



ORIGINAL RESEARCH PAPER

Transfusion Medicine

SEROPREVALANCE OF TRANSFUSION TRANSMITTED INFECTIONS(TTIS) AMONG BLOOD DONORS: A RETROSPECTIVE STUDY FROM A TERTIARY CARE HOSPITAL IN NORTH INDIA.

KEY WORDS: Transfusion transmitted infection, Human immunodeficiency virus Hepatitis B virus, Hepatitis C virus, Syphilis, Malaria.

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ABSTRACT

A transfusion transmitted infection (TTI) is any infection that is transmissible from person to- person through parenteral administration of blood or blood products. Blood transfusion carries the risk of transmitting infections like HIV, Hepatitis B, Hepatitis C, syphilis and malaria. So in order to provide safe blood transfusion these mandatory tests need to be done with proper monitoring. **Aim** To determine the seroprevalence of transfusion transmitted infections (TTIs) among blood donors. **Materials and method** The present study was conducted in department of hematology and transfusion medicine, Govt lal ded (LD) hospital Srinagar. Study period was from September 2020 to August 2021. A total number of 7235 donors were screened for HIV, HBV, HCV, Syphilis and malaria by ELISA and NAT test **Results** Out of 7235 donors, 99.23% were males, 0.77% were females. 0.98% were reactive for TTI. HBV 0.44%, HCV 0.46%, HIV 0.003% and syphilis 0.08% were the major infections in blood donors. None was positive for malaria. **Conclusion** Seropositivity of HBV, HIV, HCV, Syphilis and malaria among healthy donors indicates the risk of transfusion transmitted infections during blood transfusion. With the implementation of strict donor criteria and use of sensitive screening tests, it may be possible to reduce the incidence of TTI in the Indian scenario.

INTRODUCTION

Blood transfusion is a life saving modality in modern medical practice and is associated with complications which are seen in 1% of all transfusions, these also include the most dreaded, risk of acquiring transfusion transmitted infections (TTI). (1)

Transfusion-transmitted infections (TTIs), principally hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), and syphilis caused by *Treponema pallidum* (TP) among blood donors remain a major threat to blood safety (2) The risk of transfusion transmission of these viruses may be alarming due to high seroprevalence of HIV, HCV and HBV among the blood donors. (3)

Meticulous pre-transfusion testing and screening particularly for transfusion transmissible infections (TTI) is the need of the hour. (4)

Blood transfusion services (BTS) is an integral and indispensable part of the healthcare system. The priority objective of BTS is to ensure safety, adequacy, accessibility and efficiency of blood supply at all levels. (5) As per the guidelines of the ministry of health & family welfare (Government of India) under The Drug and Cosmetic Act, 1945 (amended from time to time), all the blood donations are to be screened against the five major infections namely HIV, HBV, HCV, VDRL and malaria. (6) Their tests were made mandatory in the year 2001 in India prior to the issue of compatible blood to the patient. (7)

AIMS AND OBJECTIVES

The objective of this study is to assess the seroprevalence and the trends of Transfusion Transmitted Infections among voluntary and replacement donors.

MATERIALS AND METHODS

Study Design

The present study was a record based observational study conducted at department of hematology and transfusion

medicine LD Hospital a tertiary care hospital In Srinagar, Jammu and Kashmir, India. The study was carried over a period of one year from September 2020 to August 2021. All the voluntary and replacement donors attending the blood bank were included in the study.

The data of donors are well maintained. Confidentiality of personal data is maintained. Donors were screened by trained personnel after a complete physical examination and satisfactorily answering the donor's questionnaire as per WHO guidelines/Govt. of India. Donor registration forms, which included a detailed pre-donation questionnaire, were filled by the donors.

