British Journal of Medicine & Medical Research
18(7): 1-15, 2016, Article no.BJMMR.29797
ISSN: 2231-0614, NLM ID: 101570965

SCIENCEDOMAIN *international*
www.sciencedomain.org

Public's Attitude toward Organ Donation in Egypt: A Social and Conceptual Approach

Raouf M. Afifi[1*], Sameh Sh. Zaytoun[2], Ejaz Ah. Khan[3] and Yousef Afifi[1]

[1]International Management-Health Services Institute (ITM-HS), Community Health Research, Indianapolis, Indiana, USA.
Health Care Excellence Research Center, Cairo, Egypt.
[2]Department of Community Medicine, South Valley University, Qena, Egypt.
[3]Department of Health Administration Care, Battergi Medical Academy, Jeddah, Saudi Arabia.

Authors' contributions

This work was carried out in collaboration between all authors. Author RMA designed the study, wrote the protocol, supervised field work, conducted statistical analysis and wrote the first draft of the manuscript. Author SSZ managed the literature searches, sampling, administrative and ethical issues, participants' interviewing. Author EAK shared study instrument designing and adaptation, data management plan, abstracting and managed referencing. Author YA participated in data collection, interviewing recruits, data entry and final report editing. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJMMR/2016/29797
Editor(s):
(1) Rui Yu, Environmental Sciences & Engineering, Gillings School of Global Public Health, The University of North Carolina at Chapel Hill, USA.
Reviewers:
(1) Vanessa Silva e Silva, Queen's University, Brazil.
(2) Hui-Hui, Tan, Singapore General Hospital, Singapore.
(3) Heng Wee Ling, National Cardiovascular Homograft Bank, Singapore.
Complete Peer review History: http://www.sciencedomain.org/review-history/16759

Original Research Article

Received 29th September 2016
Accepted 25th October 2016
Published 5th November 2016

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.

**Corresponding author: E-mail: raoufafifi43@gotmail.com, raoufafifi@hotmail.com;*

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.

1. 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. Not only once an organ loses its functionality or gets damaged can nothing be done to cure it, but also the patient, along with his/her family may be faced with severe problems. Bottom-line, without replacing a failed organ, i.e. transplantation, patients go through much suffering, which often leads to death. With that in mind, organ donation (OD) is the gift of giving an organ to someone who has lost one, to overcome the detrimental consequence of this loss [1]. Two types of OD are known: one when an organ is taken from a live donor; and another when an organ has 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].

1.1 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 OT 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 and advanced kidney diseases. Many countries today engage in OT 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 OT. 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 take 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]. Estimates show that transplant tourism accounts for 10% of all OT practices worldwide [4]. Ever 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. Now that these regulations were provided by governmental agencies as the policy maker party, but not by the medical organizations, vitalizing the role of these regulations in preventing unlawful OT entails involving concerned medical organizations to take part as a key in this process. The World Health Organization (WHO) has condemned organ trafficking on many occasions, [5,6] urging member states to exercise effective supervision on OT and seek out living as well as deceased organ donors. A legal consent for the extraction of 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 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).

1.2 Egypt and Organ Donation and Transplantation

Until recently, Egypt has been one of the few countries without legislation criminalizing the organ trade and regulating OT. This issue has been subject to a broad debate amid repeated warnings of a "mafia of organ traffickers," targeting the poor and most vulnerable [7]. A strong demand has been heard for strict legislation to regulate the chaos in this critical field in the health sector. On the other hand, 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 of donating their organs. The Egyptian Initiative for Personal Rights (EIPR) [7] was among voices which offered rights-based perspective on OT policies as a means by which the state can meet its commitments to the human rights to health and life. The EIPR stresses 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 fairly. To that end, the only legal framework existed to regulate OT in Egypt was the professional code of ethics and conduct of the Egyptian Medical Syndicate [8]. The code is simply a set of general principles, as such as informing the Syndicate about any OT process to assure adherence by ethical guidelines contained in the code; no mention of any criminal liability or civil rights is endorsed. Not before December 2010 when legalizing deceased donation was made possible 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]. 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.

