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Sero-prevalence of Transfusion Transmitted Infections among Blood Donors at CRRH, Gelephu, Bhutan

Authors
Vishal Chhetri*, Rinchen[1], Ran Bdr Giri[1]
[1]Clinical Laboratory Department, Blood Bank Unit, Central Regional Referral Hospital, Gelephu, Bhutan
*Corresponding Author
Vishal Chhetri
Email: *vishal_srmc@yahoo.com*, Contact# 00975-17822830

Abstract

Background: *Blood transfusion has become a lifesaving medical procedure in modern day health care system. The need for blood or its products is increasing due to two reasons, firstly due to improved and accurate diagnosis of complex diseases and treatment modalities and secondly due to increase in ageing population with increase in average life expectancy. Therefore, it is a huge challenge to meet this demand of safe blood and blood products. On the other hand, the subject of real concern during transfusion is transfusion transmitted infections (TTIs) that threaten the safety of the recipient. Hence, the aim of this study is to know the TTI sero-prevalence rate among the blood donors presented at Blood Bank Centre, Central Regional Referral Hospital, Gelephu, Bhutan.*

Material and Methods: *A retrospective study from the blood units collected from both voluntary and replacement blood donors over a period of 12 years (2005 to 2017)at CRRH, Gelpehu, was included in the study. Blood samples were collected as purposive sample from each donor to screen for anti HIV 1 & 2, HBsAg, anti HCV, Syphilis and malaria.*

Results: *Over the years the number of voluntary blood donors has drastically increased from 04 voluntary blood donors in 2005 to 1043 in 2017. A total of9193 donors were included from January 2005 to December 2017, amongst which 47.75% (n=4364) were replacement and 52.25% (n=4775) were voluntary blood donors. Of the total blood donors there were 2.57% (n=236)sero-reactive cases which included 0.02% (n=2) HIV 1&2, 0.93% (n=85) of HBsAg, 0.02% (n=2) HCV, 1.61% (n=147) Syphilis, respectively. Sero-reactivity for various TTIs among replacement blood donor was 1.43% (n=131) and 1.14% (n=104) among voluntary blood donors, respectively. The common types of TTI among blood donors was Syphilis (1.61%) infection then followed by Hepatitis B infection (0.93%).*

Conclusion: *It was found there is gradual increase in the number of voluntary blood donors over the time. Although, the rate of sero-reactivity is not so high, but there is still a need to improve and implement better donor selection criteria and use sensitive test kit to reduce the probability of transmission of TTIs.*

Keywords: *Blood Donor, Gelephu, Transfusion Transmitted Infections.*

Introduction

Blood transfusion has become a lifesaving medical procedure in modern day health care system. The need for blood or its products is increasing due to two reasons, firstly due to improved and accurate diagnosis of complex

diseases and treatment modalities and secondly due to increase in ageing population with increase in average life expectancy (Chamberland, 2002). Though transfusion of blood and blood components is a life saving measure but at the same time it has life threatening effect involved (Repine et al., 2006) due to blood transmissible diseases. The provision of safe blood and blood components has improved over past decades, through number of process such as continuous improvements in donor recruitment procedure, testing of donated blood with increasingly sensitive assays, and appropriate clinical use of blood (Sharma et al., 2014).

Blood transfusion is a risky procedure due to risk of infection involved with the probability of 1% infection with every unit of blood. Recently the risk has decreased to some extent in developed countries but minimal change in countries with low socioeconomic background. In the developing countries the prevalence of TTIs is much higher and quite far from attending zero risk level (Kurien et al., 2005). Serologic testing for transfusion transmitted diseases had historically been the foundation of blood screening, while newer strategies like nucleic acid testing (NAT) have helped further shorten the "window period" (Kurien et al., 2005). Currently, no technology exists to completely detect all window period donations. Therefore, extensive donor screening selection, counselling and screening procedure will increase the blood safety. Moreover, effective laboratory quality system and effective quality of TTI screening is important to minimize the risk of infection.

