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Does Donating Blood for the First Time During a National Emergency Create a Better Commitment to Donating Again?

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Abstract

Background and Objectives—Emergency situations often elicit a generous response from the public. This occurred after attacks on the US on September 11, 2001 when many new blood donors lined up to donate. This study was performed to compare return rates for first time donors (FTD) after September 11th, 2001 to FTD during a comparable period in 2000.

Materials and Methods—3315 allogeneic whole blood donations from FTD at a regional blood center were collected between September 11th and 30th, 2001. Subsequent donations by the FTD before March 31, 2002 were reviewed. This (test) group was compared to 1279 FTD(control group) donating during the same time period in September 2000 and to their return rate in the subsequent six months.

Results—Following September 11, 2001, 1087/3315 (32.8%) FTD returned by March 31, 2002. This return rate was similar to the control group (427/1279 (33.4%)). The deferral rate during the donor screening process for the control group was significantly higher than the deferral rate for the September 11–30, 2001 group ($p < 0.01$). The odds of an individual FTD returning increased with age, and the chance of a female donor returning was 1.13 times higher than a male ($p = 0.06$). There was a carryover effect after Sept. 11, 2001 too.

Conclusion—A national emergency, September 11, 2001, inspired people to donate blood for the first time. However, the proportion of return donations amongst them was not increased. Females and males in certain age groups were more likely to become repeat donors due to the residual effect of September 11, 2001. Additional efforts are needed to retain eligible FTD in donor pools.

Keywords

blood donor; donor retention; national emergency; 9/11

Introduction

After the events of September 11, 2001, the American population responded patriotically and mobilized in a number of ways, including donating blood. America's Blood Centers sent

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out a plea and received an overwhelming response, as did the American Red Cross [1,2]. In a cross-sectional survey of five large regional US blood centers, Glynn et al. found a 2.5-fold increase in the number of allogeneic donations in the first week following the attack compared to the corresponding period of the previous year [3]. Although the blood that was received in response to the disaster was important, the blood that was used for the victims came from the stock already on hand at regional blood centers [4]. Because donated blood has to be processed and tested to reduce the risk of transfusion-transmitted infections, donated blood collected during or following a national emergency or disaster is not available for immediate use. Therefore, to be prepared to respond to major demands, such as national disasters, it is critical to have an inventory of tested blood in local hospitals and regional blood centers prior to the emergency. In order to do so, there has to be a steady supply of regular donors.

It is important to recruit first time donors (FTD), but even more important to retain them as repeat donors. FTD are motivated to donate blood for a number of reasons, such as altruism, a health check, incentives, or a relative or friend in need of blood [5]. After major disasters or national emergencies, FTD have been seen to give blood in larger numbers than repeat donors [6]. However, a large proportion of FTD do not become regular donors because of the lack of convenience, fear, loss of motivation, temporary deferment, bad experience, or other reasons [7].

Different approaches have been used to encourage FTD to become regular donors. Donors are more likely to respond to messages that appeal to empathy as opposed to self-esteem [8], as illustrated in the public response to calls for blood following terrorist attacks. Previous research has also demonstrated that one of the main determinants of a FTD returning is having a positive donation visit [9,10]. After the September 11th event, blood donors felt that they were contributing something that held more than just medical value [11]. Thus, we wanted to study whether a person's initial motivation, namely a national emergency, to donate blood for the first time leads to subsequent donation, more often than those who become FTD for other reasons. Another aim of this study was to evaluate the carryover effect of a national disaster on new donors continuing to come in subsequently.

To maintain the safety of the blood supply, and to protect the health of donors and transfusion recipients, blood centers use established criteria for donor selection, e.g., history questions, hemoglobin/hematocrit levels, and normal vital signs. Further, all donations are tested for infectious disease markers. A third aim of this study was to evaluate donor deferral rates at the time of the pre-donation interview process and deferral rates based on positive infectious disease test results in the post-emergency group compared to a group of FTD during a comparable non-emergency time.

Materials and Methods

We studied 3315 (2141 female and 1174 male) allogeneic whole blood donors who gave blood for the first time at a regional blood center, its satellites, and its mobiles (BloodSource, then known as the Sacramento Medical Foundation Blood Centers) between September 11th and September 30, 2001 (Post 9/11 Group 1). The eligible donors' donation histories were reviewed to determine if they made any subsequent donations in the next 6 months, i.e., before March 31, 2002. This "test" group (Post 9/11 Group 1) was compared to blood donations given by 1279 FTD (771 female and 508 male) during the same time frame one year earlier in September 2000 (Control Group 1). This group's 6 month return rate was determined through March 31, 2001. To verify if events of September 11th had an additive or carryover impact on the donor pool during a slightly later period, another group of FTD from a later, three month period, January 1 to March 31, 2002, was reviewed (Post 9/11

Group 2). As comparison, a second control group, Control Group 2, was evaluated; the data from Control Group 2 consisted of FTD data from the same period in 2001. During the respective 6 month time periods after September 30 of 2000 and 2001, the methods of recruiting new donors as well as FTD who successfully donated a useable unit did not change.

