

Awareness, Attitude, and Beliefs Regarding Organ Donation Among the General Public in Saudi Arabia

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Background: Organ donation is a lifesaving option to rescue many patients with end-stage organ failure from possible morbidities and mortalities. Unfortunately, due to a shortage of donors, many patients suffering from their illnesses are waiting for an organ. This study aimed to determine the awareness, attitude, and beliefs toward organ donation among the Saudi population.

Patients and Methods: This is an online cross-sectional survey that was conducted in Saudi Arabia between July and September 2022. A self-administered questionnaire was distributed to the general public using an online platform. The questionnaire consists of two sections: the first is about demographic data, and the second is about questions to assess awareness, attitude, and beliefs regarding organ donation. The Chi-squared test was used to examine the differences in participants' awareness, attitude, and beliefs towards organ donation. A binary logistic regression analysis was used to identify predictors of a positive attitude towards organ donation.

Results: A total of 3507 individuals participated in this study. Around 68.1% were aged between 18 and 30 years. Twenty-four percent of them knew of the legislative body for organ donation; 58.5% believed that organ donation should be promoted; and 66.1% had a positive attitude toward donating body organs. Younger age (31–50 years), male gender, being unemployed or working in a government job, and being married were factors that decreased the likelihood of having a positive attitude towards organ donation.

Conclusion: Although there was a positive attitude and belief about organ donation, awareness was suboptimal. Younger age, male gender, being unemployed or working in a government job, and being married were factors that decreased the likelihood of having a positive attitude towards organ donation. It is necessary to address the gaps in knowledge, and social media as well as mass media may have an important role in bridging the gaps.

Keywords: organ donation, attitude, knowledge, belief, public

Introduction

Organ donation (OD) is a life-saving medical procedure in which organs are procured from a donor and transplanted into a recipient suffering from organ failure, restoring essential functions, improving quality of life, and diminishing morbidity, and mortality. Many patients with end-stage organ failure have transplantation as their best and, in most cases, only treatment option.¹ Donation is driven by the need for transplants among patients with end-stage organ failure, and the most essential metrics in this regard are transplant rates, both in terms of the total number of transplants (from both living and deceased donors) and those for specific organs.¹ Organ transplantation enhances patient survival and quality of life, and has a significant positive effect on public health and the socioeconomic burden of organ failure.² The availability of an appropriate organ is the greatest obstacle in transplantation.³ The escalating demand for OD is an urgent matter requiring coordination between multiple sectors of the medical, social, and religious leadership.⁴ Organs for transplantation purposes may be procured from donors who have been declared dead based on neurological or circulatory criteria and, when this applies, living donors (eg, kidney and liver).⁵ Insufficient OD in Saudi Arabia remains a significant barrier to transplantation.⁶ The decision to be an

organ donor is influenced by relational ties, religious beliefs, cultural influences, family influences, body integrity, previous interactions with the health care system — medical mistrust, validity of brain death, and fear of early organ retrieval — the individual's knowledge about the OD process, and significant reservations about the donation process, even among those who support OD.⁷ Improved survival rates and the expectation of organ transplantation will enhance life expectancy, and prompted a growing number of physicians and their patients with organ failure to choose transplantation.⁸ Traditionally, organ donation rates have been expressed as Donors Per Million of Population (PMP).¹ According to the Global Observatory on Donation and Transplantation, Saudi Arabia had a rate of 43.6 PMP for total organ transplants in 2021,⁹ compared to the global rate of 33.3 PMP. The high number of surviving donors in Saudi Arabia, particularly those who donate kidneys or livers, surpasses the global donation rate per million inhabitants. The pressure to increase the number of available organs is felt globally, and many nations have implemented programs to increase donation.¹ Deceased donor organ donation pertains to the procedure of obtaining organs from individuals who have passed away, usually as a result of either brain death or circulatory death, with the explicit permission of their families or the individuals themselves prior to their death. Subsequently, these organs are implanted into individuals who require them. On the other hand, living donation involves the deliberate contribution of a particular organ or tissue, such as a kidney or a portion of the liver, by a someone who is alive and typically has a close relationship with the receiver, such as a family member or friend, and is medically suitable for transplantation. Living donors undergo a comprehensive assessment process to ascertain their well-being and compatibility with the recipient. The transplantation procedure takes place while the donors are still alive, which often leads to a more favorable recovery outcome for the recipient owing to the reduced duration of organ preservation.

Saudi Arabia has the most comprehensive and advanced facility for multi-organ transplantation in the Middle East, which is named Organ Transplant Centre.¹⁰ The legislation pertaining to OD and transplantation in Saudi Arabia is overseen by the Saudi Center for Organ Transplantation (SCOT) in accordance with the regulations established by the Ministry of Health.¹¹ The Kingdom of Saudi Arabia has implemented a policy that allows for the legal practice of deceased organ donation, with the condition that explicit consent from the donor or their immediate family is mandatory. In instances when the deceased individual has not previously registered as an organ donor, it is common practice to approach their family to seek approval for organ retrieval. In Saudi Arabia, the practice of living OD, specifically involving kidney or liver donation, is permissible.¹¹ In order to verify that living donors are making a voluntary decision, it is imperative that they offer informed consent and undergo comprehensive medical and psychiatric assessments. In Saudi Arabia, there exist transplantation committees that assume the responsibility of overseeing activities related to OD and transplantation.¹¹ These committees play a crucial role in guaranteeing transparency throughout the process and validating the eligibility of both recipients and donors. Saudi Arabia does not possess a presumptive consent system. Explicit consent from either the donor or their family is required for OD to take place.

