

ORIGINAL ARTICLE

Influence of Gender and Previous Blood Donation Status on Attitude Toward Blood Donation: a Cross-Sectional Study

Amr J. Halawani

Department of Clinical Laboratory Sciences, Faculty of Applied Medical Sciences, Umm Al-Qura University, Makkah, Saudi Arabia

SUMMARY

Background: Blood supply shortage may affect the health of patients who are transfusion-dependent. Consequently, blood donation plays an important role in the community as it can provide sufficient blood supply at blood bank centers. Medical sciences students can help promote blood donation. The current study aimed to assess the knowledge on, attitude toward, and barriers on blood donation among medical sciences students at the Faculty of Applied Medical Sciences of Jazan University, Saudi Arabia.

Methods: An online questionnaire with 23 knowledge and attitude questions was established using Google Forms. Statistical analysis was performed based on gender and blood donation status (never donated, unable to donate, and donated blood).

Results: In total, 601 participants from six different departments responded to the questionnaire. Interestingly, female students had a higher rate of accurate responses toward the knowledge and attitude questions than male students ($p < 0.01$). Furthermore, students who previously donated had a higher rate of accurate responses to the questions than those who were not able to or never donated blood ($p < 0.01$).

Conclusions: The questionnaire was designed to assess the general knowledge and attitude of medical sciences students and barriers on blood donation. Female gender and a history of blood donation had a significant impact on responses. Therefore, more efforts are required to educate students regarding the importance of blood donation among patients who are transfusion-dependent.

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Correspondence:

Amr J. Halawani
Department of Clinical Laboratory Sciences
Faculty of Applied Medical Sciences
Umm Al-Qura University
Makkah
Saudi Arabia
Email: ajjhalawani@uqu.edu.sa

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INTRODUCTION

Jazan Province is located in the southwestern region of Saudi Arabia. In this area, sickle cell disease (SCD) and thalassemia are endemic [1]. Patients with these conditions commonly require blood transfusion. Therefore, they can benefit from sufficient blood supply [2].

Blood donation is the stem of blood banking and transfusion services. To achieve adequate blood supply in each country, the World Health Organization has recommended that different populations should participate in blood donation to address the demands of blood transfusion [3]. Several studies on the knowledge on, at-

titude toward, and practice of blood donation have been conducted. They frequently assessed the attitude of people toward blood donation to increase the number of blood donors who donate voluntarily and frequently [4,5]. These studies can support voluntary blood donation [6].

Based on recent studies, several factors can inhibit blood donation in a specific population. These include limited knowledge and information, absence of any incentive, lack of the need for repeated and frequent donation, and different beliefs of individuals toward blood donation [7-10].

Medical sciences students are future healthcare professionals, and they will have opinions and beliefs regarding blood donation that may affect others in their network [11]. Hence, they must have sufficient knowledge on blood donation and awareness regarding insufficient blood supply at blood centers and should encourage others to donate [12]. Therefore, it is important to investigate their knowledge on blood donation.

The current study aimed to evaluate the knowledge on and attitude toward blood donation among the students of the Faculty of Applied Medical Sciences (FAMS), Jazan University, Saudi Arabia. This research might have a positive influence on the promotion of blood donation in Jazan and other provinces of Saudi Arabia.

MATERIALS AND METHODS

Ethical consideration

This research was approved by the Standing Committee for Scientific Research Ethics of Jazan University, Saudi Arabia (application number: REC41/5/143). All participants signed the consent forms. The participants' anonymity was maintained by not providing names or any information that can identify the participants during the survey.

Study design

A cross-sectional study was conducted on 601 students (329 female and 272 male) from FAMS of Jazan University from July 2020 to December 2020. Students from all six departments, including the Medical Laboratory Technology, Clinical Nutrition, Diagnostic Radiology, Physical Therapy, Emergency Medical Services, and Respiratory Therapy, participated in this research. An online questionnaire was established using Google Forms, and the generated links were sent to all channels including Twitter on social media. The questionnaire had 23 knowledge and attitude questions obtained from Gao and Wang and the Blood Donation Knowledge Questionnaire by Zucoloto et al., with some minor modifications to suit the participants of the current study [13,14]. For validation, a pilot study was conducted on 20 participants to guarantee that the survey was acceptable and consistent.

