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EFFECTIVENESS OF A CASE VIGNETTE BASED EDUCATIONAL INTERVENTION ON KNOWLEDGE, ATTITUDE AND BELIEF TOWARDS ORGAN DONATION AMONG MEDICAL STUDENTS OF A PRIVATE MEDICAL INSTITUTION

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ABSTRACT

Background: Organ donation remains still the cornerstone of transplantation due to inadequate knowledge and misconceptions remains even among health care workers continue to impede its promotion. Educational interventions employing case vignettes may improve awareness and foster positive attitudes towards organ donation.

Objectives: To assess the baseline knowledge, attitudes, and beliefs regarding organ donation among medical students and to determine the effectiveness of a case vignette-based educational intervention in improving these domains.

Materials and Methods: A pre – post interventional study was conducted among 320 MBBS students of a private medical institution. Baseline KAP and willingness towards organ donation were assessed using a structured, validated questionnaire. Participants subsequently received a case vignette-based educational intervention, followed by post-test assessment. Paired *t*-test and McNemar's test were used to compare pre- and post-intervention scores.

Results: The mean baseline knowledge score was 5.5 ± 1.8, attitude score was 30.8 ± 5.2, and 65.6% expressed willingness to donate organs after death. Following the educational intervention, significant improvements were observed in overall knowledge (mean difference: 5.4; $p<0.001$), attitude (mean difference: 5.1; $p<0.001$), belief score. Overall score (48.5 ± 7.1 vs. 57.3 ± 6.4; $p<0.001$). The proportion willing to donate organs increased from 65.6% to 85.9% ($p<0.001$).

Conclusion: Case vignette-based educational intervention significantly improved knowledge, attitudes, beliefs and willingness towards organ donation among medical students. Integrating such interactive educational strategies into undergraduate medical curricula could strengthen in improving organ donation rates.

KEYWORDS: Organ donation, Medical students, Case vignette, Educational intervention Real time

INTRODUCTION

Organ donation is the voluntary donation of organs or tissues from a living or deceased individual for recipients with end stage organ failure. The WHO set voluntary, equitable allocation and transparency as the global ethical framework for human organ transplant programs.[1] For improving lives and survival, organ transplants are a great medical intervention in Modern Medicine. In spite of advances, the demand for transplantable organ continues to exceed the supply worldwide. Global Observatory on Donation and Transplantation (GODT) reported 173,727 organ transplants in 2024 with a 2% increase from 2023, with 47,180 deceased donors.[2] In India organ donation and transplantation activities are coordinated by National Organ and Tissue Transplant Organisation (NOTTO) performed 20,019 organ transplants in 2025 yet short of need with 89,839 waitlist patients for transplantation showing the scale of unmet need.[3,4] National Deceased Donar rate stands at only 0.81 donors per million population which is very much lower in countries with well-established deceased donation program.[5]

Medical students make up a significant portion of the population for educational interventions learned during undergraduate training, which are likely to influence future practice. Approaching healthcare professionals to identify potential donors, counsel families, and advocate for donation will be successful. Medical students' willingness to contribute was generally higher, and a systematic study and meta-analysis show that communication-based and instructional approaches can be successful.[6,7] Few studies found that high awareness combined with on-going gaps in legal regulation knowledge, religious considerations, and positive attitudes prevented donors from registering.[8-10] The collective results indicate that increasing factual knowledge may not be enough to change the attitudes and behavioral intentions required for successful organ donation advocacy.

Case vignette is a brief, structured written scenarios depicting realistic clinical or ethical situation used as a discrete teaching stimulus rather than full case discussion. It is considered less studied institutional format than Case based learning[11–13] Being the organ donation as awareness education, no study has evaluated case vignette-based instruction and few assessed beliefs as a construct distinct from attitude. Addressing these gaps, this study aimed to assess baseline knowledge, attitude and beliefs regarding organ donation among medical students of private medical institution and evaluating the effectiveness of structured case vignette based educational intervention in improving these outcomes.

