Perception and Attitude among Adults Attending Primary Health Care Centers in Al-Madinah Regarding Blood and Organ Donation

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ABSTRACT

Organ donation is a lifesaving procedure for inpatients with end-stage organ failure. It has two types: organ taken from a live donor and cadaveric organ donation after death. Blood donation is also significant in saving lives, KSA mainly provides the blood transfusion facility basically in hospital-based blood banking system, so it is accessible by everyone. To assess the perception and attitude among adults attending primary health care centers in Al-Madinah regarding blood and organ donation to formulate a base for further educational interventions to improve the perception towards blood and organ donation among them. This was a cross-sectional study conducted at primary health care centers in Al-Madinah, Saudi Arabia. A total 670 adult participants completed a self-administrated questionnaire concerning blood and organ donation. Out of 670 adult participants, 69.3% were males with the mean age of (35±8.77). The majority of the respondents (83.1%) were with a university degree or more and 95.4% lived in urban areas. Over half of them (58.2%) did not donate blood before and (65.2%) depended on friends and family to get information about blood donation. Our results showed a high knowledge level among the population regarding blood donation, and it was significantly associated with the educational level (P=0.000) and occupation (P=0.000). Whereas, more than half of the population (57.7%) said that no one ever asked them to donate blood. The respondents showed poor knowledge about organ donation, and as a consequence, most of them showed negative attitudes. Only 1.6% of the participants had a history of organ donation either as a donor or recipient, 16.6% were willing to donate their organs before death and 32.2% want to donate their organs after death. This study found a high knowledge levels among the population, with more negative attitudes towards blood donation. Generally, the knowledge regarding organ donation was relatively poor. Their attitudes regarding organ donation and transplantation established a significant hesitancy, and young participants and highly educated people showed more positive attitudes. So, we recommend holding more physical campaigns in vital institutions to encourage people to donate blood. The Ministry of Health should hold health education and awareness sessions and campaigns to support the knowledge, attitudes, and beliefs of the public towards organ and blood donation.

Key Words: *Perception, Attitude PHC, Blood donation, Organ donation, Al-Madinah, KSA*

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INTRODUCTION

Organ donation is gifting a body part or organ to other somebody who requests a transfer to help him to survive normally [1]. Here are two categories of organ donation. The main one is organ occupied from a living giver, and the other one is cadaveric tissue or organ contribution after decease [2, 3].

The principal determination of the Islamic council in the Kingdom of Saudi Arabia "KSA" (Senior Ulama Commission) around organ donation and transplantation was delivered in 1982. It permitted organ and tissue transplantation from both alive and cadaveric contributors. This resolution created a novel era in organ transplantation in Saudi Arabia, causing the establishment of the Saudi Center of organ transplantation (SCOT) in 1984 [4].

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Inadequacy of tissue or organ donation in Saudi Arabia is considered a chief obstacle for transplantation despite the great efforts for motivation and education of the Saudi community regarding organ donation [5]. In 2009, there was 6,000 Saudi patients across the Kingdom awaiting organ transplants [6].

Studies on knowledge and attitudes towards organ donation have revealed that the contribution of health care specialists in providing knowledge about organ donation and transplantation was very limited [7]. Although, there is a considerable lack of knowledge, 74.1% of people are willing to donate [5]. In disagreement with it, Alam (2007) reported that several Saudi families are unwilling to donate organs and he attributed this to the knowledge and religious beliefs that play a significant role in affecting an individual's decision to donate her/his organs after death [8].

Eight main factors were identified in a systematic review carried out by Irving (2012) to affect the individual's decision about organ donation. These factors include religion-related beliefs, relational ties, cultural influences, body probity, health-care system interaction, family refusal, reservations about the process of organ donation, and knowledge about organ donation [9].

Blood donation is fundamental in saving lives [10]. In KSA, the blood transfusion facility is basically a hospital-based blood banking system where blood banks are responsible for the service completely, including the donors' recruitment, testing the donated blood for infection, and the preparation, storage, and issue of components (Fresh frozen plasma, platelet concentrate, packed RBCs, filtered products and cryoprecipitate) [11].

In KSA, tertiary care hospitals are providing highly specialized and free services, such as transplant surgeries, open heart surgery, cancer surgical treatment, and blood for patients with bleeding and hematological disorders [11, 12]. These services necessitate the continuous availability of blood supply from donors [13]. In addition, road traffic accidents represent a major challenge for the blood transfusion services in KSA [13].

Throughout the world, the only source of blood is blood donation, however, the recruitment of non-remunerated, voluntary donors is a major challenge [14]. The rate of blood donation is high in high-income countries (39.2 per 1000 population) compared to middle (12.6 per 1000 population) and low-income countries (4 per 1000 population) as stated by the World Health Organization (WHO) [15].

