

Systematic Review

Efficacy of intervention towards blood donation to increase voluntary blood donation: a systematic review

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ABSTRACT

Although blood is the essence of life, and is one of the most precious donations; blood transfusion services are facing shortage of blood all over the world. A significant percentage of people have false beliefs about blood donation. Increase in the level of knowledge and correction of false beliefs should be the top most priority. Therefore, studying factors contributing to their knowledge, attitude and practice of blood donation is essential. There are studies that investigated the effectiveness of interventions or procedure changes in blood donation settings on outcomes including donor deferral, disclosure of risk factors, and rates of errors and omissions. Researchers also identified several interventions to improve donor compliance that have been tested in blood donation settings and provided evidence for the effectiveness of computerized interviews in improving detection of risk factors. Interventions can utilize the processes of change (POC) measure to guide stage matched interventions to encourage use of relevant experiential and behavioral strategies to increase blood donation. Interventions to recruit and retain blood donors in the general population have been classified into five approaches: motivational, reminders/asking, measurement of cognitions, incentives, and preventing vasovagal reactions. Effective recruitment and retention are two different processes and may require different approaches. For example, retention may be influenced more by interventions that focus on actions during or after donation rather than interventions prior to the blood donation appointment.

Keywords: Blood transfusion, Blood donation, Intervention, Save lives, Knowledge, Attitude, and practice

INTRODUCTION

Blood is one of the most valuable contributions since it is the substance of life. There is a global blood scarcity that affects blood transfusion services. The present level of blood donation is insufficient to fulfill the growing need for blood, which is increasing daily.¹ In India, the blood collection during 2011-2012 was 72.7 lakh units, compared to the estimated requirement of 100 lakh units, resulting in a shortfall of 27.3 lakh units.² Studies on knowledge, attitude, and behavior regarding blood donation have been conducted in many countries, revealing common outcomes despite differences in

demographics and culture. These outcomes include misinformation about blood donation, fear of the donation process, a tendency to donate only for family or friends, concerns about the commercialization of blood, and the inability to convert positive attitudes into actual donations.³ Most studies on blood donation have been conducted in countries other than India.^{4,5} A study conducted in Bangladesh assessed the awareness, knowledge, and practices of blood donation among donors. The results revealed that the mean age of donors was 28.4 (± 7.2) years, ranging from 18 to 57 years, with female donors being significantly fewer compared to males. More than half (56.0%) of the donors were aware

of the eligibility criteria for blood donation, such as the appropriate age to start donating and the interval between donations. However, there was a lack of knowledge regarding the volume of blood donated in each session and the required hemoglobin level for donation. In terms of practice, nearly all donors (96.0%) stated that their primary reason for donating blood was to help friends or relatives. Over half had a history of past blood donations, and the majority expressed a willingness to become regular donors. Positive effects of donation, such as a sense of satisfaction, were reported by most donors, who also generally exhibited a good attitude towards blood donation. Despite this positive outlook, the study highlighted the need for active education programs to encourage broader participation and ensure an adequate and safe blood supply.^{6,7}

Another study assessed the knowledge and attitude towards voluntary blood donation among students at Dhaka University in Bangladesh. Two hundred students were selected for face-to-face interviews using a structured questionnaire. The findings revealed that 82% of participants had a positive attitude towards blood donation; however, only 16% had ever donated blood voluntarily. Common reasons for not donating blood among non-donors included concerns about physical harm and fear. Additionally, a significant majority (93%) of respondents held a negative attitude towards paid blood donation. The study suggested that an immediate motivational campaign is needed to convert the favorable attitudes of this young population into regular blood donation practices to boost voluntary blood donation rates in Bangladesh.

