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Seroprevalence of transfusion-transmissible infections among blood donors and their notification: A study from North India

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Abstract:

BACKGROUND: Blood transfusion carries the risk of transfusion-transmissible infections (TTIs) if not properly screened. As per protocol blood donors who are found reactive for TTIs are requested to come for counseling and directed for further management. Many of them are either not interested or do not follow-up their visit to blood center. This study is undertaken to determine the rate of seroprevalence of TTIs and the attitude of reactive blood donors in response to post donation notification and counseling.

MATERIALS AND METHODOLOGY: This observational study considers the blood donations from January 2019 to April 2021. Blood donors with reactive test results identified by different TTIs markers were notified, and their response rates were evaluated.

RESULTS: During this study, 8904 donations were recorded out of which 171 donors were found to be reactive (1.92%), only 142 donors were contacted (89.30%), and only 74 reactive donors could be counseled (52.11%).

CONCLUSION: This study shows low prevalence of TTI reactivity among blood donors and recommends strengthening of donor notification and counseling practices in blood centers and raises the question of need for central notification system for the traceability of reactive blood donors to prevent the spread of TTIs in the community.

Keywords:

Notification of reactive blood donors, reactive blood donors, seroprevalence of transfusion-transmissible infection reactive blood donors

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Introduction

Blood transfusion is a routine medical procedure which contributes to save millions of lives. The steps to reduce risks and availability of safe blood for transfusion requires accessibility of voluntary blood donors, following proper donor screening criteria and testing of donated blood for markers of transfusion-transmissible infections (TTI). This testing of donated

blood units will also help to roughly estimate the prevalence of TTIs among general asymptomatic population.

An efficient method to prevent the transmission of TTI is notifying and counseling of TTI reactive blood or organ donors. Blood transfusion services must confirm the outcomes of TTI testing and provides guidance to these reactive donors by counseling, so that they understand this information and guide them for future treatment.^[1,2] The National Blood

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Transfusion Council of India (NBTC) in 2017 also advocates the disclosure of results of TTI to blood donors. Blood centers are now required to obtain written consent at the time of blood donation from the donors if they wish to be informed about TTI reactive test result. Blood centers should refer donors who tested HIV reactive to the designated Integrated Counselling and Testing Centres (ICTC) for disclosure, counseling, and referral. All donors reactive to hepatitis B or hepatitis C need to be informed and then referred to a gastroenterologist for further management and for syphilis and malaria, they are sent to sexually transmitted disease (STD) clinic or physician respectively.^[3] Following this guideline, our institution is also notifying reactive blood donors and referring them to respective departments for further management. Except some, majority blood centers discard TTI reactive blood units, as well as they notify donors of their TTI status.^[4,5] However, most of the reactive donors who are called to inform results either do not respond at all or do not follow-up. As a result, some reactive donors continue to donate blood despite being notified about the infectious disease test results. Therefore, this study is carried out to determine rate of seroprevalence of TTIs and to know the attitude of the reactive blood donors in response to post donation notification and counseling and if there is any need to modify this notification process so that blood centers can change their practices and may play a role to stop this transmission chain.

Materials and Methodology

It is an observational study conducted at the Department of Transfusion Medicine and Blood Centre of our institution from January 2019 to April 2021. As per NBTC guidelines following blood donation at our department, each unit was being screened for HIV, hepatitis B, hepatitis C, syphilis by chemiluminescence method, and malaria by rapid test.^[3]

Inclusion criteria

Inclusion criteria of blood donors were aged between 18 and 60 years, hemoglobin concentration 12.5 g% or more, body weight 45 kg or more, no history of hepatitis B and hepatitis C infections and STDs, and no history of jaundice for the past 1 year fulfilling normal blood donation criteria as per Drug and Cosmetic Act, India amendment made on March 2020.

Study protocol

If any donor was found reactive by chemiluminescence, the unit was discarded, and the test was repeated with plasma from donor unit by chemiluminescence method in duplicate. Before calling the donor, the test was repeated by Chemiluminescence method from microbiology laboratory. In case of a reactive donor

for any marker, the blood center counselor informs the donor telephonically about the detection of an abnormal test result with some advice to report for one-to-one counseling by medical officer and for referral to the gastroenterology department of the hospital or ICTC center for further management free of cost maintaining the privacy. As a protocol, three phone calls were done to inform the donor about any abnormal result before their noncompliance was termed as nonresponder.

Statistical analysis

The prevalence of all TTI reactive donor was calculated. The percentage of donor responded to attend the department for notification was calculated. After counseling by the medical officer, a significant number of donor informed that they were aware about their TTI reactive status. Hence, the percentage of such donor was also noted.