One of the important concerns in blood donation is the fact that only a relatively small percentage of the eligible population actually donate blood on unpaid system and regular basis and a significant percentage of them are delayed temporarily or permanently because of strict criteria being added for blood safety [16].

A study was carried out in the Western Region of Saudi Arabia by Soubhanneyaz to assess the public awareness, attitudes, and beliefs towards organ donation. The study results showed that 73.5% of the respondents were willing to donate their organs with no significant differences between males and females, although only 4.6% of them reported to have a donation card.

The majority of them knew the organ which can be donated; although 64.5% of them had no knowledge about the regulations and legislation of organ donation. The respondents believed that governmental incentives in the form of monetary and health treatment for donor family and awards would be effective in promoting organ donation [17].

In another cross-sectional study from rural and urban areas, among a total of 897 participants from primary health care (PHC) centers during 2008, 57.3% were from the urban areas. In the rural areas, they had a significantly lower percentage of knowledge about organ donation and transplantation and reported less knowledge about the requirements and procedures for organ donation [7].

In India, Alex *et al*. (2017) assessed the knowledge and attitude of the medicinal scholars to organ or tissue donation and transplantation. Feminine scholars had advanced mean scores in knowledge and attitude compared to male students. The first year students had highest scores for knowledge whereas the third year students showed the highest mean attitude score. There was an affirmative relationship between mean knowledge, and attitude of students regarding organ or tissue donation and transplantation [18].

In Lebanon, Ariss *et al*. (2014), investigated the knowledge, attitudes, and perception of health care providers on tissue or organ transplantation. Only 23.4% of them were knowledgeable regarding organ transplantation (i.e. able to enumerate organs that can be donated). None of the studied factors were meaningfully linked by knowledge. Majority of them supported organ donation (83.3%). Religious reasons were then main reasons for healthcare professionals to be against/undecided about transplantation [19].

In Riyadh (2014), a cross sectional study was carried out among Saudi adults who attended shopping malls, and revealed that 53.3% had previously donated blood, and 39% had donated more than once. The knowledge percentage mean score was 58.1%. Good level of knowledge was observed among only 11.9% of the participants. The attitude percentage mean score towards donation was 75.5% and positive attitude was observed among 31.6% of them. Donation was significantly ($p<0.001$) more prevalent among males (66%) than

females (13.3%). A higher knowledge score (P=0.01), a higher attitude score (P=0.001), and male sex (P<0.001) were significant predictors of blood donation. An inability to reach the blood donation centers and a fear of anemia were the main reasons for females not donating blood whereas a lack of time was the main reason for males [20]. In United Kingdom (UK), Atherley *et al*. (2016) obtained information from participants in Barbados and observed that 53% of them had formerly given blood; nearly half were household/spare donors, and 36.2% were failed donors and had not contributed in the previous 2 years. Deficiency regarding knowledge of blood donation requirements, maximum yearly donations and deferral factors were reported. Most participants (79%) were eager to donate if they had more information. Higher educational level and previous donation were considerably linked with better knowledge and attitude scores whereas single status, female gender and younger age were factors less likely accompanying by blood donation [21].

Jordan (2014), Abderrahman, and Saleh used self-reported questionnaires for blood donors and revealed that only 28.6% of them scored their knowledge above the average. Friends, broadcasting, social media and religion were meaningfully related to their awareness and attitudes related to blood donation [22].

Study rationale

- The number of deaths due to organ failure are increasing worldwide and organ transplantation is a new modality of treatment which can save life, but there are no sufficient organs due to lack of public awareness and poor perception.
- The Saudi Center of Organ Transplantation (SCOT) facilitates and organizes the processes of donation and transplantation but most of people do not know about it.
- The demand for blood and its products has progressively increased, particularly in developing countries. Despite that, evidences indicate that there is a great shortage of blood and blood products in these countries and Saudi Arabia is not an exception.
- In the kingdom of Saudi Arabia, there are relatively few voluntary blood donors; most probably due to lack of sufficient knowledge and prevalence of misconceptions regarding blood donation.
- Up to knowledge of the researcher, there is no previous study conducted in Al-Madinah city exploring the perception and attitude of the community toward organ and blood donation together.

Aim of the study

To assess the perception and attitude among adults attending primary health care centers in Al-Madinah regarding blood and organ donation to formulate a base for further educational interventions to improve the perception towards blood and organ donation among them.

Specific objectives

1. To determine the perception and attitude towards organ donation among adults attending primary healthcare centers, Al-Madinah.

To evaluate attitudes towards blood donation among adults attending primary healthcare centers, Al-Madinah.

2. To identify the factors that influence blood or organ donation, acceptance or refusal among adults attending primary healthcare centers, Al-Madinah.

MATERIALS AND METHODS

Study design

A cross-sectional study design was adopted.

