Evaluating the Effectiveness of Emotionally Framed Messaging in Open Recruitment of Potential Donors Aged 18 to 55 Years to Join Stem Cell Registries: A Feasibility Pilot Study

Anishka Basu, Rishabh Shah
Liberal Arts and Sciences Academy, Westlake High School
anishkabasu99@gmail.com, rishi.329.shah@gmail.com

ABSTRACT

Every 27 seconds, someone is diagnosed with blood cancer, and a blood stem cell transplant may be their only life-saving therapy (DKMS, 2023). However, patients need a matched donor from the limited donor pool, often relying on unrelated individuals of the same ethnicity to register. There is a significant lack of community awareness regarding the life-saving role of stem cell therapy, and insufficient research to maximize recruitment.

It is essential to investigate the impact of various messaging types to broaden the pool. This study followed a randomized controlled experimental design. The two arms were the standard science-based message intervention (protocol A) and the emotional appeal video of a blood cancer patient awaiting a life-saving transplant (protocol A+B). To better understand participants' motivations for joining the registry, post-experiment interviews were also conducted.

Across five drives at different locations, there were a total of 43 participants – 22 in protocol A and 21 in protocol A+B. A Fisher's exact test compared the distribution of outcomes across the two differing groups (A and A+B). The null hypothesis could not be rejected (i.e., statistically, there was no difference in the outcome across the two groups). Both arms yielded a high success rate of willingness to register: 90-100%. Interview responses revealed altruism & empathy to be motivating factors.

This study underscores that clear science-based messaging alone, or when combined with patient testimony, results in high recruitment of stem cell donors. These findings can inform ways to improve donor registration rates.

INTRODUCTION

Stem cell transplants have a potentially life-saving role in treating blood cancers, and data show that every 27 seconds someone across the globe is diagnosed with blood cancer (DKMS, 2023). Data from Blood Cancer United show that every 3 minutes, someone in the U.S. is diagnosed with blood cancer, and every 9 minutes, someone in the U.S. dies from a blood cancer (Blood Cancer United). Despite scientific advancements with potentially life-saving therapeutic options for blood cancers, including chemotherapy

and immunotherapy, there is still a tremendous need for blood stem cell transplants for rare blood cancers, blood disorders unresponsive to such therapies, or those with complications from the existing therapies (Bair et al., 2020). This is because stem cells, the blood-forming cells produced in the bone marrow of a healthy donor, can replace a blood cancer patient's diseased cells, thereby potentially reducing their disease burden and prolonging their life (National Cancer Institute, 2024).

For donor stem cells to be successfully transplanted into a patient with a blood cancer or blood cell disorder, ensuring donor-patient tissue compatibility is critical. This matching is referred to as HLA (human leukocyte antigen) matching. HLAs act as identity markers of one's immune system to recognize "self" from "non-self". HLA compatibility is based on the patient's genetic inheritance; a better match is with siblings, parents, the same family, ethnicity, and race. However, only 30% of matched stem cell donations come from a family member who is eligible to donate, while 70% of the donations come from unrelated, eligible, healthy living donors for their potentially life-saving match (Health Resources and Services Administration, *The need for more marrow donors, 2026*). Hence, there is a critical need to expand the stem cell donor pool, making open-recruitment drives imperative to increase recruitment of unrelated eligible donors. Currently, the chances of finding a match lie at 29-79% based on ethnic origins, with non-Hispanic White groups having the highest chances and African-Americans the lowest (DKMS, 2023). Thus, current data suggest the need for more potential donors who are eligible, especially of ethnically diverse backgrounds, to join the stem cell registry to reduce the time that it takes to find a potential life-saving matched stem cell donation for blood cancer patients (Li et al., 2021). Through open recruitment drives like ours, efforts should continue in identifying effective interventions to increase the number of ethnically diverse eligible donors in the registry, as well as spreading awareness about the science of stem cells, their role, their impact, and the existing needs gap in this realm.

As a thorough literature review was undertaken on the stem cell registration processes, we found that the perceptions and attitudes of the community, as well as knowledge and access to donor registration locations, were some of the potentially modifiable barriers, while age and health issues were the non-modifiable barriers to registration (Kollman et al., 2001). The key psychological frameworks of the Elaboration Likelihood Model and Narrative Transportation Theory gave us insights into how messages are processed by people and can lead to changes in their attitudes and perspectives on a subject. The Elaboration Likelihood Model, developed by Richard Petty and John Cacioppo, a theory of information processing, delineated the activation of two different routes - central and peripheral paths which are theoretically considered opposite ends of an elaboration continuum. These help ground the story, facilitate impact on future behavior through impressions on long-term memory, as well as counter common misconceptions to persuade desirable behavior (Petty & Cacioppo, 1986). Additionally, the Narrative Transportation Theory also shows that there is better engagement and commitment when psychological reactance is lowered through triggers within the interventions (Green and Appel, 2024). Slater and Rouner's extended elaboration likelihood model helps reconcile narrative persuasion with the elaboration framework (Rouner, Slater et al., 2003). Moreover, the synopses of select studies, which are outlined below, highlighted the factors relevant to persuasion leading to intended behavioral responses and change in attitudes for the field of stem cell transplant.

