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Research Article

KAP About Organ Donations

Knowledge, Attitude, and Practice of Medical Professionals About Organ Donation and Transplantation in Saudi Arabia: A Cross-Sectional Study

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Abstract: Transplantation is the preferred therapy for terminal organ disease because it improves patients' long-term survival and quality of life. This study aimed to assess knowledge, attitudes, and practices regarding organ donation among medical students and doctors across Saudi Arabia. It is a cross-sectional study using a questionnaire distributed online through social media. The 32-item questionnaire was adapted from a previous study to assess organ donation knowledge, attitudes, and practices among medical students and doctors in Saudi Arabia. Participants demonstrate a moderate level of knowledge, with an average total knowledge score of 6.5 out of 12. Females have higher knowledge scores than males (p=0.037), and married participants score higher than non-married individuals (p=0.031). Interns and doctors score higher than medical students (p<0.001). Most participants support organ donation (85.13%), feel comfortable discussing it (81.28%), and are willing to donate their organs (61.03%). However, concerns about premature treatment termination for registered donors (35.64%) and the belief that your body should be kept intact after death (56.67%) are present. A minority have pledged or signed to donate (33.59%), and even fewer have donated organs (13.59%). Medical professionals in Saudi Arabia have moderate knowledge and good attitudes, but some are concerned about premature treatment termination for donors and fear of disfigurement. The findings highlight the need for educational interventions to improve knowledge and address concerns to bridge the gap between attitudes and actual organ donation practices.

Keywords: Knowledge, Attitude, Practice, Organ donation, Organ transplantation, Saudi Arabia.

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1. INTRODUCTION

Organ transplantation removes an organ from a donor to be medically transplanted into another individual who needs transplantation for a therapeutic reason or due to end-stage organ failure.[1,2] Transplantation is the preferred therapy for terminal organ disease because it improves patients' long-term survival and quality of life. There are a tremendous number of people waiting for life-saving organ transplants; for example, in 2018, there were 4,351 cases in Canada, and 223 Canadians passed away while awaiting organ transplantation in the same period.[3] In many countries, the greatest barrier to transplantation is a lack of organs and donors.[4–6] Multiple factors contribute to organ scarcity, including poor donor recognition, poor consent rates, and inefficient donor care.[7,8] Although methodological variations constrain these comparisons, Spain is acknowledged to have a well-coordinated system that includes hospital-based experts with specialized training.[9] In fact, Saudi Arabia has a low rate of organ donation (2–4 per million people), in contrast to nations such as the United States and Spain, which have rates of more than 20 per million people.[10] There is a belief that using financial incentives will raise the number of donors, but in a study conducted in Germany, most participants opposed directly using financial incentives.[11] Governments and medical professionals must address the lack of organs available for donation, a global problem,[12] due to an ongoing lack of understanding and negative attitudes regarding organ donation and transplantation.[13] People's attitudes about organ donation are influenced by essential factors that include education and knowledge, as well as other factors such as religion and culture.[14,15] Several studies have shown that medical students' awareness of and attitudes about organ donation are important.[16–18] Nevertheless, it has been discovered that some knowledge gaps and misunderstandings among healthcare professionals, particularly medical students, need to be adequately addressed.[19] Due to specific ethical concerns in society, it is important that medical students have the necessary knowledge and a highly positive attitude regarding organ donation in this context.[17] A Canadian study found that medical students have inadequate knowledge about organ donation, in which 76% knew that a man could be neurologically dead while the heart is still working, and 69% were not familiar with a circulatory determination of death.[3] In Mexico, medical physicians had not received any training about organ donation, and the main gap in their knowledge was related to donor requirements.[20] Some studies have assessed knowledge about organ donation in Saudi Arabia and found that 61.1% of medical students in the Western region had weak levels of knowledge.[21] Another study among medical students at Jouf University in Saudi Arabia found that 51.9% lacked an adequate understanding of organ donation, which is the most significant obstacle to organ donation.[22] The study also found that students do not know about the Saudi Centre for Organ Transplantation.[22] Different factors are significantly associated with more knowledge about organ donation, including academic year[21] and having an organ donation card.[23] In contrast, some studies have found that female medical professionals have more knowledge about organ donation in Pakistan[24] and Iran,[23] while another study in Saudi Arabia did not find this difference.[21] Several studies have assessed attitudes about organ donation among medical students and found favorable results.[3,22,23] In Canada, 96% were willing to be organ donors after they died.[3] In Iran, while most students (73.8%) agreed to donate an organ, 67.5%) did not know how to obtain a card for organ donation, and only 9.6% had an organ donation volunteer card.[23] In Saudi Arabia, 51.2% of medical students at Jouf University were prepared to donate their organs under any circumstances, with 48.8% of participants willing to give mostly to family members. There were also 1.9% of respondents who had given their organs at some point.[22] According to the available research, organ donation is uncommon in Saudi Arabia. From the findings from several studies, the primary causes of this phenomenon are societal stigma, ignorance, and a lack of knowledge.[25,26] Unfortunately, over the next few years, the Saudi population will be at an increased risk of suffering from the failure of various organs due to the growing lack of donors.[10] It should be highlighted that each of the previous studies in Saudi Arabia was limited to a specific region and was also limited to medical students. Therefore, this study aimed to assess the knowledge, attitudes, and practices regarding organ donation among medical students and doctors across Saudi Arabia.

