UNDER PEER REVIEW

"Public's attitude toward organ donation in Egypt: A social and conceptual approach"

Abstract

It is now well established that organ donation (OD) in Egypt gains utmost official support both from Islamic and Christian authorities. Yet, some social and behavioral obstacles may often obviate the full benefit of cadaver donors. ***Aim:*** To identify and analyze determinants influencing the public's awareness and attitude toward organ donation (OD) in Egyptian population. ***Methods:*** At an outpatient setting of Qena University hospital (QUH), Qena, Egypt, care seekers were interviewed. ***Results:*** Participants mean age was 42.9±8.17y years. More than half (56%) of participants are aware of the presence of OD programs in Egypt. However such awareness was not significant as to improve OD knowledge score. Otherwise, the same score significantly increased by educational level [F(df 3, 812= 3.61, p=0.0002]. Importantly too, the participants' OD attitude score significantly improved by education [F(df 3, 805) = 4.52, p=0.038]. Media was most accessible as an individual source of information about OD (16.5%), and the knowledge score varied by source of OD information (14.6% with Internet source, 13.3±3 healthcare source, 5.6±1.9 friends source, 38% more than one source) [F(df 6, 809)= 3.10, p=0.0016]. Only 43.6% of participants were willing to donate an organ after death. Conceptualizing OD as an anti-religious behavior was reported by 16.9% of participants. ***Conclusions:*** The current knowledge fabric toward OD among Egyptian bears a mix of negative and positive potentials. Improving OD knowledge standard assures propagating positive attitude toward OD and hence enhanced survival opportunities for organ failure victims.

Keywords: Organ donation, attitude, adults, Egypt

Introduction

A major challenge health care has been facing is the occurrence and consequences of severe tissue damage and organ failure, whether pathological or traumatic. If a body organ fails, it is hard, and frequently impossible, to restore its original viability. Ultimately, total organ failure is incurable and once an organ loses its functionality or gets damaged nothing can be done to cure it. Organ failure causes severe problems not only to the patient, but to her or his family. Bottom-line, without replacing a failed organ, in other words organ transplant, patients can go through a painful journey to death. With this in mind, OD is the gift of an organ to help someone else who had lost her or his organ to overcome the tough, and often fatal, consequence of this loss. Two types of OD are known: one when an organ is taken from a live donor; and another when an organ had been donated after death. Death in turn involves either cessation of heart beat and or brain death. Brain death is the irreversible end of all brain activities, including involuntary functions necessary to sustain life due to total necrosis of the cerebral neurons following loss of brain oxygenation. [1]

International perspective of organ and tissue transplantation: The organ transplantation (OT) idea has a history of stormy dispute everywhere it has been raised. The debate continued globally for a long time, until organ transplantation now is undoubtedly considered one of the most significant achievements in the history of medicine. In many cases, it is the only treatment for the late stages of organ failure, such as chronic heart, liver and advanced kidney disease. The search for widening this procedure's scope to include as many as human tissues is relentless. Many countries today engage in

UNDER PEER REVIEW

organ transplant surgeries, but successful programs in these countries do not necessarily offer an organized method for the procurement of organs from donors of various cultural, religious and economic backgrounds. [2] Rather, a high level of societal awareness, particularly among doctors, lawmakers, potential donors, and organ recipients is the key to the success of organ transplantation. Although it is a basic tenet that donation must be the foundation for all organ and tissue transplants, the rarity of organs has given rise to a growing commercial market for organs on the local, regional and international levels. As a result, abuse and exploitation takes place, especially of the poor for the benefit of the rich, and also for the benefit of local or cross-border intermediaries, in what unfortunately progressed into “transplant tourism” and “organ trafficking”. [3] The World Health Organization (WHO) has monitored the growing phenomena of transplant tourism, which started to appear in the mid-1990s. Estimates show that it accounts for 10% of all organ transplant practices worldwide. [4] Such organ transplant abuse continued to expand despite the absence of comprehensive research and documented statistics surrounding the phenomenon. Since the transplant of organs from living or deceased donors to patients suffering from organ failure first began, international medical organizations and agencies have been careful to issue resolutions prescribing guidelines for the regulation of professional standards and ethics in this field. The WHO had condemned organ trafficking on more than one occasion, starting with World Health Assembly (WHA) Resolution 40.13 in 1987. [5] Further recommendations issued by the WHO was in its 57th session (Resolution 57.18) in May 2004, [6] which urge member states to exercise effective supervision on organ transplants and seek out living as well as deceased organ donors. Further revisions of the WHO guidelines on organ transplantation in 2008 led to an emphasis on righteous aims, too. For instance, a legal consent for the extraction of cells, tissue or organs from corpses should be acquired. Also donation from the living is only allowed as long as the professionals provide necessary care and quality follow-up to the donors. No any coercion may be practiced on the donors who should only be should be motivated by a real desire to donate their organs. Moreover, the donation must be made without promise of payment or any other material reward [6] (however, donors may be compensated for reasonable costs incurred, including the loss of income).

Egypt and organ donation and transplantation: Until recently, Egypt has been one of the few countries without legislation criminalizing the organ trade and regulating organ and tissue transplant, particularly from the deceased to the living. Nevertheless, the issue has been the subject of a broad debate amid repeated warnings of a “mafia of organ traffickers,” whose victims are the poor and most vulnerable. [7] Increasingly strong demands have been heard for strict legislation to regulate the chaos in this critical field in the health sector. On the other hand, the reliance on living donors as the sole source of organs creates a severe shortage of organs due to the small number of donors, who often fear complications as a result of the transplantation. This ultimately deprives others of their rights to life and health, thus encouraging transplant tourism and the abuse of those who are vulnerable. Diligent work to produce a law that regulates organ transplant and address OD from the deceased continued on official and public levels. For instance, the Egyptian Initiative for Personal Rights (EIPR) [7] was among those voices which offered a rights-based perspective on organ and tissue transplant policies as a means by which the state can meet its commitments to the human rights to health and life. The EIPR stressed the urgency of a legislation that will put a stop to organ trafficking and ensure the availability of this type of care for all individuals as part of a system of universal insurance. To that end, the only legal framework existed to regulate organ transplantation in Egypt was the professional code of ethics and conduct of the Egyptian Medical Syndicate. [8] Since the code was simply a set of ethical principles endorsed by the syndicate, it naturally did not address criminal liability or civil rights. Moreover, it did not contain deterrent penalties for those in breach of the code. The professional code of ethics stated that the syndicate should be informed of any organ transfer to ensure the integrity of both the donation and the

UNDER PEER REVIEW

transplant, in accordance with the ethical guidelines contained in the code. No transfer may be performed without prior consent of a special committee.

