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TRANSFUSION

ORIGINAL RESEARCH

Blood Donors and Blood Collection

The effectiveness of telephone surveys on the return of first-time donors: A randomized controlled trial

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Abstract

Background: The management of blood supply depends, among other factors, on the effective remobilization of first-time donors (FTDs). This study investigates the efficacy of telephone calls to increase second donation rates.

Study Design and Methods: A randomized controlled trial was conducted on 418 first-time blood donors. In the telephone group (TG, $n = 206$), men were contacted 9–10 and women 13–14 weeks after their first donation. They were asked about satisfaction and intention to return, and offered an appointment. The primary outcome was the return rate within 6 months after the first donation.

Results: The mean age was 28.8 ± 10.0 years and 59.9% of FTDs were female. In the TG, 89.3% were reached. Approximately 50% of each group had donated a second time by 24.2 weeks for the control group (CG) and 14.8 weeks for the TG. The six-month return rate was 65.0% in the TG and 54.3% in the CG (95%-CI [0.9%; 20.6%]; $p = .033$). The restricted mean time to return within 6 months was 19.4 weeks in the CG compared to 17.2 weeks in the TG (95%-CI [0.7; 3.7]; $p = .004$). The intervention effect tended to be larger in men than in women.

Discussion: Contacting FTDs by phone after their first donation increases the six-month return rate and reduces the interval to a second donation. Male donors appear to be more receptive to this intervention. Whether the effect of the intervention helps to establish a donor identity in the long term should be the subject of further studies.

KEYWORDS

first-time donor, intervention, retention, survey, telephone calls

Abbreviations: CG, Control Group; CI, confidence interval; COVID-19, Coronavirus Disease 2019; FTD(s), first-time donor(s); Hb, hemoglobin; IQR, interquartile range; IT, Information Technology; Nr, number; OR, odds ratio; SD, standard deviation; SMS, Short Message Service; TG, Telephone Group.

1 | INTRODUCTION

The COVID-19 pandemic led to a decrease in blood donations[1–3] due to factors like donor health concerns, lockdowns, and fear of virus transmission at donation centers,[4,5] alongside closures of mobile donation sites and increasingly restrictive donation criteria.[6–8] This situation strained blood supply, prompting intensified donor recruitment efforts, reduced elective surgeries, and a reevaluation of patient blood management.[9] To counteract the shortage of blood products, public outreach was boosted,[10] resulting in a higher proportion of first-time donors (FTDs) during the pandemic,[11,12] a trend observed in previous crises.[13] Additionally, the supply of blood products is increasingly threatened by demographic changes in many countries, with rapidly aging populations, leading to proportionally high losses of regular donors.[14,15]

To overcome these challenges, it is essential to increase the number of FTDs and optimize donor retention. However, FTDs face unique challenges: they experience more adverse events, such as vasovagal reactions,[16–20] and the prevalence of infectious diseases is higher than in regular donors.[21,22] Efficient retention of FTDs can help to safeguard the donor repertoire, thereby reducing costs associated with blood donation and decreasing the proportion of new donors needed in the future.[23,24]

The return rate within one year of the first donation is crucial in forming a donation habit and predicts long-term retention.[25–29] Therefore, increasing the return rate in the first few months after the first donation is a potential strategy to create regular donors. Previous studies of various interventions on first-time donors have shown a positive impact on the retention of FTDs. These interventions include text messaging,[30] direct mailings,[31] and phone calls.[31,32] Furthermore, studies have affirmed that the "Theory of Planned Behavior"[33] applies to blood donors, highlighting that the intention to return for a donation correlates strongly with actual return donation behavior.[34] Therefore, asking donors about their intention to donate again and eliciting a commitment to a second donation can be a powerful motivator, bridging the gap between intention and action. A review by Irving et al. (2020) examining the impact of interventions on blood donor return rates[35] identified 28 randomized controlled trials, of which only three analyzed the impact of telephone calls on FTD retention.[31,36,37] We hypothesized that a personal telephone interaction, including a short survey and addressing any questions or concerns the donor might have, could further increase the retention rate of FTDs. This approach integrates multiple motivational elements, potentially leading to a higher retention rate.