In total, 2,500 students were enrolled in the year 2020. The total number of participants was 601. Each partici-

pant was informed regarding the objectives and duration of this study. All data were recorded on Google Forms, and an Excel sheet was generated to enter data for further analysis.

Students who donated blood

In terms of blood donation, the students were asked about prior donations and disqualification of donating blood. Next, they were categorized as follows: never donated, unable to donate blood, and already donated. Furthermore, the questionnaire included sociodemographic questions on gender, age, marital status, and the college department they belong to.

Statistical analysis

Qualitative and categorical variables were expressed as frequencies and proportions, respectively. Responses on the knowledge and attitude questions were analyzed using the chi-squared test based on gender and blood donation status. p-values of < 0.05 and < 0.01 indicated significant and highly significant differences, respectively.

RESULTS

In total, 601 responses were collected from 329 female (54.7%) and 272 male (45.3%) participants. Table 1 shows the sociodemographic characteristics of the participants. The participants' age groups were as follows: 18 - 19 years old ($n = 31$, 5.2%), 20 - 21 years old ($n = 221$, 36.7%), and > 21 years old ($n = 349$, 58.1%). In terms of marital status, the participants were commonly single ($n = 521$, 86.7%). Further, 69 (11.5%) were married, and 11 (1.8%) had other marital statuses. The departments of the participants were as follows: Medical Laboratory Technology ($n = 172$, 28.6%), Clinical Nutrition ($n = 177$, 29.5%), Physical Therapy ($n = 105$, 17.4%), Diagnostic Radiology ($n = 85$, 14.1%), Emergency Medical Services ($n = 37$, 6.2%), and Respiratory Therapy ($n = 25$, 4.2%).

Supplemental Table S1 shows the distribution of responses to the knowledge and attitude questions according to gender. Furthermore, the responses were classified according to donation status (donated blood, never donated, or unable to donate).

Female students had a greater rate of accurate responses to the knowledge and attitude questions. These questions were regarding the following items: the starting and maximum age at blood donation, minimum weight requirement, time intervals between two donations, gender of participants who can donate blood, pregnancy and breastfeeding status, presence of cancer, fever on the day of donation, and transmission of diseases via blood.

Male students had a higher rate of accurate responses to questions about knowledge on their own blood group, ability of smokers and individuals with chronic diseases to donate blood, duration of blood donation, volume of

Table 1. Sociodemographic characteristics of students at Faculty of Applied Medical Sciences.

Variables	Donors	Non-donors	Total number
Gender			
Female	27 (4.5%)	302 (50.2%)	329 (54.7%)
Male	142 (23.6%)	130 (21.6%)	272 (45.3%)
Total	169 (28.1%)	432 (71.9%)	601 (100%)
Age (years)			
18 - 19	2 (0.3%)	29 (4.9%)	31 (5.2%)
20 - 21	38 (6.3%)	183 (30.4%)	221 (6.7%)
> 21	129 (21.5%)	220 (36.6%)	349 (58.1)
Total	169 (28.1%)	432 (71.9%)	601 (100%)
Marital status			
Single	145 (24.1%)	376 (62.6%)	521 (86.7%)
Married	21 (3.5%)	48 (8.0%)	69 (11.5%)
Others	3 (0.5%)	8 (1.3%)	11 (1.8%)
Total	169 (28.1%)	432 (71.9%)	601 (100%)
Department			
Medical Laboratory Technology	44 (7.3%)	128 (21.3%)	172 (28.6%)
Clinical Nutrition	46 (7.7%)	131 (21.8%)	177 (29.5%)
Diagnostic Radiology	11 (1.8%)	74 (12.3%)	85 (14.1%)
Physiotherapy	35 (5.8%)	70 (11.6%)	105 (17.4%)
Emergency Medical Services	24 (4.0%)	13 (2.2%)	37 (6.2%)
Respiratory Therapy	9 (1.5%)	16 (2.7%)	25 (4.2%)
Total	169 (28.1%)	432 (71.9%)	601 (100%)

Table 2. Reasons for donating blood versus reasons for not donating blood.