The organ donation legal environment: Not before December 2010 when legalizing deceased donation was made possible by the 2010 law after the decades-long theological dispute on the definition of death was settled, and when Egypt's higher religious authorities represented by the Al-Azhar Islamic institution and the Coptic Church, officially approved it. [9] According to most interpretations of the Islamic Sharia Law, the heart must stop beating before someone is legally declared dead. Thus, donation from brain-dead patients was not possible before 2010. Unfortunately, the implementation of the law had been hindered by the political unrest in the country over the past few years, until it has only been enacted in early 2016. For that purpose, the Ministry of Health and Populations (MOHP) has trained medical professionals to diagnose brain-dead cases, with four main hospitals selected for the operations to take place (Cairo university hospital, Ain Shams university hospital, Mansoura university hospital, and the Armed Forces hospital).

General obstacles to organ donation: There is a sustained disproportion between the demand on donor organs and the number of patients demanding transplantation, globally. [10] One of the most influential factors that hider satisfactory transplantation coverage is the public opinion about OD. The latter involves knowledge and attitudinal aspects of OD support. [11] With that in mind, it would be rather challenging to convince healthy people to be hospitalized, suppose their bodies to mutilation and take the risk of death. Worst is the finding that the attitude of a supposedly promising population group, e.g., medical students, towards OD was disappointing. [12,13] Fortunately, the majority of the healthcare workers (HCWs) tend to favor OD. For instance, Esezobor et al. (2012), [14] found that Nigerian physicians are mostly willing to donate an organ. Likewise, Ahlawat, et al. (2013) [15] reported a largely favorable attitude towards OD in a HCWs study in India. However, the participants in the previous study reflected a desire to learn more about various aspects regarding OD. In another study in Qatar, [16] 83% of interviewed HCWs supported OD. However, between 51.3% and 61.6% of them (including physicians, nurses, and technicians) still wanted to be buried with all their organs intact. Furnishing a suitable legal environment for OD plays a crucial role in facilitating and supporting organ transplantation. A robust legal OD framework emphasizes public trust in the healthcare system and reflects positively upon the public attitude towards OD. [17] Ignorance of the presence of a well-established OD law and subsequent lost trust in the health system explain the high rate of refusal of OD among those with an underlying negative attitude to OD. [18] Inadequate knowledge and vague conception of brainstem death always had a negative effect on OD. [19] The effect of religion on attitude to OD is also an issue. Often, believers who also believe in the after-life develop negative attitude towards OD. [20]

Obstacles to implementing organ donation law: In Egypt, the provision of knowledge and attitude of the populations about OD and OT is rather worrying. Public obstacles include inadequate awareness of some Islamic leaders of the importance of OD. On the other hand, a greater number of people would agree to donate organs if they are supported by religious communities and leaders. Accordingly, family and patient characteristics, their attitudes, beliefs about OD, place of residence and inadequate awareness of the concept of brain death, all could be associated with the decision to donate organs. [21,22] Even population groups who supposedly have a better chance for OD literacy often do not show the expected level of awareness toward a satisfactory OD. For instance, a significant lack of sufficient knowledge about common aspects of OD among Egyptian medical students had been observed. [18] Only 36% of medical students had faint knowledge about legal criteria and details of OD processes.

UNDER PEER REVIEW

Further, only 37% of this population had a positive attitude toward OD. Generally, there has been a noticeable success of some organ donor programs in some places that had an initial difficulty in establishing OD culture. Nonetheless, many medical obstacles obviate the full benefit of cadaveric organ donors. From the medical perspective, there might be a considerable deficiency in establishing an appropriate set up for prompt and successful OD and transplantation processes in a considerable proportion of healthcare institutions in Egypt. Initially encountered is in emergency services and intensive care unit (ICU) services. There is an inadequate number of emergency room (ER) staff in many hospitals, and an inadequate number and quality of paramedics on road emergency services. [18] Paramedics and often ER physicians have inadequate knowledge about the importance of transplantation and the concept of brain death. More importantly, ICU physicians also have problems related to late recognition, diagnosis and inadequate maintenance of brain death cases. The delay in the diagnosis of brain death in such settings can be due to lack of adequate number of neurologists and inadequate equipment. In hospital settings, too, improper communication systems, admission eligibility problems, and inadequate cooperation from local health authorities lead to further delay in the OD procedure. Eventually, a state of public skepticism up to rejection constitutes a major obstacle before actual implementation of the OD law in Egypt. The Egyptian nation is known, among other things, for its traditional approaches to the idea of the posthumous sanctity of the human body. Another major drive behind the sloppiness of a healthy OD environment is the fear of organ trafficking, giving way to exploitation of the poor as spare body parts for the rich. On the other hand, the moral dilemma becomes of little importance for many families urgently in need of transplants. Article six of the 2010 law outlaws financial remuneration for OD. It aims to prevent underprivileged Egyptians from selling their organs to wealthy visitors from other countries, some of which still outlaw OD entirely. According to “Integrated Regional Information networks” (IRIN), (an agency focusing on humanitarian issues in under-reported or ignored regions), [23] until 2010, the year OD law had been issued, a report by the WHO described Egypt as a “hub for organ trafficking, saying that the country was one of five trafficking hotspots. Interestingly, the immediate effect of the law included the closure of a considerable number of illegal facilities carrying out OT operations; and eventually a reduction of more than 80% of organ trafficking crimes had been noted. Despite such decline, Debra Budiani, founder of the “Coalition for Organ-Failure Solutions” (COFS) states that “the clandestine nature of the trade and the unrest witnessed by Egypt since the 2011 anarchy made it nearly impossible to have an accurate estimate of the number of true organ trades in the country.” [9] The issue is that illegal organ donor victims do not often report the crimes against them for fear of punishment as the law also criminalizes commercial donors. Further, some argue that it is unjust to punish donors who opt to trade their organs for money they badly need; instead, officials should focus on identifying them and offering follow-up care and counseling. To this end, a UN grant received by COFS to carry out further work in Egypt, including follow-up care for victims of organ trafficking, served as an acknowledgment by the UN that much more was still needed to be done in the country to end such practices. In comparison, as early as 1982, the “Islamic Council of the Kingdom of Saudi Arabia” (IC-KSA) issued a resolution which permitted tissue and OT from both living and cadaveric donors but, cautioned against offering organs for sale. In KSA, the consent of the relatives is necessary, even if the deceased had consented in his lifetime. [24] This resolution led to formation of the “Saudi Center of Organ Transplantation” (SCOT) as a national organ procurement center that supervises all activities of organ donation and transplantation in KSA since 1984. The Islamic faith does support the concept of transplantation which provides the strongest positive influence for OD both during life and at death. [25] Both, Saudi Arabia and Egypt are considered among the most important Islamic countries. In essence, the concept of OD in Islam is perceived as a

UNDER PEER REVIEW

kind of charitable deed, whose benefit continues after a person has passed away. However, Saudi Arabia had been more prompt in taking a straight forward OD legislative action. Probably, the difference in demographic, economic, and political circumstances in the two countries lies behind such variation.

