Original Article

A cross-sectional study to assess concerns and commitment for organ donation among students of arts, science and commerce streams in degree colleges in a metropolitan city

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Abstract

Background: Organ donation has been one of the greatest advances of modern science that has resulted in many patients getting a renewed lease of life. Organs can be donated by a living person, after natural death, and many more organs can be donated after brain stem death (BSD) as "cadaver transplant" or "deceased donor transplant". It is believed that youths are the leading decision-makers in families. So identifying their concerns regarding organ donation, creating awareness in them and changing their beliefs may increase the number of consents for organ donation in the long run. **Materials and Methods:** A prospective interventional study was done among 206 students of nine degree colleges (arts, science and commerce streams) using random sampling during the study duration of 18 months. **Results:** One hundred two (48.57%) participants were willing to donate their organs after their BSD, while after the session in post test, the number increased significantly to 163 (77.61%). And when this increase was compared within streams, it was found that there was no significant difference in knowledge of students of arts, science and commerce streams. ($P > 0.05$). **Conclusions:** Willingness to donate their own organs or that of the relative's in case of brain stem death had increased significantly after session in the post test. And there was no significant difference found in the increase in knowledge when compared with all the three streams, religion, and gender, which indicates that the level of increase in knowledge amongst arts and commerce students is comparable to that of science students.

Keywords: Concerns, liver failure, organ and tissue transplant, organ donation, renal failure, willingness

Introduction

Organ donation has been one of the greatest advances of modern science that has resulted in many patients getting a renewed lease of life. Organs can be donated by a living person, after natural death. As compared to the living person, more number of organs can be donated after brain stem death (BSD). It is also called as "cadaver transplant" or "deceased donor transplant". Healthy organ or even tissues are taken from a donor, to be transplanted in the body of a needy individual. The expert opinion is that organ donation from one brain dead individual can save the life of up to 50 people.[1] Organs which can be donated include the kidneys, heart, liver, pancreas, intestines, lungs, skin, bone and bone marrow, cornea, etc., Most people can be organ donors. Many people donate an organ upon their death or when they are brain dead. These people are called deceased organ donors.

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In Spain and Portugal, the deceased donor rate is found to be highest (more than 30 donors per million populations).[2] But as compared to above statistics, India lags far behind. Even in the better performing regions of the country, the deceased or cadaver renal transplantation rate is only 0.08 per million per year. In India, 133,938 people died of road traffic accidents in 2010, and of that, 70% were brain dead.[3] This means that every year, there are almost 93,000 persons who become brain dead, and could therefore be potential organ donors. Hence, we have potentially a huge pool of brain dead donors available in India, whereas the actual organ donation is far less. It is estimated that in India, every year over 175,000 people are diagnosed to have kidney failure and would require organ transplant. Due to non-availability of organs, only about 5,500 kidney transplants are done. The Transplantation of Human Organs and Tissues Act, 1994[4] provides regulations for the removal, storage and transplantation of human organs for therapeutic purposes, to prevent commercial dealings in human organs and and make it possible to use brain dead patients as potential organs donors. In fact, the need far exceeds the supply of transplantable organs. The lack of awareness and apathy of governmental organizations to mobilize the masses have led to a poor scenario. India lags behind in the implementation of a cadaveric donation program.[5]

Here again, the vital issue which complicates the situation is the lack of awareness among people. Without awareness, it is going to be difficult to convince the relatives of the deceased patients to donate organs for transplantation. Contrary to logical understanding, educational status, socioeconomic status, language barrier, cultural and religious factors do not affect the decision for or against donation.

It is believed that youths are the leading decision-makers in families, so identifying their concerns regarding organ donation, creating awareness in them and changing their beliefs may increase the number of consents for organ donation in the long run. By assessing concerns about organ donation among youths, healthcare providers in the periphery such as family physicians may be able to address commonly raised concerns, misconceptions, and correct their queries so that the proportion of organ donation after brain stem death (BSD) may be improved and it will help to reduce the list of patients waiting for organ donation.

This present study aimed to assess concerns regarding organ donation among youths of various streams in degree colleges and hence, see their commitment toward organ donation.

Materials and Methods

A prospective interventional study was done among nine degree colleges (arts, science and commerce streams) using random sampling during the study duration of 18 months. Assuming prevalence of awareness of 50% among people, the sample size was calculated as 206 (including a 15% non-response rate). Two hundred six were students selected using the multistage sampling approach. In the first stage, we applied quota sampling and from each stream (arts, science, commerce), we select 70 samples. In the second stage, these 70 samples were selected using convenient sampling.