Traditionally, a state of imbalance between the "supply" of donor organs and the "demand" on them to save organ failure patients is suffered internationally [10]. One of the most influential factors for satisfactory transplantation coverage is the public opinion. The latter involves knowledge and attitudinal aspects of OD support [11]. With this 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 healthcare workers (HCWs) tend to favor OD [14,15]. In one study, [16] 83% of interviewed HCWs supported OD (in Qatar); however, 51.3% - 61.6% of them (including physicians, nurses, and technicians) still wanted to be buried with all their organs intact. A robust legal OD framework emphasizes public trust in the healthcare system and reflects positively upon the public attitude towards OD, [17] while ignorance of the presence of a well-established OT law explains the high rate of refusal of OD among those with an underlying negative attitude to OD [18]. Further, 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].

1.3 Obstacles to Implementing Organ Donation Law in Egypt

In Egypt, the provision of knowledge and attitude of the populations about OT is rather worrying. 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, e.g., those with higher education level, who supposedly have a better chance for OD literacy often do not show the expected level of awareness toward a satisfactory 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 OT processes in a considerable proportion of healthcare institutions in Egypt [18]. Initially encountered are emergency 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.

Article six of the 2010 law [9] outlaws financial remuneration for OD. It aims to prevent underprivileged Egyptians from selling their organs to wealthy visitors, some of which still outlaw OD entirely. Until 2010, a report by the WHO described Egypt as a “hub for organ trafficking [23]. 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. Unfortunately, illegal organ donor victims often do not report the crimes against them for fear of punishment as the 2010 law also criminalizes commercial donors. As early as 1982, the “Islamic Council of Saudi Arabia” issued a resolution which permitted tissue and OT from both living and cadaveric donors but, cautioned against offering organs for sale [24]. In essence, the Islamic faith does support the concept of transplantation which provides the strongest positive influence for OD both during life and at death [25]. Moreover, the concept of OD in Islam is perceived as a kind of charitable deed, whose benefit continues after a person has passed away. Nonetheless, Egypt, a pivotal Islamic country in the region, was decades later than Saudi Arabia to take a straight forward OD legislative action.

1.4 Sources of Knowledge and Information about Organ Donation

Many western studies [26,27] and south Asian’s [28,29,30] on knowledge and attitudes toward OD have been released. Fewer studies in the Arab East and Africa addressing OT have been available [31]. For instance, it had been reported that the source of information about OD among the Saudi populations was television (TV) [32]. The contribution of health care providers in providing knowledge about OT in Saudi Arabia, too, had been "none" or "little". Likewise, Alam et al. [22] report that many Saudi families are unwilling to donate organs. Reviewing the psychological aspects of OD revealed that knowledge and residual religious beliefs play a significant role in influencing an individual's decision to donate 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.

2. METHODS

Qena University Hospital (QUH) is a teaching secondary care institution with modern technology, and which receives referrals from the surrounding districts, including Luxor and Red Sea areas.

A cross sectional approach has been opted to achieve study aim. Accordingly, 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 QUH research ethics committee to conduct the study was granted.

2.1 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 outpatient department (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. First, participants were informed of the study nature and aim, and they 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. Acceptance to submit to the interview was considered a formal consent to participate. Formal approval from hospital's management and other concerned parties was obtained prior to the study and no other ethical approvals were need.

2.2 Data Collection

A pre-designed Arabic-language questionnaire was designed to capture information relevant to the study. Four medical consultants, including a community medicine consultant with community health research experience, a urologist with kidney transplantation experience, a senior general surgery specialist, and an experienced medical director with health administration background, were given the questionnaire to review and evaluate, in terms of language, design, flow of ideas, construct validity, content validity, criterion validity, and other validity aspects they deem appropriate. Comments of the consulting team were studied carefully, and pertinent questions were rectified, accordingly. 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.

2.3 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 and 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 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.

3. RESULTS

3.1 Socio-demographic Characteristics

The socio-demographic characteristics of the participants are presented in Table 1. The participants' mean age was 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%).

3.2 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 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 a significant difference between recognition or not 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].

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

As in Table 4, age, marital status and gender did not influence the variability in the mean score of attitude toward OD [*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) among the study population, while those with lowest education, if any, achieved lowest score (23.3±3.3) compared to peers, [*F*(df=3, 805)= 4.52, *p*=0.38] (Table 4). Awareness of the presence of OD programs (56.1%) and unawareness of such programs (43.9%) 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 was significantly shaped by their conceptualization of religious preaching with that respect, where 55.8% believed that religious faiths support OD, 27.3% were equivocal, and 16.9% did not believe so.

