Egyptians Social Acceptance and Consenting Options for Posthumous Organ Donation. A Cross Sectional Study

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Abstract
Background: Organ donation has become one of the most effective ways in developing and developed countries to save lives and improve the quality of life for patients with end-stage organ failure. No previous studies investigated either the Egyptians’ perception or preferences about different consenting options for organ donation. This study aims to assess Egyptian personal preferences and public perception of norm on several consenting options for posthumous organ donation, and measure the awareness and acceptance of the public to Egyptian law articles regulating organ donation.

Methodology: A cross sectional study was conducted along two years among 2743 participants. Participants were chosen from governmental and non-governmental facilities as well as from the general public. Each participant was required to complete the study questionnaire which included demographic characteristics, personal preferences and public norms of eleven consenting options arranged from 1 (most preferred) to 11 (least preferred), and awareness and acceptance of the seven articles of Egyptian laws concerning organ donation.

Results: About 78% of the respondents expressed willingness to donate their organs after death while 22% were not willing to donate. Out of donation preferences, informed consent by donor only was a preferable choice, where about one third of respondents assigned to this option the highest ranking scores (31% as a personal preference and 31.6 % for the public norm). There was no difference between males and females or between personal preferences and perception of norms in consenting systems ranking. The awareness for the targeted Egyptian laws regarding organ donation after death was relatively low ranging from 56% to 23%.

Conclusion: Informed consent by donor only was the preferable choice as personal preference and as norm. The choice of consenting options did not vary with gender, education or employment. Increasing the awareness of Egyptians on the articles of the law of organ donation is highly needed.

Background
A common thread that binds all religions of the world is that the saving of life overrides all objections, and no religion is against organ donation. Organ transplantation has enabled many patients to have
longer and better quality of life, which resulted in an increased demand for a limited supply of organs [1]. Posthumous donation is still the most important source of organs, and studies have shown that one of the major barriers to posthumous organ procurement is failure to obtain consent and is always hindered by the consenting process [2].

There are three major factors to organize deceased organ donation that must be fulfilled: religious and social acceptance, legislation for organ donation and transplantation, and government support. There is religious acceptance for organ donation in the Middle East [3]. Islam has given permission for organ and tissue transplantation to save human lives or vital organs (providing that other treatment options were assessed and other conditions were met). In fact, the Quran states that "whoever saves the life of a human being, it is as if he has saved the life of all mankind ..." [4]. But there is no acceptance for equating brain death to legal death in some countries. Accordingly, legislation does not exist or has not been fully implemented in Egypt, Morocco, Syria, Sudan, and Libya [3]. There is poor awareness of the medical community and public about the importance of organ donation and transplant [5]. There are weak health systems and variable infrastructures in most Middle East countries. Organ transplantation and treatment of end stage organ failure is not a priority in most Middle East countries because of the cost and technology required. Furthermore, resources are inappropriately allocated, and government support is modest at best [3]. Living-donor organ transplant is the most widely practiced type of transplant in the Middle East. Around 40% of the liver transplantation operations occurring in the developing countries [6].

Several consenting systems have been proposed. Public opinion regarding the various consenting systems is crucial and is expected to be culture-specific [7], and requires further investigation [8]. Introduction of a consenting system without public support could negatively affect donation rates that highlights the need to determine the moral focus of the public [9]. Moreover, the education of religious leaders and the public is of vital importance in changing the cultural beliefs and practices of organ donation, given that Islam does not forbid organ or tissue donation [10–12]. There is limited information on public relative attitudes towards various consenting systems, especially in Middle Eastern/Islamic countries.
The aim of this study is to:

Assess the Egyptian public perception of organ donation and transplantation after death
Assess the Egyptian public preference of norm on several consenting systems for posthumous organ donation
Assess the effect of sociodemographic factors on several consenting systems for posthumous organ donation
Assess the awareness and acceptance by the public of the law of organ donation after death.
Assess the relation between awareness and acceptance by the public among those who chose the several consenting systems as first choice

Methods

1. **Study Setting:**

   Participants were chosen from:

   Egyptian Liver Hospital – Al Dakhlyia governorate.
   National Research Center.

2. **Study Design:**

   A cross sectional study was conducted along two years among 2743 adult patients and their relatives attending outpatient clinics of Egyptian Liver Hospital – Al Dakhlyia governorate (1568) and staff members of National Research Center, staff members and nurses of Egyptian Liver Hospital – Al Dakhlyia governorate, administrative employee, students, workers, managers, technicians, and not working participants (1175).

3. **Sample Size and Sampling Technique:**

   Based on the fact that we do not have any figure for the Egyptians’ preferences about different consenting options for organ donation as we do not have previous studies. So we expect the frequency of the problem that guarantee the largest sample size to be 50 % in order to have the largest possible sample size. The Confidence limit (the absolute precision required is assumed to be 0.05 i.e. 5 percentage points (out of the average), the confidence level for the interval will be set at 95%. Calculated by Statcalc version 7, with a total of minimum 2400 participants taking into consideration the involvement of different Study participants at different socioeconomic levels who were able to understand the purpose and procedures of the study and gave both verbal and written consent for participation were included in the study.

   The activities included assessment of the target groups’ perception and wishes for organ donation and transplantation after death as well as their preference about the norm on several consenting systems for posthumous organ donation. Exploring the awareness and acceptance of different sectors of the community by the law for donation after death.
4. **Data Collection Types and Tools:**

The published questionnaire by (10) was tailored to include the required different sociodemographic data for investigation. The questionnaire was first explained by the researcher team and it was self-administrated by each participant (illiterate respondents can complete the questionnaire verbally) after has been explained by the researcher to collect data about:

i. Demographic data included: age, gender, education level (illiterate, primary school, secondary school, college or higher), occupation (professional; technical; or managerial positions, skilled or unskilled manual workers, unemployed or in education) and socioeconomic level, perceived health status (healthy, ill), knowing an organ donor (yes, no), and knowing an organ recipient (yes, no).

ii. Eleven consenting options required to be arranged from 1 (most preferred) to 11 (least preferred) by each participant in two parts of the questionnaire:

   The first part included personal preference,
   The second included public norms (what is perceived as best for the Egyptian society, regardless of personal preference).

   The eleven ranks are: no-organ-donation, presumed consent, informed consent by donor-only,
   informed consent by donor-or-surrogate, and mandatory choice; the last three options ± medical or financial incentive.

iii. The awareness and acceptance of the seven articles of Egyptian laws concerning organ donation among respondents.

