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"Seroprevalence of transfusion transmitted infections in blood donors in a tertiary health centre in Amritsar"

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Abstract

Aims: Blood transfusion is a significant route of transmission of infection to recipients. The aim of the study was to analyse the prevalence of HIV, Hepatitis B, Hepatitis C, Syphilis and Malaria in voluntary and replacement blood donors, in a tertiary medical centre in Punjab.
Methods: A total of 42275 blood donor units collected both in the blood bank and voluntary blood donation camps organized by the same, were tested over a two year period.
Results: Of these, 23465 (55.5%) were voluntary donors and 18811 (44.5%) were replacement donors. The overall prevalence of transfusion transmitted infections (TTIs) was 4%. The prevalence of HCV was highest (2.3%) followed by Hepatitis B (0.7%), Syphilis (0.6%) and HIV (0.2%).
Conclusion: Extensive screening of donor blood and promoting 100% voluntary donation can help improve blood safety.

Keywords: Blood transfusion, HIV, Transfusion transmitted infections, Hepatitis B.

Introduction

Blood Transfusion is a double edged sword because it is lifesaving and has life threatening risks as well [1].

Administration of blood and its products helps save lives but unfortunately it is a significant route for transmission of blood borne infections.[2] A TTI can be defined as any infection that is transmissible from person to person through parenteral administration of blood and its components. These infections can be caused by blood borne bacteria, parasites or viruses. [3]

Earlier, thorough donor screening was considered the most important factor in reducing the rate of TTI. The introduction of serological screening in blood banks has now led to a decrease in the incidence of TTI. [4]

Many a times blood is collected from apparently healthy donors within the immunological window period, that is to say, before the viral markers appear in the blood. This can lead to transmission of infection from the donor in the window period, to the recipient who receives that blood. Clinical morbidity and mortality may not be seen long after the recipient received blood transmission because of the chronicity of infections like Hepatitis B and Hepatitis C. [1]

The World Health Organization(WHO) has made mandatory the screening of blood donors for at least 4 of the TTI namely :

HIV 1& 2, HBsAg, HCV and Syphilis.

In developed countries, extensive screening and testing of blood donors has significantly reduced TTI. However, the screening in developing countries is not the same. Poor health education and lack of awareness about severity of TTI has led to formation of reservoirs of infection. [3]

Furthermore, in India, a good number of donation comes from replacement donors, who could be family members, colleagues or friends of the patients. Due to fear of rejection, they might hide relevant information during donor screening. At times, patients' attendants seek the help of professional/paid donors who seek money in exchange of blood. [5]

In contrast to replacement or paid donors, voluntary donation is considered the safest. Voluntary donors donate blood out of their own free will without any pressure or expectation. [6]

The aim of the present study was to study the seroprevalence of TTI in both voluntary and replacement donor units in a tertiary health centre in Punjab.

Materials and Methods

We did a two year retrospective study in the department of Transfusion Medicine, Government Medical College, Amritsar from April, 2016 to March, 2018.

A total of 42275 blood donors units collected both in voluntary blood donation (VBD) camps and replacement donors in the blood bank were included in the study. The donor units collected at VBD camps (n= 23464) outnumbered those collected in the blood bank (18811).

There were 40239 (95.2%) males and 2036 (4.8%) females in the study.

The data was analysed using SPSS 20.0 software and valid conclusions were drawn. A p-value less than 0.05 was considered significant.

The following inclusion criteria were followed- Age between 18-65 years, weight more than 45 kg, Hb> 12.5 gm%.Relevant clinical history regarding previous blood donation, any chronic illness, any vaccination, medication, recent surgical or dental procedure, promiscuous and high risk behavior was obtained, using appropriate questionnaires, and the consent forms were signed.

All the blood units were screened for HIV 1 & 2, HBsAg, HCV by using National AIDS Control Organization (NACO) approved Elisa kits (Merilisa HIV 1-2 Gen 3, HEPALISA, ErbaLISA HCV Gen 3 (v2) test kits respectively.Screening for syphilis was done by Rapid Plasma Reagin Card test (IMMUTREP RPR).

Collection of blood sample:

Taking all aseptic precautions, 4 ml of blood from each donor unit was put in a sterile numbered glass tube. The serum was allowed to separate at room temperature and then centrifuged at 3000 RPM for 5 minutes. The serum was then collected in a sterile plastic vial labeled and stored in the freezer compartment of the refrigerator till the tests are performed i.e. 48 hours.

All the reactive samples were subject to repeat testing before labeling them seropositive. The reactive units were then discarded.