The deferral rates in the interview process and infectious disease marker deferral rates between the control and post 9/11 groups in the initial and follow-up periods were also determined. Proportions were compared using a chi-square test for more than two groups or the equivalent two-sample z-test for two group comparisons. Logistic regression models were used to investigate the effects of age, gender, and test group on return rates of FTD. A p value < 0.05 was considered significant for overall tests and for regression models, with a multiple comparison correction used for subgroup comparisons.

Results

Returning blood donors in the US may give blood eight weeks after a whole blood donation. All FTD in the regional blood center's computer system database were approached by various recruitment strategies after eight weeks if they remained eligible (i.e., had negative or non-reactive infectious disease test results on their initial donation). The return rate of blood donors was determined during the subsequent four month period of eligibility. The 3315 post 9/11/01 FTD (Post 9/11 Group 1) were compared to 1279 post 9/11/00 FTD (Control Group 1) (Table 1). From the September 11, 2001 group, 1087/3315 (32.8%) of the FTD returned to donate again within six months. This rate did not differ when compared to 427/1279 (33.4%, $p = 0.7$) of the Control Group 1.

Among all donor time periods, the interview process deferral rate (deferral based on questions, hemoglobin/hematocrit levels, and vital signs) differed significantly across groups (chi square = 20.44, df = 3, $p < 0.001$). The interview deferral process rate for Control Group 1, 23.0%, was significantly higher than the rate of all three other groups, including the Post 9/11 Group 1 ($p < 0.01$), Post 9/11 Group 2 ($p < 0.001$), and Control Group 2 ($p < 0.01$). No significant difference was found among these three latter groups; all were between 18% and 19% (Table 2).

Among all FTD, the positive infectious disease deferral rates revealed modest but statistically significant differences across groups (chi square = 19.29, df = 3, $p < 0.001$). The initial Post-9/11 donors (Post 9/11 Group 1) and Control Group 2 donors had comparable rates, 4.2% and 4.6% respectively, both significantly higher than the rates of Control Group 1 (3.6%) and Post 9/11 Group 2 (3.4%). The magnitude of the difference, however, was small, amounting to about one in one hundred FTD.

Logistic regression models showed age and gender have a significant effect on return donation rates of first time donors. For every increase in age bracket, the odds of an individual returning increases approximately 1.13 times the original rate, or a 13% increase ($p < 0.001$) (Table 3). Comparing Post 9/11and Control groups, no significant difference in return rate was found between females and males within any age bracket. However, among all donors, the odds of a female returning are 1.13 times higher than a male returning ($p = 0.06$). The proportion of female FTD returning to donate after September 11th almost tripled compared to a doubling for male FTD (Table 3). Within the test group, females in the two oldest groups were most likely to return to donate blood. Among males, those > 60 years and < 20 years of age were most likely to return to donate after September 11, 2001.

After a national emergency, there may be some residual effect months later on for individuals who decide to donate blood for the first time. During the first 3 months of 2001,

long before the Sept. 11 attacks, 7,755 individuals came in as first time donors. During the first 3 months of 2002, 8,897 first time donors presented to donate. This increase of 1,142 (14.7%) occurred without any major change in community recruitment efforts.

Discussion

After the events of September 11, 2001, the citizens of the United States of America were motivated to help one another. One of the ways that people showed their desire to help was donating blood, including many who were FTD. This event presented an opportunity to see if this increased the pool of eligible, repeat donors in the near term, the subsequent 6 month period.

The results from our study do not demonstrate that a significantly greater percentage of new donors returned to become regular donors after a national emergency, like 9/11, compared to a comparable non-emergency time. Nonetheless, since the absolute number of first time donors increased, the September 11th tragedy brought an additional 2,036 new donors into our regional blood centers in California compared to the previous year. This increase in FTD resulted in an additional 660 people who returned to donate within the 6-month follow-up period. Thus, the net gain of FTD represents a larger pool of potential donors who could be motivated to return and become regular, repeat donors. Further, events like 9/11 may continue to motivate many to donate blood long after the incident, as shown by our 14.7% increase in new donors in the first quarter of 2002. In order to take advantage of this continued motivation, some donor centers use 9/11 as an impetus to increase donations. As an example, the San Diego Blood Bank, in conjunction with the San Diego and Imperial Counties Credit Union, holds an annual “11 Days in September Blood Drive” collecting blood from hundreds of employees [12]. Similar memorial blood drives occur throughout the nation. As the anniversary of September 11th approaches year after year, it can serve as a reminder that we need to have a supply of blood ready in the event of a national disaster.