Reasons for donating blood	Donors (n = 169)
Donation for relatives or friends	41 (24.3%)
Free physical examination	11 (6.5%)
Vacation	4 (2.4%)
Good healthy habit	56 (33.1%)
National duty	85 (50.3%)
Souvenir	11 (6.5%)
Self-donation (autologous donation)	1 (7.1%)
Behavior of altruism (volunteering)	139 (82.2%)
Reasons for not donating blood	Non-donors (n = 432)
Fear from contracting any infectious diseases	106 (24.5%)
Not fit enough for blood donation	225 (52.1%)
Fear of needle pain	72 (16.7%)
Fear to know current health status	48 (11.1%)
Effect of blood donation on health	48 (11.1%)
No rewards or encouragements	12 (2.8%)
No enough time to donate blood	116 (26.9%)

Table 3. Profile of students who donated blood (n = 169).

Questions	Male students		Female students		Total	
	n	%	n	%	n	%
Have you ever donated blood?	142	84.02	27	15.98	169	100
Have you donated within the last 12 months?	82	88.17	11	11.83	93	100
Have you earned money for donating blood?	1	100	0	0	1	100
How many times have you donated blood?						
1	52	76.47	16	23.54	68	100
2 - 5	57	91.94	5	8.06	62	100
> 5	29	100	0	100	29	100
Cannot remember	4	40.0	6	60.0	10	100
Total	142	84.02	27	15.98	169	100
Are you going to donate blood if requested to do so in case the blood bank runs out or is low in stock?						
Yes	132	83.54	26	16.46	158	100
No	2	100	0	0	2	100
Maybe	8	88.89	1	11.11	9	100

blood withdrawn for a single blood unit, and effect of blood donation on weight.

Individuals who previously donated blood had a greater rate of accurate responses to questions related to the knowledge on and attitude toward blood donation. These include appropriate knowledge on blood group, time intervals between two donations, donation among smokers, duration of blood donation, and volume of blood withdrawn for a single blood unit.

Interestingly, participants who claimed that they were not able to donate blood had a greater percentage of accurate responses regarding the minimum and maximum age at blood donation, minimum weight requirement, individuals who can donate blood based on gender, pregnancy status, capability of individuals with chronic diseases such as diabetes to donate blood, possible disease transmission via blood donation, transmission of infectious diseases via blood donation, knowledge on whether blood donation leads to anemia, fever during the day of blood donation, need for fatty meals after blood donation, effect of blood donation on weight, and effect of blood donation on health in general. Finally, individuals who had never donated blood had a high frequency of accurate responses on the inability of breastfeeding women to donate blood. In total, 169 students (142 males [n = 142, 84.02%] and 27 females [n = 27, 15.98%]) had previously donated blood.

There were 432 (71.9%) non-donors, of whom 207 never donated and 225 were not able to donate. Table 2 shows the reasons for donating blood versus not donating. Regarding the motivation to donate blood, the common aim was to promote altruism on blood donation (82.2%).

Second, donating blood is a national duty, accounting for 50.3% of the whole blood donation. In total, 33.1% of blood donors believed that blood donation was a good habit.

By contrast, some people donate blood due to several benefits. These include having a free physical examination (6.5%), obtaining a souvenir (6.5%), and getting a vacation (2.4%). There were other motivations for blood donation that should be considered under emergency cases. For example, 24.3% of donations were for relatives or friends (directed donation) and 7.1% for self-donation or autologous donation.

Some FAMS students avoided blood donation due to several reasons. That is, 52.1% of the students believed that they were not fit for blood donation. Around 26.9% of the students claimed that they do not have enough time for blood donation. Approximately 24.5% of the students worried about contracting infectious diseases via blood donation. The other causes include fear of needle pain (16.7%), worries about knowing the current health status (11.1%), negative thoughts about blood donation affecting their health (11.1%), and absence of rewards or encouragements (2.8%).