Table 1. Distribution of study participants by demographic criteria

	Characteristic	No.	%
Age(y)	• < 25	74	8.8
	• 25-34	153	18.1
	• 35-44	275	32.6
	• ≥45	342	40.5
	• Range 18-76 y		
	• 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

(n=844)

Table 2. Distribution of participants by OD knowledge score by selected participants' criteria

Characteristic	Subcategory	N	%	Mean ±SD	Test statistic	*p*-value
Age (y)	• < 25	69	8.5	8.8±4.1	*F*(df 3, 812)	0.0026
	• 25-34	145	17.8	9.8±4.1	= 4.78	
	• 35-44	264	32.3	10.5±4.3		
	• ≥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	
Educational level	• Illiterate/1ry school	57	6.9	4.8±2.9	*F*(df 3, 812)	0.0002
	• Intermediate school	163	19.9	6.6±2.9	= 3.61	
	• Secondary/postsecondary/ technical degree	340	41.7	8.3±2.8		
	• University/higher education	256	31.3	11.4±4.7		
Marital status	• Married	369	45.2	10.3±3.6	*F*(df 2, 813)	0.0026
	• Single	413	50.6	8.7±3.9	= 4.78	
	• Divorced/widowed	34	4.2	6.6±2.5		
Ever heard about	• Positive	728	89.2	12.3±4.8	*t*(df=814)	0.0035
OD	• 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	*F*(df 6, 809)	0.0016
	• Newspapers/magazines	101	12.4	8.1±3.3	= 3.10	
	• Internet	119	14.6	9.3±4.2		
	• Friends/relatives	67	8.2	5.6±1.9		
	• 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		

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

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

Table 3. Participants' response to items reflecting attitude toward OD

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)

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

** 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%)*

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

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

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

4. DISCUSSION

The world had been desperate for decades to achieve a tangible success in the OT quest, e.g., compared with successes achieved in curative and diagnostic sides of health care requisite. 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. In this work, we aimed to analyze some correlates pursuant with knowledge and attitude toward OD in Egypt. The study population was selected from a community stratum probably more in touch with health inquiry; some being care seekers or their families. The rationale was that if the study population scored poorer on OD than that expected for such disease - oriented population stratum, no much better response would be anticipated from the general population. Although our subjects' mean age is rather high (42±8.17 years), age did not affect their attitude toward OD and knowledge of OD scores. On the other hand, marriage led to an increase in the two scores of the study subjects. Some researches indicate that women are prone to gaining positive attitude to OD [33]. Boulware et al. [34]; otherwise reported that males may show better attitude towards OD. However, the male group in Boulware et al. study were those of higher education levels and were also young aged. In our study, gender did not impact the level of knowledge and attitude toward OD. Other OD researches support this no sex-difference trend as in our work [18,30,35]. Both OD knowledge score and attitude toward OD score significantly increased by educational level in our study. Knowledge score of medical students in Hamed et al. [18] study improved significantly by the surveyed medical students' seniority and the better knowledge the better OD attitude of students.

The participants were more likely to donate organs during life but only to relatives and prominently less likely to donate to others. On the other hand, the willingness to donate after death was remarkably lower than former group. Little quantitative research has been carried out investigating attitudes towards OD in the general population [36]. Instead, most studies predominantly surveyed health professionals [37,38] or medical students. [33,39,40] who tend to have favorable attitudes towards OD. The reason may be that medical staff could be having more insight into the subject of OT. In a Turkish study by Bilgel et al. [33] 58.4% of surveyed medical students were willing to donate organs after death, compared to the 43.6% in ours. 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 concluded from the insignificant difference in corresponding knowledge scores. In parallel, the participants' attitude to OD from people diagnosed with brain death was barely toward donation, if any (35.3% vs. 31.1). In the literature, it has been found that inadequate knowledge and vague conception of brain death almost always had a negative effect on OD [19]. The same notion is supported by the finding that 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]. A survey on Sweden ICU nurses highlighted that nurses 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 were unaware of the presence of specific OD programs. Likewise, adequate OD knowledge in Hamed et al. [18] study was present in only 36% of medical student, which was extremely low in comparison to other countries, e.g., 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 on OD score but the OD attitude score. For instance, those who have ever heard of OT programs (56.1%) scored indifferently (p=0.18) on OD attitude from those who had never done so. 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 are quite comparable with those reported from neighboring countries, [22,33,44,45] as well as studies conducted in the west; [46,47] all point to the importance of public education on OD propagation.

