



TO ASSESS THE PREVALENCE OF REPORTING (RESPONSE RATE) AMONG SERO-REACTIVE DONORS IN A BLOOD CENTRE AT A TERTIARY CARE HOSPITAL IN HIMACHAL PRADESH, INDIA, OVER A PERIOD OF SEVEN YEARS: A SECONDARY DATA ANALYSIS.

Dr Anjali Shrikant Chavan

MD Transfusion Medicine Assistant Professor, Transfusion Medicine and Blood Centre, Dr Rajendra Prasad Government Medical College, Kangra, Tanda, Himachal Pradesh.

Arsh Shrikant Chavan

Indian Institute of Science Education and Research Pune, Pune-411008, Maharashtra, India.

Dr Shweta Kanwal*

MD Community Medicine, Faculty, Regional Health and Family Welfare Training Centre RHFwTC Kangra At Chheb. *Corresponding Author

ABSTRACT

Background: The National blood policy by the Government of India in the year 2002 aims to ensure an easily accessible and adequate supply of safe and quality blood and blood components collected/procured from a voluntary non-remunerated regular blood donor in well-equipped premises, which is free from transfusion-transmitted infections, and is stored and transported under optimum conditions. **Aim:** To assess the prevalence of reporting (response rate) among sero-reactive donors in a blood centre at a tertiary care hospital in Himachal Pradesh, India. **Material and Method:** Secondary data analysis of 83 months (October 2015 to August 2022) of data of seroreactive blood donor notification and recall of blood donors of Blood Centre Dr Rajendra Prasad Government Medical College Kangra at Tanda was done. It was done by reviewing seroreactive donor notification, counselling and recall register and master donor register for the donors who had reported on recall from October 2015 to August 2022 (83 months). **Results:** Out of 391 reactive donors, 163 reported in the department, and the response rate was 41.6%. The response rate was highest for HBV-44.3% (72/163), followed by HCV-26.4% (43/163), VDRL-22.7% (37/163) and HIV-6.6% (10/163). None of the donors was found to be positive for malaria and co-infection like HIV-HbsAg or HIV-Syphilis. **Conclusion:** The overall response rate was 41.6% among the reactive donors. Further, a prospective study should be carried out to get reliable response rates.

KEYWORDS : Blood donor notification, National blood policy, pre-donation counselling, response rate (RR), transfusion-transmitted infections (TTI).

INTRODUCTION

The National blood policy by the Government of India in the year 2002 aims to ensure easily accessible and adequate supply of safe and quality blood and blood components collected / procured from a voluntary non-remunerated regular blood donor in well-equipped premises, which is free from transfusion transmitted infections, and is stored and transported under optimum conditions.⁽¹⁾ Blood can save life; however, it can be a source of transfusion-transmitted infections if meticulous screening of donated blood is not done.⁽²⁾ Safe blood is possible when procured from safe and healthy blood donors. However, an apparently healthy donor can also transmit an infection during the asymptomatic phase, which leads to increased prevalence of various infections in the general population.^(3,4,5) Acquisition of HIV disease through blood transfusion is a relatively efficient mode of transmission, with rates approaching 100%. A WHO report states that the viral dose in HIV transmission through blood is so large that one HIV-positive transfusion leads to death, on average, after two years in children and after three to five years in adults.⁽⁶⁾ National AIDS Control Organisation (NACO) and National Blood Transfusion Council (NBTC), Ministry of Health and Family Welfare, Government of India monitors the blood safety aspect in India.^(7,8)

Each blood unit collected from a blood donor is mandatorily tested for HIV I and HIV II, Hepatitis B, Hepatitis C, Syphilis and Malarial parasites, in India, in compliance with the Drugs and Cosmetics act of 1940 and the rules therein 1945 and amendments from time to time.⁽⁹⁾ The donor screening strategies include taking an elaborate medical history, performing preliminary clinical examination and screening for infectious markers.⁽¹⁰⁾ Though these strategies have been effective, the transmission of diseases still occurs, primarily because of the inability of the test to detect the disease in the 'window' period of infection, immunologically variant viruses, immune-silent carriers and inadvertent laboratory testing errors.^(10,11) Notification and counselling of sero-reactive donors is an efficient method of curtailing transfusion

transmitted infections (TTI).⁽¹²⁾ In India, disclosure of viral TTIs reactivity to the blood donor was not permitted until December 2004; at that time, the National Blood Transfusion Council, Government of India, formulated a strategy for the same. The National blood policy now advocates disclosure of results to donors.⁽¹³⁾ Donors who are confirmed positive need to be deferred from further blood donation, notified regarding their infection status, counselled and referred for clinical management as soon as possible. This duty of care extends beyond donors themselves to their families and the general population as these individuals may infect others if they are not aware of their infection status.⁽¹⁴⁾ Hence seroreactive donor notification and recall is a strong platform to target and curtail the disease burden of these transfusion transmissible infections.