Sources of knowledge and information about organ donation: Many western studies [26,27] and often south Asian studies. [28,29,30] on knowledge and attitudes toward OD have been released. Fewer studies in the Arab East and African region address OD and transplantation have been available. [31] For instance, it had been reported that the source of information about OD among the Saudi populations was the television (TV). [32] The contribution of health care providers in providing knowledge about OD and OT in Saudi Arabia, too, had been "none" or "little". Likewise, Alam et al. (2007) [22] report that many Saudi families are unwilling to donate organs when they were approached. Reviewing the psychological aspects of OD revealed that several knowledge and religious beliefs play a significant role in influencing an individual's decision to donate their organs following death. The purpose of this study was to explore the current public knowledge, opinions and attitudes toward OD, and to study factors that affect them. Findings from this study may well be used to enhance organ donation movement in Egypt; especially furnishing appropriate cultural, educational, and healthcare climate for organ donation and transplantation.

Methodology

The QUH is a teaching secondary care institution with modern technology, and which receives referrals from the surrounding districts, including Luxor and Red Sea areas. According to the study design, subjects were selected from the outpatient department who attend for ambulatory service. A study sample was randomly selected and interviewed. The investigator interviewed the participants in the waiting area and vital signs room and filled the questionnaire. Approval from the QUH research ethics committee to conduct the study was granted.

Study sample: Using sample size for a proportion formula [$n = z^2 (p)(1 - p) / e^2$] and assuming 50% probability of having positive response to OD, the optimum sample size (n) reaches 384 subjects. Since there was a desire to enhance the study power, we targeted recruiting around 800 subjects to maximize generalizability potential of the study findings. This number of participants also compensates for non-responder or incomplete questionnaire responses. In the field, a systematic sampling approach was attempted to collect required sample size “n”. According to the OPD central registration office of EHA, around 3,200 care seekers and visitors were scheduled and given OPD appointments during February – March 2014. (Calculated based on an average 10 patients per clinic per day over average 20 working clinic /day, average four working days/ week = 8 weeks); (least estimates used). Using the formula 1/k = n/N (where k = spacing unit between selected numbers, n 800, and N = sample frame population = 6400), every fourth visitor would be asked to participate (3200 / 800 = 4). Assuming that only 50% of this population estimate would be willing to participate, the spacing unit was reduced to every second visitor. Accordingly, every other visitor was invited to participate. The second visitor to show up at the central OPD registration office on day one of the research was selected as a starting sample unit (index subject). This process continued until the last day of study duration, where 844 participants were totally collected. Subjects were assured that participation was voluntary and that they could opt to withdraw from the study at any time without giving reasons and without any negative impacts on their healthcare benefits. Formal approval from hospital’s management and other concerned parties was obtained prior to the study and no other ethical approvals were need.

UNDER PEER REVIEW

Data collection: A pre-validated Arabic-language questionnaire was designed to capture information relevant to the study. The questionnaire was primarily self-administered by individual participants. Otherwise, the questionnaire fields would be filled up by the investigators on the participants' behalf, in cases of incapacitating conditions, such as illiteracy or disability. The questionnaire consists of three major scales with a total of 48 items, according to the following design: the first scale includes socio-demographic information, such as age, gender, level of education and marital status. The second scale includes items addressing and exploring knowledge status of the participants about OD, such as questions about OD, its importance, e.g., "have you ever heard about OD programs?", and questions about brain death, e.g., "do you know the meaning of brain death?", as well as questions on OD regulations, and OD by site. The third scale was to assess participants' attitudes regarding OD during the life and after death. Most questionnaire items are reflected by means of nomino-ordinal variables, whether dichotomous or multi-nominal (yes, no, don't know, or on a 5-point Likert scale, e.g., strongly agree, agree, fair, disagree, and strongly disagree, on items such as attitudes towards OD). A number of steps were taken to increase the validity of the questionnaire. First, a large body of relevant literature was intensively reviewed in order to select some statements pertaining to respondents' knowledge and attitudes. Second, five medical and research experts reviewed the questionnaire and their suggestions were incorporated into the final form. Two outcomes of interest in this research would be advocated: knowledge of OD score, and attitude towards OD score. In order to do this, responses to the items on knowledge of OD scale, each was transformed into a given score. Similarly, responses to items on the attitude towards the OD scale each was transformed into a given score. Participants' knowledge score regarding OD was calculated so that the right answers to those questions on information about OD, its importance, brain death, OD regulations, and OD by site, all were given the highest score, (minimum score = 0 and maximum score 18). Likewise, the participants' OD attitudes' scores were calculated that each response reflecting a positive attitude on the pertinent question was given the highest score, (minimum score 0 and maximum score 36). A pilot administration was conducted before data collection and modifications were done, based on the findings. The reliability of the questionnaire was conducted by retesting 40 participants. An average coefficient of correlation 0.90 was obtained. (Data of the pilot study were included in the actual study because no significant variations had been found. All ages eighteen years and above were targeted in the recruitment process. Also, both sexes were invited to participate in the study. No participant would be excluded because of their underlying health status, medical history, or educational level. Completion of ≥80% of the instrument's questions, (i.e., 38 valid responses) was necessary for inclusion in the analysis. Collected data were sorted out then coded and entered into a Microsoft program with adequate backup. The SPSS software statistical program version 20 was utilized in the analysis.

Statistical Analysis: Descriptive statistics would first be conducted, e.g., display criteria of categorical variables, such as gender, educational level, and sources of information on OD in terms of frequencies and percentages. Interval ratio scale variables, such as age or scores would be presented as the mean ± standard deviation (SD), [or median ± interquartile range (IQR), according to normality distribution, e.g., as assessed by one-sample Kolmogorov-Smirnov test]. Analytical statistics would mainly be carried out to measure the influence of determinants of interest, such as demographics and source of knowledge about OD on the selected study outcome. For instance, the influence of gender upon the participants' mean-knowledge score of OD could be compared using student's *t*-test (or non-parametric Mann Whitney *U* test alternative, where appropriate, depending on normality distribution). Also, either one-way analysis of variance (ANOVA) test to compare means of multi-level

UNDER PEER REVIEW

determinant groups, e.g., education and source of OD information (or the non-parametric Kruskal Wallis test alternative, where appropriate) to assess the influence of these factors upon the study scores could be used. Our level for tolerating alpha error was $\alpha = 0.05$, and results with *p*-value less than 0.05 would be considered significant.

Results

Table (1): Distribution of study participants by demographic criteria

(n=844)

	Characteristic	No.	%
Age(y)	• < 25	74	8.8
	• 25-34	153	18.1
	• 35-44	275	32.6
	• ≥45	342	40.5
	• Range 18-76y • Mean ±SD: 42.9 ±8.17		
Gender	• Male	663	78.6
	• Female	211	21.4
Marital status	• Single	381	45.1
	• Married	425	50.4
	• Divorced/Widowed	38	4.5
Educational level	• Illiterate/1ry school	64	7.6
	• Intermediate school	169	20.0
	• Secondary / Intermediate-post-secondary/ technical degree	346	40.9
	• University/Higher education	265	31.3

Socio-demographic characteristics: The socio-demographic characteristics of the participants are presented in Table 1. The participants' age averaged 42±8.17 years. Most (78.6%) of them were males and also 50.5% were married. Secondary school or postsecondary/ technical degree specialization (qualified technicians) numbered 346 (40.9%), while university degree holders and the less likely higher degree holders were 265 (31.3%).