Blood transfusion involves the transfer of blood or its components from a donor into the bloodstream of a recipient. This practice is crucial for saving lives in various scenarios, including both planned medical procedures and emergency situations. It serves to replenish lost blood cells or blood products due to factors such as accidents, surgical procedures, cancer, pregnancy complications, and other medical conditions.⁸ Despite an estimated 60% of individuals in developing countries having sufficient knowledge about blood donation, the actual rate of blood donation in low-income countries lags far behind that of middle- and high-income countries.^{9,10} Annually, there is a growing demand for safe blood, estimated at 25%-40%, especially for individuals experiencing severe traumas such as accidents or surgeries, as well as those affected by civil conflicts and military engagements. Additionally, patients facing severe anemia due to diverse causes may require blood transfusions.¹¹ The shortage of an adequate blood supply from donors contributes to the mortality of Ethiopian pregnant mothers.¹² Ensuring the availability of safe blood in all health facilities is crucial for reducing maternal deaths among Ethiopian pregnant mothers, safeguarding their lives during emergencies where blood is required. Despite the country's annual demand for blood being 250,000 units, only 88,000 units were

collected from donors by 2014. Consequently, Ethiopia faces significant challenges in implementing an integrated strategy for voluntary blood donation and recruiting an adequate number of safe blood donors. These challenges stem from low levels of knowledge among students, negative attitudes, and insufficient practices regarding voluntary blood donation. It is imperative for blood banks and transfusion centers to conduct more frequent blood drives to maintain a steady blood supply and adopt strategies to enhance the recruitment of new blood donors. One of the core components of the World Health Organization's basic strategy to promote global safety and mitigate risks associated with blood transfusion is the collection of blood solely from voluntary donors. Young populations represent a crucial segment of the population and are vital for ensuring both present and future sources of safe blood supply.^{13,14} A considerable number of young Imams, who are students at health science universities, possess qualities such as good health, activity, dynamism, resourcefulness, and receptiveness, which make them potential contributors to blood donation. They should be encouraged, inspired, and motivated to donate blood voluntarily. By implementing appropriate strategies to enhance their knowledge and attitude, these health science students can not only become future blood donors but also serve as motivators and role models for their communities. Healthy and physically fit young Imams represent a valuable resource for safe and high-quality blood donation.

It's essential to evaluate the knowledge and attitude of this population toward blood donation. While medical students are expected to be more aware of the lifesaving role of blood in patient care compared to non-medical students, it's crucial to explore whether this difference affects their attitudes toward voluntary blood donation. To achieve a truly voluntary donation system, understanding the motivations behind blood donations and ensuring the safety of donation practices are paramount. Despite the significance of the issue, it's surprising that there are few research papers in this area. This underscores the pragmatic importance of research in this field. The findings of such studies can be utilized to launch effective motivational campaigns, especially in regions like Bangladesh where community-based studies on this topic are lacking. Therefore, the aim of this review is to evaluate the effectiveness of interventions aimed at promoting blood donation and to identify associated factors influencing donation behavior. Given the insights provided by previous studies and the potential impact of behavioral interventions on blood donation behavior, the present study aims to assess the effectiveness of interventions aimed at increasing voluntary blood donation in Bangladesh. The study seeks to evaluate the outcome of the intervention and its impact on promoting blood donation behavior among the population. Through this research, we aim to contribute to the understanding of how behavioral interventions can

effectively promote voluntary blood donation in Bangladesh and inform future efforts in this area.

Objectives

The main objective of this study to review the efficacy of intervention towards blood donation to increase voluntary blood donation in Bangladesh.

METHODS

Study design

This review was conducted using PRISMA guidelines. The review consisted of 5 steps. (1) problem identification; (2) literature searching; (3) data review and evaluation; (4) data synthesis and analysis; and (5) data presentation.