One of the studies conducted to gauge the racial and ethnic differences in attitudes and perceptions toward stem cell donations, utilizing a cross-sectional survey, created a stratified random sample of new registrants by race and ethnicity, while assessing different attitudes towards donating (Hamed et al., 2022). Results showed that joining the stem cell registry was the most popular among White, Black, and Hispanic individuals, while ambivalence towards joining was the most prevalent in Asian/Pacific Islander individuals (Hamed et al., 2022). The ambivalence was most directly attributed to mistrust of the organization, low knowledge, and low parental support. Hence, the emotional messaging component served as a persuasive heuristic, integrating confirmation and adequate information from a potential stem cell recipient about the initiative with the demonstrated needs, as well as the legitimacy of the organization.

Similarly, another study attempted to gauge the facilitators and barriers of unrelated stem cell donation in adults. A mixed-methods review was used to search four databases, with fifty studies to screen, extract data from, analyze, and synthesize a conclusion using the COM-B model of Capacity-Opportunity-Motivation: Behavior (Forbes et al., 2025). The results showed that lack of knowledge was a barrier, while perceived convenience and altruism were the most common facilitators of donation (Forbes et al., 2025). Our approach of combining the science message with the emotional appeal integrated both sufficient knowledge about the process and invoked altruistic feelings within the potential registrant, supporting our hypothesis that the synergistic yield would be higher. Another study revealed how a rational approach versus emotional appeal generated a difference in money donation behavior. The study randomly assigned participants to observe the differences in outcomes using either a rational argument of why one should donate, using Singer's "shallow pond" argument, or an emotional video of a child in need (Lindauer et al., 2023). The themes of the personal stories of a patient passing away while waiting for a stem cell transplant, as well as one about a successful transplant of a patient getting cured of a disease, profoundly impacted the prospective donor's interest in joining the stem cell registry.

Moreover, our previous fieldwork for the AAPI (American Association of Physicians of Indian Origin) stem cell drive initiative locally in our community, from July to October 2025, helped us gauge the population's gaps in awareness regarding the impact of stem cell therapies in blood cancers, the registration processes, as well as the importance of ethnic representation for better-matched stem cell donations from unrelated donors. Our study attempted to address such existing barriers around the beliefs, knowledge, and attitudes towards stem cell donor registration through the utilization of various messaging components in stem cell donor recruitment. Specifically, our messaging included the delivery of an emotional appeal video from a patient with blood cancer awaiting a life-saving stem cell transplant, along with a clear scientific message on the role of stem cells and the donation process. The novel approach of adding the emotional messaging was based on the literature review, as elaborated above. Community-centric connections and ethos: referrals from friends and relatives were influential, as well as the socio-ethical imperative (belonging to the same community/ethnicity) and moral obligation to reciprocate. Strategic timing and location were additional instrumental factors in donor recruitment (Forbes et al., 2025).

Our mission included disseminating scientific information about the types of adult stem cell donations with evidence-based data to show that in over 85% of such cases, only peripheral blood stem cells (PBSC) were generally needed and not bone marrow (Kiene et al., 2024). Our efforts focused on newer approaches to identifying effective interventions to increase the number of ethnically diverse and willing eligible donors in the stem cell registry.

We hypothesized that, along with presenting scientific evidence to eligible individuals on the science of stem cell transplant processes and their impact on blood cancers, delivering the emotional intervention (the story of a critical blood cancer patient awaiting stem cell transplant) could result in a higher likelihood of an individual agreeing to register as a donor, thus leading to higher success of open recruitment drives. Our null hypothesis was that there would not be a significant difference in adding the emotional stimulus to the science-based messaging. Inclusion criteria in our study were based on some of the eligibility criteria of the DKMS stem cell registry for registering prospective donors: 18 to 55 years old and not previously registered as a stem cell donor. Our independent variables were the standard science message (protocol A), whereas (protocol A + B) consisted of the intervention of the emotional appeal video in addition.

METHODS AND MATERIALS

There were no chemical or biological external agents in this study. One of the materials was the intervention - the video featuring the emotional appeal of an adult patient with a blood cancer in need of life-saving stem cell donation, shown as a random assignment to half of the participants in our study. Additionally, DKMS stem cell registry's sterile cotton swab kits for sample collection, gloves, and laptops were on-site. A DKMS swab kit comprises three cotton swabs for oral mucosa samples, an envelope with specific concealed barcodes to hold the completed swabs, and a QR code label on the envelope that was scanned in the donor-specific registration form on the DKMS secure portal (these anonymous identification codes match the physical sample swab with the donor's profile securely, for DKMS's use only). The oral swabs were self-collected by eligible donors after seeing a live demo by trained volunteers of DKMS or the training video. The return mailing of the completed labeled swab kits occurred securely to a DKMS facility within a specified time period (e.g., generally 1 to 2 days after the drive). Personal protective equipment like gloves was worn, and all volunteers were well-trained in taking precautions to prevent touching swabs with saliva. This was ensured with prospective donors self-swabbing their mouths and placing those in DKMS envelopes themselves after requisite airing time, as shown previously by our trained volunteer team.

Our protocol was laid out as follows: after introducing the mission of our stem cell drive of increasing the number of stem cell donors in the pool and contributing to meaningful field research, we asked if they would like to hear more about this topic. If they assented, the research investigators listed the inclusion criteria of our study that align with the eligibility requirements of the DKMS stem cell registry: ages 18 - 55 years, living in the US, and not previously registered as a stem cell donor. The people who did not meet these minimum criteria were politely informed of the reasons why they could not participate in the drive and the study, due to compliance with safety measures for the patient and donor. It is essential to

note here that medical ineligibility could not be verified at this stage by us due to privacy laws regarding medical information. Instead, we shared the DKMS signage of medical conditions rendering people ineligible to register and informed them that the DKMS secure online assessment portal at registration would help walk them through this process of verifying their medical eligibility.