Table (2):- Distribution of participants by OD knowledge score by selected participants' criteria

(n=816) (Valid response to knowledge section= 816(96.7%), missing=28) (Score: minimum 0, maximum 18)

Characteristic	Subcategory	N	%	Mean ±SD	Test statistic	*p*-value
Age(y)	• < 25	69	8.5	8.8±4.1		
	• 25-34	145	17.8	9.8±4.1	*F*(df 3, 812)	0.0026
	• 35-44	264	32.3	10.5±4.3	= 4.78	
	• ≥45	338	41.4	8.8±3.2		
Gender	• Males	613	75.1	8.78±3.6	*t*(df=814)	0.61
	• Females	203	24.9	9.53±3.7	=0.51	

UNDER PEER REVIEW

Educational level	• Illiterate/1ry school	57	6.9	4.8±2.9		
	• Intermediate school	163	19.9	6.6±2.9		
	• Secondary / postsecondary/ technical degree	340	41.7	8.3±2.8	*F*(df 3, 812) = 3.61	0.0002
	• University/higher education	256	31.3	11.4±4.7		
Marital status	• Married	369	45.2	10.3±3.6	*F*(df 2, 813)	
	• Single	413	50.6	8.7±3.9	= 4.78	0.0026
	• Divorced/widowed	34	4.2	6.6±2.5		
Ever heard about OD	• Positive	728	89.2	12.3±4.8	*t*(df=814)	0.0035
	• Negative	88	10.8	8.6±3.4	=4.56	
Importance of OD	• Positive	676	82.8	10.6±3.5	*t*(df=814)	<0.0001
	• Negative	140	17.2	7.9±2.7	=6.33	
Knowledge of organs that could be donated*	• Positive	432	52.9	9.7±5.5	*t*(df=814)	0.29
	• Negative	384	47.1	9.2±3.3	=0.53	
Recognize proper definition of brain death	• Positive	398	48.8	9.3±3.9	*t*(df=814)	0.08
	• Negative	418	51.2	8.8±3.8	=1.4	
Source of information	• Media	135	16.5	8.9±4.3		
	• Newspapers/magazines	101	12.4	8.1±3.3		
	• Internet	119	14.6	9.3±4.2		
	• Friends/relatives	67	8.2	5.6±1.9	*F*(df 6, 809) = 3.10	0.0016
	• Healthcare workers (HCWs)	52	6.3	13.3 ±4.2		
	• More than one source	310	38.0	7.4±3.4		
	• Other	32	3.9	11.2±6.2		

** Eight selected organs: Liver, kidney, cornea, heart, bone morrow, lung, pancreas, and skin.*

Knowledge of OD: The majority (89.2%) of the participants had heard of OD, compared to those who are not aware of such activity (Table 2) The mean score of OD knowledge for those who have OD programs awareness is significantly higher than those who are otherwise [12.3±4.8 and 8.6±3.4, respectively; *t*(df=814), *p*=0.0035]. Age impacted the OD knowledge score [*F*(df 3, 812)= 4.78, *p*=0.0026]; however there was not a consistent pattern for such relationship [35-44y old subjects scored highest (10.5±4.3) score, 25-34 next (9.8±4.1), <25y and ≥45y last (8.8±4.1 and 8.8±3.2, respectively]. Demographically too, married individuals tended to score higher OD knowledge level than singles or divorced peers (10.3±3.6, 8.7±3.9, 6.6±2.5, respectively), [*F*(df 3, 812)= 3.61, *p*= 0.0002]. While 16.5% (n=135) participants with valid responses to OD knowledge inquiries get their information from media as an individual source, 14.6% (n=119) and 12.4% (n=101) get it from Internet and newspapers/magazines, respectively. Prominently, the highest proportion of participants (38%, n=310) get their information about OD from more than one source alone. Other sources accounted minor proportion of the study population (e.g., 8.2% from relatives, and 6.3% from HCWs) (Table 2). The variation in the source of OD information was significantly associated with difference in the mean knowledge score achieved by the participants [*F*(df 6, 809= 3.10), *p*=0.0016] [highest (13.3 ±4.2) for HCWs-source and lowest for friends/relatives-source]. Otherwise, scores of those gaining their OD information from sources in-between ranged between 7.4±3.4 for the "more than one source" group and 9.3±4.2 for the "Internet"- source group. Both the media- and newspapers/magazines source of knowledge scores

UNDER PEER REVIEW

ranked in-between the last two groups (8.1±3.3 and 8.9±4.3, respectively) (Table 2). Further, the knowledge score significantly increased gradually with increasing educational level, being highest among university graduates (11.4±4.7) and lowest among the illiterate/primary education group (4.8±2.9), [F(df 3, 812)= 3.61, p=0.0002] (Table 2). Also, the OD knowledge score significantly differed by the participants' marital status [married 10.3±3.6, single 8.7±3.9, and divorced/widowed 6.6±2.5; F(df 6, 809)= 3.10, p=0.0026]. Most (82.8 %) of the participants recognize the importance of OD [positive 10.6±3.5, negative 7.9±2.7; t(df=814) =6.33, p<0.0001].

There was not an important difference in the frequency of recognizing vs. not recognizing the proper definition of brain death (as an irreversible cessation of brain activities) [398 (48.8%) and 418 (51.2%), and the knowledge scores of the two groups in this regard were also not significantly different [t(df=814)=1.4, p=0.08]. Likewise, those who were able to identify (at least six out of)-eight body organs that could be donated (Table 2 footnote) slightly outnumbered those who could not do so (432 (52.9%) and 384 (47.1%), respectively. The scores of OD items associated with this area of knowledge were also not significantly different [9.7±5.5, 9.2±3.3, t(df=814)=0.53, p= 0.29].

Table (3): Participants' response to items reflecting attitude toward OD

(n=821) (Valid response= 821(97.3%), missing 23)

Organ donation Statement	Strongly disagree No. (%)	Disagree No. (%)	Equivocal No. (%)	Agree No. (%)	Strongly agree No. (%)
Causes body deformity	51(6.2)	76(9.3)	163(19.8)	321(39.1)	210(25.6)
Saves lives	10(1.2)	26(3.2)	130(15.8)	347(42.3)	308(37.5)
Willing to donate during life to relatives only	80(9.7)	144(17.4)	177(21.6)	253(30.8)	180(21.9)
Willing to donate during life to others*	114(13.9)	267(32.5)	246(30.0)	158(19.2)	60(7.3)
Willing to donate after death to others	117(14.3)	139(16.9)	207(25.2)	209(25.5)	149(18.1)
Supporting OD of brain death people	162(19.7)	176(21.4)	193(23.5)	152(18.5)	138(16.8)

** **Reason:** Fear of complications/improper post-OD care (54.9%), insufficient information on OD (32.9%), family refusal (28.7%), being against Islamic regulation (16.7%).*