2. MATERIALS AND METHODS

2.1 Study design, sampling, and sample size:

In June 2023, a cross-sectional survey was undertaken in Saudi Arabia that targeted medical students and doctors. A convenience sampling technique was used. The sample size was calculated to determine the minimum required sample, set at 385 participants. This calculation considered an alpha level of 0.05, an expected prevalence of 50%, and a confidence level of 95%. An online survey was distributed across various social media platforms, including WhatsApp, Twitter, LinkedIn, TikTok, Snapchat, and Instagram, to recruit study participants. The convenience sampling method was utilized for participant selection.

2.2 *Inclusion and exclusion criteria*:

The inclusion criteria were that participants must be adult medical students or working physicians residing and working in Saudi Arabia. Additionally, they were required to provide their consent and approval by signing the study's informed consent document. Exclusion criteria included individuals under 18 or those who did not sign the study's consent form. Each questionnaire was assigned a unique identification number to ensure respondent anonymity and maintain participant information confidentiality.

2.3 *Instrument and validity*:

The questionnaire comprised 32 questions, divided into four sections. The first section consisted of demographic inquiries, while the second section comprised 12 questions assessing participants' knowledge about organ donation. The third section included 11 questions exploring attitudes about organ donation, and the fourth section encompassed 4 questions regarding the practice of organ donation. Most questions were of the yes/no or agree/disagree type, derived from previous studies.[27]

2.4 Ethical Statement:

Ethical approval was obtained from the Institutional Review of the Board of the International Medical Center with the number 2023-06-212, NCBE Registration No: (H-02-J-010). All the participants were aware of the study and survey. Written informed consent was obtained from the participants before their participation to conduct and publish the study.

3. DATA ANALYSIS

SPSS software was used for data analysis. Descriptive statistics were employed to compute the collected data's count, percentage, mean (m), and standard deviation (SD). Furthermore, chi-square, t-test, ANOVA, and linear regression analyses were conducted to determine the relationships between the variables.

4. RESULTS

A total of 390 participants answered the study questionnaire. The participants had a mean age of 28.28 and an SD of 10.41. Detailed participant demographic data are shown in Table 1. Table 1. illustrates participant demographic data. Different demographic factors are significantly associated with knowledge about organ donation.

Table 1: Participant demographic data

Variable		n	%
Gender	Male	196	50.26
	Female	194	49.74
Marital status	Married	124	31.79
	Non-married	266	68.21
Qualification	Student	203	52.05
	Intern	53	13.59
	Graduate	71	18.21
	Specialist	30	7.69
	Consultant	33	8.46
The region in Saudi Arabia	Western	231	59.23
	Central	40	10.26
	Southern	28	7.18
	Eastern	81	20.77
	Northern	10	2.56
Nationality	Saudi	327	83.85
	Non-Saudi	63	16.15

4.1 Participants' Knowledge

Participants answered the knowledge questions differently, as shown in Table 2. When the scores for the correct answers were summed into a total score ranging from 0 (minimum level of knowledge) to 12 (maximum level of knowledge), the participants had a mean total knowledge score of 6.5 (SD=2.2). According to the statistical testing, the total knowledge score was significantly higher among females (p=0.037, m=6.74, SD=2.17) than males (m=6.27, SD=2.23). It was also higher among married participants (p=0.031, m=5.82, SD=1.79) than non-married ones (m=6.35, SD=2.37), and higher among interns/doctors (p<0.001, m=7.04, SD=1.86) than medical students (m=6.00, SD=2.38). According to ANOVA and t-test, the total knowledge score was not significantly affected by region (p=0.564) or nationality (p=0.396).Table 2**.** Medical students' and doctors' responses to questions assessing knowledge about organ donation. Organ donation is removing an organ from one person (the donor) and transplanting it to another person (the recipient) who needs it to improve long-term survival and quality of life.

