



Transfusion Medicine

INSIGHTS INTO TRANSFUSION TRANSMITTED INFECTIONS TRENDS AND DONOR NOTIFICATION PRACTICES- A STUDY FROM A TERTIARY CARE CENTER HARYANA

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ABSTRACT **Purpose:** Blood donor notification have a dual responsibility to ensure donor and patient safety. All blood transfusions carry the threat of transfusion transmitted infections (TTIs). Adequate, harmless and timely transfusions of blood products can save millions of lives. However, unsafe blood transfusions may cause many life-threatening complications resulting in high morbidity and mortality. The main purpose is to evaluate and analyze the response rate of seroreactive blood donors to post-donation notification and counseling and changes in TTI seroprevalence among blood donors. **Methods:** A retrospective study was conducted at a government tertiary care centre from January 2019 to December 2023. By telephonic call and letters all the seroreactive donors were called to the blood centre. Reactive donors were counselled and on act in accordance with they were referred to suitable centre for advance management. **Results:** In 15,227 blood donations 497(3.37%) were seroreactive donors. Out of these HBV reactivity were 1.25 %, HCV (0.54%), HIV (0.29%), and Syphilis (0.93%). The majority of TTIs were found in age group of 25–34years(52.31%) and least among donors aged ≥ 45 years ($P < 0.05$). Out of these 497 reactive donors, 214 (43 %) answered positively to the notification calls and appeared in counselling whereas, 43 (8.7%) seroreactive donors could not be contacted and not notified about abnormal test results. **Conclusion:** Notifying donors is an effective way to reduce TTI, but it is undermined by a lack of contact with donors, which leaves a constant risk of TTIs.

KEYWORDS : Transfusion-transmitted infection, Donor Notification, Seroreactive blood donors.

INTRODUCTION

Blood transfusions are an essential part of healthcare. Transfusion facilities have a twofold responsibility to ensure the wellbeing of both donors and patients.[1] Since blood transfusions began in the early 1940s, various issues related to transmission of pathogen through blood transfusions have come to the frontline.[2] All blood transfusions carry the hazard of transfusion-transmitted infections (TTIs). Safe and judicious blood transfusions save millions of lives. However, unsafe blood transfusions may cause many life-threatening complications resulting in high morbidity and mortality.[3] Prevalence of TTI in our country ranges from 1.8–4.0%, 0.4–1.09%, 0.2–1.0%, and 0.05–0.9% for Hepatitis – B Virus (HBV), Hepatitis – C Virus (HCV), Human Immunodeficiency Virus (HIV), and syphilis, correspondingly.[4] Hence pre-transfusion testing for TTIs becomes imperative for patient safety.

As per National guidelines of India it is compulsory to screen all donated blood for five infections, HBV, HCV, HIV, syphilis and malaria.[5] In 2002, the Indian Government implemented the National Blood Policy 'Action Plan for Blood Safety to guarantee a safe blood supply.[6] This strategy recommends notification of all seroreactive blood donors. Therefore, blood centres are now obligatory to obtain written consent from donors while the donation and to notify them of abnormal test results.[6] If the screening tests are anomalous, the test should be repeated in duplicate using the same method before the donor is notified to dodge notification of false-positive outcomes. Recurrent reactive are referred to integrated counseling and testing centre (ICTC) for HIV, Sexually Transmitted Disease (STD) centre for syphilis and gastroenterology for HBV/HCV for counselling, confirmatory testing, and treatment.[7] Due to the seriousness of the situation, it is necessary to notify and counsel them in a confidential and trust-building environment, with the primary goal being to limit the illness burden and the secondary goal being to lower the danger of further transmission.[8,9] Donor notification can thus be a puzzling duty demanding superior skills from the staff involved as maximum donors do not expect to listen that they have reactive results and they may become tremendously worried to hear this news. On the contrary, a minority of donors appear to disregard the notification and continue to donate blood.[10]

So, the role of counsellor is very crucial in educating blood donors about implications and potential risks associated with the infection as

well as motivating them to prevent further transmission, emphasizing on responsible behaviour and regular testing.[11] Donors are first informed telephonically and one-on-one post-test discussion (PTD) and counseling is done in blood centre. Our country lacks regional and/or national databases to document the success rate of blood donor notification and counseling, mainly due to the scrappy management of blood transfusion services.[11] Therefore, our prime objective is to evaluate and analyze the response of seroreactive donors to post-donation notification and counseling at our institution, and also to assess changes in seroprevalence and TTI among blood donors during the study period.