4.1 Effect of Religious Thoughts on OD Attitude

In this 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). Almost all official Islamic institutions worldwide have issued 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 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 OT has been so controversial, worldwide. Belief in "God" and "after-life" was reported to be associated with negative attitude towards OD [20]. Conversely, the 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 among UK populations [36].

4.2 Sources of Information on OD

The current study identified that the main individual source of information on OD was media. The same tendency is reported by Alghanim [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 in our study, sponsoring quality OD education material delivered to the public through dedicated media channels plays a pivotal role in OD promotion for enthusiastic communities [51]. Alarmingly, only 15.5% of our population did not believe that OD causes body deformity. Well, people have a right over their bodies and they should therefore be fully educated about the future 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 in any contemplated OD development programs [33,39,40]. 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.

4.3 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 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 that should be reviewed carefully. 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.

4.4 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 beliefs about OT and provide most optimum communication and legitimacy climate for spreading the message of OD as a noble deed. From moral viewpoint, OD receives an utmost support from Islam, [25] as well as from a growing number of philanthropic, societal, charitable, Goodwill, and volunteer groups, globally, where Egyptian policy makers may want to 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]. Explaining to the Egyptian people the true positive standing of Islam and Coptic Church about OD and publicizing successful OD models from the outer world pave the way for a gradual accept of OD concept until it becomes part of their beliefs and way of living. The number of people who will be motivated to donate living organs willingly shall steadily increase, when they realize that the health care system, religious scholars, community leaders, and the whole society do support them if they develop organ failure.

4.5 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. This 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.

5. STRENGTHS AND LIMITATIONS

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.

Further, the study's internal and external validity has been a matter of utmost vigilance. First, we meant to advocate two outcome scores, i.e., attitude toward OD and OD knowledge score in order to have a wider measurement of Egyptian people's OD trends, behaviors, and motives. Also, the large sample size increases the study power, minimizes type 2 error, and enhances external validity and generalizability potential of the study findings. Also, the high reliability of the data collection instrument, as well as assuring adequate randomization advocating systematic sampling, and restricting admission of returned questionnaires to only those with ≥80% valid responses, all thrust the quality of the study data. However, one study limitation could be its confinement to the outpatient setting of QUH. Arguably, people attending for ambulatory care could ne empathetic with disease matters, and may often opt to respond positively to OD inquiry, especially if donating an organ was in favor of their well-being or their sick relatives' health. However, it has been envisioned while preparing for this research that if the study population which is more disease-oriented would score poorer on OD than that expected, no better response would be anticipated from the other populations who are less health and disease-concerned. So now we may argue that even if other population sectors would be surveyed in different community settings (e.g., workplace and educational institutes), the lower OD attitude scores emphasizes a greater demand for interventions to remedy the OD situation in Egypt. Further, care seekers and their families still constitute a considerable proportion of the Egyptian population fabric and should be considered in a probability sample multi-setting study. Moreover, prominent religious scholars, prolife figures, policymakers and economists in a national "organ transplantation wake project", a large-scale qualitative research, provide a comprehensive understanding of major inputs that determine the needs and demands of organ transplantation in Egypt, and allocate resources to satisfy these demands as a result. The

currently modest level of OT 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.

6. CONCLUSION

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. Rightfully so, there should be a comprehensive insurance program that can bear the costs of transplant operations without "out-of-pocket" payment requirements. However, there have been concerns that this system may 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 international bodies must also coordinate efforts to stop the spread of the black market in human organs on this globe.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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.
   Available: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;18(3):135-140.
   DOI: 10.4103/0971-4065.43686
   Available: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.
   Available: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.
   Available:http://www.who.int/transplantation/en/WHA40.13.pdf
6. Fifty-Seventh World Health Assembly Wha 57.18 Agenda Item 12.14 22 May; 2004. Human Organ and Tissue Transplantation.
   Available:http://www.transplant-observatory.org/SiteCollectionDocuments/wha57resen.pdf
7. Egyptian Initiative for Personal Rights.
   Available: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.
   Available:http://eipr.org/en/report/2010/04/16/792/797
9. The New Arab. The Moral Dilemma of Organ Donation in Egypt.
   Available: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. Living related liver transplantation: Medical and social aspects of a controversial therapy. Gut. 2002;250: 143-145.
11. Prottas J, Batten H. Health professionals and hospital administrators in organ procurement: Attitudes, reservations and their solutions. Am J Pub Health. 1988;78: 642-645.
12. Chung CK, Ng CW, Li JY, Sum KC, Man AH, et al. Attitudes, knowledge, and actions with regard to organ donation among Hong Kong medical students. Hong Kong Med J. 2008;14:278-285.

