Knowledge and Attitude toward organ donation among female students at Al-Baha University, Saudi Arabia

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ABSTRACT

Background: Organ donation is vital and can save lives. However, there is a need for more organ donors in Saudi Arabia, specifically in the Al-Baha region. Studying university students' knowledge and attitudes towards organ donation is essential, as they are future leaders and influencers who can shape attitudes and overcome barriers to donation.

Objective: The study aimed to assess the knowledge and attitudes toward organ donation among female students at Al-Baha University, Al-Baha, Saudi Arabia.

Setting: Al-Baha University, Al-Baha, Saudi Arabia.

Design: A cross-sectional observational study.

Method: The study was conducted among 556 female students from six faculties (Medicine, Pharmacy, Applied Medical Sciences, Science, Arts and Humanities, and Business) using random sampling from October 2023 to January 2024. The study conducted descriptive statistics, as well Kruskal-Walli's and Chi-square tests to compare between groups. The *p*-value < 0.05 was considered significant.

Result: The participants were primarily between 18 and 24, mostly single. Most participants held a Bachelor's degree, and their areas of study varied across disciplines. The study found that the Internet and social media were the primary sources of knowledge about organ donation for the participants. Younger (91.5%), single (88%) students, and those with a higher level of education (93%) tended to have knowledge about organ donation, with relatively consistent knowledge scores. Interestingly, there was a significant difference in the level of knowledge about organ donation among different academic levels (*p*-value = 0.019). The study also found that attitudes towards organ donation varied across faculties (*p*-value = 0.003). There was a significant difference in willingness and preference to donate organs between faculties (*p*-value = 0.027) and academic level (*p*-value = 0.003). Motives for organ donation were consistent across groups. 85% of students do not have an organ donor card, while only 12% have one, with a significant difference noted across academic levels (*p*-value = 0.005). However, lack of awareness or decision (47%), fear (29%), and concerns about medical treatment (12%) were the most important barriers to organ donation.

Conclusion: The level of knowledge of organ donation did not differ significantly between age, marital status, academic degree, and faculty in the current study. Those with higher academic progression tend to have higher knowledge scores (*p*-value = 0.019). The study also revealed different attitudes towards organ donation across faculties and academic levels. Furthermore, the study provided insights into willingness and preference to donate organs, motives for possessing organ donor cards, and reasons for refusal. These findings contribute to the current literature on organ donation attitudes in Saudi Arabia.

Keywords: Organ donation, attitude, knowledge, university students.

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INTRODUCTION

Organ donation is an essential issue within the field of public health in various dimensions, including medical, legal, ethical, organizational, and social considerations [1–3]. As a critical of healthcare delivery, organ donation impacts the lives of both individuals in need of organs and transplant recipients [4].

Organ transplantation has emerged as a highly effective treatment for individuals suffering from end-stage organ failure [5]. Despite remarkable advancements in the field of medicine, the availability of suitable organs for transplantation remains a major challenge worldwide, including in Saudi Arabia [6]. This shortage of organs has resulted in a crisis, as many patients are left waiting for life-saving treatments.

Various organs, including the kidneys, heart, liver, pancreas, intestines, lungs, skin, bone and bone marrow, and cornea, can be donated [7]. The majority of organ donations occur after an individual's death or when they are declared brain dead [8,9].

In Saudi Arabia, where organ donation rates are relatively low compared to countries like the United States, there is a recognized need for improving organ donation practices [10]. The Saudi Center for Organ Transplantation has been making efforts to increase awareness among different population segments and enhance the organ donation process [11]. To address these challenges effectively, it is crucial to understand the attitudes and knowledge surrounding organ donation, particularly among specific populations such as university students. As young adults are often influential decision-makers within their families, comprehending their concerns, beliefs, and barriers can help create awareness and foster positive attitudes toward organ donation.

By recognizing and addressing the concerns commonly raised by young individuals, healthcare providers, including family physicians, can play a pivotal role in promoting organ donation and reducing the long waiting list of patients in need of organ transplantation. The present study aimed to assess the knowledge and attitudes toward organ donation among female students at Al-Baha University, Al-Baha, Saudi Arabia.

