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ORIGINAL RESEARCH ARTICLE**Seroprevalence of Transfusion Transmitted Infections in Blood Donors and Analysis of Response to Subsequent Counselling Using the SPIKES Protocol: A Five-Year Retrospective Study**Varun Prasad¹ | Jyoti Mishra² | Srijan Srivastav^{3*} | Natasha Singh⁴ | Richa Garg⁵ | Govind Kumar Mishra**Abstract****Background**

Transfusion-transmitted infections (TTIs) remain a significant challenge to blood safety despite advances in donor screening. Timely notification and counselling of seroreactive donors are essential to prevent secondary transmission and ensure appropriate medical care. The SPIKES protocol, originally developed for breaking bad news in oncology, has recently been adapted for counselling seroreactive blood donors.

Objectives

To determine the seroprevalence of TTIs among blood donors and evaluate donor response to post-donation notification and counselling using the SPIKES protocol.

Materials and Methods

A retrospective cross-sectional study was conducted at a tertiary care blood centre over five years (June 2016–May 2021). 18,750 blood donations took place in given time period. All donations were screened for HIV, hepatitis B virus (HBV), hepatitis C virus (HCV), syphilis, and malaria according to national guidelines. Seroreactive donors were contacted through telephone and postal communication, followed by counselling using the SPIKES protocol.

Results

Among 18,750 donors, 18,240 (97.3%) were males and 510 (2.7%) were females. Overall seroreactivity was 1.31% (246 donors). HBV was the most common TTI (0.73%), followed by HCV (0.29%), syphilis (0.16%), HIV (0.11%), and malaria (0.02%). Of the 246 seroreactive donors, 189 (76.8%) responded to the first telephone call, 28 (11.4%) after the second call, and 10 (4.1%) after postal notification. Nineteen donors (7.7%) could not be contacted. Overall counselling success was 92.3%. A statistically significant association was observed between voluntary donation and counselling compliance ($p=0.03$).

Conclusion

HBV constituted the predominant hypothetical TTI among blood donors. Structured communication using the SPIKES protocol demonstrated high counselling compliance and may improve donor acceptance, follow-up, and referral.

Key words: Blood donors, Transfusion-transmitted infections, seroprevalence, counselling, SPIKES protocol, Blood safety

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Supplementary information The online version of this article contains supplementary material, which is available to authorized users.

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1 | INTRODUCTION

Blood transfusion is an essential component of modern healthcare and is indispensable in the management of trauma, major surgeries, obstetric emergencies, hematological disorders, and malignancies. Despite advances in donor selection and screening technologies, transfusion-transmitted infections (TTIs) remain a significant public health concern, particularly in developing countries where the burden of infectious diseases is relatively high. The World Health Organization (WHO) recommends mandatory screening of all donated blood for human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), syphilis, and malaria to ensure blood safety and reduce the risk of disease transmission to recipients. (1) In India, screening of donor blood for these infections is mandatory under the Drugs and Cosmetics Act and National Blood Transfusion Council guidelines. (2)

Besides ensuring recipient safety, blood centres have an ethical responsibility to notify seroreactive donors and provide appropriate counselling. Early notification facilitates confirmatory testing, timely treatment, behavioural modification, and prevention of secondary transmission. However, communicating reactive test results is emotionally challenging and requires a sensitive, structured approach. (3) The SPIKES protocol, originally developed for breaking bad news in oncology, provides a six-step framework that promotes empathetic communication and informed decision-making and has been successfully adapted for counselling seroreactive blood donors. (4) Evaluating both the seroprevalence of TTIs and the effectiveness of donor notification and counselling is essential for strengthening blood safety programmes and improving donor follow-up.

2 | MATERIALS AND METHODS

Study Design

Retrospective cross-sectional study

Study Setting

Blood Centre of a tertiary care teaching hospital in Uttar Pradesh.

Study Duration

June 2016 to May 2021

Sample Size

18,750 blood donors.

Inclusion Criteria

All eligible voluntary and replacement blood donors during the study period.