A previous study by Altraif et al in Saudi Arabia examined knowledge and attitude toward OD among medical staff and outpatients.¹² The study conducted by Altraif et al revealed that healthcare providers exhibited a more favorable attitude towards and possessed a higher level of awareness regarding OD. Furthermore, the present study revealed that while a 97.6% of the participants possessed knowledge regarding the concept of OD, a comparatively lower proportion of 66.5% demonstrated familiarity with the favorable Islamic perspective on this matter.¹² Another study by Almutairi examined knowledge, attitude, and willingness towards OD among medical and health sciences students and found that the levels of knowledge among students in various specialties were consistently poor, with the exception of those pursuing medicine and physiotherapy.¹³ Furthermore, it was seen that female students achieved higher scores compared to their male counterparts across all three areas of knowledge, attitude, and willingness towards OD.¹³ This study aimed to determine the Saudi population's awareness, attitude, and beliefs regarding organ donation.

Materials and Methods

Study Design

This is an online cross-sectional survey (using Google forms) that was conducted in Saudi Arabia between July and September 2022.

Study Population

Residents of Saudi Arabia and at least 18 years of age were required for participation in our study. Participants under the age of 18 were excluded.

Sampling Procedure

The convenience sampling technique was used to recruit the participants in this study. The survey link was distributed using social media websites (Facebook, Instagram, Twitter, and Snapchat). The inclusion criteria for the study were mentioned in the cover letter to invite eligible individuals to participate. The questions in the survey were mandatory to avoid having missing data.

Questionnaire Tool

In this investigation, we constructed our questionnaire based on previous literature that examined awareness, attitude, and beliefs regarding organ donation.^{1,14–16} The questionnaire consists of two sections: the first section assesses participants' demographic characteristics (age, gender, social status, education, occupation, and monthly income); the second section consists of 15 questions assessing participants' awareness, attitude, and beliefs regarding OD (deceased donor organ donation and living donation). These questions assessed participants' ability to donate organs, people who will be selected to receive their organs, if they have a donation card or not, factors influencing their decision, knowledge toward logistics, their perception of OD (deceased donor organ donation and living donation) if they ever donate an organ, knowledge about which organ can be transplanted, who should give consent for a living donor and after death (deceased donor organ donation and living donation), their opinion on promoting organ donation, the legal process, and which factor will promote organ donation the most. The query "Are you willing to donate your organs?" was used to evaluate a positive attitude toward organ donation (deceased donor organ donation).

Piloting Study

A pilot study was undertaken, involving a sample of 15 individuals who volunteered from the specific group of interest. The purpose of this pilot study was to ascertain the clarity and comprehensibility of the study's inquiries. Subsequently, the questionnaire was subjected to validation by three independent experts who assessed its validity, consistency, and alignment with the study's objectives.

Sample Size

Approximately more than 34 million people live in Saudi Arabia. The calculated minimal sample size with a confidence interval of 95%, a margin of error of 5%, and a 50% response rate is 1000.

Ethical Statement

This study was approved by the Institutional Review Board at Al-Imam Muhammad Ibn Saud Islamic University, Riyadh, Saudi Arabia (Ref: 303/2022).

Statistical Analysis

For categorical variables, descriptive statistics were presented as numbers and percentages (%), while for continuous variables, the mean and standard deviation were used. Using the Chi-square test, differences in participant responses to statements assessing awareness, attitude, and beliefs were compared with socio-demographic characteristics and other perceptions related to OD. Using a binary logistic regression analysis, predictors of a positive attitude toward OD were identified.

Statistical significance was indicated by a p-value of 0.05. All statistical data were analyzed using version 26 of Statistical Packages for the Social Sciences (SPSS) (IBM Corp., Armonk, NY, USA).

Results

In total, 3507 participants completed the survey. Table 1 presents the socio-demographic characteristics of the study participants. The most common age group was 18 to 30 years old (68.1%), with nearly 60% being female, and the vast majority of the study participants (95.8%) were Saudis. More than half of the respondents were single (58.9%), 47.4%

Table 1 Socio-Demographic Characteristics of the Participants (n=3507)

Study Variables	N (%)
Age group	
18–30 years	2389 (68.1%)
31–50 years	919 (26.2%)
51–70 years	191 (5.4%)
71 years and above	8 (0.2%)
Gender	
Male	1472 (42.0%)
Female	2035 (58.0%)
Nationality	
Saudi	3361 (95.8%)
Non-Saudi	146 (4.2%)
Region of residence	
Central Region	721 (20.6%)
Northern Region	566 (16.1%)
Southern Region	532 (15.2%)
Western Region	718 (20.5%)
Eastern Region	970 (27.7%)
Employment status	
Student	1664 (47.4%)
Governmental employed	761 (21.7%)
Non-governmental employed	410 (11.7%)
Unemployed	537 (15.3%)
Retired	135 (3.8%)
Educational level	
Primary school	23 (0.70%)
Secondary school	47 (1.3%)
High school	1018 (29.0%)
Bachelor's degree	2187 (62.4%)

(Continued)

Table 1 (Continued).