Stage I: We collected baseline data of the study participants. Data regarding demographic characteristics, their knowledge regarding organ donation, and concerns regarding organ donation were collected using a pre-designed questionnaire after taking valid permissions from the colleges and participants.

Stage II: After data collection, an educational session was held for the study participants using informative slide show presentations and educational pamphlets.

Stage III: Follow up of same participants was done after 2 months to assess retention of knowledge and commitment toward organ donation. Necessary data was collected.

The data was entered using Microsoft Excel software and presented in the form of tables and graphs. Chi-squared test and McNemar's test were applied to test the significance in difference of knowledge.

Results

The present study was done among 210 students of different streams (arts, science and commerce). Among the 210 participants, 71 were from art colleges, 70 from science, and 69 from commerce colleges. Out of these students, 96 were boys (45.7%) and 114 were girls (54.28%). A majority of them belonged to the Hindu religion (77.14%), 34 were Buddhists (16.19), 8 were Muslims, and 6 were Christians (2.8%). The students were evaluated for common concerns related to organ donation and their willingness to donate their and their relative's organs after unfortunate BSD (if any). Table 1 shows that even after the educational session, there were concerns regarding disfigurement of the body after organ or skin donation, and whether organ donation was done in case of conflicts within close relatives or not.

Table 2 reveals that 26.19% of participants were willing to donate their relative's organs after their BSD while after the session in posttest, the number increased to 57.14%. And when this increase was compared within streams, it was found that there was no significant difference in knowledge of students of arts, science and commerce streams ($P > 0.05$). Religion-wise distribution of participants who were willing to donate their relative's organs after BSD revealed that in total, 55 (26.19%) participants were willing to donate their relative's organs after their BSD, while after session in posttest, the number increased to 120 (57.14%). Gender-wise distribution of participants who were willing to donate their relative's organs after their BSD revealed that in total, 24 boys (25%) before session were willing to donate their relative's organs after BSD while after session in posttest, the number increased to 55 (57.29%). Similarly, 31 girls (27.19%) before session were willing to donate their relative's organs after their BSD while after session in post test, the number increased to 65 (57.01%). And when this increase was compared within the

two genders, it was found that there was no significant difference in knowledge of boys and girls ($P > 0.05$)

Table 3 shows that 102 participants (48.57%) were willing to donate their organs after BSD, while after the session in posttest, the number increased significantly to 163 (77.61%). And when this increase was compared within streams, it was found that there was no significant difference in knowledge of students of arts, science and commerce streams. ($P > 0.05$). Religion-wise distribution of participants who were willing to donate their organs after BSD revealed that a total of 105 participants (48.57%) were willing to donate their relative's organs after BSD, while after the session in posttest, the number increased to 163 (77.61%) [Graph 1].

Table 1: Distribution of participants based on awareness about certain facts related to organ donation, before and after session

Concerns regarding organ donation	Percentage of students giving correct answers		*P**
	Before session	After session	
Which organs can be donated by living individual	27 (12.85%)	65 (30.95%)	-
Which organs can be donated after natural death	44 (20.95%)	105 (50%)	-
Which organs can be donated after brain stem death	29 (13.8%)	166 (79.04%)	-
Organ donation by cancer patients after BSD	73 (34.76%)	117 (55.71%)	0.716
Organ donation by DM/HTN patients after BSD	26 (12.38%)	91 (43.33%)	0.290
Disfigurement of body after organ donation/skin donation	31 (14.76%)	97 (46.19%)	< 0.001
Organ donation is NOT DONE in case of conflicts within close relatives	24 (11.42%)	92 (43.8%)	0.005
Organ donation can be DONE in ACCIDENT case	30 (6.67%)	100 (47.61%)	0.627

Table 2: Willingness to donate organs of their relatives after brain stem death (if any)