Table 2. Medical students' and doctors' responses to questions assessing knowledge about organ donation

Question	Yes n (%)	No n (%)	I do not know n (%)
Have you heard of the term "organ donation?"	368 (94.36)	14 (3.59)	8 (2.05)
Have you heard of the term "organ transplantation?"	362 (92.82)	18 (4.62)	10 (2.56)
Are you aware of the Transplantation of Human Organs Act?	264 (67.69)	58 (14.87)	68 (17.44)
Can a brain-dead patient's organs be donated?	282 (72.31)	40 (10.26)	68 (17.44)
Will a certified brain-dead registered organ donor be immediately disconnected from ventilation support?	133 (34.10)	99 (25.38)	158 (40.51)
Can parents or guardians make decisions on behalf of mentally disabled persons regarding organ donation?	146 (37.44)	102 (26.15)	142 (36.41)
Should a donor's and recipient's blood group be matched?	304 (77.95)	20 (5.13)	66 (16.92)
Should a donor's human leukocyte antigen be identical to the recipient's for organ transplantation?	247 (63.33)	38 (9.74)	105 (26.92)
Can hepatitis B and C carriers donate all their solid organs except the liver?	155 (39.74)	95 (24.36)	140 (35.90)
Is malignancy always a contraindication for cadaveric organ donation?	146 (37.44)	92 (23.59)	152 (38.97)

Are opportunistic infections a common complication of all transplantations?	257 (65.90)	27 (6.92)	106 (27.18)
Are organ transplant recipients more prone to developing cancer after transplantation?	175 (44.87)	61 (15.64)	154 (39.49)

4.2 Participants attitudes

The participants' attitude about organ donation was overall positive, as shown in Table 3. Most participants support organ donation and believe donating one's organ adds meaning to one's life. However, half the participants agreed to donate their family members' organs. Table 3. Medical students' and doctors' answers to questions assessing attitudes about organ donation emphasize the potential for increasing the organ donation rate with appropriate interventions, awareness campaigns, and the active involvement of medical professionals.

Table 3. Medical students' and doctors' answers to questions assessing attitudes about organ donation to emphasize **the potential for increasing the organ donation rate with appropriate interventions**

Attitude Statement	Yes n (%)	No n (%)
Do you support organ donation?	332 (85.13)	58 (14.87)
Do you feel comfortable thinking or talking about organ donation?	317 (81.28)	73 (18.72)
Have you agreed to donate organs when you die?	238 (61.03)	152 (38.97)
Do you agree to donate your family members' organs?	200 (51.28)	190 (48.72)
Does your family agree with organ donation?	207 (53.08)	183 (46.92)
Does donating one's organ add meaning to one's life?	344 (88.21)	46 (11.79)
Does your religion agree with organ donation or transplantation?	289 (74.10)	101 (25.90)
Do you believe your body should be kept intact after death?	221 (56.67)	169 (43.33)
Do you have a fear that your body will be disfigured if you donate organs?	191 (48.97)	199 (51.03)
Will there be premature termination of medical treatment for registered organ donors?	139 (35.64)	251 (64.36)
Do you think live organ donation is better than cadaveric organ donation for solving an organ shortage?	309 (79.23)	81 (20.77)

4.3 Participants practices regarding organ donation

In the practice section of the questionnaire, 86.4% of participants did not donate an organ, and 82.8% did not receive an organ for transplantation. Half of the participants know where to sign up to volunteer for organ donation, as shown in Table 4. Table 4. Medical students' and doctors' answers to questions assessing practices regarding organ donation aim to find practical solutions to improve the practice level of organ donation in Saudi Arabia.