Table 1. Serological marker for common transfusion transmitted infections

Infections	Serological Markers
Hepatitis B	Hepatitis B surface antigen (HBsAg) detection
Hepatitis C	Hepatitis C virus antibody (anti-HCV) detection
Human Immunodeficiency virus Types 1 and 2 (HIV)	HIV-1 and HIV-2 antibody (anti-HIV-1 and anti-HIV-2) detection
Syphilis	Specific anti-treponemal antibody detection
Malaria	Malaria antigen to four species (Pv/Pf/Po/Pm)

In Bhutan, in 2013 the Government of Bhutan adopted the National Standards for Blood Transfusion Services to ensure safety of blood and blood products, with the vision to have a well-organized, coordinated, standardized and quality national blood transfusion service that ensures adequate, safe and timely blood supply to all the health facilities practicing clinical blood transfusion. Therefore, the aim of the study is to know thesero-prevalence of TTIs among the blood donors in one of the biggest blood bank of the country at Central Regional Referral Hospital, Gelephu for the safety of patient's receiving blood and blood products. And secondly to study the ratio of voluntary and replacement blood donors.

Materials and Methods

Retrospective study was conducted to know the prevalence transfusion transmitted infection among the blood donors at Central Regional Referral Hospital (CRRH), Gelephu, Bhutan. Blood donors aged 18-60 years (both male and female) were included for blood donation. Donors were provided with information about procedure and brief pre-donation counselling. Then the donor's under went through brief physical examination and medical history; if any tattoo or skin infection, blood pressure check-up and hemoglobin level checked. These donors were identified as either Voluntary Donors (VD) or Replacement Donors (RD). Unique blood unit number was provided to each blood donor and labelled on the blood bags (350/450ml CPDA blood bags).

At the end of blood donation 3 ml blood in plain vial (serum clot activator) was taken. All the samples were screened for Hepatitis B surface antigen (HBsAg), anti-Human Immunodeficiency Virus (HIV), anti-Hepatitis C virus (HCV), Syphilis and Malaria. All tests were performed

following Standard Operating Procedure (SOP).All reactive samples were repeated in duplicate before labelling them sero-reactive. Reactive blood bags were segregated following standard waste management guideline and then quarantined.

Results and Discussion

The blood donors are healthy population falling under age group of 18-60 years; both male and female. A total of 9193 donors were included from January 2005 to December 2017, amongst which 47.75% (n=4364) were replacement and 52.25% (n=4775) were voluntary blood donors. The trend of voluntary blood donor started increasing after the year 2009, from 00% in 2006 to 42.9% in 2013 to 88.1 % in 2016. These findings are similar to the study done by (Gupta and Kumar, 2007, Pallavi et al., 2011). This increase in voluntary blood donors may be attributed to the increasing public awareness (Sharma et al., 2014) and involvement of Government bodies that actively propagate voluntary blood donation in our country and support mobile blood donation campaign

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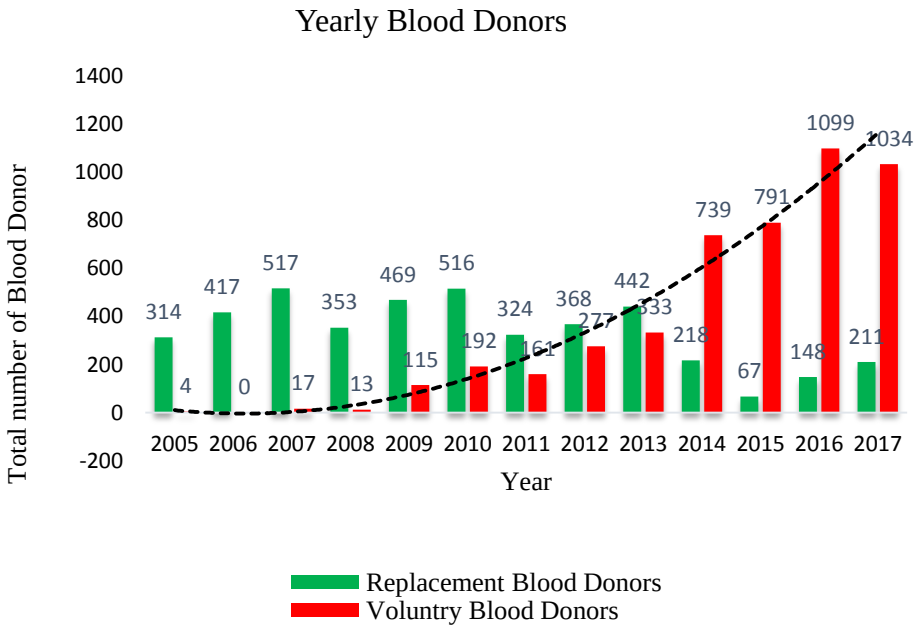
Graph 1. Yearly turnover of blood donors at CRRH, Gelephu; increasing trend of voluntary blood donors after the year 2009



Amongst the blood donors, there were 2.57% (n=236) sero-reactive cases which included 0.02% (n=2) HIV 1&2, 0.93% (n=85) HBsAg, 0.02% (n=2) HCV, 1.61% (n=147) of Syphilis, respectively. Sero-reactivity for various TTIs among replacement blood donor was 1.43 % (n=131) and 1.14% (n=104) among voluntary blood donors, respectively. The common types of TTI among blood donors was Syphilis (1.61%) infection then followed by Hepatitis B infection (0.93%). On the other hand, none of the blood donors were found to be malaria positive, this could be probably because the blood donors with the history of past malaria infection were considered unfit for blood donation.