2 | MATERIALS AND METHODS

To investigate whether the six-month return rate of first-time whole blood donors can be significantly increased by a telephone survey, a monocentric, parallel-group, randomized controlled, open-label trial was conducted. The study was approved by the Ethics Committee of the University of Leipzig (Nr. 015/21-ek).

The study focused on first-time whole blood donors who donated at a hospital-based site, tested negative for infectious diseases, and consented to telephone contact. Mobile donation sites were excluded due to limited appointment availability. All blood donations were voluntary, with FTDs receiving remuneration of 10€ for the first and 20€ for each following whole blood donation. Donors could give either whole blood or an apheresis product at their return donation. The recommended minimum interval for whole blood donations is 12 weeks for women and 8 weeks for men. After a whole blood donation, the recommended minimum interval for a plasmapheresis donation is 2 weeks.

This was a pragmatic trial[38] aiming to randomize between $n = 200$ and $n = 500$ donors over 14 weeks, with 80% power using a two-sided test at a 5% significance level. This would allow us to detect a difference in return rates of the order of 15%, depending on the return rate in the control group (CG).

We generated a randomization list by blocks of 10 with "A" and "B" using R (version 4.0.3).[39] FTDs identified by algorithmic filtering of the database were added to the list weekly, sorted by eligibility date for a second whole blood donation and their unique donor number, to ensure an equal chance of being placed in each group, that is, the telephone group (TG) or the CG. Data collected included age, sex, telephone number, living area, blood type, date, and type of donations. As a standard practice, all consenting FTDs in both groups received an invitation letter, timed according to sex-specific intervals since their first donation (10 weeks for women, 7 weeks for men). Participants in both groups were flagged in the blood bank's IT system to avoid recruitment calls during the observation period, as routinely donors are called proactively based on blood type needs.

In the TG, men were contacted from week nine and women from week 13 post-donation. We conducted a maximum of three call attempts over 2 weeks, varied in time (8–11 a.m., 11 a.m.–3 p.m., 3–6 p.m.) and day. If participants were unreachable, a text message or voicemail was left. Nonresponsive participants were included in the evaluation according to the intention-to-treat principle.

The semi-structured survey consisted of the following questions: (1) "Were you satisfied with your first

donation?" "If not, can you give us a reason?"; (2) "Do you intend to donate again?" "If not, can you give us a reason?"; (3) if the second question was answered with yes: "Can we offer you an appointment for a return donation?"

The study participants gave their consent to the use of their pseudonymized data and received a legally compliant data protection notice. During the 14-week study, 206 participants were contacted by telephone, while those in the CG did not receive any calls.

The primary outcome of the study was the six-month return rate of FTDs. Secondary outcomes included the effect of sex, age, and invitation letters on return rates, time to second donation, number of ineligible donors at the second attempt, type of blood product donated, the proportion of donors reachable by telephone, and the effect of feedback, intention, and appointments on return rates. An adverse outcome was defined as a negative response to the telephone survey, assessed by the caller.

Statistical analyses in the study were performed using R[39] on three datasets: (1) donor characteristics and first donation dates, (2) telephone survey results including call attempts, and (3) data on subsequent donations collected at the end of the observation period. Categorical variables were presented as absolute and relative frequencies, and continuous variables as means and standard deviations (SD). The six-month analysis period was set to 26 weeks in R to ensure a consistent time frame for data analysis.

Means and SDs described the central tendency and variability of the distribution. Odds ratios (OR) quantified the strength and direction of associations between categorical variables, with 95% confidence intervals (CI) for precision. All statistical tests were two-sided with a 5% significance level. The null hypothesis was that the return rate of the TG and the CG within 6 months were the same. To test the null hypothesis—where two unpaired groups are being compared based on two possible outcomes, either a return for a second donation or no return at 6 months—the chi-squared test was used.

To compare the means of a continuous variable between groups defined by a binary variable, we employed Welch's t-test, which does not assume equal variances. To describe the relationship between two categorical variables, a Cross Tabulation and Chi-Square Test of Independence were used. Logistic regression was used to assess the influence of continuous variables and categorical variables on binary outcomes. A linear regression model with an interaction term was used to assess the individual and combined influences of binary variables on a continuous outcome.

