Clin. Lab. 2026;72:XXX-XXX

ORIGINAL ARTICLE

Knowledge, Towards, and Practice of Blood Donation: a Cross-Sectional Study in Makkah City, Saudi Arabia

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SUMMARY

Background: **Insufficient blood supply negatively affects transfusion-dependent patients. Sustaining adequate blood units relies on community education. As future healthcare professionals, medical science students may assist in increasing the number of blood donations. This study assessed blood donation knowledge among medical science students at Umm Al-Qura University in Makkah City, Saudi Arabia.**

Methods: **Twenty-three questions were administered in an online survey to assess knowledge, attitudes, and practices (KAP) of medical science students regarding blood donation. A chi-squared test was used to examine associations with the status of the blood donation.**

Results: **A total of 286 students from four departments responded to the questionnaire. Remarkably, higher contributions regarding knowledge and attitude questions were observed in female participants, compared to male participants. Furthermore, students that donated blood demonstrated greater awareness of their blood group ($p < 0.05$), minimum weight legibility, and knowledge regarding the duration of the blood donation procedure ($p < 0.01$).**

Conclusions: **This study assessed the KAP regarding blood donation among medical science students at Umm Al-Qura University, Saudi Arabia. Furthermore, the most commonly reported barrier was the belief that the individual was not sufficiently fit or healthy to donate. Consequently, targeted education is crucial to emphasize the importance of blood donation and mitigate hospital blood shortages, especially for patients who require blood transfusion units regularly.**

(Clin. Lab. 2026;72:xx-xx. DOI: 10.7754/Clin.Lab.2025.250446)

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Manuscript accepted April 28, 2025

KEYWORDS

blood donation, questionnaire, knowledge, attitude, medical science students, Saudi Arabia

INTRODUCTION

Blood transfusion is extremely crucial for many patients, especially for patients undergoing surgery and multiple-transfused patients, such as patients with sickle cell disease [1]. Approximately 10% of hospitalized patients undergo blood transfusion [2]. Blood donation is the only source of blood. Inadequate supply of blood units can pose challenges for the donation centers. Therefore, the World Health Organization (WHO) has addressed this issue and called for strategies in order to achieve a sufficient blood supply worldwide [3].

Makkah is the holy city of the Islamic world and hosts the annual pilgrimage "Hajj" [4]. Demands for blood units may increase during the Hajj period [5]. As a result, ensuring adequate blood supply is essential and requires raising awareness among the city's residents.

Educating the public about the patients' need for blood is key to promoting donation, whether by visiting blood bank centers or by mobile blood drive campaigns to help avoid shortages [6]. Therefore, many studies have been conducted to assess the knowledge about, the attitude towards, and the practice (KAP) related to blood donation.

These studies assessed various groups, including healthcare professionals, medical students, and members of the general public. The aim of these studies was to encourage regular and voluntary blood donation across all sectors of society [7-9]. Research has identified several barriers to blood donation, including limited awareness of the importance of regular blood donations for multiply transfused patients, lack of incentives, and personal beliefs about blood donation [10-13].

Medical science students can meaningfully support blood donation efforts, because they possess relevant medical knowledge and will soon enter the healthcare sector. Therefore, their beliefs and behaviors may influence other individuals in their communities [14]. Consequently, their awareness and knowledge of blood donations are significant as they can encourage others to donate and are aware of the persistent shortage of blood supplies [15]. Accordingly, it is crucial to assess the KAP of these students.

Given the importance of the shortage of the blood supplies in the blood donation centers and the lack of regular blood donors, the study aimed to investigate the KAP of the medical science students at the Faculty of Applied Medical Sciences (FAMS), Umm Al-Qura University, Makkah, Saudi Arabia.

MATERIALS AND METHODS

Ethical consideration

Ethical approval for this study was obtained from the Biomedical Research Ethics Committee at Umm Al-Qura University, Makkah, Saudi Arabia (HAPO-02-K-012-2024-01-1963). All students signed the consent form and agreed to participate in the survey conducted. The purpose of the study was clearly stated to the participants at the beginning of the survey. No personally identifiable information (e.g., names) was provided to maintain the privacy and welfare of the candidates.