Attitudes toward organ donation: In assessing the participants' attitude to OD (Table 3), 821 individuals gave valid responses to items included in this questionnaire section. More than quarter (25.6%, n=210) of respondents strongly believe that OD can cause body deformities. More than one-third of respondents (39.1%, n=321) just agreed on the same understanding. Likewise, the majority of participants (79.8% =42.3%, n=347 and 37.5%, n=308) either "agree" or "strongly agree", respectively, that OD saves others' lives. Also, more than half of participants (30.8%, n=253 and 21.9%, n=180) either "agree" or "strongly agree", respectively, to donate an organ to a family member or a relative only, as need arises. In contracts, more than half (13.9%, n=114 plus 32.5%, n=267) either agreed or strongly disagreed to do so during their life to people who are not relatives. With respect to cadaver OD, those who agreed on the concept of OD from brain dead people to needy patients slightly outnumbered those who did not agree on that [162 (19.7%) "strongly disagree", 176 (21.4) "disagree", total 328 (39.9%) vs. 138 (16.8) "strongly agree" and 152(18.5) "agree", total 290 (35.3%)]. It could be also noted that subjects were not willing to donate an organ to a non-relative mostly due to a) fear of complications/ improper post-OD care (54.9%), b)

UNDER PEER REVIEW

insufficient information on OD (32.9%), c) family refusal (28.7%), and d) being against Islamic regulations (16.7%), (Table 3 footnote).

Table (4):- Distribution of participants' attitude score of OD by selected suspected correlates (7-36)

(n=810) (Valid response to knowledge section= 810(95.9%), missing=34) (Score: minimum 0, maximum 36)

Category	Level	N	%	Mean ±DS	Test statistic	*p*-value
Age (y)	• < 25 • 25-34 • 35-44 • ≥45	71 149 256 334	8.7 18.4 31.6 41.2	23.4±5.2 23.3±4.5 24.6±4.1 23.2±3.7	*F*(df=3, 806) = 1.51	0.23
Gender	• Male • Female	609 201	75.2 24.8	23.8±3.7 23.5±4.1	*t*(df=808) = 0.110	0.64
Marital status	• Married • Single • Divorced/widowed	367 407 36	45.3 50.3 4.4	23.7±5.3 24.5±4.6 23.5±3.6	*F*(df=2, 806) = 1.31	0.27
Educational level	• Illiterate/1ry school • Intermediate school • Secondary / post-secondary/ technical degree • University/higher education	55 160 338 275	6.8 19.7 41.7 33.9	23.3±3.3 24.1±4.1 25.2±4.5 27.3±5.0	*F*(df=3, 805) = 4.52	0.038
Ever heard of OD programs	• Positive • Negative	455 355	56.1 43.9	25.8±6.0 25.1±5.5	*t*(df=808) = 0.911	0.18
History of OD/reception	• Positive • Negative	3 807	0.4 99.6	26.4±4.5 25.2±4.5	*t*(df=808) = 1.10	0.13
Believe religious regulations support OD	• Positive • Negative • Don't know	452 137 221	55.8 16.9 27.3	28.6±5.1 16.1±3.8 22.7±3.5	*F*(df=2, 807) = 9.10	0.00012

As in Table 4, demographic criteria, such as age, marital status and gender did not influence the variability in the mean score of attitude toward OD of the study population [*F*(df=3, 806)=1.51, *p*=0.32, *F*(df=2, 806)=1.31, *p*= 0.27, and *t*(df=808)=0.110, *p*=0.64, respectively]. However, educational level influenced OD attitude, that respondents with highest educational degrees (university/higher education) achieved highest score (27.3±5.0) while those with lowest education, if any, achieved lowest score (23.3±3.3), [*F*(df=3, 805)= 4.52, *p*=0.38] (Table 4). Awareness of the presence of OD programs (56.1% positive) and unawareness of such programs (43.9% negative) led to insignificant difference of mean OD attitudinal scores of the two categories [*t*(df=808) 0.911, *p*=0.18)]. Also, whether or not having a history of OD/reception (0.4 positive and 99.6 negative) were not associated with a change in the score of attitude toward OD [*t*(df=808)= 1.10, *p*=0.13]. Eventually, the participants' attitude to OD is significantly shaped by their conceptualization of religious preaching with that respect. First, most (55.8%) of them ended to believe that religious faiths support OD. The remainder were either not knowledgeable enough about that concept so their answers were either equivocal (27.3%) or did not believe so (16.9%).

UNDER PEER REVIEW

Discussion

The world had been desperate for decades to achieve a tangible success in the OD and OT quest, e.g., compared with all unprecedented successes achieved in curative and diagnostic sides of health care requisite. Courtiers, health systems, and concerned organizations, globally varied widely in their timeliness, awareness, prioritization, and efforts to establish set ups most appropriate to meet a growing demand for OD. In Egypt, a tangible progress has been achieved, even before the official adoption of OD legislation chapter materialized by OD law of 2010. For instance, there are now up to 22 hospitals across the country adopting and performing liver transplant alone, including popular educational hospitals, military hospitals and a small number of private hospitals. In this work, we aimed to analyze some correlates pertinent to knowledge and attitude toward OD among the Egyptian populations. The study population was selected from a community stratum probably more or less in touch with health inquiry the time of the study, some being care seekers or their families who pursue health consultation at QUH. Those people are mostly keener to explore better health opportunities, including OD and OT. The candidates would be surveyed to measure their knowledge and attitude toward OD. The rationale is that if this study population scored poorer on OD than that expected for such disease and health- oriented population, not much better response is anticipated from the general population should they were screened for OD attitude. Although our subjects age rather older (42±8.17 years), age did not improve their attitude or knowledge of OD; marriage status did. From the gender viewpoint, some researches indicate that women are prone to gaining positive attitude to OD. [33] Boulware et al. (2002); otherwise reported that males may show better attitude towards OD. [34] However, the male group in Boulware et al., study was those of higher education levels and was also of young age range. In our study, gender did not impact the level of knowledge and attitude toward OD. Many other OD research support the no difference finding in OD knowledge and attitude based on gender. [18,30,35] The participants' OD knowledge score significantly increased by the participants' educational level. The same trend is also found in regards OD attitude (highest in same educational group). Other studies reported similar findings. For instance the knowledge score of medical students in the Egyptian study by Hamed et al., (2006) [18] improved significantly by seniority and was also noted that the better knowledge the better OD attitude of students. However, this very tendency was not consistent in senior students in particular, indicating that other variables, e.g., psychosocial, demographic, religious, also affect people's attitude towards OD.

