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Applied tension may help retain donors who are ambivalent about needles

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Vox Sanguinis

Background Vasovagal symptoms can discourage people who might otherwise give blood on many occasions. However, the effects of symptoms on donor retention as well as the effects of treatments to reduce vasovagal symptoms on donor retention are probably moderated by a person's confidence that they can tolerate the procedure.

Methods Data from a study on the effects of the muscle tensing technique applied tension (AT) on donor retention were examined to determine if (1) the degree of donor ambivalence about needles influenced the impact of vasovagal symptoms on subsequent return and (2) ambivalence about needles moderated the effect of learning AT on donor return. One-year follow-up data on 614 people who had previously given blood and were randomly assigned to either a no treatment, donation-as-usual condition or one of two conditions involving AT were obtained. Self-reported degree of needle ambivalence and vasovagal symptoms were assessed during the initial blood donation.

Results Among participants in the no treatment group, increases in vasovagal symptoms were associated with decreases in donor return but only among people who expressed some fear of blood draws. Similarly, among people who no expressed fear of needles, learning AT had no effect on post-donation estimate of the likelihood they would give blood again or return rate. However, among people with some fear of blood draws learning AT led to both a higher estimate that they would give blood again as well as actual return rate.

Conclusions The experience of vasovagal symptoms may not deter people who are generally confident in their ability to tolerate blood donation. However, among people who are ambivalent about needles, symptoms may 'confirm' pre-existing doubts about their suitability for blood donation and lead to drop-out. Targeted interventions that give the uncertain volunteer a sense of confidence that they might be able to realize their goal and become a regular blood donor may be useful.

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Introduction

Despite altruistic intentions, the experience of vasovagal symptoms such as dizziness, weakness, and fainting can

discourage blood donors from volunteering again. While more severe symptoms lead to higher drop-out rates, even mild subjective symptoms may have an adverse effect on donor retention [1–8]. These findings have contributed to recent interest in behavioural interventions aimed at reducing symptoms such as asking people to drink water before donation [9,10] or to tense muscles while giving blood [11–14]. Relative to the

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effort required to recruit donors, such procedures are simple and inexpensive. However, while they may make the donation experience more pleasant, it is unclear that a reduction in symptoms leads automatically to increased retention. For example, we recently observed that female donors who participated in several conditions involving repeated isometric muscle tension (applied tension; AT) were significantly more likely to return to give blood again compared to a similar group that was not asked to practice AT [15], but in an earlier study we found no relationship between practicing AT and subsequent return despite a reduction in symptoms [12].

An issue which complicates evaluation of the impact of symptoms on blood donor return, and the effects of treatments to reduce symptoms on blood donor return, is the fact that people can experience symptoms for many different reasons. While this has not been studied extensively in relation to donor return, basic psychological research and research on blood donation decision-making suggests that the perceived origin of symptoms influences decisions about subsequent blood donation. For example, symptoms that can be attributed to transient environmental factors such as hunger, a hot room, or a long wait are probably more likely to be discounted and have less of an impact on subsequent blood donation than symptoms that are attributed to a more dispositional characteristic like fear of needles. In a large survey of people who have never given blood before (never donors) and people who had given blood on at least one previous occasion (ever donors), Godin et al. [16] found that the best predictor of ever donors' intention to give blood again was a measure of perceived behavioural control including items such as 'I feel capable of giving blood'. The results of a number of studies indicate that a donor's confidence that they can tolerate the procedure is probably the best psychological predictor of intention to give blood [16-20]. Thus, while the experience of symptoms might, in and of itself, undermine confidence and intention to give blood again, it seems more likely that this will occur primarily among people who are already less certain about their suitability to be blood donors, such as people who are ambivalent about needles. The present study tested this idea using archival data along with the related hypothesis that the impact of an intervention to reduce symptoms (AT) on donor retention should be greater among individuals who are ambivalent about needles. Donors who have no particular concerns about needles should be relatively confident of their ability to tolerate the procedure without an external aid.