MATERIALS AND METHODS

Study design

A quasi-experimental study was conducted among undergraduate medical students at a private medical college during the scheduled academic sessions between May and June 2026.

Study participants

The study population comprised of first, second and third-year MBBS students enrolled during the study period.

Inclusion criteria

- Students willing to participate and providing written informed consent.
- Students present on the day of both pre-test and intervention.

Exclusion criteria

- Students absent during either pre-test or post-test assessment or who declined participation.
- Students who had previously attended any sessions on organ donation programmes within the preceding six months.

Sampling technique

Universal sampling was employed. All eligible undergraduate MBBS students fulfilling the inclusion criteria were invited to participate.

Study tool

Data were collected using a pre-tested, semi-structured, self-administered questionnaire developed after an extensive review of literature and validated questionnaires on organ donation.

The questionnaire consisted of four sections:

1. Sociodemographic characteristics (age, gender, year of study, religion, residence, previous exposure to organ donation awareness programmes).
2. Knowledge regarding organ donation, including concepts of organ donation, eligibility, brain death, legal provisions, organs that can be donated and national organ donation programmes.
3. Attitude towards organ donation, measured using Likert-scale statements assessing Ethical acceptability, Willingness to donate, Family support, Promotion of organ donation, Trust in organ allocation, social responsibility and advocacy.
4. Beliefs regarding organ donation, including religious, cultural, ethical and personal beliefs influencing organ donation.

The knowledge section was scored by assigning one mark for each correct response and zero for incorrect or "don't know" responses. Higher scores indicated better knowledge.

Attitude and belief scores were calculated according to the scoring system adopted for the questionnaire.

Development and Validation of study instrument

The questionnaire was developed after reviewing published literature and recommendations from the National Organ and Tissue Transplant Organization (NOTTO), the World Health Organization and previous validated questionnaires. Content validity was established by a panel comprising: Community Medicine experts, Medical Education specialists, Transplant surgeons, Bioethics experts. Each item was evaluated for relevance, clarity, simplicity and necessity. The Content Validity Index (CVI) was calculated and items with I-CVI > 0.80 were accounted. Face validity was assessed among 10 undergraduate medical students to ensure clarity and comprehensibility. The questionnaire was pilot tested among 30 non-participants and internal consistency was assessed using Cronbach's alpha. The overall Cronbach's alpha exceeded 0.80, indicating good reliability.

Case vignette - Based Educational intervention

The intervention consisted of structured case vignette-based learning session lasting approximately 60 minutes. The intervention was designed according to adult learning principles and competency-based medical education. It comprised:

Phase 1: Administration of the pre-test questionnaire.

Phase 2: Presentation of two standardized clinical case vignettes illustrating: Brain death following road traffic injury, Organ donation counselling, Family decision-making, Organ retrieval process, Recipient outcomes, Ethical and legal considerations, Interactive discussion followed each vignette.

Phase 3: A PowerPoint-assisted educational session covering: Burden of organ failure, Organ shortage in India, Brain death certification, living versus deceased donation, Organ allocation, NOTTO, THOTA Act, Myths and misconceptions, Registration procedure, printed educational leaflets were distributed. Question-answer session

Phase 4: Post-test assessment using the same questionnaire after completion of the educational session.

Data Collection Procedure

Following Institutional Ethics Committee approval, permission was obtained from the college administration. Eligible students were briefed regarding study objectives, confidentiality, voluntary participation and informed consent. Participants completed the baseline questionnaire under supervision. The educational intervention was then delivered in small groups. Immediately following completion of the session, participants completed the post-test questionnaire using the same instrument. Unique identification codes were used to match pre-test and post-test responses while maintaining anonymity.