Search method

This study was conducted at the department of transfusion, Bangabandhu Sheikh Mujib medical university, Bangladesh during the period from February 2023 to January 2024. The current review performed a search for relevant articles in electronic databases: PubMed, Google Scholar and Medline. Database searches were conducted to identify studies spanning all years up

to the present, focusing on interventions aimed at enhancing voluntary blood donor participation in Bangladesh. Titles and abstracts of citations were screened for relevance, with potentially pertinent publications retrieved in full text. Eligibility criteria were applied to assess whether full-text articles met inclusion criteria. Additionally, the reference lists of retrieved articles were manually scrutinized to identify further relevant literature. The search utilized keywords such as "blood transfusion", "blood donation", "intervention", "save lives", "knowledge", "attitude" and "practice". Inclusion criteria encompassed articles reporting outcomes of interventions aimed at augmenting voluntary blood donation rates, specifically in the English language. Exclusions comprised case reports, abstracts, letters, publications not in English, and comments.

Data collection

All types of intervention to increase the number of donors toward voluntary blood donation were included in the present review. We retrieved the following data regarding each study: study type, sample size, intervention type, approach, findings. The results were measured for those who believe that there are many risks in donating blood and who have no idea about donating blood. Such as lack of knowledge, thinking it was harmful for health, chronic disease, anemia, infection and never having being connected to give blood.

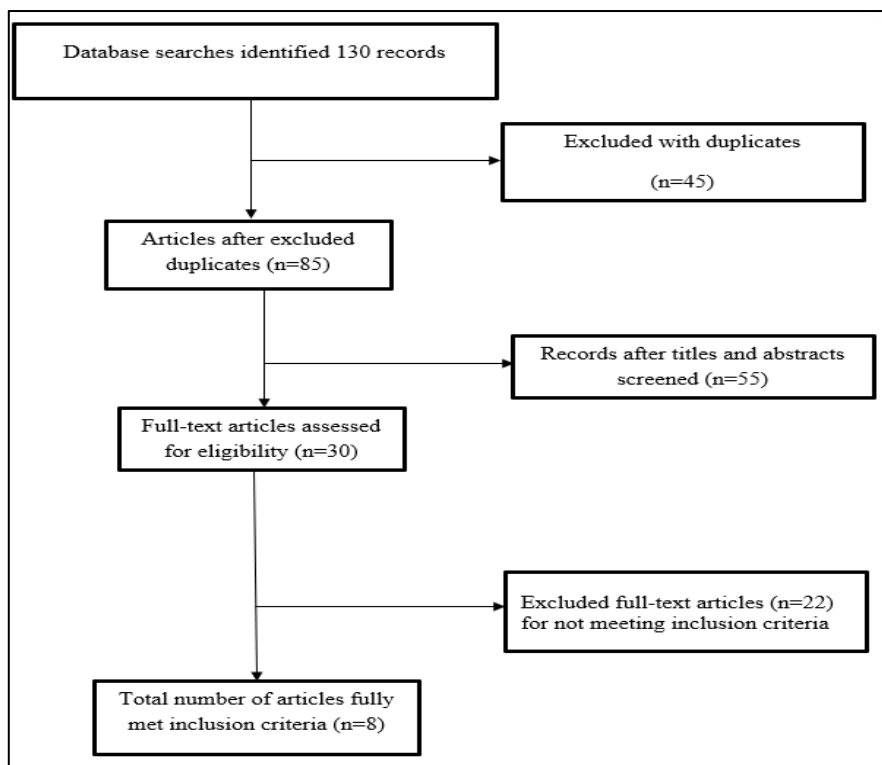


Figure 1: Flow chart of systematic review of literature selection process for the present research.

We investigated all the articles included in the present review on knowledge attitudes toward interventions to increase voluntary blood donation, there are several interventions were classified into six approaches: 1. Motivation, 2. Reminders and commitments, 3. Altruism, 4. Measurement of cognitions, 5. Incentives, 6. Cognition based.

The search resulted in 130 articles which were identified in the initial databases (Figure 1). After duplicates were removed, 85 articles remained. Of these, 55 were excluded based on titles and abstracts screened; 22 full articles were excluded for not meeting inclusion criteria. Finally, 8 publications met the criteria and were included in this review.

