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RESEARCH ARTICLE

PREVALENCE OF HIV, HEPATITIS B, HEPATITIS C AND SYPHILIS IN BLOOD DONORS OF TERTIARY CARE CENTRE IN WESTERN MAHARASHTRA

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ABSTRACT

Introduction: Timely transfusion of blood saves millions of lives, but unsafe transfusion practices puts millions of people at risk of transfusion-transmissible infections (TTIs). Monitoring of the magnitude of TTIs in blood donor is important for estimating the risk of transfusion. **Aims and objective:** To estimate seroprevalence of HIV, HBV, HCV, syphilis and malaria at tertiary care centre of Western Maharashtra. **Methods and material:** This was a retrospective study conducted in blood bank attached to tertiary care centre, Solapur of Western Maharashtra over a period of November 2017 to June 2020. All blood bag units were screened for commonest TTIs such as HIV, HBV, HCV, syphilis and malaria. **Results:** HBV infection (1.38%) was the commonest infection among blood donors followed by HCV (0.44%), HIV (0.17%), and Syphilis (0.08%). **Conclusion:** Safe blood is the universal right of every person and availability of safe blood for transfusion is a must for all recipients. Encouragement of voluntary donors along with stringent donor eligibility criteria and effective high sensitive screening methods can bring down the prevalence of TTIs.

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INTRODUCTION

Blood transfusion is a life-saving procedure as even a single unit of blood and its components can save multiple recipients in need (Jasani, 2012). Timely transfusion of blood saves millions of lives, but unsafe transfusion practices puts millions of people at risk of transfusion-transmissible infections (TTIs) (Bihl, 2007). Blood transfusion carries the risk of major infections such as hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), syphilis and malaria. In minority of cases viral infections such as cytomegalovirus, herpes virus and Epstein bar virus along with toxoplasmosis and brucella may be transmitted (Kulkarni, 2012; Yadav, 2016). TTIs can exist as asymptomatic diseases in their hosts, so donors must be screened for high-risk behavior (Bhawani, 2010). Over the past two to three decades, several measures have been introduced into the screening of blood donations to detect diseases that may be transmitted via blood transfusions with the aim of improving the quality and safety of the blood supply (Sirajunnisa Begum, 2018).

Despite the stringent donor screening and testing procedures, the safe to safe blood from TTIs remains an elusive goal (Alok Kumar, 2014). The Indian subcontinent is classified as an intermediate Hepatitis B Virus (HBV) endemic (HBsAg carriage 2% - 7%) zone and has second largest global pool of chronic HBV infection causing death due to chronic hepatitis, cirrhosis of liver and hepatocellular carcinoma (Shah, 2013). The assessment of prevalence of TTIs among donors of that particular area can give us an idea of occurrence of various TTIs in blood donor population and with stringent screening we can move towards safety of the collected blood. It can also give idea about the epidemiology of the disease in that particular community (Chavhan, 2017). The continuous monitoring of the magnitude of TTIs in blood donor is important for estimating the risk of transfusion. Hence the study was conducted to determine the seroprevalence of HIV, HBV, HCV, syphilis and malaria infection among blood donors in blood bank attached to tertiary care centre.

MATERIALS AND METHODS

This was a retrospective study conducted in blood bank attached to tertiary care centre, Solapur of Western Maharashtra over a period of November 2017 to June 2020. All the potential blood donors were requested to fill questionnaire prepared as per National AIDS Control Organization (NACO) guidelines for donor eligibility. The blood donors who were unfit to donate as per the donor section criteria were deferred from blood donation. This screening of blood donors was very important to exclude professional donors. The voluntary blood donation was obtained from blood camps organized by different colleges, institutions, social and political organizations. Informed consent was taken from all donors before blood donation. All blood bag units were screened for commonest TTIs such as HIV, HBV, HCV, syphilis and malaria. Serum samples were screened for:

- For HIV antibodies, by using Merillisa HIV (Merill Diagnostics Pvt. Ltd)
- For HBsAg, using Merillisa HBsAg (Merill Diagnostics Pvt. Ltd)
- For anti-HCV IgG and IgM, using Merilisa HCV (Merill Diagnostics Pvt. Ltd)
- For syphilis, by Rapid Plasma Reagin (RPR)
- For malarial parasite by peripheral smear examination
- The blood bag units reactive for TTIs were considered as positive and these all blood bag units were discarded as per standard protocol.

RESULTS

Among total blood donors of 7264 during study period, 7071 (97.34%) were male and 193 (2.66%) were female. Voluntary blood donors were 100% in our study. All blood bag units were screened for HIV, HBV, HCV, syphilis and malaria, out of which 151 (2.07%) were found positive for infectious diseases. HBV infection (1.38%) was the commonest infection among blood donors followed by HCV(0.44%), HIV (0.17%), and Syphilis (0.08%). Peripheral smears of all blood donors were negative for malarial parasite. (Table No.01)

Table 01. Analysis of seropositive infections among blood donors (n=7264)

TTIs	No. of positive blood donors	Percentage
HIV	13	(0.17%)
HBsAg	100	(1.38%)
HCV	32	(0.44%)
VDRL	06	(0.08%)
Malaria	00	(00%)
Total	151	(2.07%)

DISCUSSION

With every unit of blood, there is 1% chance of transfusion associated problems including TTIs. The risk of TTIs has declined dramatically in developed nations over the past three decades, but still remain a major threat for the developing countries. The national policy for blood transfusion services in our country is of recent origin and the transfusion services are hospital based and fragmented (Pallavi, 2011).