3 | RESULTS

In an intention-to-treat analysis, 418 FTDs who successfully donated whole blood at the university blood bank were enrolled in the study and randomized. The intervention began on February 15, 2021, and ended on May 23, 2021. A total of 208 participants were allocated to the TG and 210 to the CG. Two FTDs from the TG were excluded post-randomization due to non-consent or not being a FTD (Figure 1). The observation period for each FTD ended 6 months after their first donation, with September 19, 2021 marking the end of this period for the last group of donors enrolled in the study. Table 1 shows the baseline characteristics of the donors: 59.9% (249 participants) were female, with a mean age of 28.8 (± 10.0) years. Men were on average 3.4 years older than women at first donation (95%-CI [−5.3; −1.5]; $p < .001$), and 66.1% of all donors were under age 30 at first donation (Figure 2). In the TG, 89.3% of FTDs could be reached by telephone (Table S1).

The study showed that the six-month return rate for FTDs receiving calls was 10.8% (95%-CI [0.9%, 20.6%]; $p = .033$) higher in the TG (65.0%) than in the CG (54.3%) (Figure 3), with an OR of 1.57. The difference in return rates between the TG and the CG was 21.8% for men (95%-CI [−37.5%; −6.1%]; $p = .007$) and 3.4% for women (95%-CI [−16.3%; 9.7%]; $p = .68$) (Table 2). The logistic regression model indicated a possible interaction between sex and treatment group, although this was not statistically significant (OR 2.19; 95%-CI [0.97; 4.94]; $p = .059$). These results led us to further investigate the effect of sex on secondary outcomes; this extended subgroup analysis was not originally planned.

The study used the restricted mean time, which estimates the average time for FTDs to return within 6 months. If a donor did not return within this period, the time was set at 26 weeks. The restricted mean time to a second donation was 19.4 weeks for the CG and 17.2 weeks for the TG, a mean difference of 2.2 weeks (95%-CI [0.7, 3.7]; $p = .004$) (Table 3). Men in the TG returned 4.8 weeks earlier on average compared to the CG (95%-CI [2.2; 7.3]; $p < .001$). In contrast, women in the TG returned on average 0.4 weeks earlier compared to the CG (95%-CI [−1.3; 2.1]; $p = .66$). Approximately 50% of donors in each group returned for their second donation at a median of 24.2 weeks for the CG (interquartile range [IQR], 13.1–26.0) and 14.8 weeks for the TG (IQR, 10.4–26.0) ($p = .005$).

The return rate for donors who received a printed invitation was 61.1%, compared to 50.8% for those who did not (Table S2). The logistic regression indicated no