RESULTS

In the present review, we included 8 papers: one was a cohort, one was a quasi-experimental, two was a cross-

sectional, one was a case series, one was a prospective-randomized, and three was not specified (Table 1). The total number of patients was 6,107.

All interventions could be classified as using motivational and (cognitions-based) techniques, some studies also reported using other motivational techniques: altruism, two studies reported using motivational techniques: reminders, two studies reported using motivational techniques: incentive.¹⁵⁻²¹

In 2022, Harrell et al, performed a quasi-experimental study of more than 47000 donors on the effectiveness of a social media (Facebook) can increase blood donations and First-time donors are more likely to be influenced by social media. Blood donation tool increased donations by 4.0% and first-time donors by 18.9%.¹⁵

Table 1: Summary of the published articles.

References	Study design	Sample size (n)	Intervention type	Approach	Findings
Harrell et al,¹⁵ 2022, USA	Quasi-experimental	47,000	Motivational (cognitions-based, altruism)	Examined the effect of Facebook's blood donation tool	Social media can increase blood donations and First-time donors are more likely to be influenced by social media
Ramondt et al,¹⁶ 2021, Netherland	Not specified	Not specified	Motivational (cognitions-based, altruism)	Analysis of social media data and structural topic modeling applied to Facebook and Twitter data	Blood collection organizations should acknowledge the dynamic nature of social media
Ottong et al,¹⁷ 1997, Nigeria	Not specified	N=15, community mobilization sessions	Motivational (cognitions-based, reminder)	By the hosting community events	Voluntary blood donation can increase blood supply and community involvement improves blood supply situation
Anand and Pugazhendi,¹⁸ 2018, India	Cross-sectional	N=300	Motivational	Multiple logistic regression analysis	By hosting community events, significantly enhance blood donation rates
Agrawal,¹⁹ 2016, India	Not specified	Not specified	Motivational	Social marketing a type of software	Through implementation of social marketing strategies and mobile applications, there has been a noticeable increase in voluntary blood and organ donors
Grassineau et al,²⁰ 2007, France (Marseilles)	Case series	Not specified	Motivational (cognitions-based, altruism)	Culturally adapted message developed on an anthropologic approach	Regular donors present themselves spontaneously without community pressure.
Salaudeen and Odeh,²¹ 2011, Nigeria	Cross-sectional	N=400	Motivational (Incentive)	Multistage sampling technique was employed	Gift items motivated respondents to donate such as hematronics, T-shirts and wristbands
Hu et al,²² 2022, China	Prospective-randomized trial	N=692	Motivational; (reminders)	Short reminder messages for a 6-month period and web-based videos on the WeChat platform.	A web-based video intervention based on extended theory of planned behavior can effectively increase re-donation rates.

In this study conducted in Netherland, by Ramondt et al, the analysis of social media data and structural topic modeling applied to Facebook and Twitter Data. 25 topics grouped into 6 distinct clusters, resulting in a decrease in messages announcing donations, and an increase in positive donation-related topics.¹⁶

Ottong et al including approximately 15 community mobilization sessions.¹⁷ This study also reported using motivational techniques: reminders. This study reported on multifaceted, community-based interventions. These included a variety of repeated activities in target communities, most including a media component. In a cross-sectional study total of 300 study participants in India, Anand and Pugazhendi, this study reported multiple logistic regression analysis by hosting community events, significantly enhance blood donation rates. 45% had good knowledge on blood donation and 33.3% had good practices towards blood.¹⁸ Agrawal conducted in India in voluntary blood donation. This research also documented the use of motivating strategies to use social marketing a type of software increase in voluntary blood and organ donor.¹⁹

Grassineau et al conducted a case study in France. This study intervention employed the following motivating technique: cognition-based altruism.²⁰ This study found that culturally appropriate messages were generated using an anthropological metho. The medical members of the Comorian community, it was proposed that the population be sensitized to the gift of blood and regular donors presented themselves voluntarily without community pressure.