Study Variables	N (%)
Postgraduate	232 (6.6%)
Marital status	
Single	2067 (58.9%)
Married	1362 (38.8%)
Divorced	60 (1.7%)
Widowed	18 (0.50%)

were students, and more than two-thirds of the total respondents have at least bachelor's degrees (62.4%). Almost one-quarter of our study participants were from the Eastern region (27.7%).

The assessment of awareness and belief regarding OD (deceased donor organ donation and living donation) is given in Table 2. It can be observed that 10.8% of the participants carried organ donor cards, while 15.0% of the participants were aware of local legislation regarding OD. Also, approximately 85.5% of the respondents believed that OD (deceased

Table 2 Assessment of Participants' Awareness and Belief Regarding Organ Donation (n=3507)

Awareness Statement	N (%)
Do you have an organ donor card?	
Yes	378 (10.8%)
Are you aware of any local or international legislation with regard to organ donation?	
Local legislation	525 (15.0%)
International legislation	85 (2.4%)
Both of the above	233 (6.6%)
None of the above	2664 (76.0%)
Beliefs statement	
Should organ donation be promoted?	
Yes	2052 (58.5%)
Is there any need for effective laws to govern the process of organ donation?	
Yes	2997 (85.5%)
Measures to be taken by the government to be effective in promoting organ donation	
Monetary benefit to the donor family	332 (9.5%)
Giving awards	164 (4.7%)
Free health treatment for the donor family	655 (18.7%)
All above	2356 (67.2%)
In your opinion what is the reason behind refusing to donate an organ for transplant?†	
Risk of medical error	1536 (43.8%)

(Continued)

Table 2 (Continued).

Awareness Statement	N (%)
Risk of organ trafficking	1649 (53.0%)
Religious reasons	1678 (47.8%)
Violation of body integrity	2023 (57.7%)
Factors hold the greatest importance near you when donating an organ	
Age of recipient	259 (7.4%)
Religion of recipient	404 (11.5%)
Health status of the recipient	2384 (68.0%)
Relation to recipient	460 (13.1%)
What is your perception of organ donation?	
To save someone's life	3133 (89.3%)
Out of compassion/sympathy	101 (2.9%)
For money	41 (1.2%)
As a responsibility	232 (6.6%)
For a living donation, who should give consent?	
Donor	3050 (87.0%)
His family	371 (10.6%)
His spouse	86 (2.5%)
For donation after death, who should give consent?	
Family	2936 (83.7%)
Spouse	535 (15.3%)
Friend	36 (0.10%)
Who should make such decisions about organ donation in case of unclaimed dead bodies?	
Charitable organization	394 (11.2%)
Medical colleges/doctors	932 (26.6%)
A judge	939 (26.8%)
No one	1242 (35.4%)

Note: †Variable with multiple response answers.

donor organ donation and living donation) should be promoted. The most common measure to be taken by the government to be effective in promoting OD (deceased donor organ donation and living donation) was free health treatment for the donor family (18.7%), while the most common reason behind refusing to donate an organ for transplant was a violation of body integrity (57.7%). The proposition of utilizing incentives to promote OD and acknowledge the contributions of donors and their families is subject to various factors that warrant careful examination. The ethical difficulties arise from the potential perception of providing free health treatment to the donor family as a means of compensating them for their OD. The ethical implications surrounding pay for OD are a subject of concern in numerous nations, since it raises the potential for exploitation of vulnerable individuals who may be driven by financial incentives.

Moreover, the provision of complimentary healthcare services to donor families would necessitate the allocation of supplementary healthcare resources. The allocation of these resources could be more effectively directed towards addressing wider healthcare needs or enhancing the infrastructure for organ transplantation and the management of waiting lists.

The most prominent factor that holds the greatest importance when donating an organ is the health status of the recipient (68%), while the main perception of OD (deceased donor organ donation and living donation) is to save someone's life (89.3%). Furthermore, 87% of the participants knew that the donor himself should give consent for a living donation, while after death, it was the family who should give consent, according to 83.7% of participants. Additionally, 26.8% were of the opinion that a judge should decide on OD (deceased donor organ donation) in cases of unclaimed dead bodies. In the context of living OD, the donor is a living individual who possesses the capacity to provide informed consent. The principle of autonomy holds significant importance in the field of medical ethics, since it recognizes the inherent value of people's ability to make decisions pertaining to their own bodies. Hence, it is imperative that living donors provide their voluntary and informed consent to the donation process, fully acknowledging the associated risks and advantages. On the contrary, with an individual's death, their capacity to grant permission or exercise agency over their physical form becomes impossible. In order to uphold the principle of autonomy, numerous nations have enacted legislation that permits individuals to articulate their preferences pertaining to OD during their lifetime, often through the utilization of mechanisms such as donor registries or advance directives. In the event that an individual has not articulated their desires prior to their demise, the responsibility of making decisions may be entrusted to their closest living relative.