Materials and methods

Participants

The present study examined these questions using data from the previously mentioned trial of AT that did not reveal a general association between the practice of AT and donor retention [12]. Seven hundred twenty-six¹ donors at mobile clinics held English-speaking universities and colleges in the Montreal area were randomly assigned to either a no treatment, donation-as-usual group or one of two groups who learned AT. It was subsequently possible to obtain follow-up data for 614 of these individuals. Preliminary analyses revealed no significant differences between the two groups who learned AT by watching the same video in demographic characteristics or return rates. As a result, to simplify analyses, data from these two groups were combined (Table 1).

Procedure and measures

After recruitment, participants completed a brief pre-donation questionnaire and, if applicable, watched the instructional video. Participants in the two AT conditions learned the same technique. The only difference was in the duration of time (approximately 2 vs. 10 min) they were asked to practice AT. AT involves repeated cycles of 5-s on 5-s off whole body isometric muscle tension while maintaining steady breathing. After learning AT, these individuals as well as people in the no treatment, donation-as-usual control condition passed through the typical blood collection procedure.

After giving blood all participants completed a longer post-donation questionnaire focused on vasovagal symptoms and the impact of AT. This included the Blood

Variable (units)	No treatment (n = 193)	Applied tension (n = 421)
Age (years)	21.7 (5.8)	22·2 (6·8)
Sex (% female)	61	57
Previous donations (#)	3.4 (6.9)	3.3 (6.7)
Body mass index (kg/m ²)	23.8 (4.6)	23·2 (4·0)

¹Our previous paper [12] on this group limited analyses to 605 donors where nurse ratings of symptoms were also available. Since these measures were not important for present purposes, we began with the full sample of 726 individuals who participated in clinics at English-speaking colleges and universities. Donation Reactions Inventory [21], a well-validated selfreport measure of blood donation-related symptoms such as dizziness, weakness, and nausea. A total score was derived from the sum of ratings of 11 symptoms on 0 ('not at all') to 5 ('to an extreme degree') scales. The BDRI also contains a section in which the donor is asked to estimate on a 0–100% scale the likelihood they will give blood again. Participants also completed the Medical Fears Survey [22]. Fears of a number of medical procedures such as 'Having blood drawn from your arm' and 'Receiving an anesthetic injection in the mouth' were rated on 0 ('no fear or tension at all') to 4 ('terror') scales. More information on the sample, procedures, and measures can be found in Ditto *et al.* [12].

After participating in the study and giving blood, follow-up data on whether or not the donor returned to give blood again in a one-year follow-up period was obtained for individuals who provided written consent from the province's blood supplier, Héma-Québec.

Data analysis

Initial analyses related to needle fear were conducted using the needle fear subscale of the Medical Fears Survey. However, an identical pattern of results was found when using the single rating of how afraid the person was of having blood drawn from their arm. Given the specific relevance of this question to the blood donation context and ease of expressing results, final analyses focused on responses to this question. For simplicity, this item is referred to as needle fear below.²

The primary dependent measures were the donor's estimate of the likelihood they would give blood again from the BDRI and whether or not they actually returned to give blood in the one-year follow-up period. The primary independent variables were whether or not they learned AT, Needle Fear rating, and BDRI symptom score. Continuous variables (e.g., estimated likelihood of giving blood again) were analysed using analyses of variance whereas the dichotomous variable of donor return was analysed using logistic regression. Age, sex, previous blood donations experience, and body mass index were included as covariates in all analyses.