METHOD

Study design: An observational cross-sectional study was conducted at Al-Baha University, Al-Baha, Saudi Arabia, from October 2023 to January 2024 to measure the level of female students' knowledge and attitude toward organ donation.

Sampling and setting: Stratified random sampling was used to represent female students at Al-Baha University from six faculties (Medicine, Pharmacy, Applied Medical Sciences, Science, Arts and Humanities, and Business). The inclusion criteria included all local students aged 18-30, while the exclusion criteria included all non-local students. The sample size was calculated based on the expected prevalence of knowledge and attitudes toward organ donation and the precision required to estimate the prevalence with a specified confidence level. This calculation was performed using "G" powered statistical software, with 80% power, an alpha error of 0.05, and a confidence level of 95%.

Study tool: A self-administered and previously validated questionnaire [12,13] was used, including questions on socio-demographic characteristics, knowledge, and attitudes regarding organ donation. The questionnaire consisted of 26 questions, divided into three sections. The first section encompassed questions on socio-demographic information, including gender, age, marital status, academic degree, faculty, and current academic level. The second and third sections comprised questions assessing knowledge and attitudes toward organ donation, respectively. The knowledge and attitude questions were designed in either a box-checking format, providing response options like "Yes," "No," and "I do not know," or as multiple-choice questions. The survey was made available in Arabic and English languages.

Data collection: From October 2023 to January 2024, the questionnaires were randomly distributed to female students at Al-Baha University, Al-Baha, Saudi Arabia. The questionnaire was prepared on Google Forms, and the link was shared with faculty students.

Data analysis: The survey data was analyzed using appropriate statistical methods, including descriptive statistics, Kruskal-Walli's, and Chi-square tests. Only the completed questionnaires were included in the analysis for comparisons using Statistical Package for Social Science (SPSS) software (version 22.0, IBM Corp., Armonk, NY, USA). Frequencies and percentages were used to represent categorical data such as age, marital status, academic degree, and faculty. The Kruskal-Wallis test was used to determine if there are statistically significant differences between the knowledge levels of different groups based on their sociodemographic characteristics. The results were reported in terms of interquartile ranges (IQR) and standard deviations (SD), which provide insights into the variability and dispersion of knowledge scores across different demographic groups. The relationship between attitudes toward organ donation and sociodemographic characteristics was analyzed using the Chi-square test. The *p*-value was considered significant if it was equal to or less than 0.05.

Ethics: Ethical approval for the study was obtained from the Scientific Research Ethics Committee at Al-Baha University (approval number 45103812).

RESULT

Table 1. Sociodemographic characteristics of participants (*N=556*).

	N (%)
Age (year)	
18-24	509 (91.5)
25-30	47 (8.5)
Material Status	
Single	49 (88)
Married	65 (12)
Academic degree	
Diploma	37 (7)
Bachelor's degree	519 (93)
Faculty	
Medicine	49 (9)
Pharmacy	86 (16)
Applied Medical Sciences	72 (13)
Sciences	120 (21)
Arts and Humanities	89 (16)
Business	140 (25)
Current academic level	
Junior Students (1st- 3rd year)	290 (52)
Senior Students (4th- 6th year)	266 (48)

A total of 556 female students from Al-Baha University agreed to participate in this study. Most participants are between 18 and 24 years old, accounting for 91.5%. Regarding marital status, 88% of the students reported being single, while 12% identified as married. The majority of participants, 93%, hold a Bachelor's degree, whereas only 7% of

students have a Diploma. The participants' areas of study were also recorded. The following disciplines were represented: Medicine (9%), Pharmacy (16%), Applied Medical Sciences (13%), Sciences (21%), Arts and Humanities (16%), and Business (25%). This demonstrates the diversity of academic interests among the participants. Regarding the academic year, 52% of the participants were classified as junior students, meaning they were in the earlier years of their undergraduate studies. The remaining 48% were identified as senior students, indicating they were further along their academic journey (Table 1).