The main objective of our study is to assess the prevalence of reporting among reactive donors (response rate) in a blood centre at a tertiary care hospital in Himachal Pradesh, India. In addition to this, our study will observe the trends in variation in response rate over seven years including pre-Covid, Covid and post-Covid years, find out the various reasons for non-responders.

MATERIAL AND METHODS

For the purpose of the study, secondary data analysis of 83 months (October 2015 to August 2022) of data of seroreactive blood donor notification and recall of blood donors of Blood Centre Dr Rajendra Prasad Government Medical College Kangra at Tanda was done. It was done by reviewing seroreactive donor notification, counselling and recall register and master donor register for the donors who had reported on recall from October 2015 to August 2022 (83 months). The number of donors found to be reactive for various diseases like HIV, Viral Hepatitis B and Hepatitis C, Syphilis and Malaria and those who reported upon communication via phone call were noted. The information related to demographic details such as age and gender, donor status (voluntary donor, family donor, replacement donor), donation

status (first time or repeat donation) was recorded. In addition to these various reasons for non-communication among non-responders, the type of phone used (personal and department phone) to call reactive donors and the total number of calls done were also noted. Seroreactive blood donor notification and counselling were started in Blood Centre Dr Rajendra Prasad Government Medical College Kangra in October 2015 and have been conducted routinely since then, till date. Ethical clearance for the study was obtained from the Institutional Ethics Committee.

Definitions Used For Measurement Of Outcome Variables

- 1. Communicated Donors:** Those sero-reactive donors who could be successfully contacted telephonically were called communicated donors in our study.
- 2. Non-communicated Donors:** Those sero-reactive donors who could not be contacted telephonically due to various reasons.
- 3. Responder:** A sero-reactive donor who reported to Blood Centre after being communicated telephonically.
- 4. Non-responder:** A sero-reactive donor who did not report to Blood Centre after being communicated telephonically.
- 5. Voluntary Donor:** A person who voluntarily donated blood after he/she had been declared fit after a medical examination, without accepting in return any consideration in cash or kind from any source and was not a professional or paid donor.⁽⁶⁾
- 6. Replacement Donor:** A donor who is a family friend /relative of the patient /recipient.⁽⁶⁾
- 7. First-time Donor:** A blood donor who donated blood for the first time.
- 8. Repeat Donor:** A blood donor who had donated blood prior to the present donation.

Data Analysis

Data collected was coded and then entered in a Microsoft-excel spreadsheet and analysed using SPSS version 24, wherein the patients were assessed for overall response rate among the reactive donors. The response rate age-wise, gender-wise, disease wise, based on donor status and donation status, was also calculated. Categorical data was analysed and presented using frequencies and percentages, and quantitative data was analysed and presented using range and mean.

RESULTS

Donor demographics and age wise distribution

There were 56559 blood donations over 83 months, out of which 391 (0.7 %) were reactive donors for at least one of the transfusion transmissible infections tested for, in the department over that period. Out of 391 reactive donors, 163 reported in the department, and the response rate came out to be 41.6%. (Table I) Among the responders, 160 (98.1%) were males, and 3 (1.9%) were females. Gender wise response rate comes out to be 41.2% (160 out of 388) among males and 100% (3 out of 3) among females. (Figure 2) The responders belonged to age between 18 to 54 years. On age-wise distribution as per 'Levinson's model of adult development, the majority, 65.7% (107/163) were in 22-39 years (early adulthood), and the least, 6.2% (10/163) were in 17-21 years (early adulthood transition). (Table II)

Table I: Assessment Of Reporting Among Reactive Donors In Blood Centre (391) At Tertiary Care Hospital, Himachal Pradesh, India 2015-22.