Results

Of the total 42275 donor units collected, 23465 (55.5%) were from VBD camps and 18811 (44.5%) were from the blood bank itself. [Figure 1]

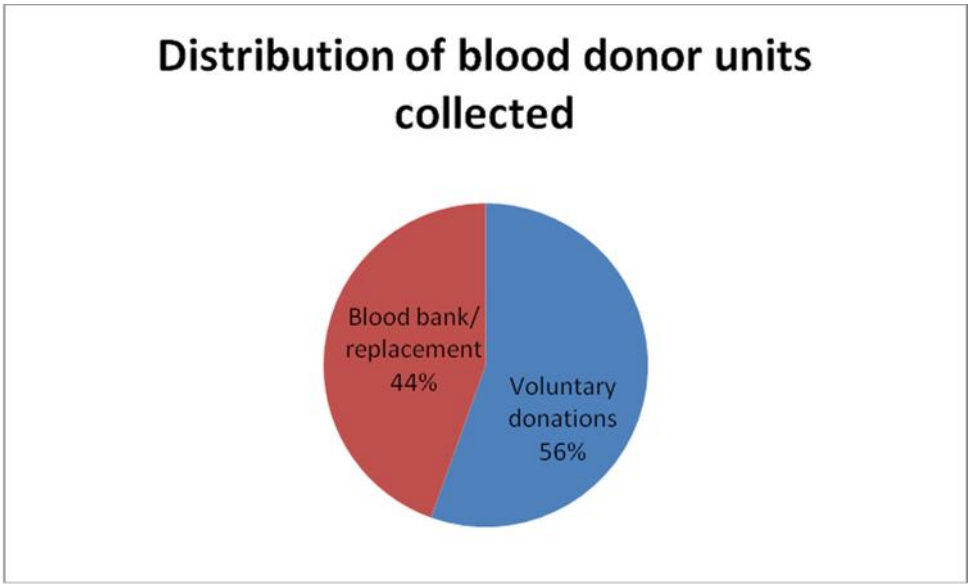

Figure 1: Distribution of voluntary and replacement blood donor units, collected in VBD camps and in blood bank respectively

Majority 40239 (95.2%) of the donors were males while there were 2036 (4.8%) female donors. The sex distribution of donors is shown in figure 2.

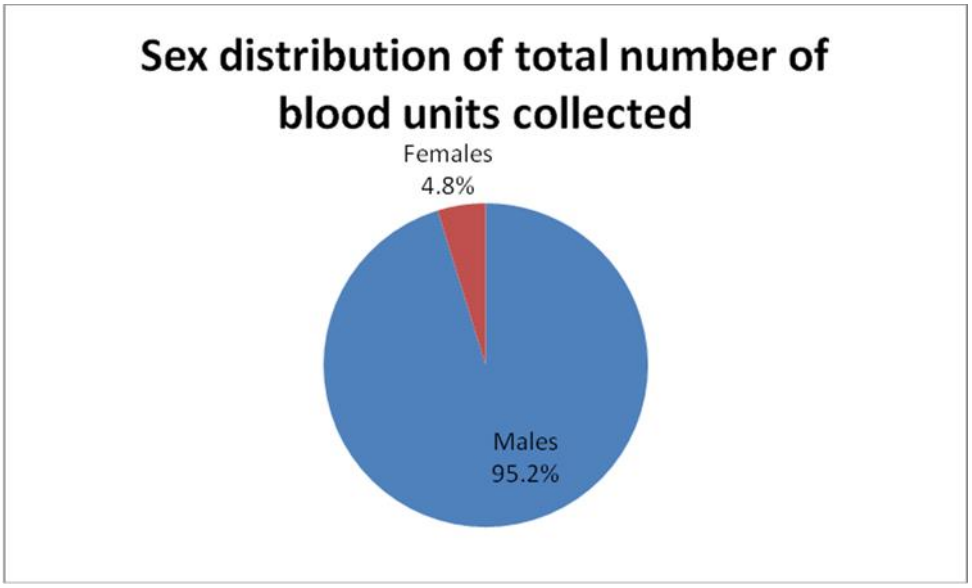

Figure 2: Sex distribution of donors

Of the total 42275 blood units, 1722 (4%) tested positive for TTI. The overall prevalence rate is shown in figure 3.