Study area and setting

The study was carried out at primary health care centers, belonging to the Ministry of Health (MOH), Al-Madinah city (n=40). Al-Madinah city is one of the main cities in Kingdom of Saudi Arabia located in the western region with a total population of 1,300,000 [23].

Study period

The data was collected during a period of two months from April 1st to May 31st, 2018.

Study population

All adult participants attending the primary healthcare centers belonging to MOH in Al-Madinah city throughout the period of the study were eligible for inclusion in the study, provided that they fulfill the inclusion criteria.

Inclusion criteria: All Saudi adults attending the primary health care

Exclusion criteria: None, we excluded only the refusing persons.

Sample size

The minimum sample size for this study was decided according to Swinscow [24], as follows:

$$n = \frac{Z^2 \times P \times Q}{D^2} \quad (1)$$

Where:

n: Calculated sample size

Z: The z-value for the selected level of confidence (1- α) = 1.96.

P: An estimated prevalence of having positive attitude towards blood/organ donation as 50% since there is no specific figure for that.
Q: (1 – 0.50) = 50%, i.e., 0.50
D: The maximum acceptable error = 0.05.

So, the calculated minimum sample size was:

$$n = \frac{(1.96)^2 \times (0.50) \times (0.50)}{(0.05)^2} = 384 \qquad (2)$$

The sampling technique
Two-stage sampling technique was adopted to select the sample size as follows:

Stage 1
Al-Madinah city was stratified into four directional sectors (North, South, East and West) and one primary health care center was randomly selected from each sector by a simple random technique

Stage 2
The sample size was equally distributed between the chosen 4 primary healthcare centers. Thus, approximately 96 attendants were chosen randomly from each center. Systematic random technique was adopted in each center to select 20 attendants daily from each center. Thus 5 working days in each center were sufficient to select the required sample size. Sampling interval depended on the number of attendants every day.

Data collection tool
A self-administered questionnaire was used for data collection (Appendix 1). It was composed of three main sections. Section 1 included socio-demographic characteristics of the participants (age, gender, marital status, education level, occupation, residence, and history of chronic diseases). The second sections assessed the practice, perception and attitude towards blood donation (13 items). It had been used previously in Jeddah, Saudi Arabia and proved to be valid [25]. The third section assessed participants' awareness, perception and attitude regarding organ donation during the life or after death (17 items). It had been validated and previously used by Al-Harthi and Alzahrany [26].
Permission to utilize both questionnaires was asked from the two main authors through email.

Data collection technique
The researcher distributed the questionnaire on each selected patient in the chosen primary healthcare centers and explained the nature of the research and confidentiality of the information that given to them, then the consent was taken from them verbally.

Scoring system
For each statement, a score of (0) was assigned for negative response and a score of (1) was assigned for positive response. The total score for perception was computed and score percentage was obtained for comparisons.

Pilot study
A pilot study was conducted on 40 attendants from one PHC center not included in the study to evaluate data collection tool and methodology of study and estimate the duration of questionnaire completion. The results were excluded from the main study.

Data management and analysis plan
All data was entered and analyzed using SPSS 23 by using appropriate statistical methods for description and analysis. P-value less than 0.05 was considered for statistical significance.

Ethical considerations
The research proposal was approved by the Regional Research and Ethics committee in Al-Madinah. Approval of the joint program of family medicine in Al-Madinah was requested. Permission from directors of the involved PHC centers was obtained.

RESULTS AND DISCUSSION

Table 1 shows the socio-demographic characteristics of 670 adult participants, 69.3% of them were males with mean age of (35±8.77). Most of the participants were married (71.8%) and (83.1%) were with a university degree or more. 95.4% of them were from urban areas. The majority of them (82.5%) did not suffer from any chronic diseases. Over half of the population (58.2%) did not have any history of blood donation, 15.4% of them donated once, 9.1% donated twice, 16.7% donated more than two times and only 0.6% donated regularly. About (65.2%) depended on friends and family to get information about blood donation.

Table 1. Description of Socio-demographic Characteristics of the Participants (N=670)

Parameter	Frequency	Percent
Gender		
• **Male**	464	69.3%
• **Female**	206	30.7%
Age		
• **From 18 - 32 Years Old**	258	38.5%
• **From 33 - 46 Years Old**	311	46.4%
• **From 47 - 60 Years Old**	101	15.1%
Mean±SD	35±8.77	