Year	Number of reactive donors	Reported Number (%)
2015	15	8 (53.3)
2016	45	23 (51.1)
2017	48	24 (50.0)
2018	61	22 (36.1)
2019	65	11 (16.9)
2020	47	20 (57.4)

2021	60	29 (51.7)
2022	50	26 (48.0)
Total	391	163 (41.6)

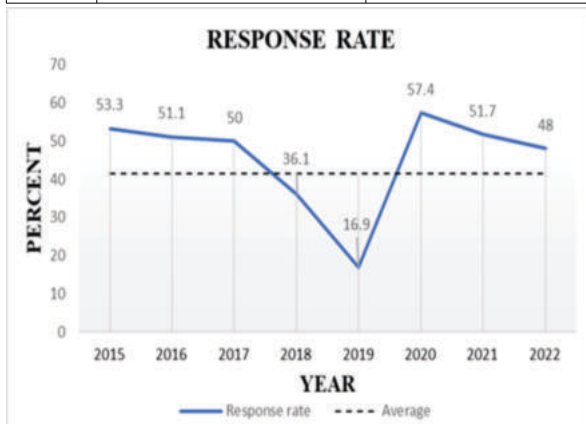


Figure 1: Prevalence Of Reporting Among Reactive Donors In Blood Centre (391) At Tertiary Care Hospital, Himachal Pradesh, India October 2015-August 2022.

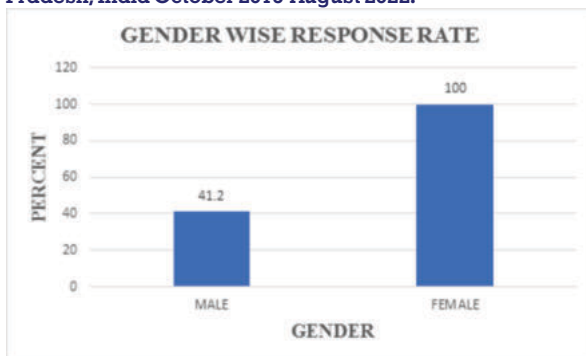


Figure 2: Gender Distribution Of Reactive Donors Who Reported In Blood Centre (163).

Table II: Response Rate Of Seroreactive Blood Donors (163) Age Wise Criteria As Per Levinson's Model Of Adult Development.

Age group in years	Number (%)
17-21 Early adult transition	10 (6.2)
22-39 Early adulthood	107 (65.7)
40-45 Midlife transition	22 (13.4)
46-60 Middle adulthood	24 (14.7)
60-65 Late adult transition	0 (0.0)

Response Rate, Infection Type And Donor Type

The response rate was highest for HBV-44.3% (72/163), followed by HCV-26.4% (43/163), VDRL-22.7% (37/163) and HIV-6.6% (10/163). None of the donors were found to be positive for malaria and co-infection like HIV-HbsAg or HIV-Syphilis. (Figure 3)

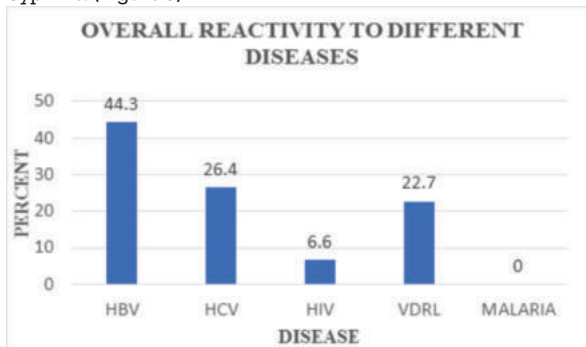


Figure 3: Overall Distribution Of Reactive Donors Who Reported In Blood Centre (163) Based On The Disease Found Among Them.

Overall, 49.1% (80/163) were voluntary donors and 50.9% (83/163) were replacement donors. Overall, 47.5% (77/163) were first time donors and 52.3% (85/163) were repeat donors.

Phone Calls And Reasons For Non-communication

Total of 612 calls were made, 308 (50.3%) from personal mobile phones from 2015-2020, when the departmental phone was not available for outgoing calls and 304 (49.7%) from the departmental phone after 2020 when departmental phone was available for calls to donors and personal phone usage was stopped. The mean number of calls per donor was 1.6. Of the total 391 sero-reactive blood donors, only 313 (80.05%) donors could be successfully communicated over the telephone, out of which 163 (52.07%) responded, and the rest did not. Whereas 78 (19.95%) could not be contacted. The most common reasons for non-responders who could not be communicated was switched off phone (39.8%), phone not reachable/no network/no incoming call facility (19.9%), invalid mobile number (13.8%), not answering call (5.6%). Among those who were communicated, the reasons for non-response were out of station/transferred out (12.5%) and refused to come (8.4%).