In Table 3, approximately 41.9% of the respondents were willing to donate body organs under special circumstances (deceased donor organ donation and living donation), whereas 58.5% were willing to donate to anyone. Approximately 1.9% of the individuals had an experience with the donation process in the family or others. In Figure 1, based on multiple response answers, respondents were aware that the most common organ that can be transplanted (deceased donor organ donation and living donation) in Saudi Arabia was the kidney (76.4%), followed by the liver (70.2%) and the heart (50.3%), while the eyes were the least mentioned (20.6%).

Table 3 Assessment of Participants' Attitudes Regarding Organ Donation (n=3507)

Attitude statement	N (%)
Are you willing to donate your organs?[†]	
Yes	754 (21.5%)
Yes under special circumstances	1470 (41.9%)
Yes irrespective of the circumstances	93 (2.7%)
No	1190 (33.9%)
Who would you like to donate your organs to? [†]	
Family member	1372 (39.1%)
Friend	85 (2.4%)
Anyone	2050 (58.5%)
Do you have an experience with the donation process in the family or others?	
Yes	67 (1.9%)

Note: [†]Variable with multiple response answers.

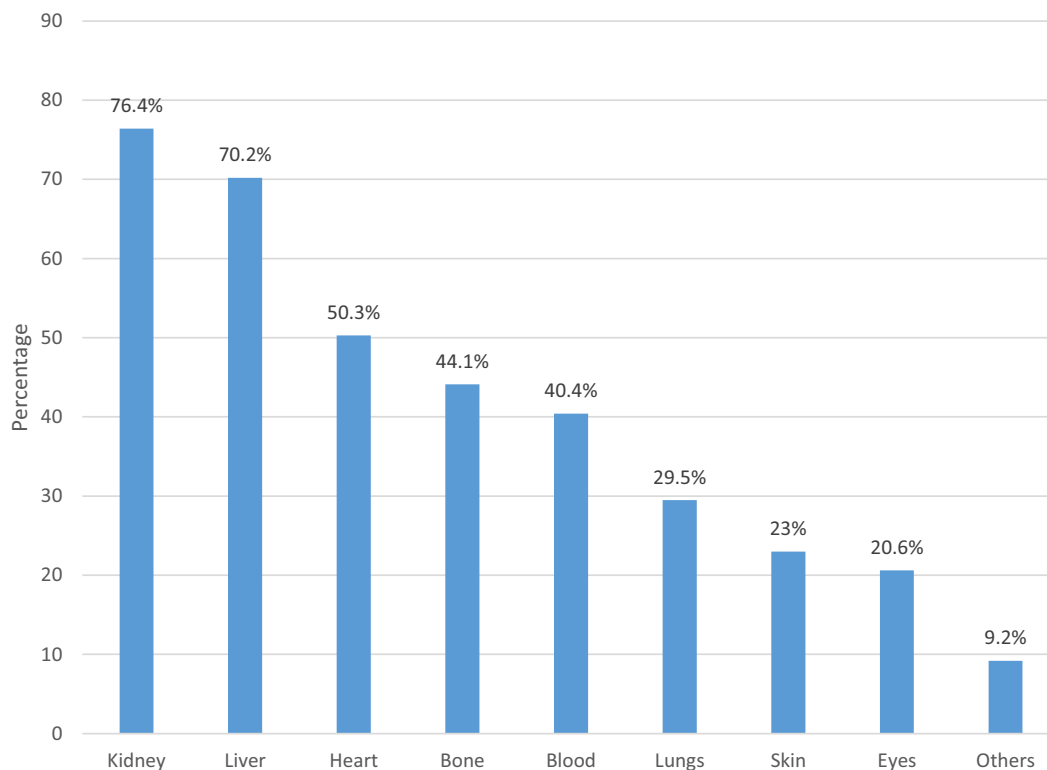


Figure 1 Knowledge about the organs that can be transplanted in KSA.

Table 4 presents the difference in terms of awareness about the legislative body of OD (deceased donor organ donation and living donation) in regards to the socio-demographic characteristics and other related perceptions of participants about OD (deceased donor organ donation and living donation). Based on our results, it was found that the percentage of participants who were aware of the legislative body of OD was higher in the younger age group ($p < 0.001$), residents of the Central Region ($p = 0.001$), students ($p = 0.006$), single participants ($p = 0.002$), aware of the organs that can be transplanted in Saudi Arabia such as, heart ($p = 0.001$), liver ($p = 0.002$), skin ($p = 0.008$), bone marrow ($p = 0.001$), and lungs ($p = 0.018$), belief that OD should be promoted ($p < 0.001$) and willingness to donate body organ ($p < 0.001$). Besides, the participants were aware that blood can be donated ($p = 0.023$).