Figure 1 displays the sources of knowledge about organ donation for study participants. The Internet and social media are the most dominant sources, accounting for 62.05% of participants. The university is the second most cited source (14.39%), followed by healthcare workers (12.23%). Television is reported by 6.29% of participants, while family and friends comprise 3.24% of sources. Newspapers are the least influential source, with only 1.80% of participants obtaining information from this medium.

The knowledge and attitudes among female university students regarding organ donation were assessed, as shown in Table 2. Nearly 97% of students show general awareness and acknowledge the life-saving potential of organ donation. About 42% and 54.5% of students have personal connections to organ donation. However, a considerable portion of students still need to. About 81.7% of students reported that the kidney is the most transplanted organ in the world.

Furthermore, about 75.7% of students are aware that organ rejection can occur after transplantation. However, nearly one-fifth still needs to be determined; in addition, 80% of participants view organ donation as ethically acceptable. However, 20% of participants do not find it ethically acceptable.

The responses to the question about organ donation from brain-dead patients revealed that the majority of students (94%) are aware of organ donation from brain-dead patients. The results showed a nearly even split in awareness regarding organ donor cards, specifically for brain-dead patients. Moreover, most participants (70%) are aware of the existence of centers and official agencies for organ donation in Saudi Arabia. However, 30% unawareness still represents a considerable portion of the population. Only a third of those aware of the donation centers know the specific laws and regulations (Table 2).

Based on this study, the participants' attitudes regarding organ donation show that 84% of the students agree with organ donation, while 16% disagree. Concerning the willingness to donate organs, 12% of students are willing to donate during their lifetime, 56% of students are willing to donate after death, and 32% of students are willing to donate both during life and after death. The study also evaluated the preferences for organ donation recipients, indicating that 14% of students would donate only to relatives, and 13% of students would donate only to non-relatives. About 83% of students are willing to donate to both relatives and non-relatives.