Table III: Reasons For Non-responders (228) Among The Sero-reactive Donors.

Non-responder (228)	Number (%)	Reason
Communicated (150)	12 (8)	Out of station
	8 (5.0)	Refused to come
	130 (87.0)	Did not come
Non-communicated (78)	38 (48.7)	Phone switched off
	20 (25.6)	Phone out of reach
	15 (19.3)	Invalid number
	5 (6.4)	Did not answer

DISCUSSION

Post-donation sero-reactive donor notification and post-donation counselling is an important step in the working of the blood centre. However, it is challenging because an asymptomatic donor, who had donated blood with an altruistic motive, must be informed about his sero-reactive status and counselled for further management and treatment. In our study, the overall response rate observed was 41.6% (163/391) among total sero-reactive donors and 52.07% (163/313) among the communicated seroreactive donors. This is comparable with the study of Basotra RM et al.⁽¹⁷⁾, who had a response rate of 31.2% in the total sero-reactive donors and of 51.4% in communicated donors and Handa A et al.⁽¹⁸⁾ with 20.99% and 39.56% response rate respectively. Higher response rates of 53.66%, 58% and 59.8% were observed in studies of Sabri Priya E⁽¹⁶⁾, Raturi M et al.⁽¹⁹⁾ and Agarwal N et al.⁽²⁰⁾ respectively. All three studies were prospective studies done for a period of only two years in deemed /private institutions.

In our study among the 163 responders, 80 (49.1%) were voluntary donors (VD) whereas 83 (50.9%) were replacement donors (RD) and 77 (47.5%) were first time donors and 85 (52.5%) were repeat donors indicating that there was no difference in responders depending on type of donor (VD/RD) or type of donation (first or repeat). Disease-wise distribution of sero-reactive donors for Hepatitis B (HBV), Hepatitis C (HCV), Human Immunodeficiency Virus (HIV) syphilis and malaria in the sero-reactive responders was 72 (44.3%), 43 (26.4%), 10 (6.6%), and 37 (22.7%) respectively. As no malaria cases were detected, there were no responders of this category.

In our study, total of 612 calls were made. 308 (50.3%) calls from personal mobile phones from 2015-2020 when the departmental telephone was not available for outgoing calls, and 304 (49.7%) from the department phone after 2020 when the departmental telephone was available for calls to donors and personal phone usage was stopped.

The trend in response rate was observed over the years which has been depicted in figure 1, and a fall in response rate was seen in 2018 and 2019. Correspondingly there was a decline in the average number of calls per donor. This could be attributed to the fact that priorly all the notification was done by personal calls. The department did not have an outgoing facility for telephonically notifying sero-reactive blood donors. Using a personal phone for notification was tedious and invited unnecessary complications. The departmental telephone was made available for donor notification in 2020. Since then, it was seen that the response rate again gained momentum. The years 2020 and 2021 saw other challenges due to the Covid pandemic which resulted in travel restrictions for donors and also difficulties in the working of Blood centre staff. However, a response rate of 42.6% and 48.3%, respectively, were achieved in these two years, which was much higher than the previous two years. It must be noted that for seroreactive donor notification purposes only one counsellor was available. Availability of at least two counsellors in Blood Centres of Medical colleges could achieve a higher response rate.

Among the non-responders, 150 (65.78%) were those who were communicated telephonically but did not respond whereas 78 (34.2%) were those who could not be communicated. Of these 78 not communicated non-responses, 38 (48.7%) donors presented with switched-off phones, 20 (25.6%) were not reachable due to network problems or their phones did not have an incoming facility, 15 (19.23%) were with an invalid number, and 5(6.4%) did not answer the calls. The reason for non-responders 228 (58.4%) in our study has been depicted in table III. Of the 150 non-responders who had been communicated and requested to come to Blood Centre, 12 (8%) donors were far away /out stationed, or had been transferred out due to their job, 8 (5.33%) refused to come and the rest 131 (87.33%) did not turn up.

