

STUDY OF TRANSFUSION TRANSMITTED INFECTIONS AND ASSOCIATED RISK FACTORS AT A TERTIARY CARE CENTRE IN JHARKHAND



Pathology

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ABSTRACT

INTRODUCTION: Blood transfusion saves many people every year that would otherwise have died. There are several infectious as well as non-infectious risks associated with blood transfusion. There is 1% chance of transfusion associated problems including transfusion transmitted infections with every unit of blood transfusion. Blood is screened for five diseases in India which could be transmitted through blood and produces serious illness- HIV, Hepatitis B, Hepatitis C, Syphilis, and Malaria. **OBJECTIVE:** To assess the transfusion transmitted infections from records (August 2020 – July 2021) at blood bank, MRMCH, Palamu. **METHOD:** A record based study was conducted from August 2020 - July 2021. Data were collected from the records of blood bank of MRMCH, Palamu, which also included data of blood donation camps. Data regarding sex, screening test results, and type of donor were collected from the records. **RESULTS:** Out of 9116 donors, voluntary donors (55.96%) were more in comparison to replacement donors (44.04%). Out of all TTIs, prevalence of HBV (1.02%) was highest followed by Malaria (0.36%), HCV (0.12%), HIV (0.08%) and Syphilis (0.03%). **CONCLUSION:** HBV infection seems to be the most common infection among blood donors. Transfusion transmitted infections (TTIs) were more common in replacement donors than voluntary donors. There is male preponderance in both voluntary and replacement donors than female.

KEYWORDS

TTIs, Voluntary donors, Replacement donor , Blood transfusion, HIV

INTRODUCTION

Blood transfusion saves many people every year that would otherwise have died because of various natural diseases and disasters [1]. Timely transfusion of blood saves millions of lives. But unsafe blood transfusion has the potential to transmit a diverse of infections to blood recipients. These infections could be due to viruses, bacteria, protozoans, and/or prions [1]. Viral agents include human immunodeficiency virus (HIV) [1, 2], Hepatitis B virus (HBV) and Hepatitis C virus (HCV) [3]. Bacterial pathogens include among others, *Yersinia*, *Pseudomonas*, *Klebsiella* and *Staphylococcus* [4]. *Plasmodium* species and *Babesia microti* are examples of protozoan infections that can be transmitted through blood transfusion [5,6]. A report by WHO Global Database on Blood Safety indicates that before year 2000 more than 40% of all blood donated in developing countries were not screened for TTIs, and that 80% of world population could access just 20% of the safe blood [7]. As of the year 2016, this has changed a lot with most of the African countries testing the four key diseases by 100% (i.e 44/46 test for HIV by 100%, 42/46 test by 100% for HBV, 41/46 test for HCV by 100%, 40/44 test for syphilis by 100%), this means more people have access to safe blood supply [8]. Studies done in Africa have shown that the risk of TTIs is higher compared to other settings [9]. A study done in Tanzania revealed seroprevalence for TTIs to be 15.9% which was lower compared to a previous and similar study but among HIV sero-negative blood donors [10]. Several risk factors have been associated with the prevalence of these infections among blood donors such as implementation of donor questionnaire [11], history of high-risk behavior, history of jaundice [12], being married, low education, informal occupation, multiple sexual activity, history of blood transfusion, being male, [9]. Infusion of blood or its components into the body, or blood transfusion, imports a much greater amount of infectious agents into blood vessels compared with an accidental needle prick, it is one of the medical activities involving the highest risk of infection. Blood transfusion should be considered a daily medical activity containing the risk of nosocomial infection. There are three types of blood donors: voluntary unpaid; family/replacement and paid. Voluntary unpaid blood donors are vital for ensuring a sufficient, stable blood supply. A well-established voluntary unpaid blood donor programme can contribute to a significant reduction in the risk for infections such as HIV, hepatitis B, hepatitis C and syphilis.

METHOD

The present study was conducted from August 2020 – July 2021 through records at blood bank of MRMCH , Palamu. In the blood bank each donor blood sample was screened for five infections - HIV, HBV,

HCV, Syphilis and Malaria. Data were collected from the records of the blood bank for the duration of August 2020- July 2021. Data regarding all donors coming to donate blood at blood bank as well as various blood donation camps organized by the blood bank were analyzed. Data regarding sex of donors, type of donors and screening test results were collected from the records. Exclusion criteria for blood donation were age <18 years and >60 years, weight < 45kg, current history of medication, recent blood transfusion, any infection, anaemia and recent history of any surgical procedure. After data collection assessment and analysis was done for transfusion transmitted infections.