Table 4 Awareness About Legislation Body of Organ Donation According to the Socio-Demographic Characteristics (n=3507)

Factor	Awareness about the Legislative Body for Organ Donation		P-value §
	Yes N (%) (n=843)	No N (%) (n=2664)	
Age group			
≤30 years	617 (73.2%)	1772 (66.5%)	<0.001***
>30 years	226 (26.8%)	892 (33.5%)	
Gender			
Male	345 (40.9%)	1127 (42.3%)	0.479
Female	498 (59.1%)	1537 (57.7%)	

(Continued)

Table 4 (Continued).

Factor	Awareness about the Legislative Body for Organ Donation		P-value [§]
	Yes N (%) (n=843)	No N (%) (n=2664)	
Region of residence			
Central Region	198 (23.5%)	523 (19.6%)	0.001**
Northern Region	141 (16.7%)	425 (16.0%)	
Southern Region	120 (14.2%)	412 (15.5%)	
Western Region	194 (23.0%)	524 (19.7%)	
Eastern Region	190 (22.5%)	780 (29.3%)	
Employment status			
Student	440 (52.2%)	1224 (45.9%)	0.006**
Employed	261 (31.0%)	910 (34.2%)	
Unemployed	142 (16.8%)	530 (19.9%)	
Educational level			
High school or below	246 (29.2%)	842 (31.6%)	0.185
Bachelor's degree or higher	597 (70.8%)	1822 (68.4%)	
Marital status			
Never been married	535 (63.5%)	1532 (57.5%)	0.002**
Been married	308 (36.5%)	1132 (42.5%)	
Organ that can be transplanted in KSA[†]			
Kidney	645 (76.5%)	2036 (76.4%)	0.959
Heart	431 (51.1%)	1334 (50.1%)	0.594
Eyes	209 (24.8%)	514 (19.3%)	0.001**
Liver	628 (74.5%)	1834 (68.8%)	0.002**
Skin	222 (26.3%)	584 (21.9%)	0.008**
Bone marrow	414 (49.1%)	1131 (42.5%)	0.001**
Lungs	276 (32.7%)	759 (28.5%)	0.018*
Beliefs that organ donation should be promoted			
Yes	555 (65.8%)	1497 (56.2%)	<0.001***
No	288 (34.2%)	1167 (43.8%)	
Willingness to donate body organ			
Yes	647 (76.7%)	1670 (62.7%)	<0.001***
No	196 (23.3%)	994 (37.3%)	

Notes: [†]Variables with multiple response answers. [§]P-value has been calculated using the Chi-square test. Bold text indicates significance. *Significant at p<0.05 level. **Significant at p<0.01 level. ***Significant at p<0.001 level.

When measuring the difference in terms of the willingness to donate organs (deceased donor organ donation and living donation) according to the socio-demographic characteristics (Table 5), it was found that the percentage of participants who were willing to donate body organs was higher among the younger age group ($p<0.001$), gender female ($p<0.001$), residents in the Central Region ($p<0.001$), student participants ($p<0.001$), single participants ($p<0.001$), beliefs that organ donation should be promoted (deceased donor organ donation and living donation), and knowledge about all the organs that can be transplanted (deceased donor organ donation and living donation) in Saudi Arabia ($p<0.001$).

In Table 6, the percentage of participants who believed that OD (deceased donor organ donation and living donation) should be promoted was significantly higher among Central Region residents ($p=0.034$), student participants ($p=0.005$), and those who were aware of all the organs that could be transplanted in Saudi Arabia ($p<0.001$).

Predictors of Positive Attitude Towards Organs Donation

Binary logistic regression analysis identified that younger age (31–50 years), male gender, being unemployed or working in a government job, and being married were factors that decreased the likelihood of having a positive attitude towards OD (deceased donor organ donation and living donation) (Table 7).

Table 5 Willingness to Donate Organs According to the Socio-Demographic Characteristics (n=3507)

Factor	Willingness to Donate Body Organ		P-value [§]
	Yes N (%) (n=2317)	No N (%) (n=1190)	
Age group			
≤30 years	1634 (70.5%)	755 (63.4%)	<0.001***
>30 years	683 (29.5%)	435 (36.6%)	
Gender			
Male	897 (38.7%)	575 (48.3%)	<0.001***
Female	1420 (61.3%)	615 (51.7%)	
Region of residence			
Central Region	494 (21.3%)	227 (19.1%)	<0.001***
Northern Region	383 (16.5%)	183 (15.4%)	
Southern Region	353 (15.2%)	179 (15.0%)	
Western Region	503 (21.7%)	215 (18.1%)	
Eastern Region	584 (25.2%)	386 (32.4%)	
Employment status			
Student	1168 (50.4%)	496 (41.7%)	<0.001***
Employed	744 (32.1%)	427 (35.9%)	
Unemployed	405 (17.5%)	267 (22.4%)	

(Continued)

Table 5 (Continued).