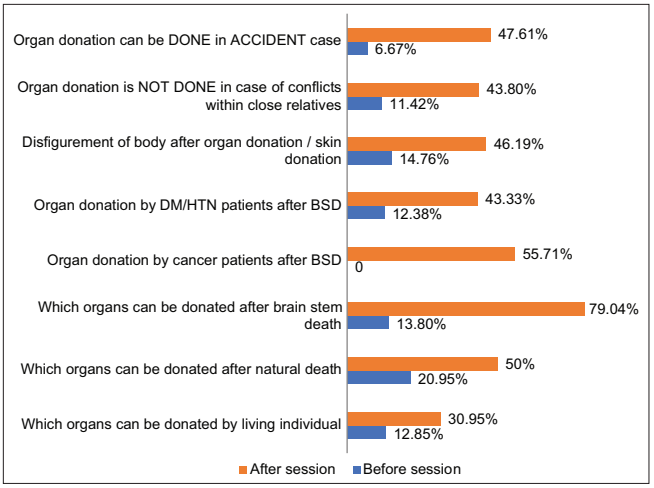
Comparison variables	Number of participants (%)		*P***
	Before session	After session	
Stream-wise comparison			
Arts	14 (19.71%)	43 (60.56%)	<0.001
Science	23 (32.85%)	37 (52.85%)	0.002
Commerce	18 (26.08%)	40 (57.97%)	0.001
*P**	0.207	0.915	--
Total	55 (26.19%)	120 (57.14%)	--
Religion-wise comparison			
Hindu	42 (26.75%)	93 (59.23%)	0.14
Muslim	3 (23.07%)	7 (53.84%)	0.62
Buddhist	8 (23.5%)	17 (50%)	0.22
Christian	2 (33.33%)	3 (50%)	0.34
Total	55 (26.19%)	120 (57.14%)	--
Gender-wise comparison			
Boys	24 (25%)	55 (57.29%)	<0.001
Girls	31 (27.19%)	65 (57.01%)	<0.001
P	0.532	1.0	--
Total	55 (26.19%)	120 (57.14%)	--

Gender-wise distribution of participants who were willing to donate their relative's organs after BSD revealed that a total of 44 boys (45.83%) before the session were willing to donate their relative's organs after BSD while after the educational session, in posttest, the number increased to 72 (75%). Similarly 58 girls (50.87%), before the session, were willing to donate their relative's organs after BSD, while after the session, in posttest, the number increased to 91 (70.82%). And when this increase was compared within gender, it was found that there was no significant difference in knowledge between boys and girls ($P > 0.05$)

In the current study, we observed that pre-test, 46.47%, 47.14%, and 52.17% of participants from arts, science and commerce streams, respectively, were willing to pledge for their organs to be donate after BSD. The percentages increased to 80.28%, 70%, and 82.6%, respectively. Also 114 participants (54.28%) signed the pledge forms after the educational session. When this increase was compared within streams, it was found that there was no significant difference in knowledge among students of arts, science and commerce streams ($P > 0.05$) [Table 3].

Table 2 shows religion-wise distribution of participants who signed the pledge forms to donate their organs after BSD. It shows that after the educational session, participants belonging to Hindu (57.96%), Muslim (23.07%), Buddhist (52.94%) and Christian (33.33%) communities signed the pledge forms to donate their own organs after BSD [Table 3].

We analyzed the gender-wise distribution of participants who signed the pledge forms to donate their organs after BSD. It showed that in total, 51 boys (53.12%) and 63 girls (55.26%) signed pledge forms to donate their own organs after BSD. And when this increase was compared between genders, it was found that there was no significant difference in knowledge between



Graph 1: Awareness about organ donation

Table 3: Willingness to sign pledge form to donate their organs after brain stem death (if any)

Comparison variables	Number of participants (%)		P**
	Before session	After session	
Stream-wise comparison			
Arts	33 (46.47%)	57 (80.28%)	<0.001
Science	33 (47.14%)	49 (70%)	<0.001
Commerce	36 (52.17%)	57 (82.6%)	0.001
P*	0.763	0.743	--
Total	102 (48.57%)	163 (77.61%)	--
Religion-wise comparison			
Hindu	80 (50.95%)	125 (79.61%)	<0.001
Muslim	6 (46.15%)	7 (53.84%)	0.69
Buddhist	15 (44.11%)	27 (79.41%)	0.3
Christian	1 (16.66%)	4 (66.66%)	0.078
Total	102 (48.57%)	163 (77.61%)	--
Genderwise comparison			
Boys	44 (45.83%)	72 (75%)	<0.001
Girls	58 (50.87%)	91 (79.82%)	<0.001
P	0.06	0.736	--
Total	102 (48.57%)	163 (77.61%)	--

('Streams were compared independently in pre-/posttest using Chi-squared test. ** Data was compared simultaneously in pre- and posttest using McNemar's test)

boys and girls ($P > 0.05$). After the session, 54.92%, 42.85% and 60.86% of participants from the arts, science and commerce streams, respectively, signed the pledge forms to donate their own organs after BSD [Table 3].