Screening for Transfusion-Transmitted Infections

All donated blood units were screened for the mandatory transfusion-transmitted infections (TTIs) in accordance with the National Blood Transfusion Council (NBTC) guidelines and the Drugs and Cosmetics Act, 1940. The donor samples were tested for:

- i. Human Immunodeficiency Virus (HIV-1 & HIV-2): Anti-HIV-1 and HIV-2 antibodies were detected using a Chemiluminescence Immunoassay (CLIA) on the VITROS ECiQ Immunodiagnostic System (Ortho Clinical Diagnostics, USA). Initial screening was also performed using a rapid immunochromatographic test.
- ii. Hepatitis B Virus (HBV): Hepatitis B surface antigen (HBsAg) was detected using CLIA on the VITROS ECiQ Immunodiagnostic System, with initial screening by rapid immunochromatographic assay.
- iii. Hepatitis C Virus (HCV): Anti-HCV antibodies were detected by CLIA using the VITROS ECiQ Immunodiagnostic System, following initial rapid screening.
- iv. Syphilis: Screening for *Treponema pallidum* infection was performed using the Rapid Plasma Reagin (RPR)/Venereal Disease Research Laboratory (VDRL) rapid card test based on the flocculation principle.
- v. Malaria: Screening was performed using a rapid immunochromatographic antigen detection test capable of detecting *Plasmodium falciparum* histidine-rich protein-2 (HRP-2) and *Plasmodium vivax* parasite-specific lactate dehydrogenase (pLDH) antigens.

Any donor sample found reactive by either the rapid screening test or the chemiluminescence assay was considered **seroreactive**. Blood units from seroreactive donors were discarded according to standard

Seroprevalence of TTIs and SPIKES Counselling

blood bank protocols and the donors were notified and counselled using the SPIKES protocol. Reactive units were discarded according to institutional policy.

Counselling Procedure

Seroreactive donors were contacted through:

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Second telephone call
Postal communication

Responding donors underwent counselling using the SPIKES protocol and were referred for confirmatory testing and clinical evaluation. (Algorithm 1)

Statistical Analysis

Data were analyzed using SPSS version 25. Categorical variables were expressed as frequencies and percentages. Chi-square test was used for comparison. A p-value <0.05 was considered statistically

significant.

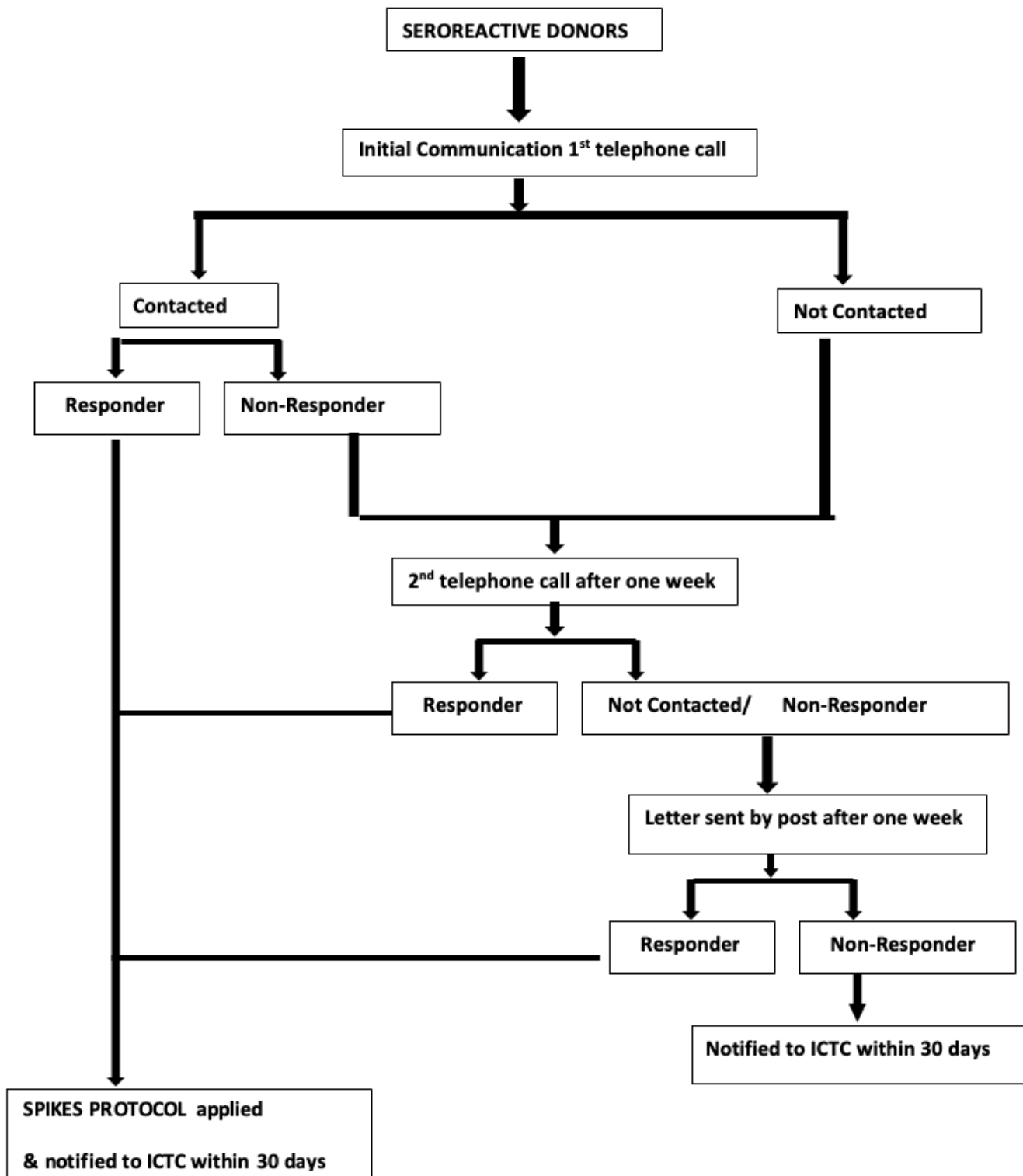
3 | RESULTS:

Table 1. Characteristics of Blood Donors, Seroprevalence of TTIs, Notification and Counselling Outcomes

Domain	Variable	Category	Number (n)	Percentage (%)
Characteristics (N = 18,750)	Sex	Male	18,240	97.3
		Female	510	2.7
	Donor type	Voluntary	15,975	85.2
		Replacement	2,775	14.8
	HBsAg	Positive	136	0.73
	Anti-HCV	Positive	55	0.29
	HIV-1/2	Positive	21	0.11
	Syphilis	Positive	30	0.16
	Malaria	Positive	4	0.02
	Overall TTI positivity	Seroreactive donors	246	1.31
Notification of Seroreactive Donors (N = 246)	First telephone call	Responded	189	76.8
	Second telephone call	Responded	28	11.4
	Postal letter	Responded	10	4.1
	Not contacted	Failed to contact	19	7.7
Counselling Outcome (N = 246)	Overall notification success	Successfully contacted	227	92.3
	Counselled	Yes	227	92.3
	Referral for further evaluation	Yes	223	90.7
	HIV-positive donors	Referred to ICTC	21	100.0†
	HBV-positive donors	Referred to Medicine OPD	136	100.0‡
	HCV-positive donors	Referred to Medicine OPD	55	100.0§
	Counselling	Declined	8	3.3
	Follow-up	Lost to follow-up	11	4.5

Table 2. Factors Associated with Counselling Compliance

Variable	Category	Compliance (%)	P-value
Donor type	Voluntary donors	95.1	0.03
	Replacement donors	86.7	
Age group	<30 years	91.8	0.28
	≥30 years	92.6	



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Fig. 1: : Protocol followed for Notification and Counselling of Seroreactive donors

Seroprevalence of TTIs and SPIKES Counselling

Abbreviations: TTI = Transfusion-Transmitted Infection; HBsAg = Hepatitis B surface antigen; HCV = Hepatitis C virus; HIV = Human Immunodeficiency Virus; ICTC = Integrated Counselling and Testing Centre.

The Percentages marked (*) are calculated using 246 seroreactive donors as the denominator. All other percentages are calculated using the total blood donors (N = 18,750). HBsAg was the most common TTI, accounting for 55.3% (136/246) of all seroreactive donations.

†All HIV-reactive donors (21/21) were referred to the Integrated Counselling and Testing Centre (ICTC). ‡All HBV-reactive donors (136/136) were referred to the Department of Medicine for further evaluation. §All HCV-reactive donors (55/55) were referred to the Department of Medicine for further evaluation.