Syphilis infection increases the risk of transmission of other diseases, including HIV due to its ulceration at genital area (Zetola and Klausner, 2007). Therefore, HIV and Syphilis are usually presented as common co-infection (Lynn and Lightman, 2004). But in our current study though the rate of Syphilis was found to be

highest (n=147), the number of blood donors with HIV infection was relatively lower (n=2) and none of the donors presented with Syphilis-HIV co-infection.

HCV infection has high morbidity among the viral hepatitis, the current study found only 0.02% of blood donors with HCV infection, in contrast the rate is relatively higher (0.64%) among the blood donors presented at the neighbouring state of Kathmandu (Nepal) as cited Shrestha et al. (2009). On the other hand, Hepatitis B was found to be relatively higher (0.93%) among the healthy blood donors presented at CRRH, Gelephu. Though there is no data about the prevalence of Hepatitis B among the Bhutanese population, a close comparison with study done by Karki et al. (2008)who recorded Hepatitis B as a major public health problem with carrier rate of 200,000, and accounts for 6% of acute hepatitis, in Nepal and the situation would probably be same in our context too.

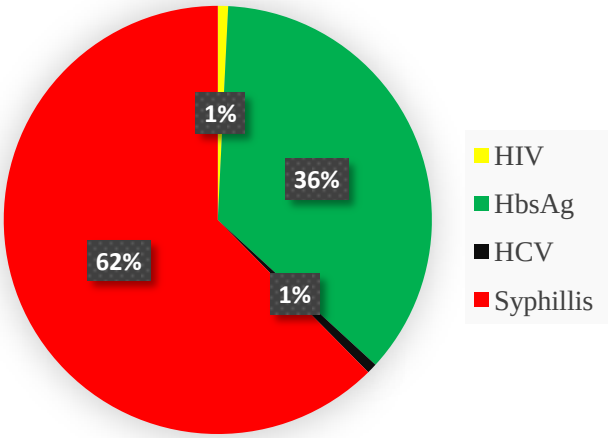


Figure 1 Percent distribution of different types of TTI amongst the blood donors

The sero-reactivity amongst replacement blood donors were 1.43% and voluntary blood donors at 1.14, respectively. It is usually found that the TTIs among replacement donors are relatively higher as compared to the voluntary blood donors. Non-remunerated voluntary blood donors are considered safe and healthy donors as they donates the blood on their own willingness. Therefore, a safer donor as compared to replacement donor who donates under obligation.

Transfusion safety begins with healthy donors. A fundamental part of preventing TTI is to notify and counsel reactive donors. It also involves, donor notification, protecting the health of the donor, prevent secondary transmission of infectious disease, reduces risk of vertical transmission and provide feedback about the effectiveness of donor selection procedures such as pre-donation education and medical history (Bianco and Kessler, 1994). We attempt to contact all 236 sero-reactive donors about their TTI status either telephonically or in person. The data of reactive donors responding to the notification is not available but as found in an Indian study byPatel et al. (2012)most of the blood donors showed a positive response following donor notification and attended counselling session. It could be same situation in our scenario too and this helps preventing sexually transmitted infections to their sexual partners.

Conclusion

The study presented with increasing trend of voluntary blood donors from 2009. Among the blood donors, sero-positivity of Syphilis was highest followed by Hepatitis B, HIV, and HCV and none of the donor presented with Malaria. The rate of sero-prevalence among Voluntary blood donors (1.43 %) is lower as compared to replacement blood donors (1.43 %). Therefore, more voluntary blood donors should be encouraged to meet the demand of safe blood and

blood products. Although, the rate of sero-reactivity is not so high, still we need to improve and implement better donor selection criteria and use sensitive test kit to reduce the probability of transmission of TTIs. This retrospective study was conducted according to the routine practice of the blood bank, with no additional staff, equipment or expenses.

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