MATERIAL AND METHODS

This retrospective study is constructed on the records of all the donations done at Blood Centre of ESIC Medical College and Hospital, India from January 2019 to December 2023. The fully filled donor forms which comprised of the type of donation (voluntary/replacement), the donor demographic details, pre-donation form, counselling specifics and medical checkup outcomes are included. As per departmental SOPs and norms for selection of donors as per Drug and Cosmetic Act, 1955 the donor selection is done. Contact number and thorough postal address of every donor was documented at the time of donation. As per the departmental rules informed consent (concerning revelation of sero-reactivity) was acquired from all the donors preceding to donation. Adequate samples were collected at the time of blood donation and screened for HIV 1-2, Hepatitis B Surface Antigen (HBsAg) and HCV using Chemiluminescence Assay following the usual procedure for each according to the kit inserts. Syphilis was confirmed by Treponema Pallidum Hemagglutination Assay and Rapid Plasma Reagin assay. Malaria was confirmed using malarial antigen detection test kit (Meril Pvt. Ltd., India). All samples with first reactive outcomes were repeated in duplicate before marking as reactive. By telephonic call, reactive donors were called to the blood center and if not answered then letters were sent on their postal address. At least three telephonic calls were made in case of non-responders and one letter posted on the presented addresses. When reactive donors arrive to the blood centre, they were educated about their results, counselled and referred to proper center for additional verification of their reactive status and treatment. HIV reactive donors were sent to the integrated counselling and testing centre of the hospital. Hepatitis B, Hepatitis C and malaria reactive donors to a medicine Out Patient Department (OPD) and

syphilis positive to a dermatology and venereal diseases OPD.

RESULTS

There were overall **15227** blood donors during the study period, including 9665 (63.42 %) voluntary and 5562 (36.52%) replacement donations. The donor group involved predominantly males as the females accounted for <1%. Out of everyone, **497** (3.37%) were sero-positive for TTIs. The statistics of blood donors and sero-positivity for TTIs was maximum in the year 2022. This surge in sero-positivity found in 2022 was statistically noteworthy ($P < 0.05$). Tendency of TTIs among donors are presented in Graph-I. Concerning various TTIs, maximum number of donors (1.25%) were Hepatitis B reactive trailed by Syphilis (0.93%), Hepatitis C (0.54%), HIV (0.29%) and Malaria (0.0%). Bulk of Syphilis cases were in the year 2022 (Table I). The TTIs were found in majority amongst the donors belonging to age group of 25–34 years ($n=260$) followed by 18– 24 years group ($n=112$). Significantly smallest number of TTIs were establish among donors aged ≥ 45 years ($P < 0.05$) (Table-II). Out of all the **497** reactive donors, 214 (43 %) comprises both voluntary and replacement donors answered positively to the phone calls and appeared in counselling at their designated area. Out of 497 reactive donors, 43 (8.7%) sero-reactive donors could not be contacted and educated about seroreactive results. Out of these **497** reactive donors, 238 (48 %) reactive donors responded to the notification sent through the telephone. Letters were sent to 318 (64%) donors, those who did not responded or came for counselling on telephone (Graph-II). The chief causes were donor's hectic schedule, donor's living out of station and reluctant to visit the blood centre another time.