Table 4. Medical students' and doctors' answers to questions assessing practices regarding organ donation aiming to find practical solutions to improve the practice level of organ donation in Saudi Arabia

Practice Question	Yes n (%)	No n (%)
Have you pledged/signed up to donate an organ?	131 (33.59)	259 (66.41)
Have you ever donated an organ?	53 (13.59)	337 (86.41)
Did you ever receive an organ for transplantation?	67 (17.18)	323 (82.82)
Do you know where to sign up to volunteer for organ donation?	210 (53.85)	180 (46.15)

4.4 Factors associated with knowledge of organ donation

Table 5 illustrates the factors associated with knowledge of organ donation. Age was statistically significant with a knowledge score of organ donation ($p = 0.01$). The analysis revealed that marital status and gender were also significantly associated with knowledge scores ($p < 0.05$). Also, the knowledge score was significantly affected by the level of education, as specialists and consultants had more knowledge than undergraduates ($p < 0.05$). At the same time, the nationality and place of residency showed no statistical association with the total knowledge score. Table 5. Factors associated with knowledge of organ donation reveal the demographic factors significantly affecting the knowledge level.

Table 5. Factors associated with knowledge of organ donation to reveal the demographic factors that affect the level of knowledge significantly.

Factor	Options	Mean	SD	P-value
Age		28.28	10.41	0.016
Gender	Male	6.27	2.22	0.037
	Female	6.74	2.17	
Marital Status	Married	6.82	1.79	0.031
	Non-married	6.35	2.36	
Nationality	Saudi	6.46	2.22	0.396
	Non-Saudi	6.71	2.13	

Qualification	Student	6.01	2.38	0.000
	Intern	6.98	2.32	
	Graduate (Bachelor)	6.96	1.85	
	Specialist	7.27	1.26	
	Consultant	7.12	1.58	
Region	Western	6.42	2.16	0.564
	Central	7.05	1.54	
	Southern	6.54	2.41	
	Eastern	6.49	2.45	
	Northern	6.20	3.01	

4.5 Factors associated with a positive attitude toward organ donation

Table 6 demonstrates the factors associated with a positive attitude toward organ donation. Age was significantly associated with a positive attitude toward organ donation (p = 0.02). In addition, females had a significantly higher positive attitude score than males (p = 0.002). The analysis showed that marital status, nationality, education level, and place of residency were not significantly associated with a positive attitude score. Table 6. Factors associated with a positive attitude toward organ donation to assess the statistically significant effect of demographic factors on the positive attitude scores.

Table 6. Factors associated with a positive attitude toward organ donation to assess the statistically significant effect of demographic factors on the positive attitude scores.

Factor	Options	Mean	SD	P-value
Age		28.28	10.41	0.02
Gender	Male	6.36	2.48	0.002
	Female	7.11	2.14	
Marital Status	Married	6.82	2.44	0.627
	Non-married	6.70	2.31	
Nationality	Saudi	6.69	2.40	0.378
	Non-Saudi	6.95	2.06	
Qualification	Student	6.61	2.26	0.084
	Intern	6.74	2.13	
	Graduate (Bachelor)	6.43	2.44	
	Specialist	7.33	2.51	
	Consultant	7.60	2.66	
Region	Western	6.84	2.32	0.104
	Central	6.62	2.72	
	Southern	5.78	2.67	
	Eastern	6.92	2.02	
	Northern	5.70	2.36	

5. DISCUSSION

The present study assessed organ donation knowledge, attitudes, and practices among medical students and doctors in Saudi Arabia. Participants demonstrated a moderate level of knowledge. Females, married respondents, and interns/doctors had higher knowledge scores than males, non-married individuals, and medical students. Most participants supported organ donation, felt comfortable discussing it, and were willing to donate their organs. However, there were concerns about premature treatment termination for donors and beliefs that your body should be kept intact after death. A minority had pledged or signed to donate, and even fewer had donated organs. As noted, our study showed moderate levels of knowledge regarding organ donation. In comparison, a previous study among undergraduate medical students in Canada found that students had limited knowledge of organ donation.[3] Specifically, 91% of the Canadian students adequately knew that neurological death is irreversible, while 76% acknowledged that someone can be neurologically deceased while their heart is still beating.[3] However, only 69% of the students knew of a circulatory determination of death.[3] A study among students in India reported that 49.4% of the participants knew the risks of organ donation. In comparison, 35% were aware of the concept of the human donor card.[28] Another study conducted among medical students in India reported uniformly low knowledge scores among all groups of students, indicating an alarming lack of knowledge.[27] In contrast, in Riyadh, Saudi Arabia, it was observed that healthcare professionals had better knowledge about organ donation than the general population.[29] However, the same study noted a decrease in the percentage of individuals allowing their families to donate organs, indicating a potential decline in knowledge.[29] Overall, these studies highlight the need for educational interventions and curriculum changes to improve knowledge levels and ensure an accurate understanding of organ donation among medical professionals and students. In terms of attitudes about organ donation, our study found that most participants supported organ donation (85.13%), felt comfortable discussing it (81.28%), and were willing to donate their organs (61.03%). A similar positive attitude was reported among medical students in Canada,[3] with 96% of respondents expressing their willingness to become organ donors after death. The study among students in India reported that 68% of the participants felt the need for laws to govern the organ donation process, indicating a