In the study by Basotra RM et al.⁽¹⁷⁾, the main reasons for non-responding communicated seroreactive donors when called included donors belonging to far-flung hilly areas which are inaccessible during winter months. In our study, Dr RPGMC is a referral hospital, and patients are referred from far-flung areas of Kangra district, HP and even from other districts and remote regions. So, when the sero-reactive donor was a family donor or a replacement donor in such cases, it was noted that the donor would be lethargic or incapable of traveling a long distance for the sake of an inconclusive test result as notified to him over the phone call. This was also seen in cases the donor was from an outstation voluntary blood donation camp far away from the Blood Centre. In our study, 12 (8%) non-responders were far away /out stationed, or had been transferred out due to their jobs.

131 (33.5%) donors who were communicated did not report to Blood Centre and 8.4% of donors refused to come. The reasons for these non-responsive donors could be prior knowledge of their reactive status, fear and denial, lack of time (busy schedule), staying in a far-off place/village from the blood centre, lack of knowledge and awareness regarding transfusion transmissible infections, not willing to revisit hospital and poor understanding of health care. Also, the other factors could be incomplete confidence in the working of blood centre personnel, inadequate predonation counselling, and fear of breach of confidentiality.

According to Kotwal U et al.⁽²¹⁾, the higher response rate in their donors was due to 'donor's better concern for knowing their test result status, and according to Kaur G et al, the low response rate in their donors may be attributed to poor health-care knowledge and poor understanding of the screening results.

In the period of 83 months from October 2015 to August 2022, of the 171 seroreactive donors for HBV, 72 (42.1%), of the 106

seroreactive donors for HCV, 43 (40.56%), of the 16 seroreactive donors for HIV, 10 (62.5%) and of the 98 seroreactive donors for syphilis 37 (37.75%) responded and were appropriately counselled and referred for further management.

Disease-wise response rate in our study was 42.1% in HBV, 40.56% in HCV, 62.5% in HIV and 37.75% in syphilis-reactive donors. Comparatively, disease-wise response rate was found to be 48.17%, 14.63%, 51.28% respectively in study by Dontula et al., 49%, 45.5%, 50.0%, 17.1% respectively in the study by Kaur et al.⁽¹⁴⁾, 51%, 50%, 78%, 77% in the study by Raturi et al.⁽¹⁸⁾, 46.15%, 66.63%, 71.42%, 51.28% in the study by Basnotra et al.⁽¹⁹⁾, 46.15%, 66.63%, 71.42%, 51.28% in the study by Basnotra et al.⁽¹⁷⁾. Studies by Sonam et al.⁽¹²⁾ and Handa et al.⁽¹⁸⁾ compared response rate of only HBV, HCV and HIV and showed results of 34.2%, 36%, 41.7% and 22.22%, 44.44% and 60% respectively in both the studies. All these studies were conducted in various cities of India for a period of one year.

Higher response rates for HIV reactive donors might be due to well setup Integrated counselling and testing centre (ICTC) with proper linkages with blood centres, awareness and feeling of a high level of responsibility of the medicos in the timely referral of these patients. This can also be attributed to the more heightened awareness and fear of HIV/AIDS among the general population^(14,17).

The strength of our study was that it was based on the response rate of sero-reactive donors over seven years, where we were able to observe the trends over the years and also in the days of Covid-19 pandemic. It had certain limitations also. Our study was a secondary data analysis done on the records available in the blood centre, which can be affected due to possible lapse in documentation at times. A prospective study would have been more rewarding in this aspect as we would have been able to compare the results after initiatives were taken for better response.

CONCLUSION

The overall response rate was 41.6% (163/ 391) among the reactive donors and 52.07% (163/313) among the communicated sero-reactive donors. Repeated attempts to communicate with the donor and not giving up on a seroreactive donor with the prime motive of the donor (patient) and his family's wellbeing could improve the response rate. A definite calling schedule could be a more systematic step for improving the response rate. Positive donor identification by reconfirming the blood donor's mobile number at the time of medical fitness and blood collection can also decrease the number of non-responders due to wrong mobile numbers. Further, a prospective study should be carried out to get reliable response rates and to compare the results after initiatives taken for better response.

Financial Disclosure: The study was not funded by any agency.

Conflict of Interest: None declared.