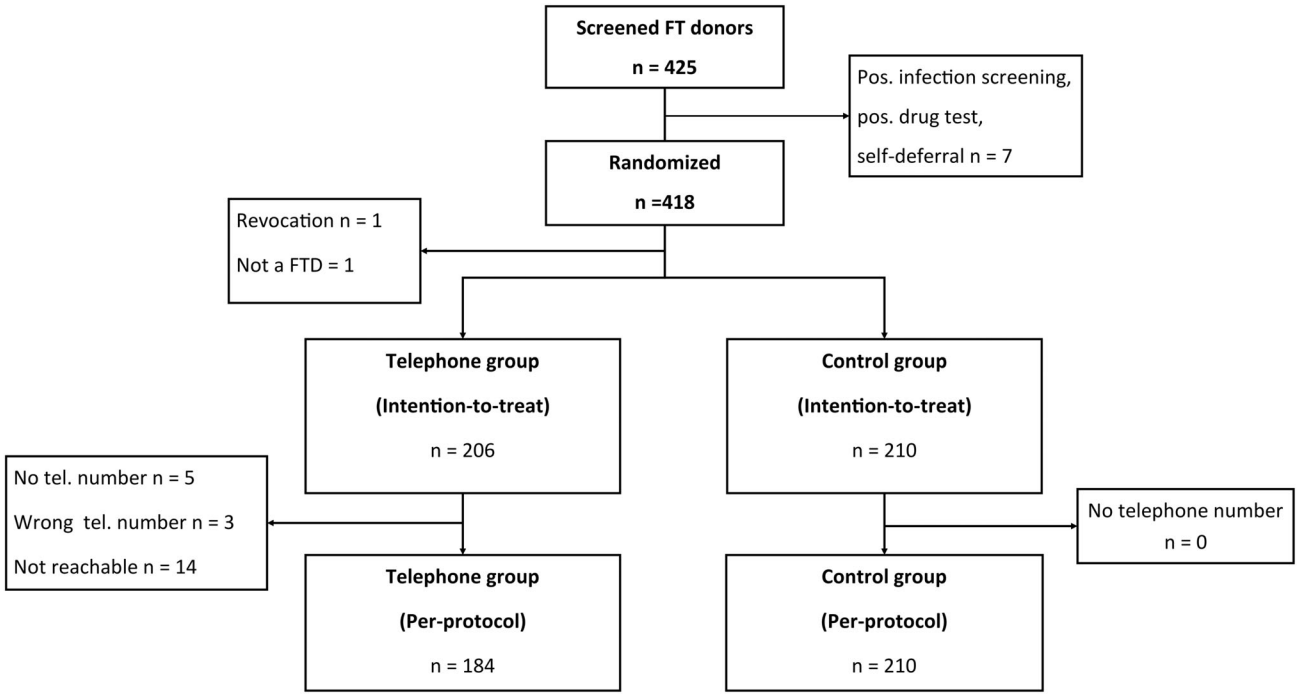

FIGURE 1 Consort diagram.

TABLE 1 Donor characteristics.

	Total $n = 416$	CG $n = 210$	TG $n = 206$	p-value
Sex, n (%)				
F	249 (59.9)	128 (61.0)	121 (58.7)	.72
M	167 (40.1)	82 (39.0)	85 (41.3)	
Age, y, mean ± SD	28.8 ± 10.0	28.8 ± 10.3	28.7 ± 9.6	.89
F	27.4 ± 10.0	27.8 ± 10.5	27.0 ± 9.4	.016*
M	30.8 ± 9.6	30.4 ± 9.9	31.2 ± 9.4	
Age groups, n (%)				
18–29	275 (66.1)	143 (68.1)	132 (64.1)	.45
30–65	141 (33.9)	67 (31.9)	74 (35.9)	
Blood type, n (%)				
A	156 (37.5)	76 (36.2)	80 (38.8)	.54
B	50 (12.9)	28 (13.3)	22 (10.7)	
0	182 (43.8)	89 (42.4)	93 (45.1)	
AB	28 (6.7)	17 (8.1)	11 (5.3)	
Agreed to receive an invitation letter, n (%)	357 (85.8)	179 (85.2)	178 (86.4)	.84
F	218 (87.6)	114 (89.1)	104 (86.0)	.25
M	139 (83.2)	65 (79.3)	74 (87.1)	

*p-value < 0.05.

significant interaction effect of receiving an invitation and being in the TG on the odds of returning for a second donation (OR 0.69; 95%-CI [0.22; 2.13], $p = .52$).

In the CG, 87.7% of donors who returned had a successful donation attempt compared to 91.0% in the TG (95%-CI [−31.2%;13.6%], $p = .52$). At the second