Then we showed and introduced the written informed consent while giving a brief introduction to our study, its purpose, and what it entailed. If they wished to proceed further, then they reviewed and signed with their name and date. After their consent, the process moved ahead, but if they did not, they were not counted in our sample or included in "n". They were informed that study participation is optional and there was an opportunity to continue in our stem cell drive and register with mouth swabs, even if they chose not to participate in our study itself.

There were two arms of our study, the control arm (A: standardized science-based) and the intervention arm (B: playing a pre-recorded emotional appeal video of a cancer patient awaiting a stem cell transplant to survive). This video had been obtained via informed consent from the adult patient. A random number generator of 100 numbers was used to determine which intervention was to be administered to each prospective donor-participant coming up. Both principal research investigators were fully equipped to deliver both components of the scripts. Next, the study participant received their assigned protocol A (standard of care: scientific message) or B+A (emotional video appeal followed by scientific message). Allocation was known to the supervisor and the clinical research investigators, who ethically delivered the next pre-assigned intervention to the interested individual coming up to register. After delivery of the assignment, the number was crossed out by the supervisor. The individuals in protocol B+A were asked to verbally consent to watching the emotional video appeal before showing it to them. If they declined, as was the case for 1 individual, their assignment was changed to protocol A, and they were later excluded from the study, as in a modified intention-to-treat analysis. A post-experiment interview was administered to all willing donors who agreed to be interviewed, but this decision to administer the interview was made after the 1st drive on November 29th in order to obtain some qualitative information and clarity on the attributive roles of arm A vs. A+B. It consisted of a couple of questions, one to assess motivation to register, and the other to gauge their change in knowledge after our messaging. This was administered to all willing donors who had eventually proceeded to register with completed cheek swabs, including if they were medically ineligible. Once the standard or intervention script with emotional stimulus was delivered per protocol, an opportunity to ask questions was given to the study participant. If they agreed to move ahead with the donor registration process, they were referred to the registration booth over to our swab squad team. This outcome was noted as "1" if they indicated willingness to register as donors. The outcome of our study was coded as "1" = success based on the willingness of potential donors (satisfying inclusion criteria), even if ineligible eventually due to medical exclusionary criteria. This was noted by our adult mentor/direct supervisor. Please note that all the donors who indicated willingness to register "1" and were medically eligible to register as donors completed their registration with cheek swab samples, and all those swab kits were confirmed to be received by DKMS. The outcome was "0" = failure if unwilling to register as a donor, after consenting to the study and being delivered one of two scripts, A or B + A. A note of the participant's assignment, i.e intervention emotional stimulus or standard control, was made, and the outcomes were recorded, tying them to the intervention received, in a

color-coded manner for ease of tracking. At this point, in a separate sheet, for those with outcome "1", an optional demographic data collection of age range, ethnicity, and race in an anonymous fashion was offered and completed as agreed by participants. Regardless, they would have answered this piece of information on the DKMS registration form online, for scientific data collection and sorting for stem cell donor research. Also, we conducted a 2-question post-interview for all the willing donors (even if medically ineligible). These questions, as elucidated below, were asked during the air-drying time of the swabs for 2 minutes. This time usage helped maximize efficiency.

a) Thank you for your willingness to make a difference in the community. What prompted your decision to register as a donor today?

Options were given only if needed for study participants who needed clarity on the prompt: (knowing well that this may lead to response bias but there were on-field constraints of time and avoiding survey fatigue)

- knowing the processes of stem cell donation better or
- be able to help and the potential life-saving nature
- watching an emotional story video today, if applicable
- Any affected family members?

b) Did you hear about stem cells before today?

Yes or *No*

If yes, then spin-off question: Did you learn more today that influenced your decision?

Yes or *No*

This was noted in a journal without any associated identification.

Numerical assignment dichotomizing response to question b as Yes or No with 1 & 0 respectively was noted.

A token souvenir provided by DKMS as a mark of appreciation and ambassadorship was provided to the participants who successfully registered in the DKMS stem cell registry.

Ethics Statement: Our study involving human participants for recruitment as potential stem cell donors was superimposed on stem cell donor registration drives conducted by the DKMS international stem cell registry. Through the appropriate training of our principal student investigators, who are volunteers formally coached by DKMS liaisons and physician mentors of the American Association of Physicians of Indian Origin, each volunteer was fully aware of the possible scenarios of privacy, the emotional vulnerability of showing a blood cancer patient's video, and the scientific rigor of this complex topic. We obtained guidance and approval by submitting our research plan protocol in print to a panel similar to an institutional review board, consisting of practicing physician leaders and global experts on this topic: Dr. Sashi Kuppala, high school chemistry and physics teacher Ms. Susan Selinidis, and PhD educator at the

University of Central Florida, Dr. Uday Nair. This review arrangement was formally constituted through the forms and protocol of the Greater Austin Regional Science and Engineering Fair and was reviewed by their committee. After their approval was granted, the study data collection started. The research plan covered details on the study layout and materials, methods, and the standard human informed consent form. This form linked here Human Informed Consent Form (A) shows the title and our mission of registering stem cell donors for blood cancers, as well as the personal medical questionnaire to be answered on a secure DKMS portal, followed by cheek swabbing. It also included our data privacy statement and anonymisation, as well as verbal consent from the study participant for watching an emotional appeal video.

RESULTS

Across five locations in four weeks, 43 participants were recruited and randomly assigned to either receive both emotional and scientific messaging (Arm: A+B) or scientific messaging alone (Arm: A). Results showed 100% willingness to register in the combined messaging group (21/21) compared to 90.9% (20/22) in the science-only group.