RESULTS

In the present study a total of 9116 donors were screened during the one year period from August 2020- July 2021. Out of them, 5102 (55.96%) were voluntary donors which included donors at the blood bank of MRMCH, Palamu and also donors at the blood camps organized by the blood bank. The remaining 4014 (44.04%) were replacement donors.

When gender wise distribution of the donors was studied it was found that majority of donors group were males (>95.5%) and rest 4.5% only, were females. This shows the predominance of males as compared to females in blood donation for the studied year August 2020 – July 2021.

The year wise proportion (in percentages) of different TTIs among blood donors has been depicted. With respect to individual TTIs, it was observed that out of total 9116 donors screened, the maximum number of donors 92 were found positive for HBV infection followed by 33 donors positive for malaria, 11 donors for HCV, 7 donors for HIV and 3 donors positive for syphilis. Thus the proportion (in percentages) of TTIs among blood donors at blood bank during August 2020 – July 2021 period was the maximum for HBV (1.02%) followed by malaria (0.36%), HCV (0.12%), HIV (0.08%) and least for syphilis (0.03%).

The pattern of TTIs with respect to donors depicted high prevalence of TTIs in replacement donors (RD) as compared to voluntary donors (VD). Out of 7 positive HIV cases (Replacement Donors=6 Voluntary Donors=1); 92 HBV cases (RD=74, VD=18); 11 HCV cases (RD=9, VD=2); 3 Syphilis cases (RD=2, VD=1); 33 Malaria cases (RD=26, VD=7)

DISCUSSION

Many pathogens and pathogenic agents are transmitted via blood, causing infection. Infectious agent transmitted via blood transfusion

includes Hepatitis viruses, HIV, HTLV, HHV-8, Cytomegalovirus, EB VIRUS, Babesiosis, parvovirus B19, Syphilis, *Yersinia enterocolitica*, malaria, Chagas disease, etc. Blood being a scarce and expensive human resource, should be prescribed judiciously and appropriately [13]. Prescribing decisions should be based on national guidelines on the clinical usage of blood; taking the individual patient's needs into consideration, with minimum cost and wastage, optimum safety and efficacy. Despite of predonation counseling and medical fitness test, the presence of TTIs is inevitable in blood donations. Since a person can transmit infection during its asymptomatic phase (window period), transfusions can contribute to an ever widening pool of infection in the population [14]. Only continuous improvement and implementation of donor selection, sensitive screening tests, and effective inactivation procedures can ensure the elimination, or at least reduction, of the risk of acquiring TTIs [15]. In the present study out of total donors, voluntary donors constituted 55.96% and replacement donors 44.4%. This reflects presence of awareness about blood donation in general population. The proportion was found to be low as compared to study conducted by Singh et al [16], Kakkar et al [17], and Pahuja et al [18], where replacement donors were the predominant group as 82.4%, 94.7% and 99.48% respectively. The present study revealed that TTIs were more prevalent in replacement donors than voluntary donors. Similar observations with high sero-positivity in replacement donors was observed by Singh et al [16], and Pahuja et al [18]. The seroprevalence of TTIs in the present study was highest for HBV infection (1.02%). This finding was similar to study conducted by Chandra et al [19], Sawke et al [20], and Bhawani et al [21], who have also found HBV to be the commonest TTI among the donors in different percentages being 1.96%, 2.90% and 1.41% respectively. The prevalence of malaria infection in donors was next to HBV infection being 0.36% in the present study. The third highest prevalence of TTI in the present study was HCV being 0.12%. Other studies reported HCV prevalence as 0.34%, 0.57%, 0.84% and 1.09% [19, 20-22]. For HIV, India is second only to South Africa in terms of overall number of people living with HIV. The prevalence of HIV in various parts of India is different with high rate in western and southern parts. In the present study the prevalence of HIV in donors was found to be 0.08%. Other studies conducted in various parts of India reported HIV prevalence in donors as 0.23%, 0.51%, 0.39% and 0.08% [19,20-22]. The least prevalence of TTI in the present study was for syphilis prevalence in donors as 0.01%, 0.23%, 0.08%, 0.85%, and 0.90% [19,20-23].

CONCLUSION

Out of 9116 donors, voluntary donors (55.96%) were more, in comparison to replacement donors (44.04%). TTIs were more prevalent in replacement donors than voluntary donors. There was male preponderance in both voluntary and replacement donors. Out of all TTIs, prevalence of HBV (1.02%) was highest in the donors followed by Malaria (0.36%), HCV (0.12%), HIV (0.08%) and Syphilis (0.03%). Therefore it is concluded that voluntary donation should be encouraged for the prevention of transfusion transmitted infections. Replacement and voluntary donors should be screened thoroughly before blood donation and professional donors should be out rightly rejected. Public awareness and counseling could also help in curbing these infections and increase blood safety.

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