Factor	Willingness to Donate Body Organ		P-value [§]
	Yes N (%) (n=2317)	No N (%) (n=1190)	
Educational level			
High school or below	715 (30.9%)	373 (31.3%)	0.768
Bachelor's degree or higher	1602 (69.1%)	817 (68.7%)	
Marital status			
Never been married	1438 (62.1%)	629 (52.9%)	<0.001***
Been married	879 (37.9%)	561 (47.1%)	
Organ that can be transplanted in Saudi Arabia[†]			
Kidney	1884 (81.3%)	797 (67.0%)	<0.001***
Heart	1277 (55.1%)	488 (41.0%)	<0.001***
Eyes	555 (24.0%)	168 (14.1%)	<0.001***
Liver	1755 (75.7%)	707 (59.4%)	<0.001***
Skin	619 (26.7%)	187 (15.7%)	<0.001***
Bone marrow	1147 (49.5%)	398 (33.4%)	<0.001***
Lungs	773 (33.4%)	262 (22.0%)	<0.001***
Beliefs that organ donation should be promoted			
Yes	1600 (69.1%)	452 (38.0%)	<0.001***
No	717 (30.9%)	738 (62.0%)	

Notes: [†]Variables with multiple response answers. [§]P-value has been calculated using the Chi-square test. Bold text indicates significance. ***Significant at p<0.001 level.

Table 6 Beliefs That Organ Donation Should Be Promoted According to the Socio-Demographic Characteristics (n=3507)

Factor	Beliefs that Organ Donation Should be Promoted		P-value [§]
	Yes N (%) (n=2052)	No N (%) (n=1455)	
Age group			
≤30 years	1391 (67.8%)	998 (68.6%)	0.615
>30 years	661 (32.2%)	457 (31.4%)	
Gender			
Male	871 (42.4%)	601 (41.3%)	0.500
Female	1181 (57.6%)	854 (58.7%)	

(Continued)

Table 6 (Continued).

Factor	Beliefs that Organ Donation Should be Promoted		P-value [§]
	Yes N (%) (n=2052)	No N (%) (n=1455)	
Region of residence			
Central Region	439 (21.4%)	282 (19.4%)	0.034*
Northern Region	342 (16.7%)	224 (15.4%)	
Southern Region	286 (13.9%)	246 (16.9%)	
Western Region	436 (21.2%)	282 (19.4%)	
Eastern Region	549 (26.8%)	421 (28.9%)	
Employment status			
Student	1006 (49.0%)	658 (45.2%)	0.005**
Employed	689 (33.6%)	482 (33.1%)	
Unemployed	357 (17.4%)	315 (21.6%)	
Educational level			
High school or below	659 (32.1%)	429 (29.5%)	0.097
Bachelor's degree or higher	1393 (67.9%)	1026 (70.5%)	
Marital status			
Never been married	1232 (60.0%)	835 (57.4%)	0.116
Been married	820 (40.0%)	620 (42.6%)	
Organ that can be transplanted in Saudi Arabia[†]			
Kidney	1654 (80.6%)	1027 (70.6%)	<0.001***
Heart	1116 (54.4%)	649 (44.6%)	<0.001***
Eyes	522 (25.4%)	201 (13.8%)	<0.001***
Liver	1544 (75.2%)	918 (63.1%)	<0.001***
Skin	570 (27.8%)	236 (16.2%)	<0.001***
Bone marrow	1019 (49.7%)	526 (36.2%)	<0.001***
Lungs	708 (34.5%)	327 (22.5%)	<0.001***

Notes: [†]Variables with multiple response answers. [§]P-value has been calculated using Chi-square test. Bold text indicates significance. *Significant at p<0.05 level. **Significant at p<0.01 level. ***Significant at p<0.001 level.

Discussion

The objective of this study was to assess the level of awareness, attitude, and beliefs among the general population in Saudi Arabia with regards to OD (deceased donor organ donation and living donation). In general, there was an positive attitude toward OD (deceased donor organ donation and living donation). Approximately 66.1% of our population was willing to donate an organ (deceased donor organ donation and living donation). Of them, 58.5% were open to donating to anyone who was in need. Conversely, a significant proportion of 39.1% indicated a preference for donating exclusively to family members. However, only 1.9% reported having an experience with the donation process on the family or others

Table 7 Predictors of Positive Attitude Towards Organs Donation

Study Variables	Odds Ratio of Having Positive Attitudes Towards Organs Donation (95% Confidence Interval)	P-value
Age group		
18–30 years (Reference category)	1.00	
31–50 years	0.76 (0.65–0.89)	<0.001 ***
51–70 years	0.75 (0.56–1.01)	0.056
71 years and above	0.51 (0.13–2.05)	0.345
Gender		
Female (Reference category)	1.00	
Male	0.68 (0.59–0.78)	<0.001 ***
Nationality		
Non-Saudi (Reference category)	1.00	
Saudi	0.92 (0.61–1.39)	0.682
Employment status		
Student (Reference category)	1.00	
Governmental employed	0.85 (0.72–1.00)	0.049*
Non-governmental employed	0.92 (0.74–1.14)	0.445
Unemployed	0.72 (0.60–0.87)	<0.001 ***
Retired	0.87 (0.61–1.24)	0.437
Educational level		
Primary school (Reference category)	1.00	
Secondary school	0.69 (0.39–1.24)	0.211
High school	1.02 (0.87–1.18)	0.849
Bachelor's degree	1.02 (0.88–1.18)	0.820
Postgraduate	1.02 (0.77–1.35)	0.917
Marital status		
Single (Reference category)	1.00	
Married	0.71 (0.62–0.82)	<0.001 ***
Divorced	0.77 (0.46–1.29)	0.318
Widowed	0.41 (0.16–1.04)	0.060

Notes: Bold text indicates significance. *Significant at p<0.05 level. ***Significant at p<0.001 level.