Confidentiality of data and ethical clearance

Donors' data regarding the symptoms, disease, investigation, and treatment were accessible to investigator, and co-investigator and the institutional ethics committee. However, it was never entered into the data entry sheet. Ethical clearance was obtained from institutional ethical committee.

Results

Totally 8904 blood donors had donated during the study period. Among them, 171 (1.92%) blood donors were found to be TTI marker reactive. There were total 174 cases of TTI reactivity as 3 donors had co-infection (1 HIV + hepatitis C virus [HCV], 1 HIV + syphilis, 1 HIV + hepatitis B surface antigen [HbsAg]).

The gender-wise distribution was as follows: there were 167 males and 4 females donors. As per the age-wise distribution, 7 donors were in 18–20 years of age group, 85 were in 21–30 years of age group, 53 in 31–40 years of age group, 15 in 41–50 years of age group, 10 in 51–60 years of age group, and 1 donor was of above 60 years. Among them, 42 donors (24.56%) were repeat donors [Figure 1].

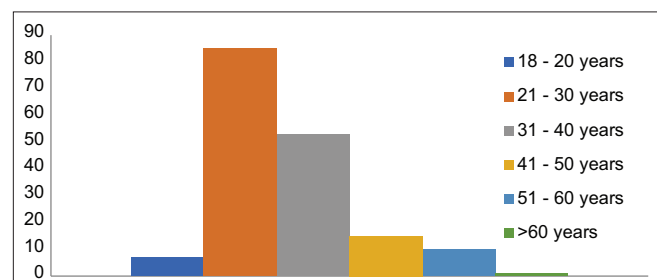


Figure 1: Age wise distribution of TTI reactive blood donors. TTI: Transfusion-transmissible infection

Among these 171 TTI reactive cases, 19 (11.11% of all reactive donors) (total – 0.21%) cases were HIV 1 and 2 reactive, 102 (59.64% of all reactive donors) (total – 1.14%) donors were reactive for HBsAg, 32 (18.71% of all reactive donors) (total – 0.32%) donors were HCV reactive, 15 (8.77% of all reactive donors) (total – 0.16%) were reactive for syphilis, 3 donors had co-infection, and no cases of malaria was noted.

Among these 171 reactive blood donors, only 159 people were called excluding possibilities of false-positive results. However, only 142 (89.30%) reactive donors could be contacted as others provided wrong contact number. Among these 142 reactive donors who responded the calls 74 (52.11%) donors attended for counseling at blood center. Those 68 blood donors who did not respond to the notification, the major reasons mentioned were busy schedule of them, personal reasons, distant residence, and not willing to visit the blood center again. During counseling of 74 TTI reactive donors, few declared (38/74 = 51.35%) about their high-risk behavior (HRB). Surprisingly, some donors (12/74 = 16.21%) declared that they are aware about their TTI reactivity status and they also have attended counseling sessions earlier.

Discussion

The overall prevalence of TTIs in apparently healthy blood donors in an area may be used to estimate their prevalence among general population in a particular area.^[6] In such area with a prevalence of reactive blood donors, special testing and strengthening the predonation counseling is really important as it can detect donors with high-risk behavior and can be rejected.

In our study, the prevalence of all five mandatory TTIs markers among blood donors was 1.92%. The other studies from India by Agarwal *et al.*, Patel *et al.*, and Leena and Shafee also found similar lower TTI rates (0.87%, 1.41%, and 1.35%, respectively), while studies done by Kumari *et al.*, Kotwal *et al.*, and Kumar *et al.* (2.81%, 3.02%, and 4.57%, respectively) showed higher rates.^[5-11] A recent report from Eastern India shows only 0.42% (182/43775) donors were found to be seropositive for TTIs. Most of the donors were positive for hepatitis B ($n = 122$, 0.28%) and hepatitis C ($n = 51$; 0.12%); however, no donor was found to be positive for malaria. These results are comparable with the present study.^[12] The reason behind lower rate of TTIs markers in the present study might be because of asking for HRB history during predonation screening and deferring donors who shows HRB. The prevalence of TTI reactivity mentioned in other studies is summarized in Table 1.

Donor notification and postdonation counseling have its benefits not only limited to the blood center by improving blood bank economy reducing wastage of blood units, but also it has impact on the larger community and well-being of the blood donor as well. An important outcome of this practice is eventual decrease in the incidence of TTI in the community as such donors are strictly advised not to donate blood or organ in the future. As TTIs can exist as asymptomatic diseases in their host so, the donor gets benefitted a lot from the disclosure and counseling process. Early diagnosis helps them to manage and start treatment, if necessary. Preventive interventions and planning for self and family can also be initiated.