There were differences in the interview process deferral rate and infectious disease marker deferral rate for individuals who donated blood immediately after 9/11, and subsequently, compared to donors who came in during comparable periods the year before. We can infer that the interview process deferral rates among the FTD in the Post 9/11 groups may have been lower than the control groups because of self-selection or the donation from individuals who had donated before but were not in the local system so appear as FTD; they did not, however, differ significantly from FTD during a second, later control period. Consistent with previous findings, our FTD after September 11, 2001 did not have a higher viral marker rate compared to individuals who donated without the stimulus of a national disaster [3,13]. A study after the October 17, 1989 San Francisco Bay Area earthquake also demonstrated that donations after this event were equally safe, especially when adjusted for the number of FTD [5]. Many eligible people do not donate unless there is a national emergency; so, special efforts should be expended to retain them as repeat, regular donors for the future.

The pool of eligible donors to draw from is smaller than formerly believed. Based on previous age-exclusion methods, 60.2% of the US population was deemed eligible to donate; however, after taking into consideration donor-exclusion factors, including infectious disease history, travel history, pregnancy, and other factors, only 37.8% of the population was deemed eligible [14]. Because the donor pool is smaller than previously estimated, it becomes even more important to retain FTD. Our study demonstrated an increasing return rate for every increase in age bracket, which is in opposition to previous findings stating that younger donors were more likely to attempt a subsequent donation than older donors after a regional or national emergency or disaster [15]. Ownby et al. [16] found that return rates increased with age, especially in the group above 30 years old, and

suggested that the difference in civic duty, maturity, and mobility may play a role in donation frequency. With 9/11 as the initial impetus to donate blood, older individuals may feel a greater responsibility to continue to contribute, especially having experienced the aftermath of previous national disasters. Furthermore, younger individuals are more likely to relocate, so they are lost to their original blood center but may instead present as FTD to new local centers. Thus, young donors may be over-represented as FTD and under-represented among return donors. Future research into age-appropriate recruitment and retention strategies will be important in maintaining an adequate supply of blood donors.

In order to understand the behavior of FTD, psychological research has explored the Theory of Planned Behavior as a conceptual framework. It is based on behavior intention, which is a measure of three independent variables: attitude, subjective norm, and perceived behavior control [17]. Application of this theory to blood donation explains that intention is a greater determinant in the prediction of behavior versus the frequency of a behavior [18]. Thus, the Theory of Planned Behavior offers an explanation for the finding of an increase in the total number of FTD following the September 11th attacks and the lack of a corresponding increase in the proportion of return donors. The theory states that an individual's beliefs in the likely consequences of a behavior, the beliefs of the normative expectations of others, and the ease or difficulty in performing a certain behavior together determine behavior intention [19]. With the impetus of the September 11th disaster, more individuals were motivated to donate for the first time because the individual's behavior intention was based on the perceived immediate need for increased blood transfusions, the national call for help, and the advertised convenience to donate through the increased availability of donation hours and sites throughout the country. Thus, our results support previous conclusions that first time blood donation is driven more by behavior intention than repeated donations [20,21].

Additionally, a recent study demonstrated that the population of donors who donate after an emergency is different from those who donate in non-emergency times, as measured by a questionnaire [22]. Those who donate during emergency times state that they are more likely to return to donate, although we found this not to be so. Emergency time donors also stated that, in general, they are more motivated by emergency situations than the regular donor. These findings are important because different approaches may be required to effect higher return rates for these post-emergency donors.

In addition to the difference in the role of intention in the behavior or FTD and repeat donors, previous research has demonstrated that return behavior is linked to other factors, such as education level and time interval between first and second donations [16]. A greater percentage of FTD donating during the second to fourth weeks (30.2% and 30.4%) following September 11, 2001, returned to donate within the next twelve months than those who donated for the first time during the first week (28.3%) [3].