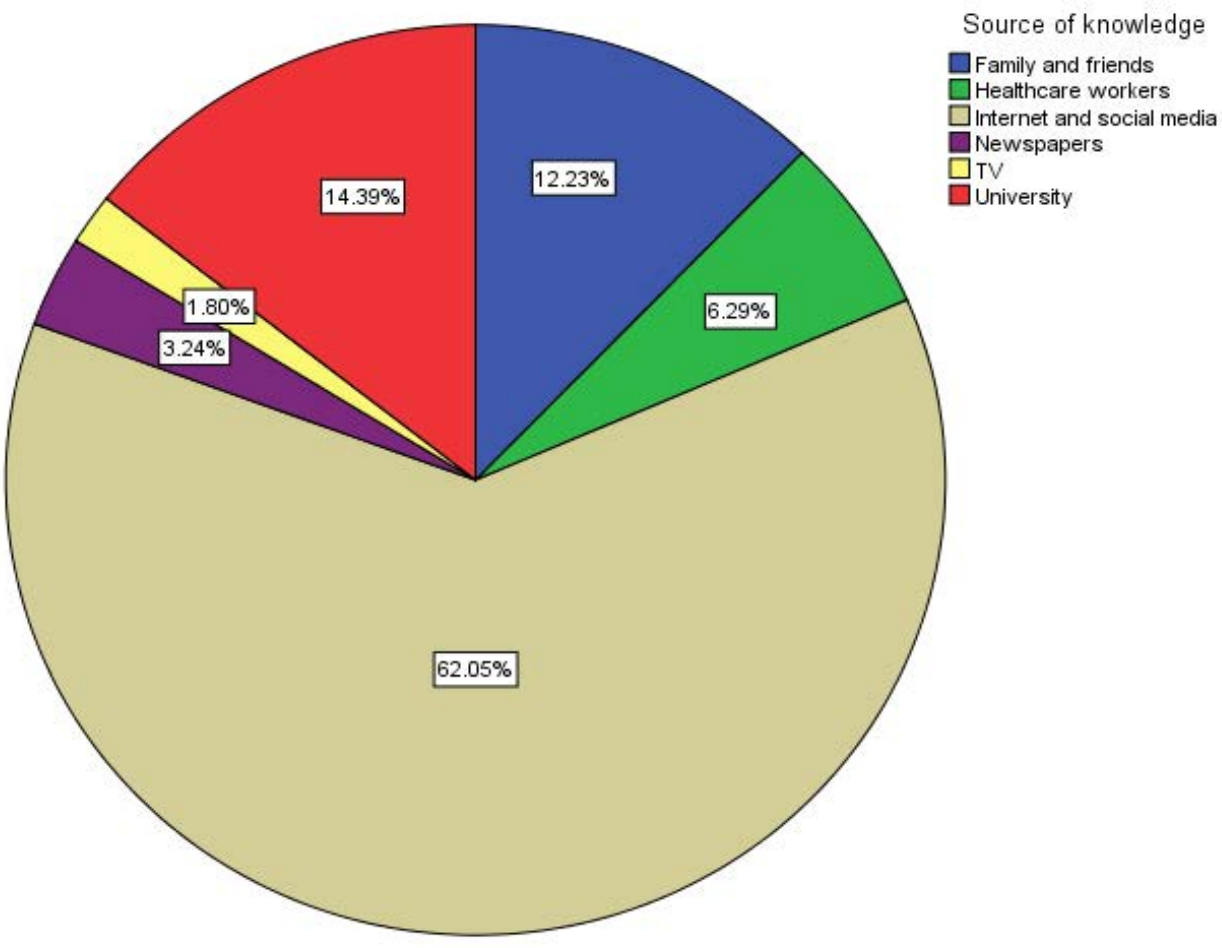

Figure 1. Participants by source of knowledge related to organ donation.

Table 2. Knowledge and attitudes among female university students regarding organ donation.

		Yes N (%)	No N (%)	I don't know N (%)
1	Have you heard of organ donation before?	538 (97)	18 (3)	-
2	Would organ donation save other people's lives?	539 (97)	17 (3)	-
3	Do you know anyone who has donated an organ?	233 (42)	323 (58)	-
4	Do you know anyone who received or is waiting to receive a kidney or other organ?	303 (54.5)	253 (45.5)	-
5	Is the kidney the most transplanted organ in the world?	454 (81.7)	16 (2.9)	86 (15.5)
6	Rejection of organ after transplantation is possible.	421 (75.7)	27 (4.9)	108 (19.4)
7	Do you think that organ donation is ethically acceptable?	443 (80)	113 (20)	-
8	Have you heard about brain death?	525 (94)	31 (6)	-
9	Did you hear about organ donation from brain-dead patients?	434 (78)	122 (22)	-
10	Have you heard about organ donor cards for brain-dead patients before?	272 (49)	284 (51)	-
11	Are you aware of the presence of centres and official agencies for organ donation in Saudi Arabia?	390 (70)	166 (30)	-
12	If you answered the previous question with yes, are you aware of the laws and regulations related to organ donation, brain death, and organ transplantation in Saudi Arabia?	191 (34)	365 (66)	-
Attitudes			**Frequencies**	**Percentages**
What is your attitude of organ donation?				
	Agree.		466	84
	Disagree.		90	16
If you are willing to donate your organs, when would you like to donate your organs?				
	During life.		66	12
	After death.		311	56
	Both during and after life.		179	32
If you are willing to donate your organs, to whom are you willing to donate your organs?				
	Only to relatives.		76	14
	Only to non-relatives.		17	13
	To both relatives and non-relatives.		463	83
If you are willing to donate your organs, what are your motives?				
	Social motives.		11	2
	Islamic religion allows me to do so.		124	22
	I would only become a donor for someone dear to me.		61	11
	I really want to help another person.		355	64
	I need the money.		5	1
Do you have an organ donor card?				
	Yes.		64	12
	No.		473	85
	I don't know.		19	3
What is the reason beyond refusing the organ donation?				
	I'm still not aware or decided regarding organ donation.		261	47
	I'm afraid.		164	29
	I find it irrelevant and am not really concerned about the matter.		12	2
	I do not trust doctors and the way that I would be treated during hospitalisation as a registered donor.		67	12
	I do not believe that the transplant would be used correctly.		15	3
	Against Islamic religion.		37	7

Table 3. Association between Pooled knowledge score and sociodemographic characteristics of participants.