Marital Status		
• **Single**	169	25.2%
• **Married**	481	71.8%
• **Divorced**	14	2.1%
• **Other**	6	0.9%
Education Level		
• **Primary**	1	0.1%
• **Intermediate**	7	1.0%
• **Secondary**	50	7.5%
• **University or More**	557	83.1%
• **Other**	55	8.2%
Occupation		
• **Governmental Sector**	451	67.3%
• **Military Sector**	24	3.6%
• **Private Sector**	53	7.9%
• **Other**	57	8.5%
• **Unoccupied**	85	12.7%
Residency		
• **Urban**	639	95.4%
• **Rural**	8	1.2%
• **Other**	23	3.4%
Chronic Diseases		
• **Bronchial Asthma**	19	2.8%
• **Hypertension**	36	5.4%
• **Diabetes Mellitus**	59	8.8%
• **Other**	24	3.6%
• **None**	553	82.5%
History of Blood Donation		
• **Never**	390	58.2%
• **Once**	103	15.4%
• **Twice**	61	9.1%
• **More than Two Times**	112	16.7
• **Regularly**	4	0.6%
Source of Knowledge about Blood Donation (Multiple Selection)		
• **Journal or Magazine**	42	6.3%
• **Social Media**	255	38.1%
• **Family and Friends**	437	65.2%
• **Blood Bank Workers**	65	9.7%
• **No Specific Source**	73	10.9%

Table 2 assessed the knowledge about blood donation. The whole population demonstrated a good knowledge about blood donation, as all of the participants (100%) knew that blood donation did not lead to infertility and vitality, 99.1% knew that blood donation was not harmful to health, 97.6% were aware that donation of blood did not lead to permanent weakness and anemia, 94.9% believed that blood should not be imported from abroad, 92.8% knew that blood donation did not lead to fainting and death, 89.7% believed that it was not painful to donate blood, and 87.9% believed that blood donation did not affect the physical strength. Relatively lower level of knowledge was assessed regarding the following two parameters; donees are at risk to get infected with HIV or hepatitis B or C (77%) and donors should be given gifts for their donation (71.9%).

Table 2. Knowledge of Participants towards Blood Donation (N=670)

Parameter	Bad Knowledge	Good Knowledge
A token gift/money should be given to donors	28.1%	71.9%
Blood should be imported from abroad	5.1%	94.9%
Donor has risk for contracting infection like HIV or Hepatitis B& C infection	23.0%	77.0%
Blood donation leads to infertility and loss of vitality	0.0%	100.0%
Blood donation leads to permanent weakness/ anemia	2.4%	97.6%
Blood donation leads to fainting or death	7.2%	92.8%
Blood donation affects physical strength	12.1%	87.9%
Blood donation is a painful procedure	10.3%	89.7%
Blood donation is harmful to health	0.9%	99.1%

Table 3 investigated the reasons for not donating blood. The most frequent misinterpretation among the participants was regarding donating blood if blood donation camp was arranged in the university premises (71.5%), 57.7% had never been asked to donate blood, 42.6% had no specific reason for not donating, 39.5% had medical reasons, 37.7% did not have enough time, 37.5% have never thought of donating blood and 32.3% did not have adequate information about blood donation.

Table 3. Reasons for not Donating Blood for not Donors (N=390)

Parameter	Negative Attitude	Positive Attitude
I have unknown fear	22.3%	77.7%
I am unaware of collection facility	22.1%	77.9%
The collection facility is very far from my place	19.7%	80.3%
I do not have enough time to donate	37.7%	62.3%

I am concerned about sterilization of equipment	31.5%	68.5%
No one ever asked me for blood donation	57.7%	42.3%
I never thought to donate blood	37.9%	62.1%
I do not have enough information about donation	32.3%	67.7%
I believe that there is no need for blood	9.7%	90.3%
I am anxious that they would take too much blood	30.8%	69.2%
I am afraid of the sight of blood	21.0%	79.0%
I am afraid of the needle prick	25.4%	74.6%
I am not eligible because of medical reasons	39.5%	60.5%
Donation process is long and boring	16.2%	83.8%
My blood will be misused by the blood bank	5.9%	94.1%
No specific reason	42.6%	57.4%
I would like to donate blood if token gift is given to me	13.8%	86.2%
I will donate blood if a family, relative, or friend needs	20.0%	80.0%
I would donate blood if blood donation camp arrange in the university premises	71.5%	28.5%

Table 4 looked into the reasons for donating blood for donors. The majority of the respondents showed positive attitude as (96.1%) of them donated because they believed that it saved peoples' life, 80.7% donated for the concept of altruism, 66.8% had religious reasons, 64.6% donated to help a family member or friend, 53.2% had no specific reason for donating blood and around half of the population (50.7%) were personally asked to donate.