Salaudeen and Odeh conducted cross-sectional research that engaged students in Nigeria in voluntary blood donation.²¹ This research also documented the use of motivating strategies, including incentives. T-shirts and wristbands motivated responders to donate blood. In a prospective randomized trial of blood donors (n=692) in China, Hu et al found that the web-based video intervention increased the rate of re-donations.²² Repeat donors had substantially larger improvements in blood donation anxiety, outcome expectancies, and cognition of the blood donation setting following the intervention than nonrepeat donors.

Implications of the results

The present review included eight studies with a total of 6,107 participants. The studies comprised a cohort study, a quasi-experimental study, two cross-sectional studies, a case series, a prospective-randomized study, and three unspecified studies. All interventions used motivational and cognition-based techniques, with some employing additional strategies such as altruism, reminders, and incentives.

Key findings and implications are as follows.

Effectiveness of social-media: Harrell et al demonstrated that social media (e.g., Facebook) can significantly increase blood donations, particularly among first-time donors. The intervention increased overall donations by 4.0% and first-time donations by 18.9%. This suggests that leveraging social media platforms can be a highly effective strategy for blood donation campaigns, especially targeting younger or the less experienced donors.

Community mobilization and media: Ottong et al reported that multifaceted, community-based interventions, including media components and repeated community mobilization sessions, were effective. This highlights the importance of sustained and varied community engagement efforts in the increasing blood donation rates.

Culturally appropriate messaging: Grassineau et al found that culturally appropriate messages, developed using anthropological methods, were effective in encouraging voluntary blood donation within the Comorian community in France. This underscores the need for culturally sensitive approaches tailored to specific communities to enhance donor engagement.

Incentives and student engagement: Salaudeen and Odeh's study in Nigeria showed that providing incentives such as T-shirts and wristbands can motivate students to donate blood. This implies that small, tangible rewards can be powerful motivators, especially among younger populations.

Web-based interventions: Hu et al demonstrated that web-based video interventions in China increased re-donation rates and improved donors' attitudes and perceptions about blood donation. This indicates that digital interventions, particularly those that are easily accessible and engaging, can effectively enhance repeat donation rates.

Social marketing and software: Agrawal A's study in India highlighted the effectiveness of social marketing software in increasing voluntary blood and organ donations. This suggests that integrating technology and marketing strategies can significantly boost donor recruitment and retention.

Knowledge and community events: Anand and Pugazhendi's study in India showed that hosting community events significantly enhances blood donation rates. With 45% of participants having good knowledge about blood donation, this indicates that educational and community engagement events are crucial for raising awareness and encouraging donations.

Implications for Bangladesh

Adapting successful strategies: The positive outcomes from various motivational techniques, including social media, community mobilization, culturally appropriate

messaging, and incentives, suggest that similar approaches could be adapted and tested in Bangladesh to enhance voluntary blood donation rates.

Cultural sensitivity: Tailoring interventions to the cultural context and specific needs of the Bangladeshi population can improve engagement and effectiveness. Culturally appropriate messaging and community involvement are crucial.

Utilizing technology: Leveraging social media platforms and web-based interventions could be particularly effective in reaching younger demographics and first-time donors in Bangladesh.

Incentive programs: Implementing small incentive programs could motivate more people, especially students and younger individuals, to donate blood voluntarily.

Educational campaigns: Hosting community events and educational campaigns can significantly improve knowledge and attitudes toward blood donation, leading to higher participation rates.

By considering these findings and implications, Bangladesh can develop and implement effective strategies to increase voluntary blood donations, ultimately improving the country's blood supply and saving more lives.