Our study was a randomized controlled experimental design in a quantitative format with additional qualitative data obtained in the form of a brief post-intervention survey. The assignment of intervention was randomized. Our standardized (control) group was A, defined by the participant only receiving the standard of care, a science-based script of stem cell drives. Our investigational (treatment) group was A + B, defined as the participant watching a video of the emotional appeal from a patient with rare blood cancer (myelofibrosis) waiting on a life-saving stem cell transplant (B) in addition to the standard treatment, a science-based script of stem cell drives (A) (see Figure 1).

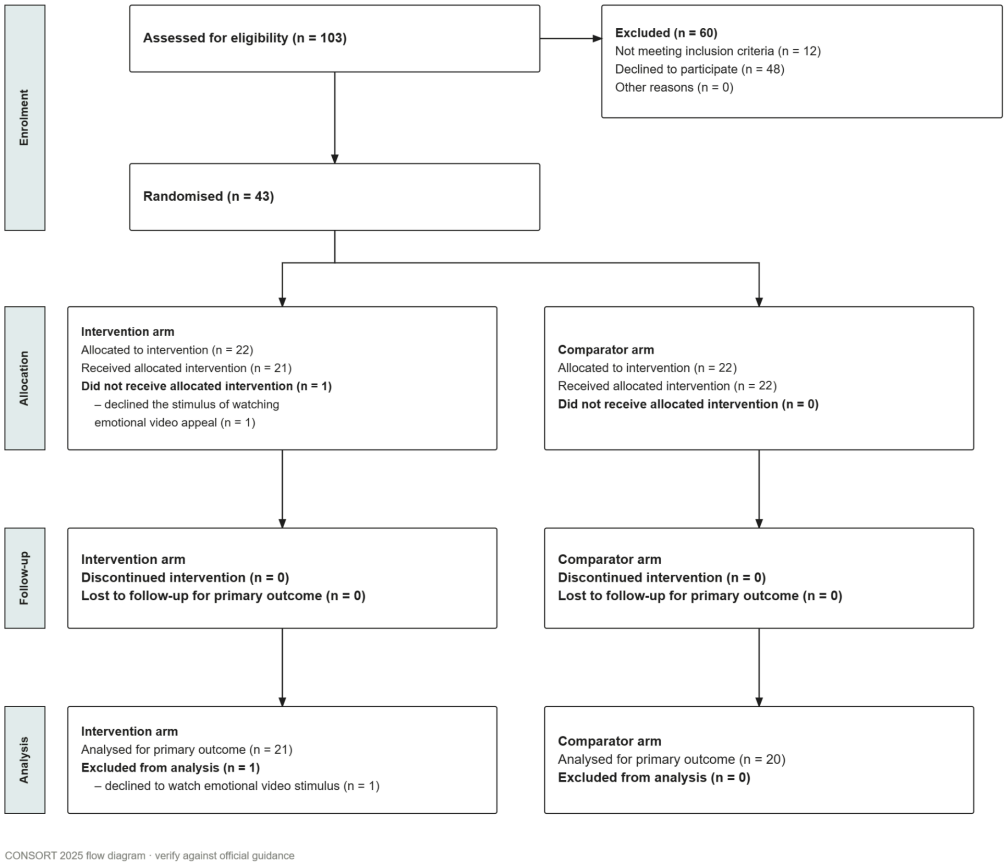

Figure 1. Flowchart of Study Protocol. Graphic created by Rishabh Shah using CONSORT creator PaperBanana, 2025.

The treatment protocol flowchart has been outlined above. We performed convenience sampling for the selection of participants at strategic locations such as community parks, fitness centers, community events through faith-based organizations, sports events, and residential neighborhoods.

The CONSORT extension for randomised pilot and feasibility trials (Eldridge et al., 2016) sets out what such a study should report. Our detailed data collection outlined below in sheets and in prose.

GARSEF - data analysis.xlsx

Table 1 outlines the data we collected.

Table 1. Contingency table: number of study participants willing to register after receiving the assigned intervention of emotionally framed messaging (protocol A+B) versus a science-based message (protocol A) as a control. Table created by Rishabh Shah using Google Sheets, 2026.

Arms of Study				
		Yes (1)	**No (0)**	**Total**
Control	**A**	20	2	22
Intervention	**A + B**	21	0	21
	Total	41	2	43

Observations on-field during study at drives:

1) Engagements: **103**
   11/29 : 27
   12/07 : 08
   12/20 : 19
   12/21 : 23
   12/27 : 26

2) Study Participants : **43** DKMS Reg Donors

   11/29: 08 **09** (2 registering donors declined participation in the study while 1 study participant was medically ineligible to be a donor)

   12/07: 03 **00** (drive code non-working)

12/20: 15 **17** (2 donors declined participation in the study)

12/21: 08 **08** (all donors participated)

12/27: 09 **11** (1 declined study participation, 1 not counted in study due to declining video but still registered as donor)

3) Subjective observations: primed- 12/43 = 27.9% all with outcome of success "1"

4) Priming high (7 of 8 study participants) on 11/29
   Priming + marketing with informational flyer & friends (5 of 15 study participants) on 12/20
   Unprimed : 12/07, 12/21, 12/27

5) There was allocation swapping
   1 swap on Drive #5, 12/27 due to an individual declining to watch the video (due to personal time)
   Had an outcome of "1"

6) Contamination once on 12/20, Drive #3
   First 2 participants received A+B assignment together but had made individual decisions and have post-experiment interview answers (one was motivated due to personal history of cancer known in family & neighborhood in a young child; the other one is a physician who was motivated to help after initial priming)

7) Field of study and Population Socio-demographics
   Ethnicity: please refer to datasheet above

To summarize, there was no statistically significant difference in effect, and the null hypothesis could not be rejected, maybe due to a small sample size, limited power and limited duration of the study.