(living organ donation). These findings are consistent across the literature, wherein most of the population indicated their preparedness to donate when someone needed an organ.^{3,5,17-22} Other studies reported that the respondents agreed to donate once they were dead (deceased donor organ donation).^{4,23}

A previous study conducted by Altraif et al revealed that healthcare providers exhibited a more favorable attitude towards and possessed a higher level of awareness regarding OD.¹² In addition, Altraif et al study revealed that while a 97.6% of the participants possessed knowledge regarding the concept of OD. In another study conducted by Almutairi to assess the knowledge, attitude, and desire of medical and health sciences students towards OD. The findings revealed that students across different specializations exhibited consistently inadequate levels of knowledge.¹³

In this study, we found that positive attitudes towards OD (deceased donor organ donation and living donation) were significantly dependent on age, female gender, being single, and being unemployed. A previous study on university students by Almutairi found that female students achieved higher scores compared to their male counterparts across all three areas of knowledge, attitude, and willingness towards OD.¹³ In Northern Nigeria, a study found that gender, marital status, educational attainment, ethnicity, and religion were significant predictors of willingness to donate.⁴ In contrast, a prior investigation carried out in Madinah, Saudi Arabia, yielded results indicating the absence of statistically significant variations in people's willingness to contribute to OD based on factors such as age, gender, religion, or income.¹⁷ More investigations are required in order to establish the true effect of willingness to donate organs among the socio-demographic variables involved. Older individuals may have had more life experience and exposure to situations in which OD could have had a significant impact.^{24,25} Female gender is commonly associated with caring and compassion.^{24,25} Due to their nurturing nature and greater willingness to assist others, they may be more inclined to support OD (deceased donor organ donation and living donation). Being single may afford greater autonomy in decision-making, allowing for a more individualistic and positive outlook on OD (deceased donor organ donation and living donation).²⁶ Unemployed individuals may have more time for activities such as volunteering or contributing to social causes, such as OD (deceased donor organ donation and living donation).²⁷ Other important variables that might have an influence on participants attitude towards OD include religious and cultural beliefs, education level, and personal experiences. At the same time, its worth mentioning that in many cases exploited donors are young, unemployed, uneducated people.²⁸⁻³⁰ This could be due to their vulnerability, lack of education, and financial desperation.²⁸

In our study, respondents were aware that the most common organ that can be transplanted (deceased donor organ donation and living donation) in Saudi Arabia was the kidney (76.4%), followed by the liver (70.2%) and the heart (50.3%), while the eyes were the least mentioned (20.6%). This was confirming the findings from previous studies from Saudi Arabia and the Middle East that kidneys are the most needed organs, followed by the corneas, liver, and heart.^{31,32} Although we have seen positive attitudes among our study participants, the participants awareness of OD (deceased donor organ donation and living donation) seems to be suboptimal. Only 24% were aware of the legislative body for OD (deceased donor organ donation and living donation), and only 10.8% had organ donor cards. These results are comparable to those of the Alsharidah et al study, which reported that only 30% of the Riyadh population in Saudi Arabia knew about the Saudi Center for Organ Donation.³ However, in Al Kharj city in Saudi Arabia, another study found that approximately 35.6% of the participants were not aware that OD (deceased donor organ donation and living donation) is legal in Saudi Arabia, and nearly all (97%) do not have accurate information about where to go if they want to express their willingness to be organ donors after death/sign a donor card.¹⁸ Therefore, awareness campaigns are needed to educate the community about the importance of OD (deceased donor organ donation and living donation) to help people with dire organ needs.³³ Increased donation rates, public education, accurate information about the donation process, and addressed concerns are all possible outcomes of awareness campaigns to promote OD (deceased donor organ donation and living donation), which play a crucial role in addressing the various challenges and misconceptions surrounding organ donation and transplantation.³³

Our survey revealed that individuals belonging to the younger age group, inhabitants residing in the Central Region, students, and those who are single had a higher level of awareness. This could be due to the fact that the central region of Saudi Arabia encompasses several prominent cities within the Kingdom, including the capital city of Riyadh. Individuals residing in the central region frequently enjoy enhanced accessibility to healthcare facilities, educational establishments, and sources of information.^{34,35} Furthermore, it is worth noting that the central region exhibits a greater degree of population diversity, as well as a more comprehensive and resilient healthcare infrastructure.^{34,35}