DISCUSSION

Ensuring safe blood transfusion entails thorough pre-donation counseling, screening for TTIs, as well as post-donation counseling and notification for TTI-reactive donors. The breach in notification and pre donation education leads to failure in achieving 100% TTI-free blood donation and thus leads to reluctant response to the seroreactivity status and leading to lower respond rate.[12] In developing nations such as India, ensuring blood safety remains a significant concern owing to the elevated prevalence of transmissible agents among donors. In our study there were a total **15,227** blood donors comprised of 9665 (63.42 %) voluntary and 5562 (36.52%) replacement donations. In present study, the combined sero-reactivity rate is 3.37% which is similar to Mathai et al^[13] (3.1%), Karmakar et al^[14] (2.79%) and Koshy et al^[15] (2.9%), respectively. Agarwal N et al, Leena MS et al and Patel SG et al have testified lower seropositivity i.e. 0.87%, 1.35% and 1.41 % respectively.[16-18] The TTI positivity was most commonly observed in the 25-34 years age group.

In the existing study the HIV seroprevalence was 0.29 %. In a study by Sindhu et al. the sero-prevalence of HIV amongst donor was 0.08% and Suresh B et al reported as low as 0.36%. In our study, over all prevalence of HBV infection was 1.26%. Mandal R et al. 1.24% Bhawani et al 1.41% and Jasani et al 1.35% stated the similar seropositivity findings.[21-23] In our study, overall prevalence of HCV was 0.54%. Similar to our study prevalence was stated by Pahuja et al. from Delhi 0.66%. In our study, whole prevalence of syphilis was 0.93%. Studies done by Pallavi et al & Singh et al reported prevalence 0.23% & 0.90% respectively.[4,25]

Transfusion safety originates with healthy donors. Essential in averting TTIs is the notification and counselling of reactive donors. Donor notification and counselling shield the health of the donor, avert secondary spread of infectious ailments to sexual partners, decreases risk of vertical transmission and offer feedback about the efficacy of donor selection processes such as predonation instructions and medical history.[1] The notification of blood donors perhaps epitomizes the single biggest setting in which asymptomatic individuals are informed of abnormal test results related to exposure to clinically substantial transmissible agents. Donor notification and post-donation counseling have become vital components of blood bank operations in modern times, especially for reactive donors.[1]

We tried to contact all 497(3.37%) seroreactive donors regarding their TTI status either telephonically or by letter. Only 214 (43%) reactive donors answered and attended the counselling. To the remaining donors letters were sent ($n=318/497=64\%$). In a study conducted by Patel et al., 236 (60.36%) donors displayed a affirmative reply after donor notification.[26] A study by Agarwal et al. involving 416 reactive donors, only 249 (59.8%) donors came back to blood centre and attended counselling after notification.[27]

This may be accredited to a comparatively lesser awareness and understanding among the donors about various infections and/or the screening test.[28] Sharma et al. discovered that numerous donors were unaware of the concept of the window period in TTI testing. They believed it was tolerable to donate blood regardless of engaging in high-risk behaviour as they presumed their blood would undergo testing for TTI markers irrespectively, and if identified reactive, it would be discarded eventually.[29]

In the present study, we also found that 8.7% sero-reactive donors could not be communicated and educated about abnormal test results. Inadequate or erroneous demographic information provided by donors were the foremost reasons blamed for this "Could not be contacted" group. Our results were comparable to Rautri et al, 11.5% causes being either the invalid address of the donors or their phones were switched off or unavailable when contacted throughout the day time, wrong details given by the donors.[30] Authors assume this high proportion of incorrect demographic details may be due to ignorance towards TTI's and not understanding the significance of the same. There is also likelihood of acknowledged reactive status and act of purposely giving wrong demographic details in effort to hide their identity. Given that Esic medical college and hospital is a tertiary care instute which provides medical treatment to all the ESIC beneficiaries from all over India. Our blood centre serves as a major referral referral centre in India, a significant portion of our donors hail from remote locations. Therefore, the distance involved could potentially explain why some donors fail to return to the transfusion facility. Following notification 27% of donors communicated to the blood centre for additional information, seen in the study by Kleinman et al.[31]