Overall, in the total engagements made at our drives, we got about 41.74% (43/103) of them to participate in our study and 43.68% (45/103) to register as stem cell donors. Furthermore, our post-interviews revealed motivations rooted in empathy, altruism, personal connection, and scientific understanding (see Figure 3). We also observed the positive impact our message had in increasing the understanding of stem cells as well. At least 18/21 (85.7%) study participants learnt more about stem cell transplants in blood cancers, even though they had heard about stem cells prior. (See Figure 4)

Since the individual approach of rational or science-based only versus emotional appeal was not feasible to be individually tested against the combination, it was impossible to prove that the combined messaging was definitively better than either individual method of messaging. Our data analysis, based on the

quantitative data and dichotomous response, used Fisher's exact test due to the individual counts being less than 5 in a couple of cells. The significance level alpha at 0.05 and the test being one-sided were preset during the study design. The uncorrected Pearson chi-square statistic is $\chi^2 = 2.002$ ($p = 0.157$), and Fisher's exact test gives $p = 0.488$ (two-sided) and $p = 0.256$ (one-sided). With 95% confidence, the null hypothesis could not be rejected, and the differences between the two arms were not significant. Also, with one cell being zero, the odds ratio became undefined, so the most informative effect estimate was the risk difference. The A+B arm exceeded the A arm by 9.1 percentage points, with a 95 percent Newcombe confidence interval of roughly −7.7 to +27.8 points. Within arms, the 95 percent Wilson intervals are 72.2 to 97.5 per cent for A and 84.5 to 100 per cent for A+B. Reporting the interval accounts for a more realistic interpretation of the fact that the emotional appeal video may help somewhat, may have a neutral influence, or even slightly reduce willingness. There was only 1 medically ineligible "willing donor". Out of 43 study participants, we had 29 interview responses because 8 study participants at the 1st drive were not offered the interview. The remaining 6 missing interview responses were from the following drives when the participants indicated "lack of time" or "lack of willingness" to answer these questions. As indicated later in the results section, we had 1 missed opportunity to obtain cheek swabs due to a non-working QR code on the DKMS portal at our 2nd drive on December 7th.

It was concluded that we failed to reject the null hypothesis - both groups had a similar distribution on the outcome of interest, which was willingness to register as stem cell donors.

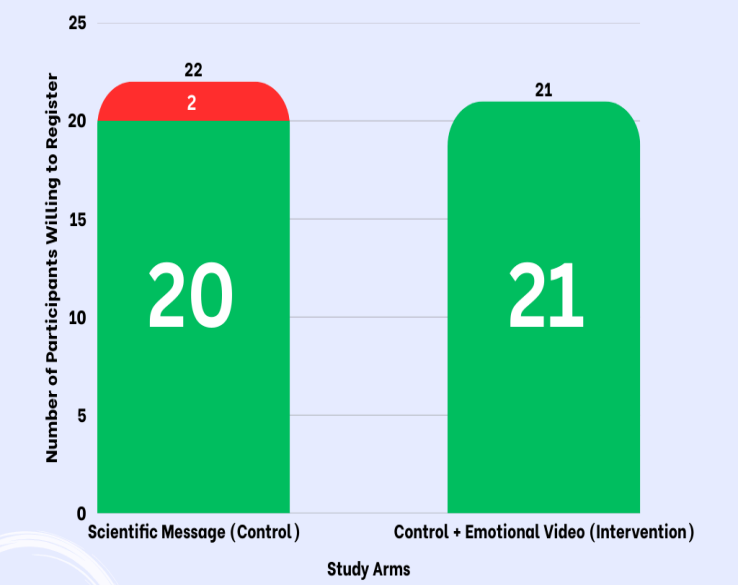

Figure 2. Bar graph of outcome responses in both arms. Created by Rishabh Shah using Canva, 2026.

