New Delhi, India). Serum samples positive on both tests were defined as repeatedly reactive. Repeatedly reactive results were considered seropositive for HIV. The HIV seropositive samples were tested for anti-HCV antibodies by a third generation ELISA test (Genedia HCV ELISA 3.0, Green Cross Corporation, Kyunggi-do, Korea). An initial reactive test was retested with another rapid anti-HCV test (HCV TRI-DOT, J Mitra and Co, New Delhi, India). Repeatedly reactive result was considered seropositive for HCV. The ELISA was performed using an automated ELISA processor (Behring ELISA Processor III, Dade Behring, Marbug, Germany). Donor information was collected via a donor record form. The data was analyzed by the statistical software SPSS version 11.5. Chi-square test was used to test for statistical significance.

RESULTS

Of the 33,255 blood donors screened, the seroprevalence of HIV was 0.19% (95% CI= 0.15-0.25). There were no significant differences in HIV seroprevalence among the different categories of age, sex and time of donation ($p>0.05$). The seroprevalence of HIV was marginally higher in volunteer donors than in replacement donors ($p>0.05$) (Table 1). The co-infection rate with HCV and HIV in the donors was 10.8% (7/65, 95% CI= 4.4-20.9). All co-infected donors were male, 86% (6/7) of them were volunteer blood donors of age 21-30 years old.

DISCUSSION

The present study revealed a slightly lower seroprevalence of HIV (0.19%) in blood donors than reported by an earlier study in Nepal (Sharma *et al*, 2001). A few studies from India reported higher seroprevalences than the present study (Sonwane *et al*, 2003; Singh *et al*, 2005) while other studies have reported similar or lower seroprevalences (Mathai *et al*, 2002; Gupta *et al*, 2004). A comparatively much lower seroprevalence has been reported from Pakistan (Kakepoto *et al*, 1996; Khattak *et al*,

Table 1
Seroprevalence of HIV in blood donors according to sex, age, times of donation and type of donation.

Blood donors	Total (no.)	No. seropositive	Seroprevalence (%)	95% Confidence interval	*p*-value
Total	33,255	65	0.19	0.15-0.25	
Sex					
Male	28,989	58	0.20	0.20-0.30	>0.05
Female	4,266	7	0.16	0.10-0.30	
Age (year)					
≤20	5,434	10	0.18	0.10-0.30	> 0.05
21-30	15,704	37	0.23	0.20-0.30	
31-40	8,455	11	0.13	0.10-0.20	
41-50	3,161	6	0.18	0.10-0.40	
51-60	501	1	0.19	0.00-1.10	
Time of donation					
First time	16,476	33	0.20	0.10-0.30	> 0.05
Repeat	16, 779	32	0.19	0.10-0.30	
Type of donation					
Volunteer	29,552	60	0.20	0.20-0.30	> 0.05
Replacement	3,703	5	0.13	0.00-0.30	

2002; Sultan *et al*, 2007).

In the present study, no differences in seroprevalence of HIV were observed between male and female donors, indicating a similar distribution of seroprevalence between male and female donors. The age specific seroprevalences was not significantly different among themselves, although it was marginally higher in the age group of 21-30 years. This study revealed a marginally higher seroprevalence of HIV in volunteer donors than in replacement donors. A study from India reported a lower seroprevalence of HIV in volunteer donors (Garg *et al*, 2001). A higher seroprevalence in volunteer donors might be due to test seeking behavior of some community recruited volunteers which are potential threats to safe blood supply (Goncalez *et al*, 2006). However, such speculation was not tested in the present study. The study reveals a similar seroprevalence of HIV in first time and repeat donors. Generally, it is expected that regular repeat donors will have a lower seroprevalence, but this was not observed in the present study. This finding underlines the need for more effective donor education and post-donation counselling. Donor notification and counselling for TTIs may prove useful in reducing the seroprevalence of HIV in repeat donors, however the process should not violate donor rights.

A 10.8% co-infection rate with HCV and HIV found in our study is notably high in individuals screened from the general population. Comparatively lower co-infection rates of HCV and HIV have been reported from North and South India (Gupta and Singh, 2006; Saravanan *et al*, 2007). However, a much higher co-infection rate has been reported in IDUs (Huemer *et al*, 1990; Thomas *et al*, 1996). Co-infection results in significant problems in clinical management for both

hepatitis C and HIV as found in several studies (Soto *et al*, 1997; Benhamou *et al*, 1999; Dodig and Tavill, 2001). The present study had a weakness in that it did not involved the determination of risk factors for transmission of HIV and HCV. A study revealing modes of transmission and the rates of co-infection might give a clearer insight into the problem of co-infection.

Our study found similar HIV seroprevalences rates between first time and repeat donors, and between volunteer and replacement donors, indicating a need for implementation of more effective donor recruitment, education and counselling. The co-infection rate with HIV and HCV was notably high. Further studies regarding this co-infection problem among different risk groups are needed to reveal the overall epidemiology of HIV/HCV infection rates.

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