	N (%)	Knowledge pooled score		
		Mean±SD	Median (IQR)	*p* value†
All	556 (100)	10.45±2.2	11 (9-12)	-
Age (year)				
18-24	509 (91.5)	10.42±2.2	11 (9-12)	0.437
25-30	47 (8.5)	10.8±1.9	11 (9-12.5)	
Material Status				
Single	49 (88)	10.49±2.2	11 (9-12)	0.367
Married	65 (12)	10.11±2.6	10 (9-12)	
Academic degree				
Diploma	37 (7)	9.5±3.19	10 (8-12)	0.08
Bachelor's degree	519 (93)	10.52±2.11	11 (9-12)	
Faculty				
Medicine	49 (9)	11.16±1.86	12 (10-12)	0.238
Clinical Pharmacy	86 (16)	10.33±2.43	10.5 (9-12)	
Applied Medical Sciences	72 (13)	10.61±2.11	11 (9-12)	
Sciences	120 (21)	10.38±2.34	10 (9-12)	
Arts and Humanities	89 (16)	10.25±2.14	10 (9-12)	
Business	140 (25)	10.4±2.14	11 (9-12)	
Current academic level				
Junior Students (1st- 3rd year)	290 (52)	10.27±2.2	10 (9-12)	**0.019**
Senior Students (4th- 6th year)	266 (48)	10.66±2.2	11 (9-12)	

† Indicates that the *p*-value was estimated using Kruskal-Walli's test. IQR refers to interquartile ranges, and SD stands for standard deviation.

The study addressed the association between sociodemographic characteristics and knowledge of organ donation, as presented in Table 3. The results showed that younger students (e.g., 18-24 years) comprise the majority of participants (91.5%) with a mean knowledge score of 10.42. The scores are relatively consistent, as indicated by the standard deviation and interquartile range. However, older students (8.5%) exhibit a slightly higher mean knowledge score of 10.8. In addition, the larger group (88% single participants) had a mean knowledge score of 10.49, slightly higher than married participants. Comprising 12% of the sample, married participants have a lower mean knowledge score of 10.11. Moreover, participants with a diploma have the lowest mean knowledge score of 9.5, while bachelor students showed a higher mean knowledge score of 10.52.

Furthermore, the knowledge scores vary across different faculties, with Medicine students scoring the highest (mean of 11.16) and Arts and Humanities scoring the lowest (mean of 10.25). The only statistically significant difference observed in participants' sociodemographic factors and knowledge scores is between junior and senior students (*p*-value 0.019).

The relationship between attitudes toward organ donation and sociodemographic characteristics has been assessed by faculty and academic level in this study, as shown in Table 4. 84% of participants agree with organ donation, with significant variation across faculties (*p*-value = 0.003). However, 16% disagreed. In addition. 12% are willing to donate during life, with no significant difference across faculty or academic levels. While 56% prefer donating after death, 32% are open to donating both during and afterlife, with no significant difference across academic levels.

Moreover, 14% of participants would donate only to relatives. 13% would donate only to non-relatives. 83% of participants are willing to donate to both, with significant variation across faculties (*p*-value = 0.027) and academic levels (*p*-value = 0.003). Concerning participants' motives for donating organs, 2% of students cite social motives, with no significant variation across groups. 22% of students cite religious permissions as a motive. 11% would become donors for someone dear, with no significant variation across faculty or academic levels. 64% want to help another person, indicating a robust and kind motive across all groups.

Furthermore, the results showed that 12% have an organ donor card, with a significant difference noted across academic levels (*p*-value = 0.005), where 64% of senior students have a card compared to 36% of juniors. However, 85% do not have a donor card. 3% are unsure about having a donor card. Reasons for refusing organ donation assessments revealed that 47% still need to be made aware or decided, with no significant variation across groups. 2% find it irrelevant, indicating minimal concern about the matter. 12% do not trust doctors or the treatment they would receive as donors. 3% believe that the transplant system would need to be used correctly. 7% cite religious reasons for refusing to donate.