5. **Data management Analysis**

All completed questionnaire forms were entered in the computer, Statistical Package of Social Science Software program (SPSS), version 16 to be statistically analyzed. Descriptive statistics such as frequency and percentage were used for data summarization. Diagrams and figures were used to illustrate simple information. The obtained data of each participant was collected and translated into qualitative ones and tabulated to assess the Egyptian public perception on organ donation and transplantation after death. The analysis was done as comparative between the participants’ first impression about organ donation after death and their opinion after orientation with donation options. The eleven consenting options for organ donation are ranked according to the personal preferences
and public norm of the participants and these eleven consenting options were analyzed according to
the sex, education, employment & socioeconomic level of the participants and according to personal
preferences and public norms. The analysis was also done as comparative between awareness and
acceptance of the public by the laws of organ donation after death and between awareness and
acceptance of laws among those who chose the several consenting systems as first choice. The
analysis was carried out using the $\chi^2$-test for comparing between two qualitative variables.

6. **Ethical Considerations:**

Written consent of each participant was accustom to be obtained before collecting data. Confidentially of collected data were maintained.
Ethical approval was obtained from National Research Center (registration number: 16124)

Results

Results showed that participation of males and females was nearly equal. The age range was between
18 and 65 years old with nearly half of the sampled population in the age category of 25 to less than
45 years. Participants were chosen from governmental (National Research Centre and university
hospitals) and non-governmental facilities (Egyptian Liver Hospital – Al Dakhlyia governorate) as well
as from the general public. Interviewees chose from among a set of pre-defined categories which best
describes their current work status. Nearly 32% were employed in professional, technical, and
managerial positions while 27% were working in jobs categorized as skilled or unskilled manual
workers. Regarding the educational attainment; about 35% were in the secondary stage or equivalent
(technical-vocational) followed by (30%) in or finished the university stage (or equivalent) while 17%
were in or finished the postgraduate studies. Illiterates represented 8% of the study sample. Although
the researchers tried to have nearly equal distribution between the chosen categories yet the
influence of occupation on the class category was more than that of the education. Both upper middle
income classes (B and C1) and high income class (A) represented one quarter versus one quarter for
the lower middle income class (C2) and half for the low income category (class D). The vast majority
of the respondents (> 95%) reported not knowing neither an organ donor nor an organ recipient
(Table 1).

**Egyptian public perception on organ donation and transplantation after death:**
The main aim of this study was to assess the Egyptian public perception on organ donation and transplantation after death. We found that the acceptors of organ donation after death versus the non-acceptors were nearly equal on the first impression, however 78% of the participants accepted organ donation after orientation with donation options while 22% of them didn’t accept (figure 1).

**Egyptian public preference of norm on several consenting systems for posthumous organ donation:**

When participants were asked to rank the eleven consenting options according to their personal preferences, only 21.6% ranked their first option as not to donate, with a mode of 1. In the first rank it was found that consent without incentives (informed consent by donor-only, informed consent by donor-or-surrogate, oral consent by the donor only and implementation of the presumed consent) was the first choice for 33% of participants as personal preference and consent with medical incentive (informed consent by donor-only with medical incentive, informed consent by donor-or-surrogate with medical incentive, and oral consent by the donor only with medical incentive) was the first choice for about one fourth of participants followed by consent with financial incentive (informed consent by donor-only with financial incentive, informed consent by donor-or-surrogate with financial incentive, and oral consent by the donor only with financial incentive) which was the first choice for about only 22% for personal preference and public norm. Implementation of the presumed consent was the least preferable consenting option where 6.7% of respondents assigned to this option, with a mode of 11. Informed consent by donor only was assigned by 10.5% of respondents followed by informed consent by donor only with a medical incentive where 9.0% assigned to this option (figure 2 and table 2).

The distribution of ranking scores of perception of public norm was similar to the personal preference pattern where the consent with medical incentive was assigned to the first rank by 24.3% of respondents, consent with financial incentive was assigned to the first rank by 22% of respondents and not to donate option was assigned to the first rank by 19.5% of respondents (with a mode of 1). Implementation of the presumed consent was again the least preferable option for the public norm with a mode of 11.

It can also be seen from the table that the informed consent by donor only was also a preferable
choice for the public norm, where 12% of respondents assigned to this option (table 3).

When the eleven consenting options for organ donation were analyzed according to the sex of the participants and according to personal preferences and public norms, results were more or less similar for both sexes and for personal and public preferences. Refusal of organ donation was the first choice for both males and females whether for themselves or for the society (with a mode of 1). Implementation of the presumed consent followed by oral consent of donor were the least preferable choices for all (with modes of 11 and 10 respectively). Difference in choice was observed when incentive was added, where females preferred consent with medical incentive as a personal preference more than males who on the other hand favored consent with financial incentive (table 4).

On analyzing the eleven consenting options for organ donation according to education and according to personal preferences and public norms, we found that refusal of organ donation was the first choice in all levels of education whether for themselves or for the society (with a mode of 1) except the postgraduate who chose the law of informed consent by the donor to be their first choice whether for themselves or for the society (with a mode of 1). Implementation of the presumed consent was the least preferable choices for all (with mode of 11) except uneducated group choice for the society (table 5).

When the eleven consenting options for organ donation were analyzed according to the employment of the participants and according to personal preferences and public norms, results was more or less similar for different types of employment and for personal and public preferences. Refusal of organ donation was the first choice for employed participants (professional or manual jobs) and students (with a mode of 1), while it was the least preferable choice for unemployed participants whether for themselves or for the society (with a mode of 11). Implementation of the presumed consent was the least preferable choice for most participants (with mode of 11). Difference in choice was observed when incentive was added, where participants with manual jobs preferred consent with financial incentive as a personal preference more than participants with professional jobs who on the other hand favored consent with medical incentive (table 6).

Refusal of organ donation was the first choice for all social grades (A, B and C) whether for
themselves or for the society (with a mode of 1) except the lowest grade D. The least preferable choice for all social grades was Implementation of the presumed consent whether for themselves or for the society (with mode of 11) except lowest grade D choice for themselves (table 7).