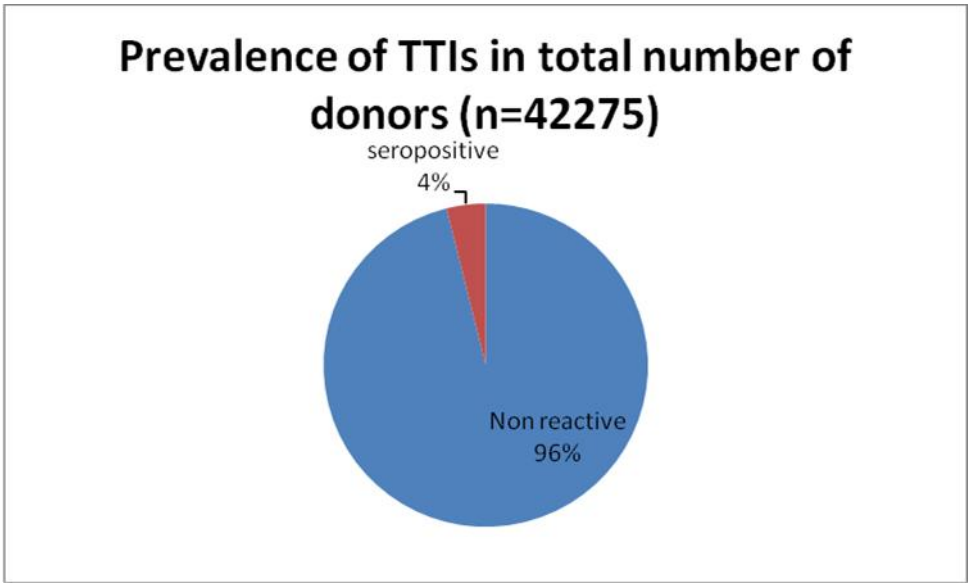

Figure 3: Prevalence of TTIs in total number of donors

The prevalence of HCV was maximum- 992 cases (2.3%) followed by Hepatitis B- 295 cases (0.7%), Syphilis – 253 (0.6%) and HIV – 82 cases (0.2%). The prevalence of each of the TTIs is shown in figure 4.

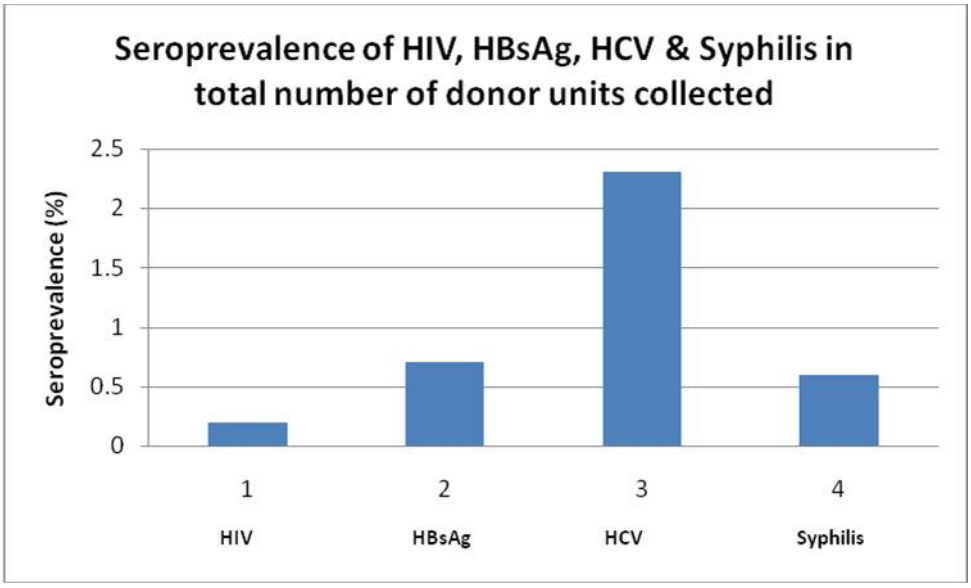

Figure 4: Seroprevalence of HIV, HBsAg, HCV & Syphilis in total number of donor units collected

The prevalence of HIV in replacement donors was 0.3% (52 cases) while in voluntary donors was 0.1% (28 cases). Hepatitis C was positive in 633 (3%) cases collected in blood bank as compared to 359 (1.5%) units collected in VBDs.

Likewise for Syphilis, a higher prevalence was seen in donors units collected at blood bank – 144 cases (0.8%) as compared to 111 cases (0.5%) collected in VBD camps.

In all these three scenarios, the difference between donor units collected at VBD camps and blood bank, was statistically significant (p value =0.000).

In the case of Hepatitis B, the difference in prevalence between blood bank and voluntary blood donation camps was not significant (p value=0.087). The prevalence of TTIs in voluntary and replacement donors is compared in table 1.

