Trends of Transfusion Transmissible Diseases Among Blood Donors at Uttarakhand, India

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ABSTRACT
Context: Blood can save lives; however, it can be a source of transfusion transmitted diseases if proper screening of donated blood is not done. It is now mandatory to screen all donated blood units, whether replacement or voluntary for five transfusion transmitted diseases-namely human immunodeficiency virus (HIV), hepatitis B and C, syphilis, and malaria. Aims: The present study was done to study the prevalence of infectious disease markers among donors at the blood bank of a tertiary care center. Settings and Design: A total of 53,069 donors donated blood over 11 years. The number of replacement and voluntary donors was 41,710 and 11,359, respectively. Materials and Methods: Screening of blood units was done by enzyme-linked immunosorbent assay (ELISA) method for HIV and hepatitis B and C. HIV testing was done using fourth generation ELISA kits. Syphilis was tested by latex agglutination assay and malaria was tested using slide method up to the year 2008-2009 and by rapid immunochromatographic assay after that. Results: The mean percentage of these infections per year was found to be 0.2, 1.2, 0.9, 0.3, and 0.002% for HIV, hepatitis B surface antigen (HBsAg), hepatitis C virus (HCV), syphilis, and malarial parasite (MP), respectively. Conclusions: The risk of transfusion transmissible infection (TTI) today is low but supply of safe blood depends on proper donor selection and sensitive screening tests.

Keywords: Blood donors, transfusion, transmissible infections

Introduction
Blood can save lives; however, it can be a source of transfusion transmitted diseases if proper screening of donated blood is not done. However, with good quality control practice starting from history taking and extending up to lab practices, one can minimize such events. It is now mandatory to screen all donated blood units, whether replacement or voluntary for five transfusion transmitted diseases-namely human immunodeficiency virus (HIV), hepatitis B and C, syphilis, and malaria. The present study was done with the aim of studying the prevalence of infectious disease markers among donors at the blood bank of a tertiary care center. It was done also because the prevalence of these diseases among blood donors also reflects the apparent as well as hidden load in the population as blood donors are usually healthy members of the society.

Materials and Methods
The study was done among all units of blood collected from the year 2000 up to 2010. All donors who had donated blood in this duration were screened for five mandatory tests for transfusion transmitted infections namely: HIV, hepatitis C virus (HCV), hepatitis B surface antigen (HBsAg), syphilis, and malaria. Prevalence and trend of infectious disease markers was studied. The subjects included all replacement and voluntary blood donors. No professional donor was accepted. Consent was taken.

Screening of blood units was done by enzyme-linked immunosorbent assay (ELISA) method for HIV and hepatitis B and C. HIV testing was done using fourth generation ELISA kits.
generation ELISA kits. Syphilis was tested by latex agglutination assay and malaria was tested using slide method up to the year 2008-2009 and by rapid immunochromatographic assay after that. Any sample found reactive was retested for confirmation. Seropositive units were discarded. The criteria for validity of ELISA tests given by the manufactures were considered. Cutoff value for reporting positive results was calculated as per manufacturer’s directions. All records were collected from blood bank records maintained as per Drugs and Cosmetic Act of India.

Results

A total of 53,069 donors donated blood over 11 years. The number of replacement donors was 41,710 and 11,359 voluntary donations were received [Table 1]. The total number of donors who were found positive for transfusion transmissible infections (TTIs) was 1,591/53,069 (2.9%). The male: female (M:F) ratio among the infected donors was 14.1:1. The seropositivity for various TTIs was found to be 153/1,591 (9.6%) for HIV, 683/1,591 (42.9%) for HBsAg, 520/1,591 for HCV (32.7%), 232/1,591 (14.6%) for syphilis and 3/1,591 (0.2%) for malarial parasite (MP) [Table 2]. Further subdivision among voluntary and replacement donors is shown in Table 3 and Figure 1. The trend of various infectious diseases per year is shown in Table 2. The mean percentage of these infections per year was found to be 0.2, 1.2, 0.9, 0.3, and 0.002% for HIV, HBsAg, HCV, syphilis, and MP, respectively.

Discussion

The number of replacement donors (41,710) was higher than voluntary blood donors (11,359). The number of replacement donors was consistently higher than voluntary donors over the years. However, there was a trend for increasing voluntary blood donation in the recent years and the percentage of voluntary donations increased in the last few years to 30.4%. This increase was seen due to strong blood donor motivation strategies over the years. Some of the changes introduced were enhanced donor motivation strategies like promotional material, motivational speeches in colleges and other institutes, screening of movies on voluntary blood donation, phone calls to donors in voluntary blood donor database, etc.

The M:F ratio of 14.1:1 probably reflects the higher number of male blood donors rather than the ratio of disease among the two genders.

The prevalence of TTIs as reported in various studies on blood donors is depicted in Table 4. (1-7)

In a study by Chattoraj et al., it was found that HCV positivity was lower than other studies and that reactivity rates did not exhibit much difference among replacement and voluntary donors. These two facts have been ascribed to the fact that both their groups of donors were from the armed forces and of same socioeconomic status. (2)
The figures regarding TTI reactivity in Table 2 show variations across studies, places, and time zones; when studies were done. Apart from the above factors, the differences could even be due to the different laboratory procedures and reagents used among various blood banks. Added to this is the window period concept and all of these may lead to an over or underestimation of these infections. The aim of infectious diseases testing practice in blood banks is screening of blood donors; hence, reagents that are used should be those having high sensitivity.

Reports on trends of TTI disease markers are scarce in the literature. In our study, moderate fluctuations were observed in the initial years for nearly all TTIs, but the last few years have showed stabilization in the trend with a mild reduction in the incidence of HBsAg, HCV, and Venereal Disease Research Laboratory (VDRL) positivity [Figure 2]. Malaria was found to be present in 0.03, 0.33, and 0.57% in studies from India, Nepal, and Pakistan (Bahadur et al., Ghimire et al., and Ali et al.), respectively; and 30.2 and 51.5% in studies from Nigeria. Screening methods used may also be responsible for the fluctuations in trends.

Hepatitis B and C and HIV units are of major concern due to carrier state and complications associated with these infections.

Fasola et al., found a decreasing trend for HIV and hepatitis B virus (HBV) infections and an increasing trend for HCV. Gupta et al., found that the prevalence of HBsAg has reduced among voluntary donors. In case of HCV, the prevalence was reduced among voluntary, but increased among replacement donors.

The prevalence of TTI and their trends over the years were studied and compared with other studies. A moderately fluctuating trend was observed in our series for all infections with a mild reduction in hepatitis B and C and syphilis infection in the recent years. Improvements must be made in donor selection criteria and screening for infectious diseases in order to provide a safe blood supply. Blood can save lives; however, it also carries the potential to transmit life-threatening infections. Sensitive screening tests and a mandatory quality assurance system are essential to maintain blood safety. There should be protocols for procedures,
reagents, equipments, maintenance, and personal involved in the process. The risk of TTI today is low, but supply of safe blood depends on proper donor selection and sensitive screening tests. Continuous improvements and education are an important component of blood safety to prevent the transmission of known and even newly emerging blood borne pathogens.

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