The participants were more likely to donate organs during life but only to relatives (52.7% = 30.8% "agree" + 21.9% "strongly agree"), and prominently less likely to donate to others (26.5%). On the other hand, the willingness to donate after death was remarkably lower than former group (43.6%). In fact, little quantitative research has been carried out investigating attitudes towards OD in the general population. [36] Instead, most of the OD attitude studies have predominantly surveyed health professionals [37,38] or medical students. [33,39,40] who tend to have favorable attitudes towards OD, probably contrary to what might be encountered in the general population. The reason may be that medical staff could be having more insight into the subject of OD and transplantation. For instance, in the Turkish study by Bilgel et al. (2006) [33] on knowledge and attitude toward OD and transplantation, 58.4% of their medical students were willing to donate organs after death, compared to the 43.6% of our subjects. Ultimately, the acceptance of live OD was higher (reportedly 74.6%) than cadaver OD in the Turkish study; similar as in ours. Among the factors that may well influence people's attitude to OD is knowledge of the definition of brain death, [36] a prerequisite our participants did not enjoy, as derived from an insignificant difference in corresponding knowledge scores (correct 9.3±3.9 and wrong 8.8±3.8; p =0.08). In parallel, the participants' attitude to OD from people diagnosed with brain death was barely toward donation, if

UNDER PEER REVIEW

any (35.3% vs. 31.1). In the literature, it has been found that inadequate knowledge and vague conception of brainstem death almost always had a negative effect on OD. [19] The same notion is supported by the finding that, e.g., a substantial proportion (up to 40%) of refusal of OD in European medical students was due to lack of confidence of doctors' reliability to diagnose brainstem death [20,41,42] Likewise, a survey on Sweden ICU nurses highlighted that they didn't trust brain death diagnosis. [43] Although the vast majority (89.2%) of our subjects heard about OD and transplant, as many as 43.9% reported that they had unawareness of the presence of specific OD programs. Likewise, adequate knowledge about OD in Hamed et al. (2006) [18] study was present in only 36% of medical student, which was extremely low in comparison to other countries: Pakistan (65%) [30] and Nigeria (60%). [35] Also, only 52.9% of our subjects recognize potential organs to donate, (including popular transplants, such as kidney and liver and the less popular ones, such as skin and pancreas). Not only had the insufficient knowledge of OD status negatively impacted the participants' knowledge of OD score but the attitude score. For instance, those who have ever heard of OD programs (56.1%) scored indifferently (p=0.18) on OD attitude from those who had never done. In this study, the generally limited knowledge about OD negatively impacts the knowledge and attitudinal scores of OD; a point that should be endorsed while planning for an outcome-driven program of OD in Egypt. The particular findings regarding direct relationship between OD knowledge and the populations' attitude to OD and transplantation are quite comparable with those reported from neighboring countries, [22,33,44,45] as well as studies conducted in the west. [46,47] All points to the importance of public education on OD propagation.

Effect of religious thoughts on OD attitude: In is work we found that subjects who believed that religion doesn't permit OD embrace negative attitude toward OD (whether their religious conceptualization was derived from educated knowledge or presumably forbiddance thoughts). For instance, almost all official (namely moderate) Islamic organizations and institutions around the globe have issued "fatwas" (clerical recommendations) in favor of OD; describing it as "an act of merit". [48,49] Our subjects- as well as the general population- tendency of any negative attitude toward OD of a religious background may well be attributed to unawareness of the religious edicts concerning OD in their jurisdictions. As a matter of fact, the effect of religion on the attitude toward OD and transplantation has been so controversial, worldwide. Belief in "God" and "after-life" was reported to be associated with negative attitude towards OD. [20] Conversely, a survey conducted on Swiss–Italian young adults reported positive impact of belief in God on their attitude to OD. [50] On the other hand, no significant association between religion and attitude for OD had been reported in the UK population. [36]

Sources of information on OD: The current study identified that the main individual source of information regarding OD was media (and mainly TV). The same tendency had is reported by Alghanim (2010). [32] Importantly, the source of information on OD significantly impacted the participants' OD knowledge score. Since media, followed by Internet, have been the most frequently reported sources of OD self-education, sponsoring quality OD education material delivered to the public through dedicated media channels plays a pivotal role in OD promotion for enthusiastic communities. In practice, the importance of visual media in increasing the awareness of the public about OD has been widely addressed. [51] Measures taken to educate people with relevant OD information can include the benefits of OD, as well as associated possible risks so that people can make informed OD and transplantation choices at present and in the future. In the absence of reliable baseline information, it would be difficult to comment on whether the general population is already aware of this simple facet. Alarmingly, only 15.5% did not believe that OD causes body deformity (6.2% "strongly disagree" and 9.3% "agree"). Well, people have a right over their bodies and they should therefore be fully educated about the future

UNDER PEER REVIEW

repercussions of removing any part of their bodies, if any. With full disclosure of such information they can then make the choice of donating an organ to another human being in the noblest spirit of munificence and benevolence. Although HCWs occupied the second least frequent (6.3%) source of information about OD, the quality of knowledge, as reflected by highest knowledge score (13.3±4.2) above all other sources mandates engaging HCWs of all fields and ranks, including medical staff, allied health practitioners, medical and nursing students, and health educators in any contemplated OD development programs. [33,39,40] First, HCWs and all medical professions' affiliates themselves should be candidates for OD and transplantation knowledge and attitude education. Had this pre-requisite been laid, a quality message about OD would be ready to confer to audience. Second, HCWs should be incorporated proactively and incentivized to communicate this message to clients, as part of their broader job responsibility. The communication gap between patients and doctors should be bridged for the generation of more favorable attitudes toward OD in the population. Policy makers should also involve religious scholars for the mobilization of a favorable public opinion toward OD. In addition, a publicly chartered organization may be established to coordinate live OD, including donation by altruistic strangers. A model from Saudi Arabia, as will be shown soon, exemplifies this very strategy which proved a remarkable success with this regard.

Why our subjects will not donate and what are the solutions? Almost two-thirds (64.7%) of the participants who did not support OD may have been concerned about fearing of bodily deformity, and also 54.9% of respondents feared subsequent complications. Therefore, it is possible that establishing legislations that will guarantee the donors better health care and easy access to health facilities might encourage Egyptians to donate during life time. [3,6] Family refusal (28.7% of causes of negative attitude to OD) was one of the main limiting factors for donating organs should be reviewed carefully. Efforts should be made to increase discussions about OD among the family members. Previous researches had reported direct correlation between willingness to donate and family support [27,32] and indicated that appropriate public exposure to knowledge about OD would result in more frequent declaration of one's wishes to donate, decreasing uncertainty at critical times of brain death of a loved one and would likely to increase OD. If OD is an important health utility in a majority of the world's countries, it ought to be a top priority in a country like Egypt, which records one of the highest infection rates of hepatitis C. The latter has often been a fatal ailment for hundreds of thousands of patients, especially those who have reached end stage liver disease, struggle due to liver failure and only a lucky few manage to recoup their health and independence through a liver transplant.