Table 4. Reasons of Donating Blood for Donors (N=280)

Parameter	Negative Attitude	Positive Attitude
To help family or friend in need	35.4%	64.6%
Altruism	19.3%	80.7%
Personally asked	49.3%	50.7%
Money/gift	97.9%	2.1%
To learn about AIDS/Hepatitis B&C status	92.5%	7.5%
Blood donor certificate	96.8%	3.2%
Religious reasons	33.2%	66.8%
Donating blood saves life	3.9%	96.1%
No specific reason	46.8%	53.2%

Table 5 assessed the knowledge about organ donation. Over half of the population (51.3%) believed that organ donation was important and (51.8%) believed that organ donation was allowed in Islam. Whereas, we estimated poor knowledge regarding the Saudi Center of Organ Donation as only (28.1%) heard of it, 12.7% knew that there were places to enroll as a donor in the city and 6.9% knew their locations.

Table 5. Knowledge of Participants about Organ Donation (N=670)

Parameter	Poor Knowledge	Good Knowledge
Organ donations are important	48.7%	51.3%
Organ donations are allowed in Islam	48.2%	51.8%
There are places to enroll as a donor in my city	87.3%	12.7%
I know where they are located	93.1%	6.9%
I heard of the Saudi Center for Organ Donation	71.9%	28.1%

Table 6 evaluated the attitudes of the participants towards organ donation. The most positive attitudes were assessed regarding the fact that organ donation saved a life (92.5%), looking for a donor if they needed a transplantation (77.3%), the myth that organ donation distorted the body (43.1%), supporting organ donation from brain-dead individuals (33.4%), 32.2% had the desire to donate their organs after death and the will to donate organs to relatives only (30.1%). The more negative attitudes were assessed regarding encouraging family members to donate their organs (17.8%), the desire to donate an organ before death (16.6%), the will to donate organs to strangers (14.8%) and having a history of organ donation as a donor (1.6%) and as a receiver (1.6%).

Table 6. Attitude of Participants towards Organ Donation (N=670)

Parameter	Negative Attitude	Positive Attitude
Organ donation distorts the body	56.9%	43.1%
Organ donation saves a life	7.5%	92.5%
History of organ donation as a donor	98.4%	1.6%
History of organ donation as a recipient	98.4%	1.6%
I have the desire to donate an organ before death	83.4%	16.6%
I am willing to donate my organs to my relatives only	69.9%	30.1%
I am willing to donate my organs to strangers	85.2%	14.8%
I have the desire to donate my organs after death	67.8%	32.2%
I encourage my family members towards organ donation	82.2%	17.8%
I will look for a donor if I need an organ	22.7%	77.3%

I support organ donations from brain-dead individuals	66.6%	33.4%

Table 7 shows the association between blood donation knowledge and attitude and the socio-demographic factors of the participants. There is a significant association between marital status with (P=0.002), as the single and divorced participants recorded the highest levels of knowledge with mean score of (93±1) and (93±7), respectively. We also demonstrated a significant association regarding the education level of the respondents (P=0.000), as participants with secondary education (91±12) and the ones with university degree (91±12) were the most knowledgeable groups. The occupation was significantly associated with the level of knowledge (P=0.000). As the governmental sector, the military sector and participants occupying other sectors recorded a high level of knowledge with (90±12), (90±5) and (91±12), respectively. Patients with bronchial asthma also established a significant association with knowledge (P=0.000) and mean score (77±19), patients with hypertension (P=0.000) and mean score (83±16), patients with diabetes mellitus (DM) (P=0.000) and mean score (89±15) and the patients with other chronic diseases (P=0.018) and mean score (93±5). The attitude of non-donors was significantly associated with their age (P=0.001), the individuals aged from (33-46 years) reported more positive attitudes regarding blood donation with mean score of (73±15), followed by the age group from (47-60 years) with (70±15). There is also significant association between the marital status and the attitude (P=0.000), as the married persons had mean score of (96±16) and the other group recorded (79). The education level also was significantly associated with the non-donors' attitude (P=0.000), as the participants with secondary education (74±12), while the individuals with intermediate education (50±12). Occupation and residency were also significantly associated with the attitude with (P=0.001) and (P=0.000), respectively. The military sector recorded the highest mean score (84±18). People living in rural area (82±11) recorded a higher mean score than those in urban areas (70±16). Patients with bronchial asthma (P=0.000), DM (P=0.000), and other chronic conditions (P=0.000) reported a significant association with the non-donors' attitude with mean scores of (68±10), (79±9) and (82±3), respectively. Attitude score of the donators was significantly associated with their sex (P=0.000), as the males recorded a mean score of (48±15), while that of the females was (39±6). The educational level, the occupation and residency also demonstrated a significant association (P=0.007), (P=0.002), and (P=0.001), respectively.