Nevertheless, our analysis revealed no statistically significant disparities in the level of awareness regarding the legislative body for OD when considering factors like as gender or educational attainment. This observation contrasts with the results of a prior investigation conducted by Iliyasu et al, wherein notable disparities in the recognition of OD (deceased donor organ donation and living donation) were identified based on educational attainment and ethnic background.⁵ In a study conducted by Khalid et al, it was determined that factors such as age, gender, occupation, and marital status did not have significant relevance to knowledge. However, religion emerged as a noteworthy component.²⁰ Other factors that could influence awareness and knowledge of OD (deceased donor organ donation and living donation) can be identified through further research among different study populations. In order to create successful awareness campaigns and strategies, it is essential to first identify the components that drive awareness. Having this knowledge allows for better message personalization and the launch of successful campaigns.³³

Regarding the beliefs about OD (deceased donor organ donation and living donation), our study found that there are overall positive beliefs about OD (deceased donor organ donation and living donation) among our study population. Nearly 60% of our study participants agreed that OD (deceased donor organ donation and living donation) should be promoted, while 85.5% were in favor of effective laws that may foresee the process of OD. Furthermore, more than two-thirds (67.2%) believed that giving awards, monetary benefits, and free health treatment to the family donor could be helpful in effectively promoting OD (deceased donor organ donation and living donation). Likewise, nearly 90% of our respondents were sure that OD's (deceased donor organ donation and living donation) purpose is to save someone's life. However, in the case of unclaimed dead bodies, our participants were seen to have mixed reactions and seemed undecided about their preferred person to decide about OD (deceased donor organ donation and living donation) (35.4%). In a previous study in India, 58.0% of the participants were in favor of promoting OD. This was different from the findings of another study that was conducted in Riyadh, Saudi Arabia, in which 77.7% expressed a willingness to donate, and only 29.1% were willing to donate only to their relatives.^{19,21} Conversely, we found that the increased belief in OD (deceased donor organ donation and living donation) promotion was significantly associated with residents living in the Central Region, students, and the awareness that all body organs can be transplanted in Saudi Arabia.

A previous study conducted in Riyadh, Saudi Arabia, reported that religion was not a barrier to OD, but belief that their bodies should be kept intact and ignorance of OD were assumed to be the major barriers to organ donation among the population.³ Notwithstanding these findings, in the UAE, a study indicated that 65.5% were open to allowing their loved ones to donate their organs in case they become brain dead, and 38% of them were of the opinion that if they donated their organs or tissues at the time of death, this could give a great benefit to someone in need.²³ However, in our study, the most common barrier to OD (deceased donor organ donation and living donation) was the belief of body integrity violation (57.7%), followed by the risk of organ trafficking (53%), religious reasons (47.8%), and risk of medical error (43.8%). While the most common consideration for donating an organ to the recipient was the recipient's health status (68%), other considerations with less importance were the recipient's relationship (13.1%), religion (11.5%), and age of the recipient (7.4%). In a study by Iliyasu et al, the willingness to donate organs fell into the following categories: religion, moral obligation, and compassion, among others.⁵

The improvement of OD (deceased donor organ donation and living donation) encompasses a diverse range of efforts that entail the implementation of various approaches, legislation, and awareness campaigns. The factors encompass strong government policies and support, healthcare professional training, and comprehensive education and awareness campaigns. The promotion of deceased donor organ donation and live donation necessitates a comprehensive strategy that incorporates various facets, including education, awareness, and community engagement. To begin with, it is imperative to initiate extensive public education efforts across several media platforms in order to clear up misconceptions, enhance understanding regarding the severe scarcity of organs, and underscore the life-preserving consequences of organ donation. In order to enhance public education, it is advisable to involve healthcare experts and local organizations in the staging of instructive sessions and workshops. Moreover, it is imperative to establish a conducive atmosphere for prospective living donors through the provision of financial aid, emotional guidance, and legal safeguards. Engaging in partnerships with educational institutions, professional environments, and religious establishments to facilitate dialogues regarding donation and its ramifications can effectively mitigate the social stigma around this subject matter and cultivate a charitable attitude. In order to promote deceased and living organ donation and so save many lives, it is crucial to employ a multifaceted approach that encompasses the transmission of knowledge, active engagement of the community, and the establishment of robust support networks.

This study has limitations. The cross-sectional study design restricted our ability to examine causality between study variables. The use of an online survey study design might have affected the generalizability of our study findings (60% of the study participants were females), as the study population could have been restricted to social media users. Therefore, our findings should be interpreted carefully.

Conclusion

Although there was a positive attitude and belief about OD (deceased donor organ donation and living donation), the study participants awareness about it was suboptimal. Younger age, male gender, being unemployed or working in a government job, and being married were factors that decreased the likelihood of having a positive attitude towards OD (deceased donor organ donation and living donation). It is necessary to address the gaps in knowledge about OD. Awareness programs are needed to narrow the gaps in knowledge.

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics Approval and Informed Consent

This study was approved by the Institutional Review Board at Al-Imam Muhammad Ibn Saud Islamic University, Riyadh, Saudi Arabia (Ref: 303/2022). Informed consent was obtained from all subjects involved in the study. The study was designed and conducted in accordance with the ethical principles that have their origin and comply with in the Declaration of Helsinki.

Author Contributions

Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Writing original draft, Writing – review & editing, All authors. All authors contributed to data analysis, drafting or revising the article, have agreed on the journal to which the article will be submitted, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

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Disclosure

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