Discussion

The present prospective interventional study was carried with a calculated sample size of 210 students of degree colleges of the arts, science and commerce streams of a metropolitan city. Colleges were selected using stratified random sampling method. The knowledge and attitudes of students toward important concepts of organ donation was found using a validated questionnaire which was administered to the students before the educational session. Our educational sessions were held for students to provide scientific knowledge regarding organ donation and to address their concerns regarding organ donation. Two types of posters were used during these sessions: informative posters and emotional appeal posters about organ donation. The same questionnaire was administered to them two months after the educational session, to gauge the retention of knowledge by the students. At the end of the session, students were appealed to fill the pledge form for organ donation, if they wished to donate their organs in case of brain stem death (BSD).

The pre- and posttest data were compared, and it was found that after the educational session, the level of awareness about organ donation had increased significantly. Knowledge about BSD also increased significantly in all the three streams.

In the posttest, more students were found to be aware of the fact that eyes (cornea) could be donated only after death. This change was found to be statistically significant.

After the posttest, more number of students could enumerate correct names of organs that could be donated by a living donor or after death. The change in awareness was found to be significant. Though for 100% awareness, more such sensitization sessions needed to be arranged for youths.

When the same data was compared within the streams, there was no significant difference in knowledge of the arts, science and commerce students.

Students were aware that organs could not be donated in the following cases:

1. Cancer
2. Drowning
3. Unclaimed bodies
4. Rabies
5. HIV/AIDS
6. Septicemia.

Similarly, they were aware that organs could be donated in the following cases:

1. Tuberculosis
2. Diabetes
3. Hypertension and any other chronic diseases
4. Death due to accidents.

However, the increase in knowledge of students about most of the above conditions in which organ donation may be done or may not be done was not found to be significant, which means that more sensitization sessions are needed to improve their knowledge.

Most of the students had doubts regarding the differences between BSD and coma in the pre-test. After the session in posttest, students' awareness of the differences between BSD and coma increased significantly. Participants became significantly aware about the importance of letting the relatives know about their wish to donate organs in case of brain stem death, and even if they did fill the donor card, there are still chances that their organs may not be donated in cases of conflicts between close relatives.

In the present study, we found that only 73 students (34.76%) were aware of the fact that organs could be donated if the death of the person was caused by cancer. After session in posttest, 117 students (55.71%) were found to be aware about that. The finding was not statistically significant. The reason behind this may be the various questions about cancer and related diseases and organ donation in the minds of youths. It needs to be specially focused upon. In our study, before the session, 37 participants (17.61%) were found to be aware that TB patients could donate organs after BSD, while after educational intervention, the number increased to 79 (37.62%), which was statistically significant ($P \leq 0.001$). Also 26 participants (12.38%) in pre-test were found to be aware that organs could be donated by hypertensive or diabetic persons after BSD. In posttest, the number increased to 91 (43.33%) which was not statistically significant [Table 1]. The reason for this may be wrong concepts about such diseases in the minds of youths which

needs to be addressed further. Thirty-two (15.23%) participants were initially found to be aware of the concept that respiration stops after BSD, while the number significantly increased to 71 (33.8%) in posttest ($P \leq 0.001$) [Table 1].

In the present study, 27 participants (12.85%) were found to be aware that organs could not be donated in case of death due to drowning. This number increased to 83 (39.53%) in the posttest, though statistically, the change was not significant ($P = 0.445$) [Table 1]. The reason may be difficulty in understanding the concept.

However, the increase in knowledge of students about most of the above conditions in which organ donation could be done or could not be done was not found to be significant, which means that more sensitization sessions are needed to improve their knowledge.

In pre-test, 31 participants (14.76%) agreed to the fact that the body does not disfigure after organ donation. The number of participants who agreed to the same increased significantly to 97 (46.19%) after the educational sessions ($P \leq 0.001$).

Bapat U *et al.*[6] in their study found that 77% of postgraduate medical students did not believe in body disfigurement. Still 23% of the postgraduate medical students thought that body may disfigure after organ donation.

In this study, when comparing the willingness to donate organs of relatives of participants after BSD within streams, it was found that the willingness to donate relatives' organs increased significantly from 55 (26.19%) to 120 (57.14%).

Similar findings were found when comparing the willingness of participants to donate their own organs after their BSD within streams and within religions.

In this study, when comparing participants who signed pledge forms to donate their organs after their BSD within streams, there was a significant increase in the number after the educational sessions ($P \leq 0.001$).

Umesh Yamanappa Ramadurg[7] found that before educational intervention, the attitude towards the possibility of their own organ being used for donation was found to be 30%, while after educational intervention it increased to 58.5%.