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Results

Symptoms, needle fear, and donor return in the no treatment group

To evaluate relationships between symptoms, needle fear, and return, several analyses were conducted using data from the no treatment control group. Not surprisingly, control donors' fear of needles was positively associated with BDRI symptom score, r = 0.41, P < 0.001, and negatively correlated with their post-donation rating of the likelihood they would give blood again, r = -0.37, P < 0.001. This was manifest in actual return rates. Needle fear was a significant predictor of whether or not they returned during the year (OR = 0.43, 95% CI = 0.27-0.68, P < 0.001; Fig. 1). People who were more ambivalent about needles to begin with were less likely to return.

Similarly, BDRI symptom score was negatively correlated with the donor's estimate of the chance they would return to give blood again, r = -0.36, P < 0.001. Consistent with previous findings linking the experience of vasovagal symptoms with a decreased likelihood of donor return [1–8], a significant negative effect of symptoms on return was also observed (OR = 0.95, 95% CI = 0.91–0.99, P = 0.011).

However, the impact of symptoms differed markedly depending on whether or not they occurred in someone with some pre-existing ambivalence about needles. When participants were divided into those who expressed no fear of having blood drawn from their arm (rating = 0) or at least some fear (rating > 0; this was also the median) differences emerged. Among donors with no reported fear of needles, there was no association between the experience of dizziness and either their estimated chance of returning (r = 0.00) or the likelihood of actual subsequent blood donation (OR = 1.03). Temporary feelings of dizziness, etc. did not seem to deter subsequent donation for people who are not bothered by needles. On the other hand, among

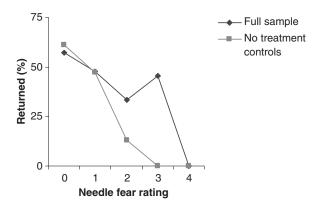


Fig. 1 Donor return in relation to needle fear rating.

²While not the primary purpose, using a single item to measure needle fear has the additional possible advantage of increasing the practical value of the results. That is, it raises the possibility that a screening nurse or phlebotomist could simply ask the donor about how comfortable they are with blood draws and use this information to guide the donation procedure.

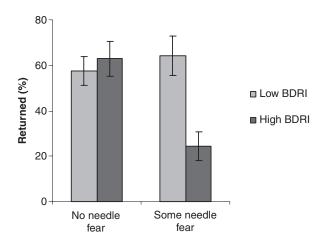


Fig. 2 Donor return in the no treatment group in relation to needle fear and vasovagal symptoms.

donors who were more ambivalent about needles, the experience of symptoms was linked to significantly lower estimates of their chance of returning (r = -0.35, P < 0.001) as well as fewer subsequent donations (OR = 0.94, 95% CI = 0.89–0.99, P = 0.017; Fig. 2).

Needle fear, AT, symptoms and donor return

Were the effects of being asked to practice AT on donor return moderated by needle fear? A Treatment (learned AT/did not learn AT) x Needle Fear (none/some) analysis of covariance of the donor's estimate of the chance they would give blood again produced a significant interaction between treatment and needle fear, F(1,542) = 6.72, P = 0.010. As can be see in Fig. 3, treatment increased the donor's estimate that they would return to give blood again, but only among people with some ambivalence about needles.

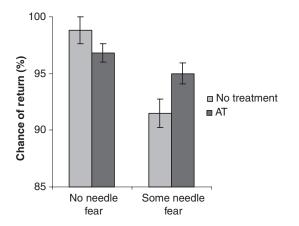


Fig. 3 The effect of applied tension on rated probability of return in relation to needle fear.

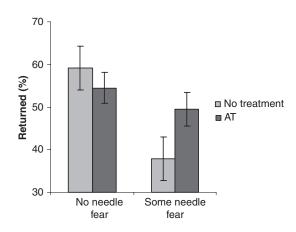


Fig. 4 The effect of applied tension on donor return in relation to needle fear.