4 | DISCUSSION

In the present hypothetical study, the overall seroprevalence of transfusion-transmitted infections (TTIs) among blood donors was 1.31%, with HBV (0.73%) being the most prevalent infection, followed by HCV (0.29%), syphilis (0.16%), HIV (0.11%), and malaria (0.02%). These findings are consistent with previous Indian studies that have reported HBV as the predominant TTI among blood donors because of its relatively higher prevalence in the community. (5) Continuous surveillance of TTIs remains essential to ensure blood safety and monitor epidemiological trends. (6, 7)

Male donors constituted 97.3% of the donor population, reflecting the predominance of male blood donors reported across India. This gender disparity is commonly attributed to higher deferral rates among women due to anemia, lower body weight, and sociocultural factors. (8, 9) Increasing awareness and promoting voluntary blood donation among women could help expand the donor pool while maintaining safety standards. (6, 7)

An important finding of this study was the 92.3% donor notification and counselling success rate, with 76.8% of seroreactive donors responding after the first telephone call. Telephone communication

proved to be the most effective notification strategy, while repeated telephone calls and postal communication further improved donor response. Similar observations have been reported by Kaur et al. and Kotwal et al., who identified incorrect contact details and reluctance to return for counselling as major barriers to donor notification. (2, 4) Maintaining updated donor information and employing a structured notification algorithm are therefore critical for successful donor follow-up.

The present study also demonstrated the utility of the SPIKES protocol for counselling seroreactive donors. Delivering reactive TTI results is emotionally challenging and requires empathy, confidentiality, and effective communication. The SPIKES protocol provides a structured six-step approach that facilitates donor understanding, reduces anxiety, and encourages compliance with referral and treatment recommendations.³ The high counselling compliance observed in this study supports previous reports advocating the use of SPIKES for donor notification and counselling. (2, 3)

Voluntary donors demonstrated significantly higher counselling compliance than replacement donors (95.1% vs. 86.7%; $p = 0.03$), suggesting better health awareness and willingness to seek medical care among voluntary donors. This finding supports the World Health Organization's recommendation to strengthen voluntary non-remunerated blood donation programmes as a means of improving both blood safety and donor follow-up. (5, 6)

All HIV-reactive donors were referred to the Integrated Counselling and Testing Centre (ICTC), while HBV- and HCV-reactive donors were referred for specialist evaluation. Early referral following donor notification facilitates confirmatory diagnosis, timely treatment, and prevention of secondary transmission, thereby strengthening public health initiatives. (2, 7)

Although the study demonstrates favourable notification and counselling outcomes, its retrospective single-centre design limits generalizability. Prospective multicentric studies with long-term follow-up are needed to evaluate behavioural changes, treatment adherence, and the long-term effectiveness of structured counselling protocols.¹⁰ Overall, integrating sensitive laboratory screening with standardized

donor notification and counselling using the SPIKES protocol has the potential to improve donor compliance, enhance blood safety, and reduce the burden of transfusion-transmitted infections.

The study included a large sample of 18,750 blood donors over five years, providing robust data on TTI seroprevalence. It evaluated both donor notification and counselling outcomes using the standardized SPIKES protocol. The use of national screening guidelines and chemiluminescence-based assays enhances the reliability of findings and their relevance to improving blood safety and donor management. The retrospective, single-centre design limits the generalizability of the findings. Donor follow-up depended on the availability and accuracy of contact information, resulting in some unsuccessful notifications. Long-term outcomes, confirmatory test results, treatment adherence, and behavioural changes after counselling could not be assessed. Prospective multicentric studies are needed to validate these findings.

5 | CONCLUSION

This retrospective educational example demonstrates that a structured donor notification and counselling program can play a pivotal role in the effective management of transfusion-transmitted infections (TTIs). Hepatitis B virus (HBV) emerged as the most frequently detected TTI among seroreactive blood donors. The application of the SPIKES protocol facilitated a high rate of successful donor notification and counselling, enabling prompt referral for confirmatory testing and appropriate medical care. A standardized, empathetic, and confidential counselling approach not only enhances donor awareness and compliance but also contributes to the prevention of secondary transmission and strengthens blood safety. These findings underscore the importance of integrating structured counselling protocols into routine blood centre practices to improve donor follow-up and public health outcomes.

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