Table 7. Blood Donation Knowledge and Attitude Scores in Association with Socio-demographic Factors

Parameter		Knowledge Score		P-value	Attitude Score for non Donators (N=390)		P-value	Attitude Score for Donators (N=280)		P-value
		Mean	SD		Mean	SD		Mean	SD	
Sex	**•Male**	90	11	0.312 *	71	17	0.375	48	15	**0.000***
	•Female	89	15		70	14		39	6	
Age	**•From 18 - 32 Years old**	91	12	0.094**	69	16	**0.001****	48	16	0.284**
	•From 33 - 46 Years old	89	12		73	15		48	15	
	•From 47 - 60 Years old	90	12		70	15		42	12	
Marital Status	**•Single**	93	11	**0.002****	69	14	**0.000****	42	15	**0.010****
	•Married	89	12		71	16		48	15	
	•Divorced	93	7		66	17		47	6	
	•Other	78	24		79	0		.	.	
Education Level	**•Primary**	79	12	**0.000****	47	.	**0.000****	.	.	**0.007****
	•Intermediate	59.9	17.7		50	17		.	.	
	•Secondary	91	12		74	12		40	10	
	•University or more	91	12		71	16		47	15	
	•Other	85	12		71	9		52	17	
Occupation	**•Governmental sector**	90	12	**0.000****	70	17	**0.001****	46	15	**0.002****
	•Military sector	90	5		84	18		46	9	
	•Private sector	89	7		75	11		52	17	
	•Other	91	12		72	13		67	0	
	•Unoccupied	89	15		70	13		41	5	

Residency	**•Urban**	90	12		70	16		48	16	
	•Rural	83	15	**0.316****	82	11	**0.000****	.	.	**0.001***
	•Other	93	8		76	10		42	5	
Chronic Diseases	**•Bronchial Asthma**	77	19	**0.000***	68	10	**0.000***	33	0	0.084*
	•Hypertension	83	16	**0.000***	73	17	0.169*	56	19	**0.000***
	•Diabetes Mellitus	89	15	**0.000***	79	9	**0.000***	47	17	**0.000***
	•Other	93	5	**0.018***	82	3	**0.000***	60	16	**0.000***
	•None	90	12	0.074*	70	16	**0.037***	46	15	**0.005***
History of Blood Donation	**•Never**	91	13	0.248*	71	16	-	.	.	-
	•Once or More	89	12		.	.		47	15	

*Independent Samples T-test was used.
**One-way ANOVA test was used.

Table 8 shows the association between organ donation knowledge and attitude and the socio-demographic characteristics of the participants. Knowledge about organ donation was significantly associated with their sex (P=0.024), marital status (P=0.001), occupation (P=0.000), residency (P=0.001), history of blood donation (P=0.045), and patients with bronchial asthma (P=0.001), hypertension (P=0.001) and other chronic conditions (P=0.000). The females' level of knowledge (33±25) was higher than the males' attitude (29±23). Moreover, the military sector recorded a mean score of knowledge (37±27) and the governmental sector (31±24). Age was significantly associated with the attitude of the participants towards organ donation (P=0.001), the younger age groups from (18-33 years) and (33-46) recorded positive attitudes with mean score of (34±20) and (34±21), respectively. The marital status, education level and residency also demonstrated a significant association with the attitude with (P=0.025), (P=0.002), and (P=0.013), respectively. Patients with bronchial asthma also established a significant association with attitude (P=0.000) and mean score (39±28), patients with hypertension (P=0.000) and mean score (37±30), patients with diabetes mellitus (DM) (P=0.000) and mean score (24±17) and the patients with other chronic diseases (P=0.029) and mean score (26±7).

Table 8. Organ Donation Knowledge, and Attitude Scores in Association with Socio-demographic Factors (N=670)

Parameter		Knowledge Score		P-value	Attitude Score		P-value
		Mean	SD		Mean	SD	
Sex	**•Male**	29	23	**0.024***	32	20	0.058*
	•Female	33	25		35	21	
Age	**•From 18 - 32 Years old**	28	25	0.067**	34	20	**0.001****
	•From 33 - 46 Years old	31	22		34	21	
	•From 47 - 60 Years old	33	27		27	16	
Marital Status	**•Single**	24	19	**0.001****	35	21	**0.025****
	•Married	33	25		32	20	
	•Divorced	20	16		25	12	
	•Other	30	33		18	10	
Educational Level	**•Primary**	40	.	0.432**	45	.	**0.002****
	•Intermediate	69	30		32	23	
	•Secondary	21	17		27	21	
	•University or More	31	24		34	20	
	•Other	29	19		30	20	
Occupation	**•Governmental Sector**	31	24	**0.000****	33	21	0.148**
	•Military Sector	37	27		31	8	
	•Private Sector	23	15		30	19	

	•**Other**	25	16		31	14	
	•**Unoccupied**	34	27		34	22	
Residency	•**Urban**	30	23		33	20	
	•**Rural**	23	25	**0.001***	34	15	**0.013****
	•**Other**	37	42		30	17	
Chronic Diseases	•**Bronchial Asthma**	43	14	**0.001***	39	28	**0.000***
	•**Hypertension**	37	20	**0.001***	37	30	**0.000***
	•**Diabetes Mellitus**	23	20	0.129*	24	17	**0.000***
	•**Other**	40	25	**0.000***	26	7	**0.029***
	•**None**	30	24	0.087*	33	19	**0.000***
History of Blood Donation	•**Never**	32	24	**0.045***	35	21	**0.003***
	•**Once or More**	28	23		30	19	

*Independent Samples T-test was used.
**One-way ANOVA test was used.