Shaheen FA *et al.*[8] found that 68% of participants in their study agreed to donate organs of relatives in case of brain death, and 91% would donate a kidney to their relatives. However, 38% agreed to donate organs of their own to organ failure patients other than relatives.

Al Ghanim SA[9] found that 70.6% of participants in their study were willing to donate deceased organs and tissues. None of these students had a donation card, and 66% of them were ready to sign a donor card.

Annadurai K, Mani K, Ramasamy J[10] found that the majority of participants (43%) said that they would think about donating their organs. 16.8% said they would not consider it.

When comparing the willingness of organ donation within genders, it was found that, 77.95% of boys were willing and 22.05% of girls were willing to donate their organs.

In a study by Katsari V *et al.*,[11] it was found that 60.5% of students were ready to be deceased donors.

In a study in south India by Bapat U *et al.*,[6] 89% wished to donate their organs after their death.

When asked about legislation regarding organ donation in India, before the educational session, most of the students were unaware about that fact, but in posttest, a significant number of students were aware that there is a law for the regulation of organ and tissue donation in India. Though more participants became aware about legislation in India after the session, the possibility of commercial dealings in organ donation was found to be a concern in the minds of students. It may be because of previous cases of illegal organ trafficking that were running for a long time in the news and in social media and created fear in the minds of people. Multiple sensitization sessions may be required in order to address such concerns and to reduce mistrust and fear in people's minds.

Awareness about the presence of appropriate Authorization Committee in the hospitals and law related to organ donation in cases of living related/unrelated organ donation was also found to have increased significantly in the post test.

Sayedalamin Z *et al.*[12] in their study in Jeddah, Saudi Arabia, assessed 481 students for their awareness of and attitudes toward organ donation. They observed that 50.9% of participants were willing to donate their organs to their family alone, 41.2% were willing to donate to any deserving patient, while 91.3% rejected that religion precluded organ donation.

Abdullah Ahmed Al Moweshy *et al.*[13] in their study at Al-Ahsa, Saudi Arabia, assessed organ donation awareness and willingness among 723 university students. They concluded that 84.09% were aware that Islam allows organ donation, 64.87% were aware that organ donation is successfully done in Saudi Arabia, and 32.64% were aware that the government gives incentives to the family of an organ donor. Over half (56.71%) of the students expressed willingness to donate their organs.

ASM Tanim Anwar *et al.*[14] in their study assessed awareness and attitudes toward organ donation among 500 participants (medical professionals, medical students, patients, and relatives) in Bangladesh. They observed that 85% had heard about organ donation, but only 46% of doctors, 33% of nurses, and 41% of medical students could report the names of all the organs that could be donated. One-fourth (25.4%) had agreed to donate

their organs (23% of doctors, 17% of nurses, 28% of medical students, 29% of patients, and 30% of attendants), and 26.0% did not agree to donate (17% of doctors, 19% of nurses, 16% of medical students, 42% of patients, and 36% of relatives). Less than half (43.8%) of participants reported that they would donate organs to help someone when they die.

In many countries, organ donation awareness studies have been conducted among medical students, but very few literature is available on organ donation awareness among non-medical students. Also, the gap in awareness about organ donation is more among medical students and nurses. The gap is much more among non-medical students.

Hence awareness programs can be framed while keeping in mind common concerns and misconceptions, and to address frequently asked queries, such that the gap in knowledge regarding organ donation can be minimized, and willingness might be increased as per the results of the current study.

Conclusions

Willingness to donate their own organs or that of relatives in case of brain stem death had increased significantly after educational sessions in the posttest. And there was no significant difference found in the increase in knowledge when compared within all the three streams, religions, and genders, which indicates that the level of increase in knowledge amongst arts and commerce students is comparable to that in science students.

Not very surprisingly, more girls were willing to donate their own organs after BSD, indicated by filling the pledge forms. The difference was not found to be statistically significant, as this tallies with the organ donation pattern in the country.

At the end of the session, participants were appealed to fill and sign the pledge forms in case of BSD. A significant number of students filled the pledge forms, but the number was less in comparison to those who had said in the posttest that they were willing to donate their organs in case of BSD. This may indicate that there is still some fear or mistrust regarding organ donation in the minds of youths. So, to improve willingness of youths, more sensitization sessions need to be arranged.

And there was no significant difference found in the increase in knowledge when compared within all three streams, religions and genders. Though more girls were willing to donate their own organs in case of BSD, the difference was not found to be statistically significant.

Ethical approval

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Conflicts of interest

There are no conflicts of interest.

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