REFERENCES

1. National AIDS Control Organisation. National blood policy of India, 29 August 2007. [Internet] Last accessed on 10-11-22. Available from:<http://unpan1.un.org/intradoc/groups/public/documents/pdf>.
2. Negi G, Gaur DS. Trends of transfusion transmissible diseases among blood donors at Uttarakhand, India. *Indian J Community Med* 2014;39:183-6.
3. Sushama AC, Gaythri P, Amonkar and Gururaj V. Seroprevalence of transfusion transmitted infections in healthy blood donors: A 5-year Tertiary Care Hospital experience. *J Lab Physicians*. 9(4):283-287.
4. Attaullah S, Khan S, Khan J. Trend of transfusion transmitted infections frequency in blood donors: provide a road map for its prevention and control. *Journal of Translational Medicine*. 2012;10:20-22.
5. Inamdarp DP et al. Seroprevalence of transfusion transmissible infections among blood at tertiary care hospital in southern Telangana- A 3 year cross sectional study. *Indian Journal of Microbiology Research*. 2018 October-December;5(4):446-450.
6. Arora A, Arora D, Khetarpal A. Seroprevalence of transfusion-transmissible diseases in donors. *Indian journal of pathology and microbiology*. 2010 April-June; 53(2).
7. National AIDS Control organisation (2007) An action plan for blood safety. National AIDS Control organisation. Ministry of Health and Family Welfare.

- Government of India.[Internet]Last accessed on 10-11-22. Available from:<http://naco.gov.in>.
8. Sachdeva S, Mittal K, Patidar G et al. Risk Factors for Transfusion Transmissible Infections Elicited on Post Donation Counselling in Blood Donors: Need to Strengthen Pre-donation Counselling *Indian J Hematol Blood Transfus* (July-Sept 2015) 31(3):378-384.
9. The Drugs and Cosmetics Act, 1940 and the Drugs and Cosmetics Rules, 1945, as amended up to 30th June, 2005. Schedule F. Part XIII. Government of India. Ministry of Health and Family Welfare. Department of Health. Last accessed on 10-11-22. [Internet] Available from:<https://cdsco.gov.in>.
10. Makroo R N, Hegde V, Chowdhry M et al. Seroprevalence & trends of infectious markers in blood donors. *Indian j med res*. 2015 September;142 :317-322.
11. Fernandes H, D'souza PF, D'souza PM. Prevalence of transfusion transmitted infections in voluntary and replacement donors. *Indian J Hematol Blood Transfus* 2010; 26:89-91.
12. Kumari S. Reactive donor notification and counseling – Reveals concealed risk factors. *Indian Journal of Social Psychiatry*. 2017 January-March;33(1).
13. National AIDS Control Organisation. National blood policy of India, 29 August 2007. Last accessed on 10-11-22. [Internet] Available from:<http://unpan1.un.org/intradoc/groups/public/documents/pdf>.
14. Kaur G, Kaur P, Basu S et al. Donor notification and counseling: experience and challenges. *Transfus Apheres Sci*. 2013 Oct; 49(2): 291-294.
15. World Health Organization- Blood donor counselling implementation guidelines, 2014. Last accessed on 11-11-22. [Internet] Available from: <https://www.who.int>.
16. Priya ES. A Retrospective Analysis of Response Rate of Seroreactive Blood Donors after notification and counselling in a Tertiary Care Hospital. *Indian Journal of Applied Research*. 2019 March;9(3):49-50.
17. Basnotra RM et al. Donor notification in reactive donors and their response to communication. *Int J Res Med Sci*. 2019 Apr; 7(4):1088-1092.
18. Handa A et al. Donor Notification and Response Rate of Sero-reactive Blood Donors: a challenge and long way to go. *Int J Community Med Public Health*. 2019 Jul;6(7):2794-2797.
19. Raturi M, Shastry S, Raj P. Response Rate of Seroreactive Blood Donors to Notification and Counselling. *J Transf. Med*. 2018;11:144-150.
20. Agarwal N. Response rate of blood donors in the Uttarakhand region of India after notification of reactive test results on their blood samples. *Blood Transfus*. 2014 Jan; 12(1) :51-53.
21. Kotwal U, Doda V, Arora S et al. Blood donor notification and counseling: Our experience from a tertiary care hospital in India. *Asian J Transfus Sci*. 2015; 9:18-22.