Table 1: Difference in prevalence of TTIs in voluntary and replacement donors

	Prevalence in voluntary donors (%)	Prevalence in replacement donors (%)	p value*
HIV	0.1	0.3	0.007
HCV	1.5	3.0	0.000
Syphilis	0.5	0.8	0.039
HBsAg	0.7	0.8	0.087

***p value<0.05 was considered significant**

The overall rate of coinfection was 0.2% (66 cases).

Maximum coinfection was recorded in donors with both HIV and Hepatitis C (36 cases) followed by coinfection with Hepatitis B and C (10 cases).

Discussion

The prevalence of TTI in donor blood, is an alarming issue especially in developing countries.

Most infected donors are asymptomatic carriers, not knowing that donating blood can transmit the virus to the recipient(s). The situation is worsened if a donor donates blood during the immunological window period, during which the serological tests can be falsely negative. [1]

In the present study, voluntary donors constituted 55.5% while replacement donors constituted 44.5%. This distribution is similar to studies done by Fernandes et al.[1] and Gupta et al.[7] The National AIDS Control Organization (NACO) has a significant role in creating awareness about voluntary donation and promoting the same in VBD camps, throughout the country. That explains why the number of voluntary donors exceeds that of replacement donors.

Ninety five percent (95.2%) of the donors were males and 4.8% were female donors, a finding common to previous studies. [1,6,8]

In the present study, the prevalence rate of HIV, Hepatitis B, Hepatitis C and Syphilis was 0.2%, 0.7%, 2.3% and 0.6%, respectively.

The comparison of prevalence of TTIs in different studies is shown in table 2.

Table 2 : Comparison of prevalence of TTIs in different studies

	Present study	Arora et al. [9]	Gupta et al. [7]	Pallavi et al. [10]	Arya et al. [11]	Sawke et al. [12]
HIV	0.2	0.3	0.35	0.44	0.10	0.51
HBsAg	0.7	1.7	1.66	1.27	1.60	2.9
HCV	2.3	1.0	0.65	0.23	0.18	0.57
Syphilis	0.6	0.9	2.80	0.28	0.89	0.23

In studies done previously and elsewhere, the prevalence rate of Hepatitis B was highest of all the TTIs. [9,10,11,12] However, in the present study, the prevalence of HCV was found highest of all the TTIs. Also, the prevalence of HCV was higher than those in previous studies [13,14,15]. A study done in Amritsar, Punjab by Sharma and Kaur showed 0.98% prevalence of HCV while a study from Patiala, Punjab showed seroprevalence of 0.88%. Another study by Singh et al. on north Indian blood donors showed a prevalence of 0.9%.

Causality of high seroprevalence of HCV in the Amritsar belt

A relatively higher prevalence of HCV among blood donors was recorded in the present study conducted in the Amritsar belt. HCV infection increases the risk of liver cirrhosis and progression to hepatocellular carcinoma (HCC). In a population based survey conducted by Sood et al in 2018, the anti-HCV prevalence rate was 3.6%. When the prevalence of HCV by potential exposures and risk factors was examined, it was found that seroprevalence was higher in people who had received a medical injection from a registered medical practitioner(RMP) or nurse in the past six months. The risk of HCV also increased with the number of blood transfusions received and was also higher among persons with a history of permanent tattoo. HCV positivity was associated with increasing age to age 40-49 years, male gender, rural residence and lower educational status.[16]

Similar risk factors for acquiring HCV infection were found in a study conducted in GMC Amritsar in the year 2014. Maximum number of cases gave history of receiving injection from a RMP/nurse. In rest of the cases, history of tattooing and multiple sexual partners were seen as causative factors[13].

HCV carriers are apparently healthy and asymptomatic.If they happen to donate blood during the immunological window period, they can transmit the infection to the recipient. The heavy burden of HCV reservoirs in the general population in this belt explains the high seroprevalence of HCV in the present study.

Conclusion

This two year study highlights the prevalence of TTIs in the donor blood. The high prevalence of HCV among blood donors in the Amritsar belt shows the tip of the iceberg- a tiny reflection of the widespread practice of medical injections given by RMPs/nurses in the periphery. Although blood transfusion is a life saving modality, yet it should be used judiciously. A better structured voluntary donor base should be constructed by promoting repeat non-remunerated voluntary donations. Extensive screening of first time donors with the help of scientific questionnaires should be done. Nucleic Acid Amplification (NAT) testing should be done for ensuring better safety of donated blood.

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