**Awareness and acceptance of the public by the law of organ donation after death:**
The percentage of awareness for the seven law articles that we targeted among our study group was relatively low, ranging from 56% to 23% while on the contrary the acceptance rate was high ranging from 91% to 73.5% and particularly significantly higher than the awareness. The article number 3 (the country shall cover the expenses for conducting the operation of organ transplantation in licensed medical facilities for those who are unable to pay and in accordance with regulations issued by the Minister of Health) received the highest awareness rate versus article number 6 (Organ donation could be permitted to non-relatives if the patient is in urgent need for the transplant) which received the highest acceptance rate. Moreover, article number 1 (Possibility of donations of organs between children of Egyptian mother and a foreign father) showed the lowest awareness rate versus article number 4 (Law not allowing transfer of an organ or tissue of a dead body until death is proven by a triple committee of specialized doctors in neurosurgery, cardiothoracic surgery and anaesthesia) which presented the lowest acceptance rate (figure 3).

About half of the participants who refused to donate their organs after death were not aware of the laws that regulate organ donation while most of the participants who choose to donate their organs after death whether with or without incentives (medical or financial) were aware of three or more laws and this difference was statistically significant (p<0.001). Regarding the acceptance of those laws, almost all the participants accepted them and this relation was statistically significant (p<0.001) (table 8).

Table 1: Characteristics of the study participants (no. = 2743)
### Characteristics

| Characteristics | No. (%) |
|-----------------|---------|
| Age             |         |
| <25             | 695 (25) |
| 25-<45          | 1184 (43) |
| 45-65           | 539 (20) |
| >65             | 325 (12) |
| Gender          |         |
| Male            | 1282 (47) |
| Female          | 1461 (53) |
| Education level |         |
| Postgraduate    | 465 (17) |
| University      | 833 (30) |
| Secondary       | 970 (35) |
| Primary/Preparatory | 251 (10) |
| illiterate      | 224 (8) |
| Job categories  |         |
| Professional technical managerial | 869 (32) |
| Manual workers  | 742 (27) |
| Unemployed      | 601 (22) |
| In Education    | 531 (19) |
| Socioeconomic characteristics |         |
| Class A         | 299 (11) |
| Class B         | 173 (6) |
| Class C1        | 203 (7) |
| Class C2        | 759 (28) |
| Class D         | 1309 (48) |
| Know organ donor |         |
| Yes             | 41 (1.5) |
| No              | 2701 (98.5) |
| Know organ recipient |     |
| Yes             | 98 (3.6) |
| No              | 2642 (96.4) |

Personal preferences of eleven consenting options
| Rank | Informed consent by donor only (2743) | Informed consent by donor-or-surrogate (2743) | Oral consent by the donor only (2743) | Implementation of the presumed consent (2743) | Informed consent by donor only with the financial incentive (2743) | Informed consent by donor-or-surrogate + financial incentive (2743) | Oral consent with the financial incentive (2743) | Oral consent with the medical incentive (2743) |
|------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 1st  | 288(10.5)                      | 228(8.3)                        | 203(7.4)                        | 184(6.7)                        | 207(7.5)                        | 191(7.0)                        | 197(7.2)                        | 246(10.7)                       |
| 2nd  | 348(12.7)                      | 254(9.3)                        | 251(9.2)                        | 214(7.8)                        | 251(9.2)                        | 233(8.5)                        | 208(7.6)                        | 308(12.1)                       |
| 3rd  | 212(7.7)                       | 244(8.9)                        | 239(8.7)                        | 209(7.6)                        | 263(9.6)                        | 239(8.7)                        | 237(8.6)                        | 242(8.9)                        |
| 4th  | 245(8.9)                       | 216(7.9)                        | 258(9.4)                        | 214(7.8)                        | 245(8.9)                        | 259(9.4)                        | 270(9.8)                        | 254(9.4)                        |
| 5th  | 285(10.4)                      | 249(9.1)                        | 246(9.0)                        | 224(8.2)                        | 306(11.2)                       | 224(8.2)                        | 233(8.5)                        | 274(10.7)                       |
| 6th  | 218(8.0)                       | 278(10.1)                       | 259(9.4)                        | 201(7.3)                        | 282(10.3)                       | 276(10.1)                       | 263(9.6)                        | 267(9.9)                        |
| 7th  | 222(8.1)                       | 247(9.0)                        | 233(8.5)                        | 212(7.7)                        | 256(9.3)                        | 281(10.2)                       | 292(10.6)                       | 243(8.9)                        |
| 8th  | 237(8.6)                       | 262(9.6)                        | 255(9.3)                        | 229(8.4)                        | 274(10.0)                       | 241(8.8)                        | 279(10.2)                       | 228(8.4)                        |
| 9th  | 224(8.2)                       | 321(11.7)                       | 270(9.8)                        | 223(8.1)                        | 236(8.6)                        | 294(10.7)                       | 303(11.1)                       | 232(8.6)                        |
| 10th | 233(8.5)                       | 243(8.9)                        | 314(11.5)                       | 276(10.1)                       | 224(8.2)                        | 292(10.6)                       | 247(9.0)                        | 238(8.7)                        |
| 11th | 230(8.4)                       | 200(7.3)                        | 214(7.8)                        | 556(20.3)                       | 198(7.2)                        | 212(7.7)                        | 213(7.8)                        | 210(8.3)                        |
| Media n 25%-75% | 5 3-9 | 6 3-9 | 6 3-9 | 7 4-10 | 6 3-8 | 6 4-9 | 6 4-9 | 6 3-8 |
| Mean( SD) | 5.7(3.2) | 6.05(3.09) | 6.1(3.1) | 6.7(3.3) | 5.9(3.01) | 6.1(3.06) | 6.1(3.02) | 5.7(3.0) |
| Mode | 2 | 9 | 10 | 11 | 5 | 9 | 9 | 2 |