DISCUSSION

The findings revealed that the study primarily involves young, single female students at Al-Baha University. It examined their knowledge and attitudes toward organ donation. The survey used in the study was developed using existing literature and included questions about organ donation knowledge, willingness to donate, and factors that influence attitudes toward organ donation. The participants had varying academic backgrounds and levels, suggesting different exposure levels to and understanding health-related topics.

This study found that the internet and social media are the primary sources of information about organ donation, consistent with previous research [13–15]. This highlights the significance of online platforms in raising awareness. Similar to the current study, previous studies also identified that healthcare professionals are essential sources of knowledge [16], while traditional sources like television and newspapers are less relied upon [13]. This suggests shifting information consumption patterns towards online platforms and personal networks.

In terms of the participant's general awareness of organ donation, this study found that most students are aware of the potentially life-

Table 4. Association between attitudes and sociodemographic characteristics of participants.

		Faculty				Academic Level		
	N (%)	**Medicine & Health Sciences**	**Sciences**	**Arts, Humanities & Business**	***p* value†**	**Junior Students (1st- 3rd year)**	**Senior Students (4th- 6th year)**	***p* value†**
What is your attitude of organ donation?								
Agree.	466 (84)	175 (38)	89 (19)	202 (43)	**0.003**	237 (51)	229 (49)	0.163
Disagree.	90 (16)	32 (36)	31 (34)	27 (30)		53 (59)	37 (41)	
If you are willing to donate your organs, when would you like to donate your organs?								
During life.	66 (12)	25 (38)	17 (26)	24 (36)		34 (51)	32 (48)	
After death.	311(56)	105 (34)	63 (20)	143 (46)	0.115	163 (52)	148 (48)	0.989
Both during and after life.	179 (32)	77 (43)	40 (22)	62 (35)		93 (52)	86 (48)	
If you are willing to donate your organs, to whom are you willing to donate your organs?								
Only to relatives.	76 (14)	36 (47)	15 (20)	25 (33)		32 (42)	44 (58)	
Only to non-relatives.	17 (13)	3 (18)	8 (47)	6 (35)	**0.027**	15 (88)	2 (12)	**0.003**
To both relatives and non-relatives.	463 (83)	168 (36)	97 (21)	198 (43)		243 (52)	220 (48)	
If you are willing to donate your organs, what are your motives?								
Social motives.	11 (2)	5 (45.5)	1 (9)	5 (45.5)		8 (73)	3 (27)	
Islamic religion allows me to do so.	124 (22)	41 (33)	36 (29)	47 (38)		65 (52)	59 (48)	
I would only become a donor for someone dear to me.	61(11)	25 (41)	12 (20)	24 (39)	0.476	30 (49)	31 (51)	0.713
I really want to help another person.	355 (64)	134 (38)	71 (20)	150 (42)		184 (52)	171 (48)	
I need the money.	5 (1)	2 (40)	0 (0)	3 (60)		3 (60)	2 (40)	
Do you have an organ donor card?								
Yes.	64 (12)	24 (38)	12 (19)	28 (44)		23 (36)	41 (64)	
No.	473 (85)	179 (38)	100 (21)	194 (41)	0.235	253 (54)	220 (46)	**0.005**
I don't know.	19 (3)	4 (21)	8 (42)	7 (37)		14 (74)	5 (26)	
What is the reason beyond refusing the organ donation?								
I'm still not aware or decided regarding organ donation.	261 (47)	99 (38)	51 (20)	111 (43)		141 (54)	120 (46)	
I'm afraid.	164 (29)	56 (34)	39 (24)	69 (42)		81 (49)	83 (51)	
I find it irrelevant and am not really concerned about the matter.	12 (2)	5 (42)	1 (8)	6 (50)		4 (33)	8 (67)	
I do not trust doctors and the way that I would be treated during hospitalisation as a registered donor.	67 (12)	24 (36)	14 (21)	29 (43)	0.654	31 (46)	36 (54)	0.281
I do not believe that the transplant would be used correctly.	15 (3)	6 (10)	4 (27)	5 (33)		9 (60)	6 (40)	
Against Islamic religion.	37 (7)	17 (46)	11 (30)	9 (24)		24 (65)	13 (35)	