Furthermore, there are several insufficiencies existing in the policies such as poor links between blood centers with ICTCs or medical units. Referral pathways lack consistency, compounded by untrained donor counselors and inconsistent communication content in letters to sero-reactive donors. Moreover, nonresponding donors may choose to donate blood elsewhere, particularly at centers lacking biometric identification systems. This presents a notable risk to blood supply safety, particularly as many centers still rely on "rapid kits" for screening instead of the more reliable ELISA/Chemiluminescence method, which could result in a greater rate of false negatives. Donors who are Chemiluminescence/ELISA/NAT reactive somewhere else may escape TTI screening.[32] Added vital problem which is faced in our daily transfusion practice is about donors who are notified as of Chemiluminescence /ELISA reactive status. These donors have their tests repeated by their own physicians and come back with discrepant results as maximum of the labs again screen donor samples by rapid kit. Donors who frequently exhibit anger in the blood centre often challenge the reliability of the screening procedures. Despite our efforts, we struggle to convey the significance of terms like sensitivity, specificity, and window period in a manner that resonates with them. Consequently, we must monitor such cases for six months since approximately 95% of infected individuals will undergo seroconversion within this timeframe.[33]

CONCLUSION

Testing, notification and counselling collectively form the dynamic association between the healthy donor and safe blood. Our study was a trifling endeavor in defining donor behavior when educated about their reactive status. We endorse importance on stringent pre donation counselling and confidentiality be preserved to increase the donor confidence. Government ID-cards be acquired from donors for records or the use of biometrics for donor identification is also suggested. There is a pressing need to frame the nationally suitable guiding principle for notification of all seroreactive blood donors.

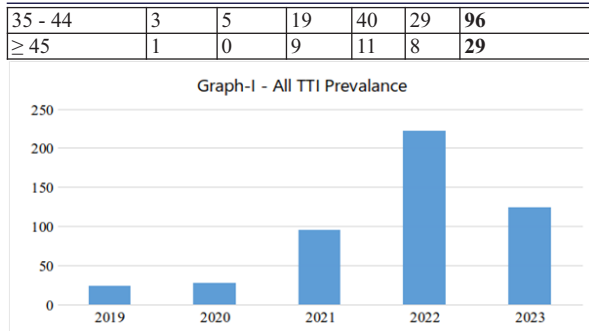
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Conflict of Interest None

Table- I- Comparison Of Seroprevalence Of TTI Among Blood Donors

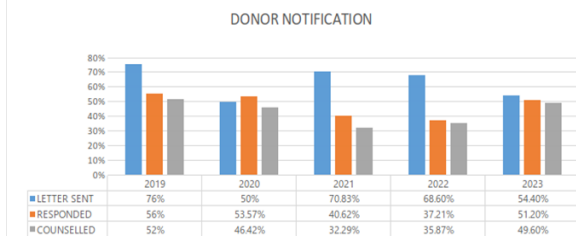
AGE GROUP	2019	2020	2021	2022	2023	Total
18 - 24	7	6	11	55	33	112
25 - 34	14	17	57	117	55	260 (P <0.05)



Graph-I-Prevalence of Transfusion Transmitted Infections in blood donors

Table- II- Age Wise Distribution Of Seroreactive Blood Donors

YEAR	HIV	HBsAg	HCV	SYPHILLIS	MALARIA
2019	0.17%	0.96%	0.34%	0.28%	0.00%
2020	0.32%	1.44%	0.24%	0.24%	0.00%
2021	0.29%	1.63%	0.55%	1.48%	0.00%
2022	0.16%	1.38%	0.82%	2.02%	0.00%
2023	0.49%	0.86%	0.75%	0.61%	0.00%
AVG	0.29%	1.25%	0.54%	0.93%	0.00%



Graph-II - Seroreactive Donor Response Rate on Notification & Counselling

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