Table 3: Public Norms of eleven consenting options
| Rank | Informed consent by donor only (2743) | Informed consent by donor-or-surgeon (2743) | Oral consent by the donor only (2743) | Implementation of the presumed consent (2743) | Informed consent by donor only with the financial incentive (2743) | Informed consent by donor-or-surgeon + financial incentive (2743) | Oral consent with the financial incentive (2743) | Informed consent by donor only with the medical incentive (2743) |
|------|------------------------------------|----------------------------------------------|--------------------------------------|-----------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|------------------------------------------------|
| 1st  | 333(12.1)                          | 206(7.5)                                     | 186(6.8)                            | 212(7.7)                                      | 217(7.9)                                        | 204(7.4)                                        | 183(6.7)                                        | 244(12.0)                                        |
| 2nd  | 314(11.4)                          | 240(8.7)                                     | 268(9.8)                            | 217(7.9)                                      | 247(9.0)                                        | 220(8.0)                                        | 202(7.4)                                        | 331(12.1)                                        |
| 3rd  | 221(8.1)                           | 280(10.2)                                    | 244(8.9)                            | 203(7.4)                                      | 263(9.6)                                        | 259(9.4)                                        | 213(7.8)                                        | 290(10.6)                                        |
| 4th  | 223(8.1)                           | 254(9.3)                                     | 255(9.3)                            | 188(6.9)                                      | 225(8.2)                                        | 235(8.6)                                        | 272(9.9)                                        | 285(10.6)                                        |
| 5th  | 277(10.1)                          | 218(7.9)                                     | 248(9.0)                            | 217(7.9)                                      | 312(11.4)                                       | 210(7.7)                                        | 266(9.7)                                        | 258(9.3)                                        |
| 6th  | 233(8.5)                           | 233(8.5)                                     | 253(9.2)                            | 219(8.0)                                      | 264(9.6)                                        | 304(11.1)                                       | 282(10.3)                                       | 254(10.6)                                        |
| 7th  | 226(8.2)                           | 249(9.1)                                     | 225(8.2)                            | 247(9.0)                                      | 255(9.3)                                        | 301(11.0)                                       | 305(11.1)                                       | 214(10.1)                                        |
| 8th  | 240(8.7)                           | 272(9.9)                                     | 221(8.1)                            | 222(8.1)                                      | 267(9.7)                                        | 244(8.9)                                        | 281(10.2)                                       | 232(9.5)                                        |
| 9th  | 209(7.6)                           | 333(12.1)                                    | 271(9.9)                            | 205(7.5)                                      | 256(9.3)                                        | 205(11.1)                                       | 276(10.1)                                       | 226(10.6)                                        |
| 10th | 223(8.1)                           | 253(9.2)                                     | 340(12.4)                           | 263(9.6)                                      | 237(8.6)                                        | 358(9.4)                                        | 225(8.2)                                        | 218(9.9)                                        |
| 11th | 244(8.9)                           | 205(7.5)                                     | 232(8.5)                            | 550(20.1)                                     | 200(7.3)                                        | 203(7.4)                                        | 238(8.7)                                        | 191(8.7)                                        |
| Media | 6                                | 6                                     | 6                                | 7                                      | 6                              | 6                              | 6                              | 5                              |
| n 25%-75% | 3-8                        | 3-9                                | 3-9                        | 4-10                              | 3-9                        | 4-9                        | 4-9                        | 3-8                        |
| Mean( SD) | 5.6(3.2)                        | 6.1(3.09)                     | 6.1(3.1)             | 6.7(3.3)                              | 5.9(3.04)                      | 6.1(3.04)                     | 6.2(2.9)                         | 5.6(3.04)                      |
| Mode | 1                                | 9                                | 10                          | 11                              | 5                              | 9                              | 7                              | 2                              |

4: Personal preferences and Public Norms of eleven consenting options according to Gender
| Male: Personal preferences | Informed consent by donor only (2743) | Informed consent by donor-or-surrogate (2743) | Oral consent by donor only (2743) | Implementation of the presumed consent (2743) | Informed consent by donor only with the financial incentive (2743) | Informed consent by donor-or-surrogate + financial incentive (2743) | Oral consent with the financial incentive (2743) | Informed consent by donor only with the medical incentive (2743) |
|---------------------------|--------------------------------------|-----------------------------------------------|----------------------------------|-----------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------|
| (median) 25%-75% Mode     | 6 3-9 2                               | 6 3-9 9                                      | 6 3-9 10                         | 7 4-10 11                                     | 6 3-8 5                                                          | 6 3-9 9                                                        | 6 4-9 7                                                     | 6 3-9 5                                             |
| Male: Public Norms         |                                      |                                               |                                  |                                               |                                                                  |                                                                  |                                                             |                                                   |
| (median) 25%-75% Mode     | 6 3-8 2                               | 6 3-9 8                                      | 6 3-9 10                         | 7 4-10 11                                     | 6 3-8 5                                                          | 6 3-9 9                                                        | 6 4-9 7                                                     | 6 3-8 5                                             |
| Female: Personal preferences |                                      |                                               |                                  |                                               |                                                                  |                                                                  |                                                             |                                                   |
| (median) 25%-75% Mode     | 5 3-8 2                               | 6 3-9 9                                      | 6 3-9 10                         | 7 4-10 11                                     | 6 4-8 8                                                          | 6 4-9 9                                                        | 6 4-9 7                                                     | 6 3-8 2                                             |
| Female: Public Norms       |                                      |                                               |                                  |                                               |                                                                  |                                                                  |                                                             |                                                   |
| (median) 25%-75% Mode     | 5 3-8 1                               | 6 3-9 9                                      | 6 3-9 10                         | 7 4-10 11                                     | 6 3-9 5                                                          | 6 4-9 7                                                        | 6 4-9 7                                                     | 5 3-8 2                                             |

Multiple modes exist. The smallest value is shown.

5: Personal preferences and Public Norms of eleven consenting options according to education.
| Uneducated: Personal preferences | Informed consent by donor only (2743) | Informed consent by donor-or-surrogate (2743) | Oral consent by the donor only (2743) | Implementation of the presumed consent (2743) | Informed consent by donor only with the financial incentiv e (2743) | Informed consent by donor-or-surrogate + financial incentiv e (2743) | Oral consent with the financial incentiv e (2743) | Informed consent by donor only with the medical incentiv e (2743) |
|--------------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Mode | 2 | 5 | 8 | 11 | 7 | 7 | 1 | 8 |
| 3-9 | 3-9 | 4-9 | 4-9 | 3-9 | 3-9 | 3-9 | 3-9 |

| Uneducated: Public Norms | | | | | | | | |
|--------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 6 | 6 | 6 | 6 | 6 | 7 | 6 | 6 |
| Mode | 6 | 10 | 11 | 2 | 10 | 9 | 5 | 4 |
| 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 |

| Primary and preparatory education: Personal preferences | | | | | | | | |
|------------------------------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 6 | 6 | 7 | 7 | 5 | 5 | 6 | 6 |
| Mode | 6 | 10 | 8 | 11 | 3 | 3* | 3-9 | 3-9 |
| 4-9 | 3-9 | 4-9 | 3-9 | 3-8 | 3-8 | 4-8 | 4-9 |

| Primary and preparatory education: Public Norms | | | | | | | | |
| ------------------------------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 6 | 6 | 7 | 7 | 5 | 5 | 6 | 6 |
| Mode | 6 | 10 | 8 | 11 | 3 | 3* | 3-9 | 3-9 |
| 4-9 | 3-9 | 4-9 | 3-9 | 3-8 | 3-8 | 4-8 | 4-9 |