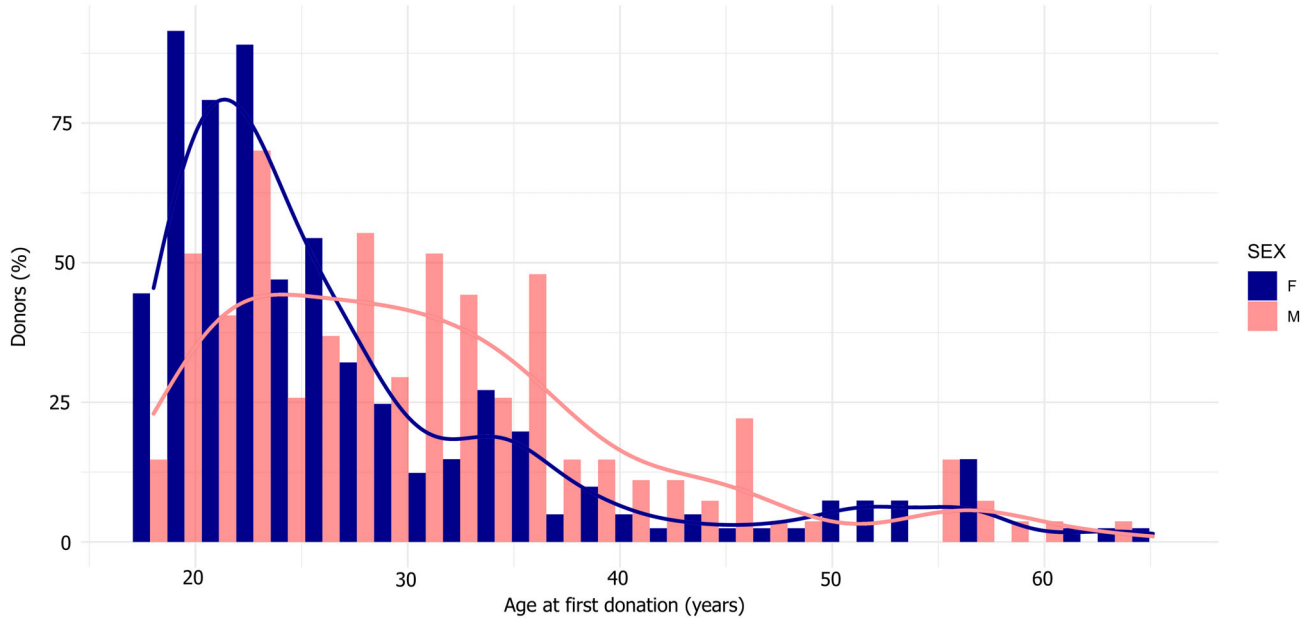

FIGURE 2 Age distribution at first donation by sex. [Color figure can be viewed at wileyonlinelibrary.com]

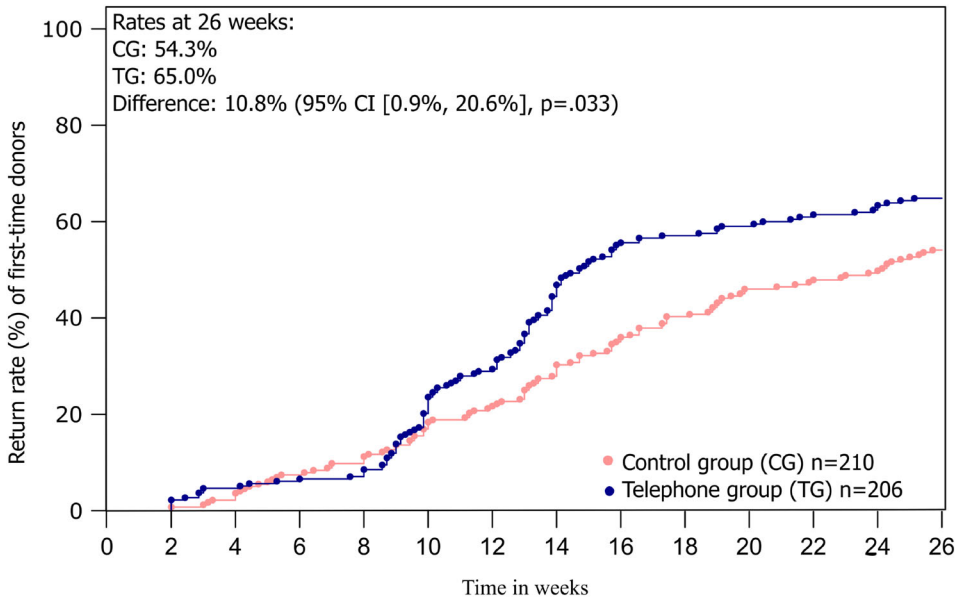

FIGURE 3 Reverse Kaplan–Meier curve of the six-month return rates by study group. The events are return donations within 6 months. [Color figure can be viewed at wileyonlinelibrary.com]

donation, participants donated either whole blood or blood plasma. Of the successful second donations, 24.0% in the CG donated plasma compared to 18.0% in the TG (95%-CI [−5.7%; 17.7%]; $p = .36$) (Table 2). Donor age was not significantly related to the overall return rate (OR 1.02; 95%-CI [1.00; 1.04]; $p = .13$). However, donors in the over-30 age group showed an 18.0% increase in the return rate in the TG (95%-CI [0.8%; 35.3%]; $p = .043$) (Table 2).