Study design

A cross-sectional observational study was conducted using Google Forms from June through August 2024. Participants were drawn from four FAMS departments: Clinical Laboratory Sciences (CLS), Physiotherapy, Clinical Nutrition (CLN), and Emergency Medical Services (EMS).

The survey combined questions related to sociodemographic characteristics, including age, gender, department, and marital status. Twenty-three knowledge and attitude questions were used in this survey, adapted from previous studies [16-19]. Questions also addressed donation eligibility and history (if they are able to donate, if they never had donated, and if they have an inability to donate blood).

Regarding validation of the survey, a pilot sample of 20 participants completed the questionnaire in order to assess acceptability and consistency. A total of 1,690 medical science students were enrolled in the 2024/2025 academic year. However, 286 students responded by the end of the survey period, accounting for 16.9%.

Statistical analysis

The sample size calculation was conducted using the Raosoft sample size calculator. A minimum sample of 234 students was required to achieve a 90% confidence interval with a 5% margin of error. Responses were collected on Google Forms, then exported to Microsoft Excel to analyze the data. Data were summarized and demonstrated as counts and percentages. The knowledge and attitude questions were assessed for significance using the chi-squared test. p-values < 0.05 and < 0.01 indicated statistical significance and high significance, respectively.

RESULTS

Two hundred eighty-six students from FAMS, Umm Al-Qura University, participated in this study. The majority were female students (n = 235, 82.2%), while male students accounted for 17.8% (n = 51). Table 1 demonstrates the sociodemographic data of the medical science students. Most participants were aged between 20 - 21 years and were single, accounting for 51.7% and 97.6%, respectively. Among the four FAMS departments, CLS had the highest number of students participating in the study (73.4%).

Knowledge, attitudes, and practice based on the status of blood donation

Supplemental Table 1 summarizes the responses to knowledge and attitude questions among students who had previously donated blood and non-donors. Statistically significant differences were observed between the two groups. For example, students who had donated blood before demonstrated greater awareness of their blood group (95.7%, $p < 0.05$), the minimum weight requirement ($p < 0.01$), and the duration of the donation procedure ($p < 0.01$).

On the other hand, non-donor students showed higher awareness of contraindications, including deferral during fever or chronic diseases, and potential transmission of infectious diseases.

Table 1. Sociodemographic characteristics of medical science students.

Variables	n	%
Gender		
Female	235	82.2
Male	51	17.8
Total	286	100
Age (years)		
18 - 19	28	9.8
20 – 21	148	51.7
> 21	110	38.5
Total	286	100
Marital status		
Single	279	97.6
Married	6	2.1
Others	1	0.3
Total	286	100
Department		
Clinical Laboratory Sciences	210	73.4
Clinical Nutrition	48	16.8
Physiotherapy	19	6.6
Emergency Medical Services	9	3.2
Total	286	100

Table 2. Reasons for donating versus not donating blood.

Reasons for donating blood	Donors (n = 47)
Donation for relatives or friends	13 (27.7%)
Free physical examination	8 (17%)
Vacation	0
Good healthy habit	13 (27.7%)
National duty	2 (4.3%)
Souvenir	2 (4.3%)
Self-donation (autologous donation)	1 (2.1%)
Behavior of altruism (volunteering)	36 (76.6%)
Reasons for not donating blood	**Non-Donors (n = 239)**
Fear of contracting any infectious diseases	64 (26.8%)
Not fit enough for blood donation	134 (56.1%)
Fear of needle pain	40 (16.7%)
Fear to know current health status	25 (10.5%)
Effect of blood donation on health	19 (7.9%)
No rewards or encouragements	10 (4.2%)
Not enough time to donate blood	78 (32.6%)

Table 3. Profile of students who donated blood (n = 47).