| Secondary education: Personal preferences | | | | | | | | |
|-------------------------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 6 | 6 | 6 | 7 | 6 | 6 | 6 | 6 |
| Mode | 2 | 9 | 10 | 11 | 2 | 4 | 4 | 4 |
| 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 |

| Secondary education: Public norms | | | | | | | | |
|-----------------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 6 | 6 | 6 | 7 | 6 | 6 | 6 | 6 |
| Mode | 1 | 9 | 10 | 11 | 5 | 6 | 4 | 6 |
| 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 |

| University: Personal preferences | | | | | | | | |
|----------------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 5 | 6 | 6 | 8 | 6 | 7 | 7 | 5 |
| Mode | 2 | 9 | 10 | 11 | 5 | 6 | 8 | 2 |
| 2-8 | 3-9 | 3-9 | 4-9 | 3-9 | 4-9 | 4-9 | 2-8 |

| University: Public norms | | | | | | | | |
|----------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 5 | 6 | 7 | 8 | 6 | 6 | 7 | 5 |
| Mode | 2 | 9 | 10 | 11 | 5 | 6 | 7 | 2 |
| 2-8 | 3-9 | 3-9 | 4-9 | 3-9 | 4-9 | 4-9 | 3-8 |

| Postgraduate: Personal preferences | | | | | | | | |
|-----------------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 5 | 6 | 7 | 8 | 6 | 7 | 7 | 5 |
| Mode | 1 | 2 | 4 | 11 | 3 | 9 | 7 | 5 |
| 2-9 | 3-8 | 3-8 | 4-10 | 3-9 | 4-9 | 4-9 | 3-8 |

| Postgraduate: Public norms | | | | | | | | |
|----------------------------|--------------------------------------|---------------------------------------------|--------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| median 25%-75% | 5 | 6 | 7 | 8 | 6 | 6 | 7 | 5 |
| Mode | 1 | 2 | 5 | 11 | 6 | 5 | 9 | 7 |
| 2-8 | 3-9 | 3-9 | 4-10 | 4-9 | 4-9 | 4-9 | 3-8 |

Multiple modes exist. The smallest value is shown.

≥ 6: Personal preferences and Public Norms of eleven consenting options according to employment.
|                           | Informed consent by donor only (2743) | Informed consent by donor-or-surrogate (2743) | Oral consent by the donor only (2743) | Implementation of the presumed consent (2743) | Informed consent by donor only with the financial incentive (2743) | Informed consent by donor-or-surrogate + financial incentive (2743) | Oral consent with the financial incentive (2743) | Informed consent by donor only with the medical incentive (2743) |
|---------------------------|--------------------------------------|-----------------------------------------------|---------------------------------------|-----------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| **Employed in professional, technical, managerial position: Personal preferences** | | | | | | | | |
| **median**                | 5                                    | 6                                             | 6                                     | 9                                             | 6                                                            | 7                                                            | 7                                                            | 7                                                            |
| **Mode**                  | 2                                    | 2-8                                           | 3-9                                   | 4-9                                           | 3-8                                                          | 4-9                                                          | 4-9                                                          | 4-9                                                          |
| **25%-75%**               |                                       |                                               |                                       |                                                |                                                              |                                                              |                                                              |                                                              |
| **Employed in professional, technical, managerial position: Public Norms** | | | | | | | | |
| **median**                | 5                                    | 7                                             | 7                                     | 9                                             | 6                                                            | 6                                                            | 7                                                            | 5                                                            |
| **Mode**                  | 2*                                   | 9                                             | 10                                    | 11                                            | 5                                                            | 6                                                            | 7                                                            | 2                                                            |
| **25%-75%**               | 2-8                                   | 3-9                                           | 4-9                                   | 5-11                                          | 3-8                                                          | 4-9                                                          | 4-9                                                          | 2-8                                                          |
| **Working in jobs categorized as skilled or non skilled manual workers: Personal preferences** | | | | | | | | |
| **median**                | 6                                    | 6                                             | 6                                     | 6                                             | 6                                                            | 6                                                            | 6                                                            | 6                                                            |
| **Mode**                  | 2                                    | 2-8                                           | 3-9                                   | 4-9                                           | 3-9                                                          | 3-8                                                          | 4-9                                                          | 3-9                                                          |
| **25%-75%**               |                                       |                                               |                                       |                                                |                                                              |                                                              |                                                              |                                                              |
| **Working in jobs categorized as skilled or non skilled manual workers: Public Norms** | | | | | | | | |
| **median**                | 6                                    | 6                                             | 6                                     | 6                                             | 6                                                            | 6                                                            | 6                                                            | 6                                                            |
| **Mode**                  | 1*                                   | 10                                            | 3-9                                   | 10                                            | 3-9                                                          | 3-9                                                          | 3-9                                                          | 3-9                                                          |
| **25%-75%**               | 3-9                                   | 4-9                                           | 4-9                                   | 4-9                                           | 4-9                                                          | 4-9                                                          | 4-9                                                          | 4-9                                                          |
| **Student: Personal preferences** | | | | | | | | |
| **median**                | 6                                    | 6                                             | 6                                     | 7                                             | 6                                                            | 6                                                            | 6                                                            | 6                                                            |
| **Mode**                  | 2                                    | 2-8                                           | 3-9                                   | 3-9                                           | 3-9                                                          | 3-9                                                          | 3-9                                                          | 3-9                                                          |
| **25%-75%**               |                                       |                                               |                                       |                                                |                                                              |                                                              |                                                              |                                                              |
| **Student: Public norms** | | | | | | | | |
| **median**                | 5                                    | 6                                             | 6                                     | 7                                             | 5                                                            | 10                                                           | 9                                                            | 6                                                            |
| **Mode**                  | 1*                                   | 2                                             | 3-9                                   | 11                                            | 3-9                                                          | 4-9                                                          | 9                                                            | 9                                                            |
| **25%-75%**               | 3-9                                   | 4-9                                           | 4-9                                   | 4-9                                           | 4-9                                                          | 4-9                                                          | 4-9                                                          | 4-9                                                          |
| **Unemployed: Personal preferences** | | | | | | | | |
| **median**                | 6                                    | 6                                             | 6                                     | 7                                             | 6                                                            | 6                                                            | 6                                                            | 6                                                            |
| **Mode**                  | 5                                    | 8                                             | 3-9                                   | 8                                             | 4-9                                                          | 4-9                                                          | 2                                                            | 7                                                            |
| **25%-75%**               | 3-8                                   | 3-9                                           | 3-9                                   | 3-9                                           | 3-9                                                          | 3-9                                                          | 3-9                                                          | 3-9                                                          |
| **Unemployed: Public norms** | | | | | | | | |
| **median**                | 6                                    | 6                                             | 6                                     | 7                                             | 6                                                            | 6                                                            | 6                                                            | 6                                                            |
| **Mode**                  | 1*                                   | 10                                            | 3-9                                   | 7                                             | 3                                                            | 9                                                            | 2                                                            | 3                                                            |
| **25%-75%**               | 3-9                                   | 4-9                                           | 3-9                                   | 3-9                                           | 3-9                                                          | 3-9                                                          | 3-9                                                          | 3-9                                                          |

Multiple modes exist. The smallest value is shown.