As per NBTC guidelines following blood donation in our department, each unit was being screened for HIV, hepatitis B hepatitis C, by ELISA method, and malaria, syphilis by rapid test. We use Merilisa HIV 4th generation kit for HIV testing, Merilisa HCV 3rd generation for hepatitis C virus and Merilisa HBsAg 3rd generation kit for hepatitis B virus. For syphilis we do rapid test by Oscar and reliable rapid kits for malaria. The negative ELISA tests were further tested by NAT testing (nuclei acid amplification technology). In our setup we do mini pool NAT testing from Roche Diagnostics GmbH, Mannheim. From sample loading to detection we use HAMILTON, COBAS AMPLIPREP and COBAS TAQMAN instruments of the roche. The advantage of NAT test was to minimise the window period of all the three virus HIV, HBsAg and HCV. (table 1). Tests were performed according to the manufacturers instructions. All the reactive samples were repeated in duplicate before labeling them seropositive. The donated blood was discarded whenever the pilot donor sample was found positive for.

Inclusion Criteria

Clinically healthy individuals between 18 and 65 years of age with a body weight of above 45 kg and haemoglobin more than 12.5 g/dl with no significant medical or surgical history were qualified for the donation process.

Exclusion Criteria

Persons belonging to high-risk groups such as patients with chronic diseases, professional blood donors, drug abusers, dialysis patients, pregnant ladies and sex workers were excluded from the donation.

Ethical and Institutional Issues

The study has been approved by institutional ethics committee. Informed consent of the participants were collected while blood donation.

RESULTS

Totally 7235 blood donors had donated during the study period. Among these 7179 were males and 56 were females.(figure:1).Among them, 71 (0.98%) blood donors were found to be TTI marker reactive. There were total 32 (0.44%)cases of hepatitis B surface antigen [HbsAg] positive,34(0.46%) donors were positive for HCV,1 (0.003%) for HIV,4(0.08%) donors were positive for VDRL(syphilis) and none for malaria.All the reactive donors were males,none was found positive from female donors.(table 2,3,4)

Table:1- window period (ELISA VS NAT)

| S.No | Infectious Marker | ELISA screening window period | NAT screening window period |
|------|-------------------|-------------------------------|-----------------------------|
| 1. | HIV | 21 days | 2.98 days |
| 2. | HBV | 38 days | 10.34 days |
| 3. | HCV | 60 days | 1.34 days |

Table:2- Gender wide distribution ofTTI reactive donors.

| Gender | Number of donors | Reactive number of donors |
|---------|------------------|---------------------------|
| Males | 7179 | N=71(0.98%) |
| Females | 56 | N=0(0%) |
| Total | 7235 | N=7235(0.98%) |

Table:3-prevalence of HCV, HBsAg,HIV and VDRL among blood donors.

| Prevalence | HCV | HBsAg | VDRL | HIV | Total number of donors |
|------------|-------|-------|-------|--------|------------------------|
| Total | 34 | 32 | 04 | 01 | 7235 |
| Percentage | 0.46% | 0.44% | 0.08% | 0.003% | 0.98 |

Table 4:-Sex Distribution of blood Donors

| N=7235 | Total number of donors | Percentage (%) |
|---------|------------------------|----------------|
| Males | 7179 | 99.23 |
| Females | 56 | 0.77 |