Questions	Total	
	n	%
Have you ever donated blood?	47	16.4
Have you donated blood within the last 12 months?	21	44.7
Have you earned money for donating blood?	0	0
How many times have you donated blood?		
1	28	59.6
2 - 5	14	29.8
> 5	3	6.4
Cannot remember	2	4.3
Are you going to donate blood if requested to do so, in case the blood bank runs out or is low in stock?		
Yes	42	89.4
No	0	0
Maybe	5	10.6

Motivation and barriers regarding blood donation

Altruism was the most prevalent motivation for donating blood (76.6%), followed by considering blood donation a good habit (27.7%). All other reasons for donating and not donating are listed in Table 2. In contrast, barriers included the belief that they were not fit enough to donate (56.1%), insufficient time to donate blood (32.6%), and fear of needle pain (16.7%).

Donation profile

Table 3 presents the profile of students who had donated blood before. A total of 47 students had previously donated blood. Out of these, 44.7% had donated blood within the last 12 months. The majority had donated blood only once (59.6%), while 29.8% had donated blood two to five times. Nearly 90% of these students expressed a willingness to donate again in response to urgent requests.

DISCUSSION

This study aimed to investigate the KAP related to blood donation among medical science students in Makkah City. The proportion of blood donors in the present study (16.4%) was relatively low compared to a previous study done in Saudi Arabia by Al-Salmi et al. (2020), which reported 30.1%, nearly double the donation rate [20].

Among the 47 blood donors, male and female students comprised 53.2% (n = 25) and 46.8% (n = 22), respectively. This reflects a relatively balanced gender distribution.

However, previous studies reported higher rates of male

blood donors, reaching 76.6% and 84.02% [19,20]. These variations could be attributed to cultural differences among Saudi cities as well as the lower average body weight among females [21]. Moreover, this pattern may reflect increased awareness in female students about blood donation.

Student donors demonstrated higher knowledge in certain domains, such as eligibility as well as blood donation procedures. The finding is supported by Gazibara et al. (2015), which reported that prior donation experience enhances awareness [15].

The most common reason for donating blood was volunteering (behavior of altruism), accounting for 76.6%. This proportion was lower than in a study conducted in Jazan, for which it was 82.2% [19]. In addition, volunteering is recognized as a global motivator for blood donation, as indicated by international studies from India and Brazil [11,15].

Interestingly, in this survey, blood donations for relatives and friends accounted for 27.7%. Actually, replacement blood donors comprise the largest proportion in Saudi Arabia, exceeding 70% of the entire blood donations [22,23]. Similar responses were obtained from medical science students who donated blood, with 27.7% considering blood donation a good habit (27.7%). This reflects growing social responsibility among medical science students.

In this study, the most common reason students refrained from donating blood was the belief that they were not fit enough (n = 134, 56.1%). A similar observation was reported by Mahfouz et al. (2021), Jazan Province, with 57.5% of the students expressing the same reason [24].

Furthermore, lack of time was reported by 78 students (32.6%) as a reason for not donating blood. This may reflect their status as full-time students early in their academic journey, with limited time-management skills. A study at Gulf Medical University in the United Arab Emirates reported lack of time as a barrier in 19.3% of the students [25]. In addition, Monteiro et al. (2024) stated that lack of time is a routine obstacle to donating blood [26].

In the present study, 26.8% of the participants reported fear of contracting infectious diseases as a barrier to blood donation, whereas a higher proportion (48.7%) was reported in a previous study conducted among Jazan University students in Saudi Arabia [24]. Both proportions were lower than that reported in an Indian cohort (62%) [27]. Interestingly, although the rate of blood donors among the medical science students was low, student donors expressed willingness to donate again if requested (89.4%). In order to increase blood donation among these students, targeted measures should be implemented, including on-campus campaigns, mobile blood drives, and initiatives to raise awareness of the importance of blood transfusions for patients in need.

The limitations of the present study may include the lack of health-based eligibility verification, such as weight and hemoglobin level, and its sole reliance on self-reporting. Future research should integrate clinical screening to validate donor eligibility criteria.

In conclusion, this study assessed the knowledge and attitudes among medical science students at Umm Al-Qura University, Saudi Arabia. Moreover, the findings highlight that greater efforts are required to raise awareness of blood donations among students. Educational campaigns across the university facilities, as well as the integration of a donation culture, may improve student participation in blood donations and ensure a sustainable blood supply.

Acknowledgment:
The author would like to thank all the students who participated in this study.

Source of Funds:
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of Interest:
The author has no conflicts of interest to declare.

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