7: Personal preferences and Public Norms of eleven consenting options according to socioeconomic level.
| Consent Options                          | A: Personal preferences | B: Personal preferences | C1: Personal preferences | C1: Public norms | C2: Personal preferences | C2: Public norms | D: Personal preferences | D: Public norms |
|-----------------------------------------|--------------------------|--------------------------|--------------------------|------------------|--------------------------|------------------|--------------------------|------------------|
| Informed consent by donor only (2743)  | median: 4, Mode: 1, 2-7 | median: 5, Mode: 2-8    | median: 5, Mode: 2-8    | median: 5, Mode: 2-8 | median: 6, Mode: 3-9    | median: 6, Mode: 2-8 | median: 6, Mode: 3-9    | median: 6, Mode: 2-8 |
| Informed consent by donor or surrogate (2743) | median: 6, Mode: 3-8 | median: 7, Mode: 3-9 | median: 7, Mode: 3-9 | median: 7, Mode: 3-9 | median: 7, Mode: 3-9 | median: 7, Mode: 3-9 | median: 7, Mode: 3-9 | median: 7, Mode: 3-9 |
| Oral consent by the donor only (2743)   | median: 6, Mode: 4-9    | median: 8, Mode: 4-9    | median: 8, Mode: 4-9    | median: 8, Mode: 4-9 | median: 8, Mode: 4-9    | median: 8, Mode: 4-9 | median: 8, Mode: 4-9    | median: 8, Mode: 4-9 |
| Implementation of the presumed consent (2743) | median: 10, Mode: 7-11 | median: 11, Mode: 7-11  | median: 11, Mode: 7-11  | median: 11, Mode: 7-11 | median: 11, Mode: 7-11  | median: 11, Mode: 7-11 | median: 11, Mode: 7-11 | median: 11, Mode: 7-11 |
| Informed consent by donor only with the financial incentive (2743) | median: 6, Mode: 5-8 | median: 7, Mode: 4-9    | median: 7, Mode: 5-8    | median: 7, Mode: 5-8 | median: 7, Mode: 5-8    | median: 7, Mode: 5-8 | median: 7, Mode: 5-8    | median: 7, Mode: 5-8 |
| Informed consent by donor or surrogate + financial incentive (2743) | median: 8, Mode: 6-9 | median: 7, Mode: 6-9    | median: 7, Mode: 6-9    | median: 7, Mode: 6-9 | median: 7, Mode: 6-9    | median: 7, Mode: 6-9 | median: 7, Mode: 6-9    | median: 7, Mode: 6-9 |
| Oral consent with the financial incentive (2743) | median: 6, Mode: 5-8 | median: 7, Mode: 6-9    | median: 7, Mode: 6-9    | median: 7, Mode: 6-9 | median: 7, Mode: 6-9    | median: 7, Mode: 6-9 | median: 7, Mode: 6-9    | median: 7, Mode: 6-9 |
| Informed consent by donor only with the medical incentive (2743) | median: 10, Mode: 3-9 | median: 11, Mode: 3-9   | median: 11, Mode: 3-9   | median: 11, Mode: 3-9 | median: 11, Mode: 3-9   | median: 11, Mode: 3-9 | median: 11, Mode: 3-9   | median: 11, Mode: 3-9 |

Table 8: Relation between awareness and acceptance of laws among those who chose the several consenting systems as first choice.

*Multiple modes exist. The smallest value is shown.
| Types of consent (2743) | Informed consent by donor only | Informed consent by donor-or-surrogate | Oral consent by the donor only | Implementation of the presumed consent | Informed consent by donor only with the financial incentive | Informed consent by donor-or-surrogate + financial incentive | Oral consent with the financial incentive | Informed consent by donor only with the medical incentive |
|------------------------|--------------------------------|-------------------------------------|--------------------------------|---------------------------------------|----------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|---------------------------------------------------|
| Awareness              |                                |                                     |                                |                                       |                                                          |                                                          |                                                 |                                                   |
| Do not aware           | 71 (21.5)                      | 26 (12.7)                           | 27 (14.6)                      | 22 (10.4)                             | 19 (8.8)                                                | 17 (8.4)                                                | 13 (7.1)                                        | 42 (17.3)                                         |
| Aware <3               | 66 (19.9)                      | 30 (14.6)                           | 23 (12.4)                      | 31 (14.6)                             | 38 (17.5)                                               | 23 (11.3)                                               | 21 (11.5)                                       | 32 (13.2)                                         |
| Aware 3 or more        | 194 (58.6)                     | 149 (72.7)                          | 135 (73.0)                     | 159 (75.0)                            | 160 (73.7)                                              | 163 (80.3)                                              | 149 (81.4)                                      | 169 (69.5)                                         |
| Total                  | 331 (100)                      | 205 (100)                           | 185 (100)                      | 212 (100)                             | 217 (100)                                               | 203 (100)                                               | 183 (100)                                       | 243 (100)                                         |
| P<0.001                |                                 |                                     |                                |                                       |                                                          |                                                          |                                                 |                                                   |
| Acceptance             |                                |                                     |                                |                                       |                                                          |                                                          |                                                 |                                                   |
| Do not accept          | 1(0.3)                         | 2(1.0)                              | 1(0.5)                         | 1(0.5)                                | 0(0.0)                                                  | 2(1.0)                                                  | 0(0.0)                                          | 1(0.4)                                            |
| Accept <3              | 6(1.8)                         | 8(3.9)                              | 1(0.5)                         | 3(1.4)                                | 3(1.4)                                                  | 2(1.0)                                                  | 1(0.5)                                          | 4(1.6)                                            |
| Accept 3 or more       | 326 (97.9)                     | 195 (95.1)                          | 182 (99.0)                     | 207 (98.1)                            | 214(98.6)                                               | 200(98.0)                                               | 182 (99.5)                                      | 238 (97.4)                                        |
| P<0.001                |                                 |                                     |                                |                                       |                                                          |                                                          |                                                 |                                                   |

Discussion

This study is the first study to assess Egyptian personal preferences and public perception of norm on several consenting options for posthumous organ donation. It also measures the awareness and acceptance of the public to Egyptian law articles regulating organ donation.