Successful OD models from the outer world: A comprehensive solution to OD conflict in Egypt lies in a multitude of approaches aiming to rectify all the wrongful thoughts and beliefs about OD and transplantation and provide most optimum communication and legitimacy climate for spreading the message of OD as a noble deed. From the faith and moral viewpoint, OD received utmost support from Islam, [25] as well as from a growing number of philanthropic, societal, charitable, Goodwill, and volunteer groups, globally, where Egyptian health policy makers should partner with and aspire as a model. In the USA, for instance, a nonprofit organization called "MatchingDonors" (*http://www.matchingdonors.com/life/index.cfm)* provides an example for a successful establishment that strives assisting both people desperate for a transplant and people willing to donate their organs altruistically to others in demand of this life line and provides an appropriate environment for such matching. Reportedly, MatchingDonors.com gets over 1.5 million hits in a month from OD candidates. A lesson to learn from the organ donor-recipient communication model above in order to push OD forward in the coming years is paired donation concept, where patients who failed to find a matching related donor coordinate with other families looking for a cross-match. [9]

UNDER PEER REVIEW

A model from closer peers: Since 1985, Saudi Arabia was one of the few Arab countries to have started an OD program. Public and governmental work helped the program to expand and renamed the SCOT *(Saudi Center for Organ Transplantation)* in 1994. [25] The publicly funded organization is now responsible for organizing most OD-OT affairs in the country. The newly born organization grew up steadily until it was able to create an efficient coordination system with supportive means of transportation to enhance the movement of harvesting teams, organs, and recipients all over the country. To date, its efforts benefited a significant number of patients. Early since its inception, SCOT had attempted to improve the stakeholders and particularly the medical community's awareness to the importance of OD and transplantation, advocating efficient tools addressing HCWs training, visits to donating hospitals, conferences, publications, and incorporating OD as an essential component of curricula of medical schools and postgraduate hospital training. Despite the similarity and the many shared societal, cultural, and religious values between Egypt and many other societies with an Islamic faith majority, an Islamic country such as Pakistan has 65% of its adult population willing to donate their organs. [30] This record emphasizes the fact that Islam in itself as a doctrine does not hinder OD nor does it undermine it. Had such information, as well as reports from neighboring countries with early successful OD work been conveyed to the Egyptian people, their attitude toward OD would considerably change.

Among strengthens of this work, up to our belief, this is the first study to examine the relationship between the general public's knowledge and attitudes about OD; their socio-demographic characteristics in Egypt. In addition, the present study emerges at a point in time when OD is an actively debated bioethical and medical issue. The study had started two years before the final OD law statue would be vitalized in 2016. Therefore, this research is relevant and timely. This creates a fertile ground for promoting national awareness campaign on solid ground. Through our study and its findings, we hope to be in a better position to clarify certain ethical issues regarding OD in the country. The awareness regarding OD here can certainly be improved and this in turn can impact the motivation of the people toward OD. We state this because our study and previous studies done in other regions of the world have shown that awareness and motivation go hand in hand. Better awareness of OD and its various facets can be expected to improve the motivation to donate. Religion is one vehicle that can be used to motivate people to donate, not to detain them from doing so. The currently modest level of OD and transplantation should serve as a revelation that despite the increasing prevalence of end organ diseases in the country, not many ODs are being carried out in a legitimate manner. The opinions of the people in this survey can help shape future policies regarding OD; their wishes, preferences and reservations can all be actively debated at higher forums before germane policies are engineered. This study can also help create more motivation amongst the people for OD; this being one of the major hurdles organ transplantation is facing today. Eventually, an important baseline document for future studies is now being presented, and a qualitative tool can be employed in further studies to gauge requisite information. In conclusion, OD and transplantation is now fully legislated in Egypt. The arena is prepared to move forward with a national OD plan highlighting people education, incentives provision, strict law enforcement, and HCWs training. A national registry system of donors and potential recipients should be in place, soon. Equitably, too, there should be a comprehensive insurance program that can bear the costs of transplant operations without "out-of-pocket" payment requirements, which does open the door to organ trafficking. Decision makers need to deploy the now available database of an updated epidemiological profile of OD, together with a strong societal and religious support in order to expedite saving the lives standing in the line for a timely and potentially successful transplant opportunity. Organ trading has to stop in Egypt, thanks to sincere efforts to eliminate this evil through an optimistic OD vision. Regional and

UNDER PEER REVIEW

international bodies must also coordinate efforts to stop the spread of the black market in human organs on this globe.

References

1 Caplan A. Daniel H. Coelho (Editor). The Ethics of Organ Transplants: The Current Debate. Prometheus Books. 1999. SBN-10: 1573922242. ISBN-13: 978-1573922241.
2 International Standards Established by Organizations for Organ and Tissue Transplantation http://eipr.org/en/report/2010/04/16/792/795
3 Delmonico FL. The declaration of Istanbul on organ trafficking and transplant tourism Indian J Nephrol. 2008 Jul; 18(3): 135–140. doi: 10.4103/0971-4065.43686 http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2813140/
4 World Health Organization (WHO). Media Center. "WHO Proposes Global Agenda on Transplantation" 30 March 2007. http://www.who.int/mediacentre/news/releases/2007/pr12/en/
5 Fortieth World Health Assembly Geneva, 4-15 MAY 1987. WHA40.13. Development of guiding principles for human organ transplants http://www.who.int/transplantation/en/WHA40.13.pdf
6 Fifty-Seventh World Health Assembly Wha57.18 Agenda item 12.14 22 May 2004 Human organ and tissue transplantation. http://www.transplant-observatory.org/SiteCollectionDocuments/wha57resen.pdf
7 Egyptian initiative for personal rights. http://eipr.org/en/report/2010/02/01/792.
8 Egyptian initiative for personal rights: Situation in Egypt. National Legislation to Regulate Organ Transfer, Transplant and Prevent Organ Trafficking. http://eipr.org/en/report/2010/04/16/792/797
9 TheNewArab. The moral dilemma of organ donation in Egypt. https://www.alaraby.co.uk/english/features/2015/7/17/the-moral-dilemma-of-organ-donation-in-egypt
10 Broelsch CE, Testa G, Alexandrou A, Malagó M (2002). Living related liver transplantation: medical and social aspects of a controversial therapy. Gut 50: 143–145.
11 Prottas J, Batten H (1988). Health professionals and hospital administrators in organ procurement: attitudes, reservations and their solutions. Am J Pub Health 78: 642-645.
12 Chung CK, Ng CW, Li JY, Sum KC, Man AH, et al. (2008). Attitudes, knowledge, and actions with regard to organ donation among Hong Kong medical students. Hong Kong Med J 14: 278-285.
13 Saub EJ, Shapiro J, Radecki S (1998). Do patients want to talk to their physicians about organ donation? Attitudes and knowledge about organ donation: a study of Orange County, California residents. J Community Health 23: 407-417.
14 Esezobor CI, Disu E, Oseni SB. Attitude to organ donation among healthcare workers in Nigeria. Clin Transplant. 2012 Nov-Dec;26(6):E612-6. doi: 10.1111/ctr.12032. Epub 2012 Oct 16. http://www.ncbi.nlm.nih.gov/pubmed/23072566.
15 Ahlawat R, Kumar V, Gupta AK, Sharma RK, Minz M. Jha V. Attitude and knowledge of healthcare workers in critical areas towards deceased organ donation in a public sector hospital in India. The National medical journal of India. 2013; 26(6):322-6.
16 Alsaied O, Bener A, Al-Mosalamani Y, Nour B. Knowledge and attitudes of health care professionals toward organ donation and transplantation. Saudi J Kidney Dis Transpl [serial online] 2012 [cited 2016 Mar 31];23:1304-10. http://www.sjkdt.org/article.asp?issn=1319-2442;year=2012;volume=23;issue=6;spage=1304;epage=1310;aulast=Alsaied,
17 Gridelli B, Remuzzi G (2000) Strategies for making more organs available for transplantation. N Engl J Med 343: 404–410.
18 Hamed H, Awad ME, Youssef KN, Fouda B, Nakeeb AE, et al. (2016) Knowledge and Attitudes about Organ Donation among Medical Students in Egypt: A Questionnaire. J Transplant Technol Res 6:155. doi:10.4172/2161-0991.1000155.