A similar logistic regression equation was calculated predicting actual return from Treatment, Needle Fear, and the interaction of these variables as well as the covariates. The interaction between treatment and needle fear was significant (OR = 2·03, 95% CI = 1·19–3·47, P = 0.009). As can be see in Fig. 4, this is because learning AT was associated with more subsequent blood donations, but only among people with some ambivalence about needles. To see if this effect was mediated by a reduction in vasovagal symptoms, BDRI score was added to the analysis. Though BDRI score continued to predict return (P = 0.002), this only slightly reduced the significant interaction between treatment and needle fear (P = 0.021).

Discussion

The results suggest that vasovagal symptoms are more likely to discourage people who already have some doubts about their suitability to be blood donors. Symptoms had a much stronger effect on the likelihood of return among people with at least some fear of needles. Unfortunately, given the archival nature of the data, more detailed information about the donor's perceived control or self-efficacy is not available. It will be interesting to examine interactions among the experience of vasovagal symptoms, fear, confidence, and intention to give blood in future research. Relatedly, it could be predicted that symptoms that can be attributed to a clear external event such as not eating before giving blood or a warm room would have smaller effects on return than symptoms that may be seen as 'confirmation' of inability to tolerate the procedure.

That said, two features of the results are particularly encouraging and suggest that even people who may be somewhat ambivalent about needles are not necessarily 'lost causes' in relation to blood donation. First, it is interesting to note that people in the no treatment condition who expressed some fear of blood draws but who did not experience symptoms were no less likely to return than people who reported no fear (Fig. 2). While they may be at greater risk for drop-out than people with no fear, this does not necessarily have to prevent them from becoming repeat donors. This is especially the case since, second, learning AT led to significantly reduced drop-out among people with some fear of needles. Once again, examination of the psychological mechanisms of this effect awaits further research. For example, it is not clear if this was due simply to treated participants experiencing fewer symptoms and having a more enjoyable experience or something more subtle, such as an increase in confidence among some people who learned AT. We speculate that it may be the latter since data from this study and our more recent study [15] suggest that there does not appear to be a strong correspondence between the effects of AT on vasovagal symptoms and donor return. Also, controlling for the effects of AT on symptoms did not eliminate its effect on return in needle ambivalent donors.

In addition to the archival nature of the data, another possible limitation of the present analyses is the focus on fear. Volunteer blood donors are not, by definition, needle phobic (since the definition of phobia involves a measure of avoidance) or in most cases even that fearful of needles. On the other hand, it is widely acknowledged that people give blood for many reasons [3,23,24] and a certain amount of fear is common [24–27] though the modest severity in most cases is more consistent with the term we chose to emphasize, that is, 'ambivalence'.

A concrete sense of this is provided by the numbers of donors in the full sample reporting specific ratings of needle fear in Fig. 1. The most common rating of fear of blood draws was no fear (0; n = 312), but an almost equal number reported either a little (1; n = 202) or moderate fear (2; n = 57). Twelve donors actually reported very high fear (ratings of 3 or 4). Thus, among these donors who are early in their blood donation careers, almost half the sample reported some modest fear of needles, so the issue is not irrelevant. The increasing reliance on donors as young as 16-year old [28–30] suggests further attention to this issue. Relatedly, as can be seen in Figs 1 and 2, it does not require particularly high levels of needle fear to encourage dropout, especially if combined with an unpleasant blood donation experience.

Finally, while the present results deal entirely with retention of individuals who have already demonstrated some commitment to blood donation, another interesting idea raised by these findings is the possibility of interventions for people who might like to give blood but have not followed through due to concern about needles. The relative importance of fear of needles among non-donors vis-à-vis other disincentives such as convenience has been the topic of discussion for some time [17–19,25,26] but few would dispute the idea that many people who might like to give blood hesitate for fear of needles. As previously noted, Godin *et al.* [16] found that the best predictor of ever donors' intention to give blood again was a measure of perceived behavioural control. This was also the best predictor of intention to give blood among people who had never given blood before. Targeted interventions that give the ambivalent volunteer a sense of confidence that they might be able to realize their goal and become a regular blood donor may be useful.

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