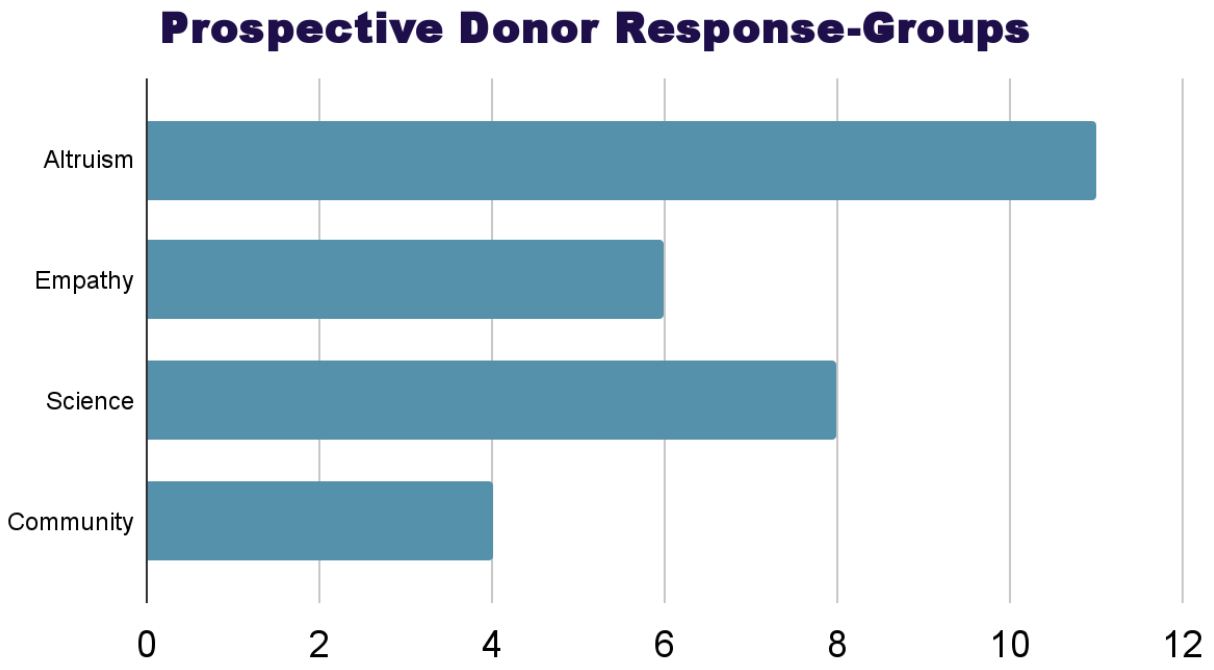

Figure 3. Bar graph of prospective donor response groups and number of individuals in each group. Graph created by Rishabh Shah using Canva, 2026.

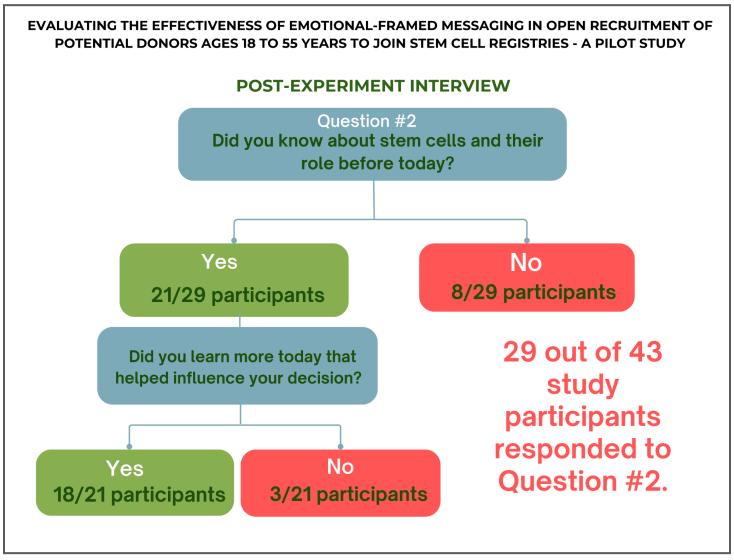

Figure 4. Responses to determine change in knowledge about stem cells after delivery of our message. Schematic depiction as a flowchart, respectively. Graphic created by Rishabh Shah

GARSEF Post-experiment interview

Categorization as above into four separate divisions was discussed by principal investigator students with their on-site clinical mentor, Dr Arathi Shah, with review of references.

Our responses from the post-experiment interview suggest that altruism and empathy did play a significant role in willingness to register. The opportunities lie ahead for more impactful interventions that help expand the stem cell donor pool. Similarly, other public health interventions may benefit from such novel messaging strategies and community feedback.

DISCUSSION

The findings of our randomized controlled feasibility pilot study indicate that our messaging was highly effective in donor recruitment. However, given that the scientific script (A) alone prompted a high willingness to register (90.9%), the emotional video appeal (B) failed to show an additional significant impact on registration separate from the combination message (A+B).

Our high success rates in both types of messaging interventions can be explained through the Elaboration Likelihood Model and Narrative Transportation Theory. This model serves to describe how the effectiveness of persuasion is determined by two different cognitive pathways (Petty & Cacioppo, 1986). The central route is activated when an individual is confronted with an argument prompting high cognitive elaboration (Petty & Cacioppo, 1986). During our science message, also referred to as the control script (A), maybe the central route was initially activated upon learning the statistics of how frequently someone is diagnosed with blood cancer, along with the information on peripheral blood stem cell transplant (PBSC), the processes involved, HLA compatibility, and more. It should be noted that the presence of both motivation and ability to engage with the message is necessary for the central route to be activated (Petty & Cacioppo, 1986). Hence, given that our participants were internally motivated to listen to our message and possessed the necessary reasoning skills to engage with complex information, the introduction of our initiative as "life-saving and urgent" likely triggered an altruistic motivation to further commit to the process of donor registration. Once the central route has been activated, the information prompts a long-term change in "issue-relevant attitude schemas" that could have held misinformed assumptions about stem cells before the script, such as "bone marrow donation is the only option", "it's not a safe process", or more common misconceptions (Petty & Cacioppo, 1986). Through the activation of the central route, our scientific messaging component (A) therefore could have aided in the dismantling of common potential misconceptions and getting the presented information stored in the long-term memory, such that it can be recalled by the individual in the future. Yet, rational data itself does not fully account for the immediate follow-through seen in the registrants at open-recruitment drives. The alternate route in the Elaboration Likelihood Model, the peripheral route, is characterized by low cognitive elaboration, where the individual is reliant on "peripheral cues" such as emotional stimuli, tone of voice, and environment to draw inferences (Petty & Cacioppo, 1986). This pathway can also be triggered when individuals are unmotivated or cognitively occupied, represented by the population of individuals whom

we likely caught mid-grocery shopping, or in the middle of something that was occupying their focus (Petty & Cacioppo, 1986). But just as the core claim suggests that attitudes formed through peripheral stimuli like our emotional appeal video could be less durable, we would also like to draw attention that the emotional message could be a rationalizing argument as well, therefore it has multiple roles including stimulating rational decision-making. In our case, the adult patient with myelofibrosis had his kids in the video and delivered substantive information (the South Asian disparity, the absence of a match and what it takes for an eligible individual to register). This can work for an engaged listener and it may well be processed centrally. Although it is possible that for the registering individuals, the video that was first played in the emotional intervention script (A+B) acted as an altruistic stimulus, triggering the peripheral route, leading the individual to immediately frame the overall initiative as a morally imperative endeavor, additive to the content of the scientific script subsequently.