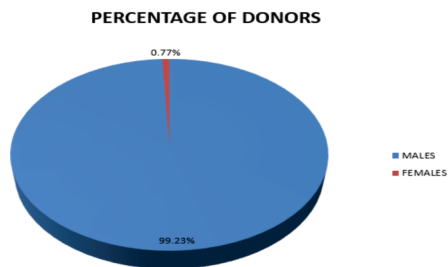


Figure 1 Showing male vs female donors

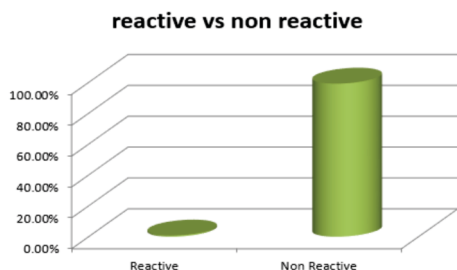


Figure 2 showing reactive vs non reactive

DISCUSSION

Blood transfusion is an integral and life-saving procedure of modern medicine, but simultaneously it carries the risk of transmitting the life-threatening transfusion transmissible infections. HIV, hepatitis B, and hepatitis C are major public health problems in developing countries. They are transmitted parenterally, vertically, or through high-risk sexual behaviors and can cause fatal acute and chronic life-threatening disorders. Blood transfusion is a potential route of transmission of these TTIs. Screening of blood is now mandatory for many diseases and is undertaken routinely in blood banks. Transmission of TTIs during the serologically window period still poses a threat to blood safety in environments where there is high rate of TTIs. HBV and HCV are the two established causes of post transfusion hepatitis. The prevalence of TTIs among the Indian blood donors is reported to be ranging as follows; HBV – 0.66% to 12%, HCV – 0.5% to 1.5%, HIV – 0.084% to 3.87%, and syphilis – 0.85% to 3% respectively.(8)

In our study, the prevalence of all five mandatory TTIs markers among blood donors was 0.98%. Other studies like Giri et al., Agarwal et al., Patel et al (1.09%, 0.87%, 1.41% respectively).(9)(10)(11). While studies done by Kumari et al., Kotwal et al., Kumar et al., Garg s et al and Mumtaz s et al.(2.81%, 3.02%, 4.57%, 3.44% and 5.86% respectively) showed higher rates. (12)(13)(14)(15)(16), table 5. Concurrent rates for seroreactivity in our study were highest for HCV followed by HBsAg, syphilis and HIV in descending order. HCV is an evoving public health problem globally. For hepatitis C, the estimated prevalence was 0.46%, its very less than other studies from the rest of the country but blood is the main source of transmission of Hepatitis C; hence donor selection is of paramount importance. Infected persons can progress to chronic infection and chances of cirrhosis and hepatocellular carcinoma is more as compared to HBV.

In the present study the prevalence of hepatitis B was 0.44%. The main reason of HBV transmission is parenteral and it is most infective among blood borne viruses and chronic carrier state is associated with chronic liver disease and cirrhosis.

Prevalence of HIV among donors were very very low that is 0.003%. Prevalence of syphilis was also very low that is 0.07%. low prevalence indicates good donor selection in our setup and self deferral of the high risk groups. To achieve 0% prevalence of TTIs need further understanding from both the sides mainly donors and availability of high sensitive techniques and instruments.

In our study, 90.1% donors could be contacted for notification and counseling process, and among them, only 60.12% attended the blood center for counseling. The causes for that was either they don't come to blood bank after notifying or the phone number given by them was not working.

Table:5-prevalence in different studies

| S. no. | Studies | Percentage of TTI positives |
|--------|----------------|-----------------------------|
| 1. | Present study | 0.98% |
| 2. | Giri et al | 1.09% |
| 3. | Agarwal et al | 0.87% |
| 4. | Patel et al | 1.41% |
| 5. | Kumari et al | 2.81% |
| 6. | Kotwal et al | 3.02% |
| 7. | Kumar et al | 4.57% |
| 8. | Garg s et al | 3.44% |
| 9. | Mumtaz s et al | 5.86% |

CONCLUSION

This study shows that the prevalence of TTI reactive blood donor was 0.98% which is comparatively lower than other areas. Our study showed only one positive case of HIV and

none for malaria. This shows the importance of proper donor screening in our setup. Hence, strict selection of blood donors with emphasis on getting voluntary donors and comprehensive screening of donors for TTIs using standard methods are highly recommended to ensure the safety of blood for recipient and newer strategies like NAT are to be adopted.

Source Of Funding

Nil.

Conflict Of Interest

The authors declare that there is no conflict of interest.

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