13. Saub EJ, Shapiro J, Radecki S. 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. 1998;23:407-417.
14. Esezobor CI, Disu E, Oseni SB. Attitude to organ donation among healthcare workers in Nigeria. Clin Transplant. 2012;26(6): E612-6.
    DOI: 10.1111/ctr.12032.
    Epub 2012 Oct 16.
    Available: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;23:1304-10.
    [cited 2016 Mar 31].
    Available: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. Strategies for making more organs available for transplantation. N Engl J Med. 2000;343: 404-410.
18. Hamed H, Awad ME, Youssef KN, Fouda B, Nakeeb AE, et al. Knowledge and attitudes about organ donation among medical students in Egypt: A questionnaire. J Transplant Technol Res. 2016;6:155.
    DOI: 10.4172/2161-0991.1000155
19. Burra P, De Bona M, Canova D, D'Aloiso MC, Germani G, et al. Changing attitude to organ donation and transplantation in university students during the years of medical school in Italy. Transplant Proc. 2005;37:547-550.
20. Sanner MA, Hedman H, Tufveson G. Evaluation of an organ-donor-card campaign in Sweden. Clin Transplant. 1995;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.
    Available: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. Opting-in or opting-out?" The views of the UK's faith leaders in relation to organ donation. Health Policy. 2010;96:36-44.
27. Mossialos E, Costa-Font J, Rudisill C. 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. 2008;8:48.
28. Albright CL, Glanz K, Wong L, Cruz MRD, Abe L, et al. Knowledge and attitudes about deceased donor organ donation in Filipinos: A qualitative assessment. Transplant Proc. 2005;37:4153-4158.
29. Tam WWS, Suen LKP, Chan HYL. Knowledge, attitudes and commitment toward organ donation among nursing students in Hong Kong. Transplant Proc. 2012;44:1196–200.
30. Saleem T, Ishaque S, Habib N, Hussain SS, Jawed A. Knowledge, attitudes and practices survey on organ donation among a selected adult population of Pakistan. BMC Medical Ethics. 2009;10:5.
31. Iliyasu Z, Abubakar IS, Lawan UM, Abubakar M, Adamu B, et al. Predictors of public attitude toward living organ donation in Kano, Northern Nigeria. Saudi J Kidney Dis Transpl. 2014;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. Knowledge and attitudes about organ donation among

medical students. Transplantation-smedizin. 2006;18:91.
34. Boulware LE, Ratner LE, Sosa JA, Cooper LA, LaVeist TA, et al. Determinants of willingness to donate living related and cadaveric organs: Identifying opportunities for intervention. Transplantation. 2002;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.
39. Dutra MMD, Bonfim TAS, Pereira IS, Figueiredo IC, Dutra AMD, et al. Knowledge about transplantation and attitudes toward organ donation: A survey among medical students in Northeast Brazil. Transplant Pros. 2004;36:818-820.
40. Schaeffner E, Windisch W, Freidel K, Breitenfeldt K, Winkelmayer W, et al. Knowledge and attitude regarding organ donation among medical students and physicians. Transplantation. 2004;77: 1714-1718.
41. Laederach-Hofmann K, Gerster BI. Knowledge, attitude and reservations of medical students about organ transplantation: Results of a survey during the first year of study. Schweiz Med Wochenschr. 1998;128:1840-1849.
42. Dominguez-Roldan JM, Murillo-Cabezas F, Munoz-Sanchez A, Perez-San-Gregorio MA. Psychological aspects leading to refusal of organ donation in Southwest Spain. Transplant Proc. 1992;24:25-26.
43. Floden A, Persson LO, Rizell M, Sanner M, Forsberg A, et al. Attitudes to organ donation among Swedish ICU nurses. J Clin Nurs. 2011;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. Attitudes and behavior of young European adults towards the donation of organs – a call for better information. Am J Transplant. 2001;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.

Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/16759