In our study male donor predominance was noted, this finding is similar with other studies (Yadav, 2016; Bhawani, 2010; Sirajunnisa Begum, 2018; Alok Kumar, 2014; Shah, 2013; Chavhan, 2017). It is due to most Indian female population is usually anemic and underweight; so they are deferred from blood donations as per donor section criteria. In our study, all blood donors were voluntary. This 100% voluntary donation may be attributed to increase in public awareness and involvement of government bodies like NACO that actively propagate voluntary blood donations. Voluntary blood donation is a healthy sign for transfusion services. This practice of voluntary donors over replacement donors to meet the need of blood will definitely reduce the risk of TTIs. Replacement donors should be accepted only in cases of dire emergency when transfusion of blood or blood products would be life saving. In our study out of 7264 blood bags collected, 151 (2.07%) were positive for TTIs. This finding correlates with Yadav *et al.* (2016) while Chavhan *et al.* (2017), Bhavani *et al.* (2010) and Kumar *et al.* (2014) found higher prevalence of 3.11%, 2.72% and 2.57% respectively. A lower prevalence of 1.48% has been noted in Shah *et al.* (2013).

The most common infection in our study was HBV which was in accordance with other studies enlisted in table no.02. Seroprevalence of HBV varies in different parts of India (Yadav, 2016; Bhawani, 2010; Sirajunnisa Begum, 2018; Alok Kumar, 2014; Shah, 2013; Chavhan, 2017; Ajay, 2017). Gupta N. *et al* (12) found lower prevalence of 0.66% while Begum *et al.* (Sirajunnisa Begum, 2018) found higher prevalence of 2.1%. The risk of TTIs particularly for HBV infection continues to remain a major threat, although it has reduced with introduction of HbsAg testing but it failed to detect HBV infection in window period. Hence many countries have also added the testing for detection of antibodies to HBV core protein (anti-Hbc) and Nucleic acid amplification testing (NAT). The second most common infection was HIV in most of studies (Yadav, 2016; Alok Kumar, 2014; Chavhan, 2017; Ajay, 2017) while Bhawani *et al.* (2010) found HCV as second most common infection among blood donors which was similar to our study. In the present study seroprevalence of HCV was 0.44% which is in accordance with Makroo *et al* (Makroo, 2015), who reported 0.43%. Bhawani *et al.* (2010) found higher prevalence of 0.84%, while some other studies (Yadav, 2016; Shah, 2013; Ajay, 2017) found lower prevalence (Table no.02). Seroprevalence of HIV in present study was 0.17% which is comparable with studies in other parts of India (Yadav, 2016; Shah, 2013).

Higher seroprevalence of 0.64%, 0.53% was found in Sinha *et al.* (2012) and Kumar *et al* study (Alok Kumar, 2014) respectively. Lower seroprevalence of HIV in our study may be due to 100% voluntary donation and improved awareness regarding blood donation. In the present study prevalence of syphilis was 0.08%, exactly similar with Bhavani *et al.* (2010), while low prevalence was found in some studies (Yadav, 2016; Alok Kumar, 2014; Ajay, 2017) and higher prevalence was seen in Arora *et al.* (2010). Prevalence of malaria in our study was 0% similar to other studies enlisted in table no.02. This may be due to stringent donor selection criteria by asking detailed history. Safe blood is the universal right of every person and availability of safe blood for transfusion is a must for the recipients as well for community and can be achieved by stringent screening of blood donors, public awareness and motivational programs for voluntary blood donations along with testing of donated blood with advanced laboratory

Table 2. Prevalence of transfusion transmitted infections (TTIs) in various studies within India

Authors	HIV	HBsAg	HCV	Syphilis	MP	HIV+ HBsAg	Total
Bhawani <i>et al.</i> (2010)	0.39%	1.41%	0.84%	0.08%	0%	0%	2.72%
Shah <i>et al.</i> (2013)	0.16%	0.98%	0.11%	0.23%	0%	0%	1.48%
Kumar <i>et al.</i> (2014)	0.53%	1.76%	0.20%	0.07%	0%	0.01%	2.57%
Yadav <i>et al.</i> (2015)	0.14%	1.77%	0.09%	0.04%	0%	0%	2.04%
Jungare <i>et al.</i> (2017)	0.24%	1.24%	0.15%	0.005%	0%	0%	1.635%
Pravin S. Chavhan <i>et al.</i> (2017)	0.39%	1.61%	0.33%	0.78%	0%	0%	3.11%
Present study (2019)	0.17%	1.38%	0.44%	0.08%	0%	0%	2.07%

screening tests like ELISA. Number of TTIs cases can also be brought down by using higher sensitivity tests like NAT for TTIs. With advent of NAT developed countries have reduced the risk of TTIs to a major extent but the cost effectiveness of NAT is poor and high financial cost is the major concern in the developing countries like India.

Conclusion

Blood transfusion is one of the major modes of TTIs and transmission of TTIs during window period is a major threat to safety of blood and blood products. In present study, HBV is the most common infection followed by HCV. Encouragement of voluntary donors along with stringent donor eligibility criteria and effective high sensitive screening methods can bring down the prevalence of TTIs. Proper treatment and follow up counseling can help in preventing further transmission of infection in the community.

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