Donors are more likely to return to give blood after having a positive experience during their first donation [8,9]. Although local and regional blood centers try to adhere to a high level of customer service, the flood of donors on the days following a local or national emergency, such as the September 11th attacks, creates an environment in which the optimal donor experience may be difficult to attain. After September 11th, donor lines extended out the doors, emotions were running high, and blood center employees were often overwhelmed. Therefore, we speculate that a number of FTD did not return because, although they had altruistic intentions, their experience of blood donation may have been suboptimal or may not have been a positive one. Fading memories of the traumatic event combined with the stress of blood donation may also mitigate against subsequent efforts to donate blood again. With the experience of 9/11, blood centers can develop protocols for national disasters

during which centers will be flooded with individuals willing to donate blood. By creating a detailed plan, including emergency supplies, backup facilities, and a list of qualified volunteers, the process of blood donation can be streamlined in order to foster an environment more conducive to a positive experience and the development of repeat donors. National disasters are unpredictable and create feelings of anger, sadness, and helplessness. Having prepared institutions provide an outlet for the public to be involved in the relief efforts is important not only for the victims but also for national morale and unity.

Although a catastrophic event like 9/11 in the US did not result in a higher return rate among FTD, the absolute number of FTD was increased, especially among females, which confirms the findings of Glynn et al [3]. From the increased pool of FTD, there is a larger population to develop into repeat, regular donors. Since blood donors are more likely to return as less time has passed following their donations [16,23], extra effort should be made to contact them sooner rather than later [24]. Future research should be directed towards determining the long-term effects, e.g., years, of a national disaster on blood donor recruitment and retention of FTD coming in after a national disaster like 9/11.

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Table 1

Number & Percentage of First Time Donors (FTD) who Returned for Subsequent Donations within the following 6 Months

Control	September 11–30, 2000 (Group 1)	Returned to donate by March 31, 2001 (Group 2)	Percentage within group
Total FTD	1279	427	33.4%
FTD Female	771	255	33.1%
FTD Male	508	172	33.9%

Post 9/11	September 11–30, 2001 (Group 1)	Returned to donate by March 31, 2002 (Group 2)	Percentage within group	Difference between Control & Test Groups
Total FTD	3315	1087	32.8%	−0.6%
FTD Female	2141	729	34.1%	+1.0%
FTD Male	1174	358	30.5%	−3.4%

Table 2

Donors Deferred by Interview Process for First Time Donors

	Deferred	Not Deferred	Total
Control Group 1 (September 11–30, 2000)	381* (23.0%)	1279 (77.0%)	1660
Post 9/11 Group 1 (September 11–30, 2001)	644 (18.1%)	2915 (81.9%)	3559

	Deferred	Not Deferred	Total
Control Group 2 (January–March 2001)	1429 (18.4%)	6326 (81.6%)	7755
Post 9/11 Group 2 (January–March 2002)	1677 (18.9)	7220 (81.1%)	8897

* $p < 0.01$ from Post 9/11 Group 1 and Control Group 2 and $p < 0.001$ from Post 9/11 Group 2

Table 3

Number & Percentage of First Time Donors (FTD) who Returned for Subsequent Donations (By Gender and Age Group)

Control					Test Group				
	Age	**September11–30, 2000**	**Returned to Donate by March31, 2001**	**Percentage within Group**		**Age**	**September 11–30, 2001**	**Returned to Donate by March 31, 2002**	**Percentage within Group**	**Percentage Difference**
FTD Female	< 20 years	212	63	29.72%	**FTD Female**	< 20 years	228	61	26.75%	−2.96%
	20–29 years	154	46	29.87%		20–29 years	485	133	27.42%	−2.45%
	30–39 years	156	52	33.33%		30–39 years	502	179	35.66%	2.32%
	40–49 years	136	48	35.29%		40–49 years	473	166	35.10%	−0.20%
	50–59 years	77	30	38.96%		50–59 years	332	138	41.57%	2.61%
	60+ years	36	16	44.44%		60+ years	121	52	42.98%	−1.47%
	Subtotal	**771**	**255**	**33.07%**		**Subtotal**	**2141**	**729**	**34.05%**	**0.98%**
FTD Male	< 20 years	122	32	26.23%	**FTD Male**	< 20 years	108	35	32.41%	6.18%
	20–29 years	102	32	31.37%		20–29 years	219	50	22.83%	−8.54%
	30–39 years	108	40	37.04%		30–39 years	290	92	31.72%	−5.31%
	40–49 years	86	27	31.40%		40–49 years	257	75	29.18%	−2.21%
	50–59 years	56	25	44.64%		50–59 years	206	66	32.04%	−12.60%
	60+ years	34	16	47.06%		60+ years	94	40	42.55%	−4.51%
	Subtotal	**508**	**172**	**33.86%**		**Subtotal**	**1174**	**358**	**30.49%**	**−3.36%**
Total FTD		**1279**	**427**	**33.39%**	**Total FTD**		**3315**	**1087**	**32.79%**	**−0.60%**