In addition to the above model, the emotional impetus can be explained according to the Narrative Transportation Theory, whereby the emotional video intervention can explain how the psychological reactance was lowered when individuals were requested to register (Green & Appel, 2024). Specifically, the "narrative" consisted of a young South Asian father's account of his secondary active bone marrow disease, myelofibrosis, after putting leukemia in remission, wherein he was requesting eligible people to register as stem cell donors, especially those of underrepresented ethnic groups, so patients like him could get a second chance at life and spend more time with family. When prompted with the video, the individuals became immersed in the story, causing them to experience "identification and reference" (Green & Appel, 2024). This phenomenon occurs when an individual empathizes with the protagonist, the young father, and themselves, connecting their own autobiographical experiences to the narrative (Green & Appel, 2024). This likely made the emotional intervention in Script A+B more personal to the potential registrant, especially if they had lost loved ones to cancer. This could have been emotionally identifying with another South Asian and feeling compelled to participate on learning the significant South Asian disparity in the stem cell registry that left the young father without a match. Ultimately, Narrative Transportation Theory can contribute to a lowered psychological reactance by detaching an individual from their surroundings, lowering barriers such as mistrust of the organization, lack of knowledge, and other common misconceptions (Green & Appel, 2024). If we were to process this more definitively in future studies on messaging in stem cell donor registration, then grounding in objective questions reflective of the Narrative Transportation Scale (NTS) would be more evidence-based. This 7-point Likert scale with 15 self-report items is an authoritative psychometric instrument developed by Melanie C. Green and Timothy C. Brock (2000) designed to measure narrative transportation, a distinct psychological state characterized by cognitive absorption, emotional engagement, and vivid imagery processing during narrative engagement. Grounded in the metaphor of travel, transportation conceptualizes the psychological journey wherein an individual becomes profoundly immersed in a story, temporarily distancing themselves from physical reality and subsequently returning to the real world modified by the narrative experience.

Hence, the pairing of the scientific script along with the emotional intervention, shown through Script A+B, is an effective strategy to increase the number of registrants in stem cell drives. By activating the peripheral route along with the central route, the script prompts the individual to frame the initiative as a

moral obligation, increasing their inclination to participate. Subsequently, the central route counters misconceptions and engages long-term memory, fostering the education of the general population. During stem cell drives in minority communities or cultural venues, it is beneficial to have a specific emotional story true to life, potentially tailored to the predominant ethnicity of the hub, allowing for "reference frame and identifying with the patient" to lower reactance via Narrative Transportation Theory.

At our AAPI-DKMS open recruitment stem cell donor drives, we conducted the study through convenience sampling, targeting South Asian local hubs as well as general local festivals, establishments, residential neighborhoods, parks, and fitness centers. While this strategy targeted typically underrepresented ethnicities in the stem cell registry, it introduced an overrepresentation of the behaviors of South Asians within our study. While we attempted to mitigate this skew by including local establishments to represent a more accurate representation of the local diversity in the area, other ethnicities in the greater Austin, Texas area, such as Hispanics, African Americans, and East Asians, were not as prevalent in the South Asian hubs and were underrepresented. Consequently, the convenience sampling distorted our results, as this cannot be generalized to the greater Austin population and diversity, as many ethnicities were minimally represented throughout our study.

Additionally, we recognized that "contamination bias" occurred if the emotional story video intervention intended for group A+B was shared inadvertently, directly, or indirectly by researchers during the experiment with the study's standard control A group. We tried to avoid "contamination bias" during our study by isolating in space intervals each interaction while administering interventions, but we did have a single instance of such accidental contamination and possible ambiguity.

In our experimental design, at one of our five drives, certain individuals would have been informed regarding our stem cell drive before they arrived at our drive site(s), and in contrast, we also pitched to populations that were not informed. Given historical experience in our local communities, the general population had a relatively minute amount of information regarding the need for joining stem cell registries and stem cell donation, even if they knew what stem cells were. Hence, we found it imperative to prime a portion of our population to improve the yield rate. At the same time, we were attempting to ensure that a portion of our population stays congruent with the actual general population in regard to their knowledge about joining stem cell registries and stem cell donation. Single blinding, at least at the outcome recording stage, can be achieved by having a swab squad volunteer not actively involved in our research study be the recorder of the outcome as "1" or "0".

Each study has its own limitations and feasibility, just like ours did, with regard to randomized clinical trials in the field on a less popular topic with many perceived barriers to understanding. If this study were to be built upon, we believe a larger sample size would be necessary to see a tangible power to the study and provide statistical difference in impact at open-recruitment drives. A paucity of the available published data surrounding a yield percentage of open stem cell drives suggests that, for a baseline comparison, more studies need to be conducted regionally in the future to increase awareness about stem cells and stem cell donation, as well as assess donor engagement. We will need a tighter field with single blinding of principal investigators to the control versus intervention assignment until after the eligible individual is engaged. Allocation and response biases should also be acknowledged to be avoided.