The study sample consisted of 2743 participants with nearly equal percentages of male and female participants.

After orientation with different donation options, the percentage of participants disagreeing to organ donation after death became only 22% versus 53% who initially refused indicating that raising awareness regarding organ donation is still recommended. In a Saudi Arabian study, it was found that only 13% of respondents showed refusal of organ donation (10) while in the UK, the refusal rate was 42% which is the highest in Europe (13). A study in Pakistan found that 38% expressed a refusal to donate (14). Many interventional studies for behavioral changes that were done in Egypt provided concrete results about the marvelous effect and influence of creating awareness among communities
especially rural and closed ones for improving healthy behaviors for different health care aspects (15–19), so creating awareness is a key entry among Egyptians to raise their acceptance to donate after death.

There was no difference between males and females or between personal preferences and perception of norms in consenting systems ranking. This is consistent with a previous study in Saudi Arabia where personal preferences of participants were similar to their perception of norms (10). Ranking of the eleven consenting options showed that the most favorable consenting system (apart from the refusal option) was the informed consent by donor only while the least favorable was the implementation of the presumed consent. This expressed disfavoring of presumed consent found in our study could be due to distrust in the health care system and the worry that medical personnel would withhold adequate treatment or the fear of not making utmost effort to keep them alive. The particular arguments supporting presumed consent policy revolve around the fact that it is effortless and countries with presumed consent regulation have a higher willingness to donate (20).

The presumed consent system has been the subject of major public and ethical debates because it may represent a violation of the right of autonomy, where the individual’s body would become public property unless claimed otherwise (21), besides being inaccurate and misleading and cannot be considered a type of informed consent (22). Presumed consent was not supported by the Institute of Medicine and was rejected by the American Medical Association’s Council on Ethical and Judicial Affairs (23). Unlike this study and studies from other countries, only in Belgium was there an overall approval of presumed consent (24).

The effect of adding medical and financial incentives in order to encourage participants to agree on organ donation was studied. It was found that consent without incentives was the first choice for 33% of participants as personal preference. Consent with medical incentive was the first choice for about one fourth of participants followed by consent with financial incentive which was the first choice for about only 22% for personal preference and public norm. This shows that participants perceived organ donation mainly as an act of altruism rather than a financial advantage and that donation is an act of charity that should not be compensated by materialistic benefits. Consistent with our results, a
The percentage of awareness among our study participants for the targeted Egyptian legislations regarding organ donation after death was relatively low ranging from 56–23%. Similar results of low awareness have been witnessed in other studies (27, 28). It should be noted that the acceptance rate for the targeted law articles was high (91–74%), with a highly significant difference compared to awareness. Hence, improving the awareness of the public at large to the current law articles is essential.

Awareness with the articles of the law regulating organ donation was associated with more willingness to donate where it was found that the majority of those accepting donation were aware of three or more laws. Mossialos et al, 2018 indicated that individuals' awareness of the legislation has a significant effect on willingness to donate, indicating that efforts to improve educational programs and informational campaigns on the social and health benefits of organ donation could contribute to increase the number of donations (20). This result contrasts another study where education programs were not found helpful in impacting organ donation rates (29).

The strengths of the study include a relatively large sample size, inclusion of participants of different socioeconomic classes, disparity of educational level of participants, comparing various consenting options of organ donation and ranking them according to personal preferences of respondents and perception of norm.

On the other hand, limitations were the inability to generalize the data as it was obtained from two governorates and although the chosen sample was representative, yet not all participants answered the questionnaire so results were based only on those who were willing to participate.

Conclusion
Informed consent by donor only was the preferable choice as personal preference and as norm. The choice of consenting options did not vary with gender, education or employment. However, increasing the awareness of Egyptians on all articles of the law of organ donation is highly needed especially
article number 1 “Possibility of donations of organs between children of Egyptian mother and a foreign father” which showed the lowest awareness rate.

Declarations

**Ethics approval and consent to participate:**
Written consent of each participant was accustom to be obtained before collecting data. Confidentially of collected data were maintained Ethical approval was obtained from Medical Research Ethics Committee, National Research Center, Giza, Egypt, reference number: 16124.

**Consent for publication:** Not applicable

**Availability of data and materials:** The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing interests:** The authors declare that they have no competing interests

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**Authors’ contributions:** All authors contributed to the design and implementation of the research. AMM, GAA, LE, and AM took the lead in writing the research study and reviewed overall data analysis and manuscript. AMA and HA submitted the research study. GAA, AM, RMS, DM, HIS, SIA, RRAA, HM, HMB, HEE, TR, MA, NA, and NC conducted the field visits and collected & entered data. AMM and GAA supervise conduction of the study. GAA, RMS, DM, HE, and TR performed data analysis, while GAA, LE, and AM interpreted the data and wrote the results of the manuscript. All authors discussed the results and commented on the manuscript. All authors reviewed and approved the final manuscript.

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**References**

1. Sheehy E, Conrad SL, Brigham LE, Luskin R, Weber P, Eakin M, Schkade L, Hunsicker L: Estimating the number of potential organ donors in the United States. N Engl J Med 2003, 349(7):667-74.

2. Wright L: Is presumed consent the answer to organ shortage? BMJ 2007, 334:1089.
3. Faissal A. M. Shaheen. ORGAN DONATION IN THE MIDDLE EAST COUNTRIES. Ethnicity & Disease, Volume 19, Spring 2009

4. The Holy Quran 5:32http://www.dar-alifta.org/Ar/ViewFatwa.aspx?ID=3638&LangID=1

5. Shaheen FA1, Souqiyyeh MZ. Current obstacles to organ transplant in Middle Eastern countries. ExpClin Transplant. 2015 Apr; 13Suppl 1:1-3.