positive attitude toward regulation.[28] Additionally, 63.4% of the participants in the same study expressed their willingness to be part of any organ donation group, highlighting their motivation to participate actively.[28] Similar to the knowledge scores, the study conducted in Riyadh found that healthcare professionals had better attitudes about organ donation than the general population, suggesting a higher level of awareness and acceptance within the medical community.[29] They also noted slight improvements in attitude over the years. Still, they observed a relatively low proportion of participants who carried a donor card, indicating a need for increased awareness and practical steps.[29] Similarly, another study among medical students in the western region of Saudi Arabia reported that 86.1% of the participants exhibited an appropriate attitude about organ donation, indicating a favorable disposition.[21] Around one-third of the participants in our study (35.64%) expressed the belief that there will be premature treatment termination for registered donors. It was highlighted by a systematic review that found this belief is negatively affecting organ donation.[30] There exists a prevalent apprehension regarding inadequate and premature cessation of therapy for enlisted organ contributors among the Chinese and Korean populations, as evidenced by many studies.[31–33] According to survey results, a significant proportion of the Chinese public (51.6%) and Hong Kong nurses (15%) believed donors would receive suboptimal treatment. Similarly, a considerable proportion of Korean nurses (67%) expressed apprehension about being misdiagnosed as brain dead. These findings were reported in several studies.[31–33] Handling such misunderstandings is crucial, given that healthcare providers are considered one of the main sources for disseminating health information to the public.[34] In addition, a high percentage (56.67%) of people believed that your body should be kept intact after death. It was noticed in China and seems to be a cultural issue therein.[35] It was also a concern in a systematic review regarding organ donation,[36] indicating that this issue might not be limited to certain geographic areas. One prior study reported that religious beliefs might influence this view.[37] Because the majority of residents in Saudi Arabia are Muslim, there has been controversy about organ donation from a religious standpoint.[37] This might be one of the reasons for the prevalence of this attitude. In the present study, a minority of participants had pledged or signed to donate (33.59%), and even fewer had donated organs (13.59%). In contrast, a previous study in Riyadh, Saudi Arabia, indicated that no one had signed up for organ donation.[38] Thus, our results can be taken as indicating an improvement. One reason is that, in Saudi Arabia, any adult can sign a donation consent using a main government application (Absher).[39] Another potential reason for the low level of donations might be that people have not had the chance to complete the donation form, in addition to many of the participants in our study being students and, thus, still young.

6. CONCLUSIONS

Medical professionals in Saudi Arabia have moderate knowledge and good attitudes about organ donation. Still, they also have concerns about premature treatment termination for donors and fears of disfigurement. The findings highlight. These findings collectively highlight the positive attitudes about organ donation among the studied populations and emphasize the potential for increasing the organ donation rate with appropriate interventions, awareness campaigns, and the active involvement of medical professionals to improve knowledge and address concerns to bridge the gap between attitudes and actual organ donation practices.

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8. AUTHORS CONTRIBUTION STATEMENT

Study conception and design: Raghad Alharbi and Omar Amer; data collection: All authors; analysis and interpretation of results: Raghad Alharbi, Abdullah Alfozan, Hind Jrais, Laila Aljifry and Imtinan Ibrahim; draft manuscript preparation: Raghad Alharbi, Mariam Alrawi, Samah Alotaibi and Raghad Alawn. All authors read and approved the final version of the manuscript.

9. CONFLICTS OF INTEREST

Conflicts of interest declared none.

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