CONCLUSION

Our study produced a high yield overall of willing donors from engaged individuals at the stem cell drives conducted. This could be attributed to factors such as the real story of the young dad with his emotional video appeal, strategic locations with a team of youth volunteers, community connections, pre-priming with stem cell drive infographics, and a team of physicians and youth trained by DKMS, well-equipped to answer questions and provide clarity. This helped bridge the gaps in the community's understanding of stem cell transplant in blood cancers. We found that the community was forthcoming in sharing their perceptions and beliefs with us to help others battling blood cancers and such life-threatening blood cell disorders. Our collected demographic information can be used to base another study to gauge the perspectives and attitudes of young adults from different ethnicities towards stem cell donation. These findings underscore the importance of targeted messaging for open-recruitment drives, offering a better understanding of the drivers of stem cell donation among the general public. There is promise in the potential to get stem cell recipients and donors to present their stories in person or by virtually connecting with our community, making it more relatable to eligible individuals and moving them towards the action of registering with less hesitation. This can leverage our impact regionally and make a discernible positive difference by potentially giving a second life to someone with blood cancer.

ACKNOWLEDGEMENTS

We would like to extend our gratitude to our clinical research mentors, Dr. Uday Nair, PhD, Ed., from the University of Central Florida, and Dr. Arathi Shah, MD, FAAP.

REFERENCES

American Cancer Society. (2025). *Cancer facts & figures 2025*. https://www.cancer.org

Bair, S. M., Brandstadter, J. D., Ayers, E. C., & Stadtmauer, E. A. (2020). Hematopoietic stem cell transplantation for blood cancers in the era of precision medicine and immunotherapy. *Cancer*, *126*(9), 1837–1855. https://doi.org/10.1002/cncr.32659

DKMS. (2023, May 3). *Ethnic disparities in the registry*. https://www.dkms.org/press/urgent-need-to-reduce-ethnic-disparities

Forbes, J., Rice, P., Groarke, J., Berry, E., Graham, H., & Graham-Wisener, L. (2025). Factors influencing unrelated stem cell donation: A mixed-methods integrated systematic review. *British Journal of Health Psychology*, *30*(1), e12758. https://doi.org/10.1111/bjhp.12758

Green, M. C., & Appel, M. (2024). Narrative transportation: How stories shape how we see ourselves and the world. *Advances in Experimental Social Psychology*, *70*(1), 1–82. https://doi.org/10.1016/bs.aesp.2024.03.002

Hamed, A. B., Bruce, J. G., Kuniyil, V., Mattila, D., Williams, E. P., Dew, M. A., Myaskovsky, L., Confer, D. L., & Switzer, G. E. (2022). Racial and ethnic differences in attitudes, perceptions, and knowledge about unrelated hematopoietic stem cell donation: A study of younger newly recruited potential donors. *Transplantation and Cellular Therapy*, *28*(6), 340.e1–340.e16. https://doi.org/10.1016/j.jtct.2022.03.013

Health Resources and Services Administration. *The need for more marrow donors* | (2026) https://bloodstemcell.hrsa.gov/donor-information/donate-bone-marrow/need-more-marrow-donors

Kiene, S., Albrecht, M., Theurich, S., Scheid, C., Skoetz, N., & Holtick, U. (2024). Bone marrow versus peripheral blood allogeneic haematopoietic stem cell transplantation for haematological malignancies in adults. *Cochrane Database of Systematic Reviews*, *11*(11), CD010189. https://doi.org/10.1002/14651858.CD010189.pub3

Kollman, C., Howe, C. W. S., Anasetti, C., Antin, J. H., Davies, S. M., Filipovich, A. H., Hegland, J., Kamani, N., Kernan, N. A., King, R., Ratanatharathorn, V., Weisdorf, D., & Confer, D. L. (2001). Donor characteristics as risk factors in recipients after transplantation of bone marrow from unrelated donors: The effect of donor age. *Blood*, *98*(7), 2043–2051. https://doi.org/10.1182/blood.V98.7.2043

Li, E. W., Lee, A., Vaseghi-Shanjani, M., Anagnostopoulos, A., Jagelaviciute, G., Kum, E., Petraszko, T., Elmoazzen, H., Allan, D., & Fingrut, W. (2021). Multimedia resources to support the recruitment of committed hematopoietic stem cell donors: Perspectives of the most-needed donors. *Transfusion*, *61*(1), 274–285. https://doi.org/10.1111/trf.16186

Lindauer, M., Mayorga, M., Greene, J., Slovic, P., Västfjäll, D., & Singer, P. (2023). Comparing the effect of rational and emotional appeals on donation behavior. *Judgment and Decision Making*, *15*(3), 413–420. https://doi.org/10.1017/S1930297500007208

National Cancer Institute. (2024, February 2). *Stem cell transplants in cancer treatment*. U.S. Department of Health and Human Services, National Institutes of Health. https://www.cancer.gov/about-cancer/treatment/types/stem-cell-transplant

Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology*, *19*, 123–205. https://doi.org/10.1016/s0065-2601(08)60214-2

Rouner, D., Slater, M. D., & Domenech-Rodríguez, M. (2003). Adolescent evaluation of gender role and sexual imagery in television advertisements. *Journal of Broadcasting & Electronic Media*, *47*(3), 435–454. https://doi.org/10.1207/s15506878jobem4703_7