In our study, 89.3% donors could be contacted for notification and counseling process, and among them, only 52.11% attended the blood center for counseling. In a study conducted by Kaur *et al.*, 89.5% donors could be contacted, and about 10.5% of the donors could not be contacted as either their addresses were not valid or their cellular phones were switched off or unavailable when contacted during the daytime.^[18] A study done by Agarwal *et al.* reported that of 416 reactive donors, 249 (59.8%) responded positively to the notification calls and attended counseling.^[7] Reactive donor response rate of different studies is mentioned in Table 2.

According to Kotwal *et al.*, the higher response rate was due to donors better concern for knowing their test result status and according to Kaur *et al.*, low response rate in their donors may be attributed to poor health-care knowledge and poor understanding of the screening results.^[10,18] But noticing the pattern of responses from donors, it is evident that a significant number of donors are confident about their TTI reactivity status. As a result, when they are contacted for counseling they refuse. Some donors during counseling also mentioned that the reactivity status was known to them, and surprisingly, they were also counseled earlier for not to donate in future. Although the exact number of such donor could not be estimated but it is expected that it is significantly more than reported in this study as only 52.11% donors attended the counseling session. These donors put the question of the mandatory need of behavioral therapy in some reactive donors and psychological support as donor notification of abnormal test results leads to psychological disturbances to donors and their family members also. A significant number of reactive donors continue to donate as they are not aware of their reactivity status and not being properly addressed by the blood center. From our study, it is evident as 24.56% donors were repeat donors and study done by Suman *et al.* from Chennai showed among TTI reactive donors 35% were repeat donors and they were not aware of their status.^[21] Though blood center is doing a social

Table 1: Prevalence of TTI reactivity from different parts of India

Study name	Area/place	Year	Total prevalence (%)	HIV (%)	HBsAg (%)	HCV (%)	Syphilis (%)	Malaria (%)
Arora <i>et al.</i> ^[13]	Haryana, India	2002-2006	3.94	0.3	1.7	1	0.9	Nil
Pallavi <i>et al.</i> ^[14]	Mysore, India	2004-2008	2.23	0.44	1.27	0.23	0.28	Nil
Bhutia and Das ^[15]	Sikkim, India	2013-2017	1.7	0.15	0.91	0.22	0.4	Nil
Omhare <i>et al.</i> ^[16]	Kanpur, India	2014-2015	2.1	0.068	1.45	0.33	0.15	0.007
Adhikary <i>et al.</i> ^[12]	West Bengal, India	2016-2020	0.42	0.01	0.28	0.12	0.004	Nil
Negi and Gaur ^[17]	Uttarakhand, India	2000-2010	2.6	0.2	1.2	0.9	0.3	0.002
Present study	Haryana, India	2019-2021	1.92	0.21	1.14	0.32	0.16	Nil

HBsAg: Hepatitis B surface antigen, HCV: Hepatitis C virus

Table 2: Percentage of responded transfusion-transmissible infection reactive blood donors in different studies

Study name	Percentage of responder
Agarwal <i>et al.</i> ^[7]	59.8
Kotwal <i>et al.</i> ^[10]	98.2
Kaur <i>et al.</i> ^[18]	38.9
Kleinman <i>et al.</i> ^[19]	42.0
Tynell <i>et al.</i> ^[20]	88.0
Patel <i>et al.</i> ^[5]	81.6
Suman <i>et al.</i> ^[21]	70.3
Sachdev <i>et al.</i> ^[22]	21.6
Present study	59.8

justice to the community by this notification practices but same can create unnecessary anxiety, stress, and suicidal tendencies in blood donors as it was evident in a case from Eastern India.^[4] But recognizing the impact of this problem it should be made legally mandatory to start this practice for all blood centers as well as there is a need for central notification system for tracing of these donors by synchronizing with Aadhar number or retinal impression or photo.

Conclusion

This study shows that the prevalence of TTI reactive blood donor was 1.92% which comparatively lower than other areas and there is an importance of notification and counseling of TTI reactive donors and recommends vigilant monitoring in this process. This study also recommends that to achieve 100% response rate for reactive donor notification, it is required to educate the donors at the time of predonation screening about the various TTI screening tests done, and the importance of informing them the test results and there is need to improve the technologies in the blood center so that traceability of reactive donor can be made. It also puts up a question that there is a need of behavioral therapy as well as psychological support in some reactive blood donors.

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Conflicts of interest

There are no conflicts of interest.

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