UNDER PEER REVIEW

19 Burra P, De Bona M, Canova D, D'Aloiso MC, Germani G, et al. (2005). Changing attitude to organ donation and transplantation in university students during the years of medical school in Italy. Transplant Proc 37: 547-550.
20 Sanner MA, Hedman H, Tufveson G (1995) Evaluation of an organ-donor-card campaign in Sweden. Clin Transplant 9: 326-333.
21 Shaheen FAM, Souqiyyeh MZ. Factors influencing organ donation and transplantation in the Middle East. Transplant Proc 2000; 6:41-52.
22 Alam AA. Public opinion on organ donation in Saudi Arabia. Saudi Journal of Kinney Diseases and Transplantation. 2007; 18(1):54-59.
23 Integrated Regional Information Networks (IRIN). New law targets illegal organ transplants. http://www.irinnews.org/report/93144/egypt-new-law-targets-illegal-organ-transplants
24 Albar MA. Islamic ethics of organ transplantation and brain death. Saudi Journal of Kinney Diseases and Transplantation. 1996; 7(2):109-114.
25 Al faqih SR. The influence of Islamic views on public attitudes toward kidney transplant donation in a Saudi Arabian community. Public Health 1991; 105:161-65.
26 Randhawa G, Brocklehurst A, Pateman R, Kinsella S, Parry V, et al. (2010) “Opting-in or opting-out?” The views of the UK’s faith leaders in relation to organ donation. Health Policy 96: 36–44.
27 Mossialos E, Costa-Font J, Rudisill C (2008) Does organ donation legislation affect individuals' willingness to donate their own or their relative's organs? Evidence from European Union survey data. BMC Health Serv Res 8: 48.
28 14 Albright CL, Glanz K, Wong L, Cruz MRD, Abe L, et al. (2005) Knowledge and attitudes about deceased donor organ donation in Filipinos: a qualitative assessment. Transplant Proc 37: 4153-4158.
29 Tam WWS, Suen LKP, Chan HYL (2012) Knowledge, Attitudes and Commitment toward Organ Donation among Nursing Students in Hong Kong. Transplant Proc 44: 1196–200.
30 Saleem T, Ishaque S, Habib N, Hussain SS, Jawed A (2009) Knowledge, attitudes and practices survey on organ donation among a selected adult population of Pakistan. BMC Medical Ethics 10: 5.
31 Iliyasu Z, Abubakar IS, Lawan UM, Abubakar M, Adamu B, et al. (2014). Predictors of Public Attitude toward Living Organ Donation in Kano, Northern Nigeria. Saudi J Kidney Dis Transpl 25: 196-205.
32 Alghanim SA. Knowledge and attitudes toward organ donation: a community-based study comparing rural and urban populations. Can Med Assoc J. 2010;21(1);23-30.
33 Bilgel H, Sadikoglu G, Bilgel N (2006). Knowledge and Attitudes about Organ Donation among Medical Students. Transplantationsmedizin 18: 91.
34 Boulware LE, Ratner LE, Sosa JA, Cooper LA, LaVeist TA, et al. (2002). Determinants of willingness to donate living related and cadaveric organs: identifying opportunities for intervention. Transplantation 73: 1683-1691.
35 Odusanya O, Ladipo CO. Organ donation: knowledge, attitudes, and practice in Lagos, Nigeria. Artif Organs 2006; 30:626-9.
36 Coad L, Carter N, Ling J. Attitudes of young adults from the UK towards organ donation and transplantation. Transplantation Research 2013; 2:9. DOI: 10.1186/2047-1440-2-9.
37 Conesa C, Ríos Zambudio A, Ramírez P, Canteras M, Del Mar RM, Parrilla P: Socio-personal profile of teenagers opposed to organ donation. Nephrol Dial Transplant. 2004; 19: 1269-1275. 10.1093/ndt/gfh075.
38 Sanavi S, Afshar R, Lotfizadeh AR, Davati A: Survey of medical students of Shahed University in Iran about attitude and willingness toward organ transplantation. Transplant Proc. 2009, 41: 1477-1479.

UNDER PEER REVIEW

39 Dutra MMD, Bonfim TAS, Pereira IS, Figueiredo IC, Dutra AMD, et al. (2004). Knowledge about transplantation and attitudes toward organ donation: a survey among medical students in northeast Brazil. Transplant Pros 36: 818-820.
40 Schaeffner E, Windisch W, Freidel K, Breitenfeldt K, Winkelmayer W, et al. (2004). Knowledge and attitude regarding organ donation among medical students and physicians. Transplantation 77: 1714-1718.
41 Laederach-Hofmann K, Gerster BI. (1998) Knowledge, attitude and reservations of medical students about organ transplantation: results of a survey during the first year of study. Schweiz Med Wochenschr 128: 1840–1849.
42 Dominguez-Roldan JM, Murillo-Cabezas F, Munoz-Sanchez A, Perez-San-Gregorio MA (1992) Psychological aspects leading to refusal of organ donation in Southwest Spain. Transplant Proc 24: 25-26.
43 Floden A, Persson LO, Rizell M, Sanner M, Forsberg A, et al. (2011) Attitudes to organ donation among Swedish ICU nurses. J ClinNurs 20: 3183–3195.
44 El-Shoubaki H, Bender A, Al-Mosalamani Y. Factors influencing organ donation and transplantation in the state of Qatar. Transplant Med 2006; 18:97-103.
45 Al-Sebayel M, El-Enazi A, Al-Sofayan M, et al. Improving organ donation in Central Saudi Arabia Saudi Med J 2004; 25:1366-8.
46 Schauenburg H, Hildebrandt A. Public knowledge and attitudes on organ donation do not differ in Germany and Spain. Transplant Proc 2006; 38:1218-20.
47 Sandera S, Miller B. Public knowledge and attitudes regarding organ and tissue donation: an analysis of the northwest Ohio community. Patient Educ Couns 2005; 58:154-63.
48 Ashraf O, Ali S, Ali SA, Ali H, Allam M, Ali A, Ali TM. Attitudes toward organ donation: a Survey in Pakistan. Artificial Organs 2005; 29:899-905.
49 Carlisle D. Life-giving fatwa–Editorial. Nursing Times 1995; 29:29-30.
50 Gross T, Martinoli S, Spagnoli G, Badia F, Malacrida R, et al. (2001). Attitudes and behavior of young European adults towards the donation of organs – a call for better information. Am J Transplant 1: 74-81.
51 Matesanz R, Miranda B. Organ donation; the role of the media and of public opinion. Nephrol Dial Transplant 1996; 11:2172-8.