Table 3 shows the profile of students who donated blood according to gender. Approximately 55.03% of the students donated blood within the last 12 months, and male and female donors accounted for 88.17% and 11.83%, respectively. Interestingly, only one male student claimed that he earned money from the procedure. The number of times when students donated blood was follows: 40.24%, one time; 36.68%, 2 - 5 times; 17.16%, > 5 times. Meanwhile, 5.92% of students cannot remember the number of times they donated blood.

In addition, the students responded that they could donate blood if blood banks run out or are low in stock. Further, 93.49% of the students responded to the call of donation, and approximately 6% might have responded or refused to donate blood.

DISCUSSION

The current study used an online questionnaire in Google Forms due to the coronavirus disease 2019 pandemic. This type of online form has several advantages. That is, it is extremely easy to administer among students and can be used to obtain outcomes immediately particularly during the pandemic, which affected several disciplines.

This research showed that the survey comprises simple questions with acceptable discriminating capability. Hence, it can be utilized in different situations and can be implemented at different higher educational levels and even among healthcare employees.

In Saudi Arabia, blood banks and hospitals experience challenges in recruiting sufficient blood donors. Medical science students have fair knowledge and can have potential working experience in hospitals in the future. Therefore, they can promote blood donation.

This study showed that 169 (28.1%) medical sciences students donated blood. The blood donors were commonly males and accounted for 84.02% of all participants. However, the female ratio was only 15.98%. In Jeddah City, Saudi Arabia, the percentage of female blood donors was similar (16.5%) [15]. Abolfotouh et al. revealed that the number of female donors was lower than that of male donors (13%) [16]. This finding could be explained by the belief that only male patients can donate blood ($p < 0.05$). Thus, more efforts should be made to encourage both male and female individuals to donate blood. This situation can be attributed to two reasons. First, inherited diseases could be prevalent in Jazan Province [17-19]. Second, female individuals in the area might be short and light in weight.

Regarding the knowledge questions, almost all males know their blood groups. However, approximately one-third of the female students were not knowledgeable. Hence, there is a statistically significant difference in terms of correct responses to knowledge questions between donors and non-donors and regarding knowledge of their own blood group, the minimum age at blood donation, time intervals between two blood donations, the ability of smokers to donate blood, duration of blood donation, volume of blood withdrawn for a single blood unit, and effect of donation on body weight between male and female individuals ($p < 0.01$).

Approximately 94% of students had fair knowledge regarding the transmission of infectious diseases via blood donation. However, this was in contrast to the finding of Alsalmi et al., which showed that 60.4% of students believed that donors can develop such types of diseases [15].

Interestingly, 93.49% of students expressed a strong readiness to donate blood when requested to. Thus, altruism plays a key role in blood donation, which was the common reason for donating blood (82.2%). The findings are in accordance with those of Chauhan et al. [20] who performed a study on medical students in North India. Their study showed that 83.3% of the students were voluntary donors [20]. Moreover, 50.3% of donors donated blood due to national duty. In total, 56 (33.1%) students donated because blood donation is considered a good health habit.

Nevertheless, 432 (71.9%) students did not donate blood. Among them, 207 (34.4%) never donated, and 225 (37.5%) could not donate. Around 52.1% of non-donor students believed that they are not fit enough for blood donation. The number of students who were not fit to donate blood in this study was higher than that in the study of Chauhan et al. conducted in North India (31.5%) [20].

This could be attributed to the fact that some students from Jazan Province in the current study presented with inherited diseases such as SCD and thalassemia. Furthermore, some of the students did not fulfill the criteria on the minimum body weight. Unfortunately, all these details were not included in this study. However, the responses of students to the knowledge and attitude questions reflected poor awareness regarding blood donation. A study conducted on medical students from Taif University, Saudi Arabia, reported a higher rate at 79.2% [21].

In addition, 24.5% of non-donor students are afraid of contracting infectious diseases via blood donation. This rate was higher than that (13.6%) in a recent study performed in Saudi Arabia [22]. However, the proportion of students who are afraid of contracting infectious disease in the study of Chauhan et al. was higher than that in the current study (62%) [20]. This finding could be attributed to higher concerns about the negative insight of students regarding the quality of blood banks and donor safety.