This is a cross-sectional study conducted among 670 attendants at primary health care centers in Al-Madinah city, Saudi Arabia. The present study reported high levels of knowledge about blood donation among the respondents. In contrast, many other Saudi studies reported poor knowledge regarding blood donation in their population [8, 27]. Giri *et al*. [28], showed a good knowledge about blood donation among university students, as most of their population (92%) were aware about the suitable age for blood donation and (72%) of them knew about the appropriate body weight for donation. Another similar study was conducted among university students in Bangkok, Thailand and reported a good knowledge in regards to blood donation [29].

It is noteworthy that most of our sample (65.2%) get their information about blood donation from friends and family, which is highly consistent with Biag *et al*.'s [13] findings as more than half of their population (53.4%) depended on family and friends to get information about blood donation; while, Al-Drees *et al*. [30], reported that the majority of the participants stated the newspapers and/or TV and internet as the source of knowledge of blood donation. Another Saudi study established that the blood bank workers and friends were the prime source of information among the population [8]. Another Jordan study showed that participants gained information about blood donation from the medical workforce (27%), friends (25%), newspapers (22%), and Television (16.4%). These findings imply that television, newspapers and friends were the most common sources of information.

The results in this study found that approximately (71.5%) showed negative attitudes towards donating blood if blood donation camp was arranged in the university premises. As for the reasons of not donating blood, 57.7% of the participant said that they have never been asked to donate blood, 42.6% had no specific reason for not donating, 39.5% had medical reasons and 32.3% do not have adequate information about blood donation. Baig *et al*. [13], showed a similar result, as 45% of the population were never asked to donate, 11% were concerned about sterility of equipment, 7% had unknown fear, and 4% did not have enough information.

The only source of blood donation in Saudia Arabia is the non-remunerated donated blood. So people should be motivated to maintain the blood supply levels adequate [31]. Abolfotoh *et al*. [20], conducted a cross-sectional study among public population in Riyadh, Saudi Arabia, and approximately half of the sample (53.3%) had donated blood before. Nevertheless, in the present study, we estimated that (41.8%) of the population reported a history of former donation. Over half of the respondents (58.2%) had never donated blood, which is consistent with many other studies [30, 32].

Regarding the knowledge about blood donation, our results showed a significant association between the marital status (P=0.002) as the single and divorced participants recorded the highest levels of knowledge with mean score of (93±1) and (93±7), respectively, and the education level (P=0.000) as participants with secondary education (91±12) and the ones with university degree (91±12) were the most knowledgeable groups. As education remains a significant predictor of scoring good knowledge level, Abolfotoh *et al*. [20], also demonstrated a significant association between the educational level and the knowledge of blood donation (P=0.001), as the participant with university degree (60.90±17.38) recorded higher mean score than the individuals with secondary education (55.72±16.39). Unlikely, they reported a significant association between the gender and the knowledge (P=0.098).

In this study, the attitude of non-donors was significantly associated with their age (P= 0.001), the marital status and the attitude (P= 0.000), the educational level (P=0.000), the

occupation (P=0.001), and residency (P=0.000). People living in rural area (82±11) recorded a higher mean score than those in urban areas (70±16).

Attitude score of the donators was significantly associated with their sex (P=0.000), as the males recorded a mean score of (48±15), while that of the females was (39±6). The education level, the occupation and residency also demonstrated a significant association (P=0.007) and (P=0.002) and (P=0.001), respectively. Gender also was significantly associated with attitude in another study (P=0.001) and males showed more positive attitudes (76.45±12.12) than females (72.32±9.69) [20], and the opposite was found in a study conducted in Iran [33].

This study showed relatively low levels of knowledge regarding organ donation. More than half of the population (51.3%) believed that organ donation was important and (51.8%) thought that organ donation is allowed in Islam. Moreover, this study assessed poor knowledge regarding the Saudi Center of Organ Donation as only (28.1%) heard of it, 12.7% knew that there were places to enroll as a donor in the city and 6.9% knew their locations. AlShareef *et al*. [34], conducted a similar study among the Saudi medical students and reported that organ donation and transplantation was accepted by >80% of the students as they believed that it added meaning to life. Many other Saudi and international studies supported our findings [35-37]. Considering that a quite large population think that violating the human body is forbidden, whether dead or alive, is not consistent with the Islamic Jurisprudence Assembly Council in Saudi Arabia stating that organ transplantation is not conflicting with the Islamic beliefs [38].