Compared to donors who intended to return, those who expressed an intention to return but said that they were currently unavailable were 76% less likely to return (OR = 0.23; 95%-CI: [0.10, 0.55], $p < .001$). A small subgroup of donors who did not intend to return or who had moved were the least likely to return (OR = 0.06; 95%-CI: [0.007, 0.49], $p = .009$) (Table S3).

In our study, 10.9% of donors provided feedback on their first donation experience, including negative experiences or suggestions for improvement. Specific categories of feedback did not significantly affect return rates (Table S3), with only feedback about "vasovagal reactions" approaching significance ($p = .06$), indicating a possible but nonsignificant negative association with return rates. A chi-squared test revealed a significant

TABLE 2 Return rates to second donation and subgroup analyses.

	All, $n = 416$		CG, $n = 210$		TG, $n = 206$		p-value
	n	(%)	n	(%)	n	(%)	
Return rate	248	(59.6)	114	(54.3)	134	(65.0)	.033*
Return rate by sex							.059[a]
Female	148	(59.4)	74	(57.8)	74	(61.2)	.68
Male	100	(59.9)	40	(48.8)	60	(70.6)	.007**
Return rate by age group							.26[a]
18–29	161	(58.5)	79	(55.2)	82	(62.1)	.30
30–65	87	(61.7)	35	(52.2)	52	(70.3)	.043*
Second donation attempts							
Deferrals	26	(10.5)	14	(12.3)	12	(9.0)	.52
Successful donations	222	(89.5)	100	(87.7)	122	(91.0)	
Whole blood	176	(79.3)	76	(76.0)	100	(82.0)	.36
Plasmapheresis	46	(20.7)	24	(24.0)	22	(18.0)	

[a]Interaction test comparing the intervention effect by study group.
*p-value < 0.05; **p-value < 0.01.

TABLE 3 Mean time to second donation and number of donations.

	All		CG		TG		
Condition	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**p-value**
Restricted mean time to return (weeks)	18.3	7.7	19.4	7.6	17.2	7.6	.004**
Female	19.1	7.0	19.3	7.3	18.9	6.6	.66
Male	17.1	8.6	19.6	8.2	14.8	8.4	<.001***
Mean number of donations	2.3	2.7	2.2	2.8	2.4	2.6	.47
Female	2.0	1.5	2.0	1.7	2.0	1.3	.74
Male	2.8	3.8	2.5	3.9	3.0	3.6	.36

Note: Due to different recommended donation intervals and different maximum donations per year for men and women, the significance of the difference in means was calculated separately for each sex.
**p-value < 0.01; ***p-value < 0.001.

association between any negative feedback and the likelihood of returning for a second donation. Donors who provided feedback had an OR of 0.35 for return compared to those who did not ($p = .04$).

Donors who received an appointment were significantly more likely to return for a second donation, with an OR of 11.84 times greater than those who did not receive an appointment (OR = 11.84; 95%-CI [5.6; 14.9]; $p < .001$) (Table S3).

4 | DISCUSSION

Efficient remobilization of FTDs is a critical factor in blood supply management. This study investigated the effectiveness of telephone calls in increasing the six-month return rate of FTDs and provides insights into potential improvements in donor retention strategies.

We found that FTDs who received a telephone call had a significantly higher return rate than those in the CG. This suggests that personalized telephone contact, including a survey that addresses donor feedback and return intentions, is effective in encouraging FTD reengagement.

Previously, a limited number of studies addressed the influence of telephone calls on the recruitment of FTDs. Godin et al. (2011)[32] found a significant increase of 10% in returning FTDs (48%, over 38% baseline) after an observation period of 12 months. In contrast to our study, the intervention was blood-group dependent (AB and B

forming the CG). Hashemi et al. (2019)[31] and Reich et al. (2006),[36] using a randomized approach, found increased six-month return rates of FTDs of 32% versus 22% and 28% versus 13% (phone call vs. control) respectively.