In addition, 72 (16.7%) FAMS students are afraid of needle pain. However, the proportion of students who are afraid of needle pain in this study was remarkably lower than that in the study of Mahfouz et al. (34.2%) [23]. Furthermore, 72 (16.7%) students claimed that they did not have sufficient time for blood donation. This is because they were full-time students. However, the percentage of undergraduate students claiming that they had no time for blood donation was higher at 45% [23].

More efforts are needed to encourage individuals to participate in blood donation. These have been carried out via special campaigns in different occasions [24]. A campaign inside the university halls can be helpful for full-time students. Indeed, the Saudi Ministry of Health has implemented several strategies to encourage blood donation using the online mobile application "Wateen" [25]. This can help find a suitable donor for patients who require blood transfusion. The outcomes of these

efforts have been observed in Jazan Province. That is, the number of blood donors increased during the coronavirus disease 2019 pandemic [24].

The current study had some limitations. That is, there was no information regarding the suitability to donate blood based on body weight and health conditions particularly in students with genetic diseases.

In summary, a questionnaire was used to assess the barriers on blood donation and the knowledge on and attitude toward blood donation among students from FAMS at Jazan University, Saudi Arabia. Female students and those who previously donated blood had the highest influence on the question responses. Therefore, efforts are required to educate students and individuals living in that area. Ultimately, the number of students who donate blood should increase particularly in Jazan Province, where some inherited disorders including SCD and thalassemia are endemic.

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Declaration of Interest:

The author has no conflicts of interest to declare.

References:

- AlHamdan NA, AlMazrou YY, AlSwaidi FM, Choudhry AJ. Premarital screening for thalassemia and sickle cell disease in Saudi Arabia. *Genet Med* 2007 Jun;9(6):372-7. (PMID: 17575503)
- Gammon RR, Rosenbaum L, Cooke R, et al. Maintaining adequate donations and a sustainable blood supply: lessons learned. *Transfusion* 2021 Jan;61(1):294-302. (PMID: 33206404)
- World Health Organization. Blood safety and availability; 2023. Online [cited Jul 19 2023]. Available from: <https://www.who.int/news-room/fact-sheets/detail/blood-safety-and-availability>
- Masser BM, Wright S, Germain M, et al. The impact of age and gender on first-time donor return behavior. *Transfusion* 2020 Jan;60(1):84-93. (PMID: 31837033)
- Tey YS, Arsil P, Brindal M, Lee SK, Teoh CT. Motivation structures of blood donation: a means-end chain approach. *Int J Health Econ Manag* 2020 Mar;20(1):41-54. (PMID: 31236797)
- Lownik E, Riley E, Konstenius T, Riley W, McCullough J. Knowledge, attitudes and practices surveys of blood donation in developing countries. *Vox Sang* 2012 Jul;103(1):64-74. (PMID: 22443506)
- Gonçalez TT, Di Lorenzo Oliveira C, Carneiro-Proietti AB, et al. Motivation and social capital among prospective blood donors in three large blood centers in Brazil. *Transfusion* 2013 Jun;53(6):1291-301. (PMID: 22998740)
- Zucoloto ML, Gonçalez T, Menezes NP, McFarland W, Custer B, Martinez EZ. Fear of blood, injections and fainting as barriers to blood donation in Brazil. *Vox Sang* 2019 Jan;114(1):38-46. (PMID: 30485453)
- Moreno EC, Bolina-Santos E, Mendes-Oliveira F, et al. Blood donation in a large urban centre of southeast Brazil: a population-based study. *Transfus Med* 2016 Feb;26(1):39-48. (PMID: 26924292)
- Mariano Gislon da Silva R, Kupek E, Peres KG. [Prevalence of blood donation and associated factors in Florianópolis, Southern Brazil: a population-based study]. *Cad Saude Publica* 2013;29(10):2008-16. (PMID: 24127095)
- Gomes MJ, Nogueira AJ, Antão C, Teixeira C. Motivations and attitudes towards the act of blood donation among undergraduate health science students. *Transfus Apher Sci* 2019 Apr 1;58(2):147-51. (PMID: 30639083)
- Gazibara T, Kovacevic N, Maric G, et al. Factors associated with positive attitude towards blood donation among medical students. *Transfus Apher Sci* 2015 Dec 1;53(3):381-5. (PMID: 26297188)
- Gao L, Wang Q. Survey on knowledge, attitude and practice about blood donation among continuing medical education (CME) students in Sichuan Province, China. *Transfus Apher Sci* 2017 Jun 1;56(3):454-8. (PMID: 28566126)
- Zucoloto ML, Bueno-Silva CC, Ribeiro-Pizzo LB, Martinez EZ. Knowledge, attitude and practice of blood donation and the role of religious beliefs among health sciences undergraduate students. *Transfus Apher Sci* 2020 Oct 1;59(5):102822. (PMID: 32487510)
- Alsalmi MA, Almalki HM, Alghamdi AA, Aljasir BA. Knowledge, attitude and practice of blood donation among health professions students in Saudi Arabia; A cross-sectional study. *J Fam Med Prim Care* 2019 Jul;8(7):2322-7. (PMID: 31463250)
- Abolfotouh MA, Al-Assiri MH, Al-Omani M, Al Johar A, Al Hakbani A, Alaskar AS. Public awareness of blood donation in Central Saudi Arabia. *Int J Gen Med* 2014 Aug 12;7:401-10. (PMID: 25152628)
- Alsaeed ES, Farhat GN, Assiri AM, et al. Distribution of hemoglobinopathy disorders in Saudi Arabia based on data from the premarital screening and genetic counseling program, 2011-2015. *J Epidemiol Glob Health* 2018 Mar 1;7;Suppl 1:S41-7. (PMID: 29801592)
- Hazzazi AA, Ageeli MH, Alfaqih AM, Jaafari AA, Malhan HM, Bakkar MM. Epidemiology and characteristics of sickle cell patients admitted to hospitals in Jazan region, Saudi Arabia. *J Appl Hematol* 2020 Jan 1;11(1):10. https://journals.lww.com/jaht/fulltext/2020/11010/epidemiology_and_characteristics_of_sickle_cell.3.aspx
- Gosadi IM, Gohal GA, Dalak AE, Alnami AA, Aljabri NA, Zurayyir AJ. Assessment of factors associated with the effectiveness of premarital screening for hemoglobinopathies in the south of Saudi Arabia. *Int J Gen Med* 2021 Jun 30;14:3079-86. (PMID: 34234536)
- Chauhan R, Kumar R, Thakur S. A study to assess the knowledge, attitude, and practices about blood donation among medical students of a medical college in North India. *J Fam Med Prim Care* 2018 Jul;7(4):693-7. (PMID: 30234039)

Knowledge Regarding Blood Donation in Students

21. Rizwan FA, Al-Amri RO, Al-Harhi AA, Al-Otaibi NA, Al-Otaibi RF. Knowledge, attitude, and blood donation practices among medical students of Taif University, Saudi Arabia. *Saudi J Health Sci* 2022 Jan 1;11(1):68.
https://journals.lww.com/sjhs/fulltext/2022/11010/knowledge,_attitude,_and_blood_donation_practices.10.aspx
22. Syed W, Alsadoun A, Bashatah AS, Al-Rawi MB A, Siddiqui N. Assessment of the knowledge beliefs and associated factors among Saudi adults towards blood donation in Saudi Arabia. *Hematology* 2022;27(1):412-9. (PMID: 35413216)
23. Mahfouz MS, Ryani M, Saleh Hamzi NA, et al. Blood donation among university students: practices, motivations and barriers, Saudi Arabia. *Avicenna J Med* 2021;11(2):70-6. (PMID: 33996644)
24. Halawani AJ. The impact of blood campaigns using mobile blood collection drives on blood supply management during the COVID-19 pandemic. *Transfus Apher Sci* 2022 Jun 1;61(3):103354. (PMID: 35042671)
25. Alessa T. Evaluation of the Wateen App in the blood-donation process in Saudi Arabia. *J Blood Med* 2022 Apr 15;13:181-90. (PMID: 35450013)

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