6. Seeff LB (2009): The history of the “natural history” of hepatitis C (1968-2009). Liver Int; 29 (s1):89-99.

7. Clark PAC: Financial Incentives for Cadaveric Organ Donation: An Ethical Analysis. The Internet Journal of Law, Healthcare and Ethics; 2006:4(1).

8. PierscioneK BK: What is presumed when we presume consent? BMC Med Ethics 2008, 9:8.

9. Lawson A: Presumed consent for organ donation in the United Kingdom. JICS 2008, 9(2):116-117.

10. Hammami et al: Consenting options for posthumous organ donation: presumed consent and incentives are not favored. BMC Medical Ethics 2012, 13:32 doi:10.1186/1472-6939-13-32

11. Uskun E, Ozturk M. Attitudes of Islamic religious officials toward organ transplant and donation. Clin Transplant 2013;27:E37-41

12. Güden E, Cetinkaya F, Naçar M. Attitudes and behaviors regarding organ donation: A study on officials of religion in Turkey. J Relig Health 2013;52:439-49

13. Hulme, J. Allen, A. R. Manara, P. G. Murphy, D. Gardiner and E. Poppitt: Factors influencing the family consent rate for organ donation in the UK. Anaesthesia 2016, 71, 1053–1063 doi:10.1111/anae.13535

14. Saleem T, Ishaque S, Habib N, Hussain SS, Jawed A, Khan AA, Ahmad MI, Iftikhar MO, Mughal HP, Jehan I: Knowledge, attitudes and practices survey on organ donation
among a selected adult population of Pakistan. BMC Med Ethics 2009, 10:5. doi:10.1186/1472-6939-10-5.

15. Shiha G, Metwally AM, Soliman R, Elbasiony M, Mikhail NNH, Easterbrook P. An educate, test, and treat programme to reduce hepatitis C in Egypt: results from a community-based demonstration project. Lancet Gastroenterol Hepatol 2018; published online July 17. http://dx.doi.org/10.1016/S2468-1253(18)30139-0.

16. Ammal M. Metwally, Rehan M. Saleh, Lobna A. El-Etreby, Somaia I. Salama, Ahmed Aboulghate, Hala A. Amer, Asmaa M. Fathy, Reham Yousry, Sherif E. El-Deeb, Ghada A. Abdel-Latif, Dalia M. Elmosalami, Nihad A. Ibrahim, Osama M. Azmy, Tamer Taha, Hanaa M. Imam, Mohamed Abdel Rahman and Samia A. R. Hemeda (2019): Enhancing the value of women's reproductive rights through community based interventions in upper Egypt governorates: a randomized interventional study. International Journal for Equity in Health, Volume 18, Issue 1, 18 September 2019, Article number 146

17. Iman I Salama, Samia M Sami, Zeinab Nabil Ahmed Said, Somaia I Salama, Thanaa M Rabah, Ghada A. Abdel-Latif, Dalia M Elmosalami, Rehan M. Saleh, Aida M Abdel Mohsen, Ammal M Metwally, Amal I Hassanain, Hanaa M Emam, Samia A Hemeda, Safaa M Elserougy, Naglaa F Abd Alhalim, Fatma A Shaaban, Walaa A. Fouad, Amira Mohsen, and Manal H El-Sayed. Early and long term anamnestic response to HBV booster dose among fully vaccinated Egyptian children during infancy. Vaccine 36 (2018) 2005–2011, ISSN: 0264-410X

18. Metwally AM, Ibrahim NA, Saad A, Abu El-Ela MH. Improving rural women role in health and environmental issues. Int J Environ Health Res. 2006;16(2):., 133-44.

19. Metwally AM, Saad A, Ibrahim NA, Emam HM, El-Etreby LA. Monitoring progress of the role of integration of environmental health education with water and sanitation services in changing community behaviours. Int J Environ Health Res. 2007;17(1):61-
20. Mossialos E, Costa-Font J, and Rudisill 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.

21. Horvat LD, Cuerden MS, Kim SJ, Koval JJ, Young A, Garg AX: Informing the debate: rates of kidney transplantation in nations with presumed consent. Ann Intern Med 2010, 153:641–9.

22. Truog RD: Consent for organ donation—balancing conflicting ethical obligations. N Engl J Med 2008, 358(12):1209–11.

23. Chouhan P, Draper H: Modified mandated choice for organ procurement. J Med Ethics 2003, 29:157–162.

24. Rithalia A, McDaid C, Suekarran S, Norman G, Myers L, Sowden A: A systematic review of presumed consent systems for deceased organ donation. Health Technol Assess 2009, 13(26). doi:10.3310/hta13260.

25. Haddow G: “Because you’re worth it?” The taking and selling of transplantable organs. J Med Ethics 2006, 32:324–328.

26. Alam AA: Public opinion on organ donation in Saudi Arabia. Saudi J Kidney Dis Transplant 2007, 18(1):54–59.

27. Ozdag N. The nurses knowledge, awareness and acceptance of tissue-organ donation. EDTNA ERCA J.2001 Oct-Dec;27(4):201-6.

28. Manish R. Balwani, Manoj R. Gumber, Pankaj R. Shah, Vivek B. Kute, Himanshu V. Patel, Divyesh P. Engineer, Dinesh N. Gera, Umesh Godhani, Mehin Shah, Hargovind L. Trivedi. Attitude and awareness towards organ donation in western India. Journal of renal failure.2015;47(4):582-88

29. Beard TR, Kaserman DL, Saba RP. Limits to altruism: Organ supply and educational
Figures

Figure 1

Public willingness for organ donation
Figure 2

Personal preferences of first choice of eleven consenting options
Figure 3

The Awareness and the acceptance of the laws of organ donation by the public

The key of categories:
1- Possibility of donations of organs between children of Egyptian mother and a foreign father
2- Law introducing severe penalties (stipulating long jail sentences and huge fines) for those involved in commercial transplants with violation of any articles of the law
3- The country shall cover the expenses for conducting the operation of organ transplantation in licensed medical facilities for those who are unable to pay and in accordance with regulations issued by the Minister of Health
4- Law not allowing transfer of an organ or tissue of a dead body until death is proven by a triple committee of specialized doctors in neurosurgery, cardiothoracic surgery and anaesthesia
5- Possibility of organ transplantation from a living person to another only under the purpose of donation among relatives of Egyptians
6- Organ donation could be permitted to non-relatives if the patient is in urgent need for the transplant
7- The punishment with the penalty of premeditated murder stipulated in article 230 for any who transfer an organ or part of an organ or tissue from a person without being proved to be dead with a valid evidence according to the article 14