DISCUSSION

Blood donation is a crucial part of healthcare, used for various medical procedures like childbirth complications, cancer treatment, surgeries, accidents, and trauma cases.^{23,24} Studies indicate that a significant portion of donated blood from adults is transfused to elderly patients.²⁵⁻²⁷ Recognizing its importance is crucial as excessive current demand may lead to shortages in the future. Encouraging donations through public and non-profit organizations can help meet emergency needs.²⁸⁻³⁰

Blood donation awareness campaigns are essential for educating the public about the importance of donating blood and maintaining a steady blood supply. These campaigns employ impactful visuals and utilize social media platforms to reach a broad audience.³¹ Initiatives like blood donation camps are effective in encouraging donations.³² Furthermore, the influence of repeated donors in educating young people about the significance of regular blood donation is notable, as it can increase youth donation rates.³³ Projects that use various social media platforms to spread information about blood donation have been effective, stressing the advantages to both donors and recipients. Social media has evolved as a significant source of information regarding blood donation, particularly during donor shortages, and utilizing these channels can help improve donation patterns.³⁴ Additionally, organizing donation drives in

conveniently accessible areas, engaging with influencers, and providing educational seminars to dispel myths and motivate potential donors are also excellent strategies for encouraging blood donation. Web-based video interventions have also demonstrated effectiveness, particularly as the most efficient method for dissemination when guided by an ETPB to conduct exploratory studies of behavioral interventions. The findings from such studies, indicating that web-based short video interventions are more effective than SMS text messages for nonregular blood donors, align with broader research demonstrating the efficacy of video in enhancing patients' knowledge, self-efficacy, satisfaction, and self-management across various health domains such as diabetes, heart disease, and patient family care.³⁵⁻⁴²

Prior research underscored the efficacy of reminders, including telephone calls, emails, and web-based videos, in informing blood donors about upcoming blood drives, providing details such as the time, date, and location.²² Additionally, a recent study among first-time donors found that receiving a telephone reminder about the opportunity to donate blood led to a higher rate of return donors, who also returned more promptly compared to those who did not receive such calls. These telephone calls serve as a "cue-to-action," acting as environmental prompts that remind individuals to engage in a specific behavior.

It is important to note that incentives were occasionally employed alongside other intervention elements, such as appealing to altruistic motives or offering T-shirts. We incorporated studies indicating limited evidence supporting the effectiveness of incentives such as money, prizes, or similar tokens in boosting blood donation rates.²¹ In fact, there's even evidence suggesting that these incentives might potentially decrease donations by undermining altruistic motivations to donate blood.⁴³

Motivating and retaining blood donors is vital for maintaining a stable blood supply. Demographic factors such as sex and age influence the likelihood of future donations.⁴⁴ Satisfaction levels among donors vary across demographic subgroups and donation history, with higher satisfaction correlating positively with motivation for future donations. While generosity remains a primary motivator for donors, tailoring future donation campaigns to specific demographic subgroups could enhance motivation for future contributions.⁴⁵

Educating young people about the importance of regular blood donation and their potential impact on communities is crucial.⁴⁵ Introducing features like selfie points, allowing donors to share post-donation images on social media, can enhance donor motivation and broaden the donor pool. Leveraging platforms like Facebook's blood donation tool, which connects users with local blood centers, could also improve donor retention and motivation for increased donations.⁴⁶

Embracing technology has the ability to transform current blood donation procedures.⁴⁷ Mobile applications, for example, can improve donor scheduling and recruiting, while artificial intelligence can help estimate blood demand and manage inventory levels.⁴⁸ Future efforts should emphasize incorporating technology into blood donation programs to increase their effectiveness and efficiency. The future of blood donation depends on addressing these difficulties and implementing creative solutions to provide a stable and sustainable blood supply.

Limitations

The current review has notable limitations that warrant acknowledgment. Firstly, the relatively limited number of studies available constrained the depth of analysis. Secondly, the inclusion criteria restricted the review to studies written exclusively in English, thus excluding potentially valuable literature in other languages.

CONCLUSION

The present review, raising awareness about voluntary blood donation is crucial for saving lives and improving community health. Current strategies include community events, social media campaigns, partnerships with indigenous groups, and involving public figures and athletes. Ongoing efforts focus on maintaining and enhancing donor engagement by tailoring messages, providing convenient donation options, and addressing common misconceptions.

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