Our data, which showed substantially higher return rates (65% vs. 54%) compared to previous work, were collected by three consecutive attempts to reach donors and effectively reached 89.3% of donors. In previous studies, the rates of donors reached by phone were either not reported or were considerably lower than in our study. Our data thus suggest that systematic follow-up and contacting of donors who were not reached may be relevant. Furthermore, our data indicate that 50% of donors have attempted a second donation within 15 weeks (vs. 24 weeks in the CG). This provides an estimate of the power of phone calls to increase donation rates in situations of blood shortage.

We observed that male FTDs were more responsive to telephone mobilization for a return donation than females. Our study confirmed that sex plays a role in the susceptibility of FTDs to interventions, which was previously demonstrated in a randomized questionnaire study that used phone call reminders on FTDs by Jansen et al. (2019).[40]

While women in the CG had a higher baseline return rate, the increase in return rate upon a telephone call was more prominent for men. Moreover, the time between donations shortened significantly for male donors, but not for female donors. This sex difference in baseline return rate is consistent with increased altruism in women during natural disasters, where female donors showed a higher return rate,[41] a trait that may have also emerged during the study period amid the COVID-19 pandemic. It is possible that the intervention was less effective in convincing women beyond those who would have returned on their own out of altruism.

However, the higher increase in return rates observed in male donors could be due to several factors. One factor could be lower hemoglobin levels in female donors, possibly resulting in anemia-related symptoms and longer post-donation recovery times, making them less responsive to unsolicited recruitment calls. Additionally, the longer interval between the donation and the recruitment call for females might reduce the effectiveness of these calls. Men might respond more positively to direct requests and personal contact than women. It remains to be investigated whether the predominantly female staff in the call center may have influenced the results. To our knowledge, our study is the first randomized intervention study on FTDs that confirms the preponderance of male return.

In the literature, relatively high variation in return rates of FTDs has been reported. As reported by Kheiri and Alibeigi,[29] Gillet et al.,[16] and Kasraian and Tavassoli[25] about 50% of FTDs returned for a second donation after 15 months to 3 years. Yu et al.[26] showed that early return is a positive predictor of FTD retention, and Schreiber et al.[27] found that the frequency of early returns after the first donation is positively associated with becoming a successful long-term donor. Our study shows a baseline return rate of 54% at 6 months, whereas other comparable studies looking at six-month return rates of FTDs observed rates between 13%–38% for second donations.[26,31,42] We can only speculate on the reasons for the divergent results. Our study differs from the work of Kheiri and Alibeigi,[29] Gillet et al.,[16] Kasraian and Tavassoli,[25] Yu et al.,[26] and Schreiber et al.[27] in allowing plasmapheresis donations as a second donation, as is the current practice in our blood bank.

We also addressed the question of whether negative experiences during blood donation affect return rates. Notably, donors who expressed unpleasant experiences or made suggestions for improvement were less likely to return than donors who expressed no negative feedback. Our results are consistent with previous studies showing that negative experiences during the first donation, such as an adverse event, are major deterrents for a return donation.[34,43]

Our telephone interview was designed to make donors feel heard, contextualize negative experiences, and offer solutions from experienced staff, such as advising the donor on how to prepare for donation to avoid vasovagal reactions. Feedback from such interviews can be put directly into practice to improve and review practices at the donation site which can impact donor satisfaction and ultimately lead to higher return rates.[44]

A potential limitation of our study is that it was conducted at a single center in Germany with a primarily urban donor population, and results may be of limited validity in other blood donor communities. Another potential limitation is that five FTDs with missing telephone numbers were inadvertently included in the TG. This may have introduced selection bias, potentially impacting the results.

Taken together, our findings invite further research to confirm the long-term impact of such interventions and to explore the potential relationship between short-term strategies and long-term regular giving. The observed sex differences in response to interventions suggest the need for sex-specific approaches to improve donor retention. As new technologies emerge, there will be more ways to interact with donors that could significantly contribute to a more reliable blood supply, highlighting the critical need for further research in this important public health area.

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CONFLICT OF INTEREST STATEMENT

The authors have disclosed no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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