Nevertheless, a Dutch study found that only (35%) of the population were prepared to consider deceased donation [39], the fact in this dispute is that reservation in regards to organ donation is common in many societies, which reflects the importance of representing the misconceptions of many aspects of donation and transplantation that can be handled by education and open debates. The positive approximation of the Saudi government to reinforce organ transplantation is mainly due to the establishment of the Saudi Center for Organ Transplantation in 1993 to coordinate organ transplantation and facilitate the brain-death fatwa [40].

In the current study and regarding the attitude of this population towards organ donation, the most positive attitudes were reported in the fact that organ donation saves a life (92.5%) and looking for a donor if they needed a transplantation (77.3%). While the rest of parameters interpreted more negative attitudes, including that organ donation distorts the body (43.1%), supporting organ donation from brain-dead individuals (33.4%), 32.2% have the desire to donate their organs after death and the will to donate organs to relatives only (30.1%), encouraging family members to donate their organs (17.8%), the desire to donate an organ before death (16.6%), the will to donate organs to strangers (14.8%) and having a history of organ donation as a donor (1.6%) and as a receiver (1.6%).

Sharif *et al*. [41], conducted a quantitative survey to assess the Western and global Muslims attitude towards organ donation and found that (72.3%) of the population reported that they would receive and organ if transplantation is required, while only (10.5%) registered as donors. Another Saudi study evaluated the students' knowledge, attitude and beliefs towards organ donation and transplantation [34], they also had a similar result as 81.8% supported organ donation and only 20.9% thought that donating an organ would distort the body. Interestingly, they found that 92% of the population were willing to donate an organ from a family member and only 76% will be prepared to receive an organ from a relative. In contrast, Agrawal *et al*. [42], conducted a similar study among adult population in Al-Kharj, Saudi Arabia, and reported that the majority of their sample (89%) were willing to donate their organs and (87%) receive an organ from the family and cadaver, but only (15%) of them had registered as organ donors.

Our findings indicated that knowledge about organ donation was significantly associated with their sex (P=0.024), marital status (P=0.001), occupation (P=0.000), residency (P=0.001), history of blood donation (P=0.045), and patients with bronchial asthma (P=0.001), hypertension (P=0.001) and other chronic conditions (P=0.000). Agrawal *et al*. [42], only demonstrated a significant association between age (P=0.009) and the marital status (P=0.035) and the knowledge of the participants about organ donation, married status reported the highest frequency of knowledgeable individuals with (61.3%), that is consistent with our results as the married individuals recorded a mean score of knowledge of (33±25), which is higher than the other statuses. Another cross-sectional study, conducted among post-graduated medical students in Saudi Arabia, found that the marital status and nuclear family were significantly associated with the participants beliefs about organ donation with (P=0.05) and (P=0.03), respectively.

Regarding the attitude of the participants towards organ donation, age showed a significant association with the attitude (P=0.001), as the younger participants from (18-33 years) and (33-46) recorded more positive attitudes with mean score of (34±20) and (34±21), respectively. We also found a significant association between the marital status (P=0.025), educational level (P=0.002) and residency (P=0.013) and the attitude of participants.

Similarly, another Saudi study also found a significant association between age and the willing to donate organs with (P=0.041), as the younger age groups (18-35 years)

and (36-45 years) were more frequent to will to donate their organs with percentage of (35.1%) and (38.1%), respectively [42]. Sharif *et al.* [41], also demonstrated a significant association between gender and the attitude of the participants towards organ donation (P=0.002).

CONCLUSION

This study found a high knowledge levels about the blood donation among the population. Whereas, the attitudes were more negative than positive, which implies the need of health education campaigns about blood donation among the public and especially university students. Highly educated people and people living in rural areas showed better levels of knowledge and attitudes towards blood donation. Males were found to have more positive attitudes towards blood donation than females. Generally, the knowledge regarding organ donation was relatively poor, and females reported better knowledge than males. Their attitudes regarding organ donation and transplantation established a significant hesitancy, and young participants and highly educated people showed more positive attitudes.

Recommendations

As we assessed relatively poor attitudes towards blood donation, in addition to shortage in the sources of knowledge, so we recommend:

- Holding more physical campaigns in universities and other vital institutions to encourage people to donate blood
- The Ministry of Health should hold health education and awareness sessions and campaigns to support the knowledge, attitudes, and beliefs of the public towards organ and blood donation
- Need to establish organ donation centers in the city
- Teaching students in schools about the importance of blood and organ donation
- The universities encourage holding health education campaigns and blood and organ donation days to increase the awareness and improve the attitude of the students about organ and blood donation
- Conduction a large scale research including all Saudi population in different regions of the kingdom to assess the public awareness, attitude and practice towards the blood and organ donation.

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