† Indicates that the *p-value was estimated using the* Chi-square test.

saving benefits of organ donation. These findings align with previous research. A study by Al Moweshy et al., 2022[17] found that most university students were aware of the potential of organ donation. In addition, the present study indicates that most participants (70%) are aware of organ donation centers and agencies in Saudi Arabia, which is consistent with the findings of Somali et al. 2022 across the general population [12]. However, more than half of the survey participants were not aware of the specific laws and regulations related to organ donation. This suggests a need for more awareness among university students regarding the legal aspects of organ donation.

The study's results regarding the agreement toward organ donation, willingness to donate after death, and preferences for organ donation recipients among students who participated are in line with several previous studies conducted in Saudi Arabia [18], [18,19]. These findings collectively highlight a consistent pattern of positive attitudes and willingness toward organ donation among university students.

The current study focused on analyzing the relationship between sociodemographic characteristics and knowledge of organ donation among participants in Saudi Arabia. It is worth noting that the mean knowledge score in the current study was consistent at 10.42 for most participants, indicating a moderate level of knowledge regarding organ donation. Interestingly, the only significant difference observed in this study was between junior and senior students. This finding aligns with previous studies [12,18,20,21]However, it should be noted that the lack of significant differences among other sociodemographic variables emphasizes the need for comprehensive educational programs aimed at improving organ donation knowledge among all groups in Saudi Arabia.

Several studies have examined the attitudes toward organ donation among different population segments in Saudi Arabia [22–24]. One study examined the Saudi population, students of health science colleges, and healthcare workers in Riyadh city regarding organ donation. Results

showed that these healthcare professionals demonstrated favorable attitudes toward organ donation [15]. The study emphasized the role of knowledge and awareness in shaping these attitudes, with healthcare professionals being more knowledgeable about the scientific aspects of organ donation. The current study adds to this growing body of research by determining attitudes toward organ donation among different faculties and academic levels within a university setting. Notably, the majority of students agree with organ donation, although there is variation across faculties.

The motives for donating organs identified in the current study, including social reasons, religious permissions, and the desire to help others [25], are consistent with the findings of previous studies conducted in Saudi Arabia. These motives highlight the importance of societal and cultural factors in shaping attitudes toward organ donation. The study also found that only a small percentage of participants have organ donor cards, which is consistent with other studies [26,27]. However, the study revealed that senior students were more likely to have organ donor cards, possibly due to increased exposure to information about organ donation throughout their studies. The reasons for refusing organ donation identified in the current study, such as lack of awareness or decision, fear, and lack of trust in doctors or treatment, are also consistent with previous research [13,28,29]. These findings underscore the need for educational campaigns and interventions to address the concerns contributing to the refusal of organ donation.

The study has limitations. It was conducted at a specific university in Saudi Arabia and may not represent all educational institutions.

CONCLUSION

Overall, the current study found that ongoing initiatives are crucial for increasing knowledge and awareness of organ donation among female university students in Saudi Arabia. The data suggests that academic progress is associated with higher knowledge scores. This analysis highlights the importance of considering these factors when assessing knowledge levels in educational settings.

Additionally, the study highlights the complex interplay of educational background, academic level, and personal beliefs in shaping attitudes toward organ donation. The significant variations across different faculties and academic levels suggest that targeted educational interventions could be beneficial in addressing barriers and enhancing the willingness to donate organs. Future research should concentrate on developing effective interventions to improve knowledge and attitudes towards organ donation in different population segments, aiming to increase donation rates and save lives.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Ethical Approval: Approved by the Deanship of Scientific Research Review Board at Al-Baha University, Al-Baha, Saudi Arabia ((approval number 45103812). Before participating in the survey, participants had to consent by agreeing to the terms. They were also informed that they could choose not to participate or withdraw from the study at any point. The information provided by the participants was kept confidential.

Potential Conflict of Interest: None

Competing Interest: None

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