Statistical analysis

Data were entered in Microsoft Excel and analysed using IBM SPSS Statistics version 23.0. Descriptive statistics were presented as frequencies, percentages, means, and standard deviations. Paired t-test was used to compare pre- and post-

intervention knowledge, attitude, and belief scores. McNemar's test was employed to compare paired categorical outcomes, including willingness to donate organs before and after the intervention. Chi-square test was used to determine factors associated with positive attitude change. Effect size (Cohen's d) was calculated to determine the magnitude of improvement following the intervention. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 320 MBBS students participated in the study. The distribution across academic years was nearly equal, with 110 (34.4%) from the first MBBS and 105 (32.8%) each from the second and third MBBS years. Regarding awareness, 190 (59.4%) of students had no previous exposure to an organ donation awareness program, and 45 (14.1%) reported having a family member registered as an organ donor, while the majority (85.9%) did not. (Table 1)

Table 1: Baseline Characteristics of study participants (n = 320)

Variable	Frequency (n)	Percentage (%)
Age (years)		
<20	120	37.5
20–22	170	53.1
>22	30	9.4
Gender		
Male	140	43.8
Female	180	56.2
Academic Year		
First	110	34.4
Second	105	32.8
Third	105	32.8
Previous Exposure to Organ Donation Awareness Program		
Yes	130	40.6
No	190	59.4
Family Member Registered as Organ Donor		
Yes	45	14.1
No	275	85.9

The participants had overall knowledge regarding organ donation, with a mean knowledge score of 5.5 ± 1.8. The highest level of awareness was observed for the concept of organ donation 290 (90.6%), followed by living organ donation 270 (84.4%) and organs that can be donated 250 (78.1%). Awareness of cadaveric organ donation 225 (70.3%) and brain death criteria 210 (65.6%) was comparatively lower. Less than two-thirds of the students were aware of the national organ donation program 185 (57.8%), legal aspects of organ donation in India 170 (53.1%), and the organ donor registration process 160 (50.0%) respectively. (Table 2)

Table 2: Frequency distribution of Knowledge Regarding Organ Donation (n=320)

Knowledge Item	Correct Response n (%)
Aware about the concept of organ donation	290 (90.6)
Aware of brain death criteria	210 (65.6)
Aware of organs that can be donated	250 (78.1)
Aware of living organ donation	270 (84.4)
Aware of cadaveric organ donation	225 (70.3)
Aware of national organ donation program	185 (57.8)
Aware about the legal aspects of organ donation in India	170 (53.1)
Aware of organ donor registration process	160 (50)

Table 3: Distribution of Attitudes and Beliefs towards Organ Donation among study participants (n=320)

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
Organ donation saves lives	290 (90.6)	20 (6.3)	10 (3.1)
I am willing to donate my organs after death	210 (65.6)	70 (21.9)	40 (12.5)
Organ donation is ethically acceptable	250 (78.1)	45 (14.1)	25 (7.8)
My religion supports organ donation	180 (56.3)	95 (29.7)	45 (14.1)
Brain death is equivalent to death	190 (59.4)	80 (25)	50 (15.6)
I would encourage family members to donate organs	240 (75)	50 (15.6)	30 (9.4)
Organ donation should be promoted among the public	285 (89.1)	25 (7.8)	10 (3.1)

I trust the organ allocation system	170 (53.1)	90 (28.1)	60 (18.8)

The observed positive attitude towards organ donation, with a mean attitude score of 30.8 ± 5.2. Most students agreed that organ donation saves lives 290 (90.6%) and should be promoted among the public 285 (89.1%). A majority also considered organ donation ethically acceptable 250 (78.1%), expressed willingness to donate their organs after death 210 (65.6%), and stated that they would encourage their family members to donate organs 240 (75.0%) respectively. (Table 3)

Table 4: Comparison of Knowledge, Attitude and Belief Scores Before and After Intervention (n=320)

Knowledge Domain	Pre-test Mean ± SD	Post-test Mean±SD	Mean Difference	Paired t-test (t)	p-value
General Knowledge	3.2±1.0	4.4±0.7	1.2	18.6	<0.001
Brain Death Knowledge	2.8±1.1	4.1±0.8	1.3	17.9	<0.001
Legal Aspects	2.4±1.0	3.9±0.9	1.5	19.8	<0.001
Organ Donation Process	2.6±1.2	4.0±0.8	1.4	18.2	<0.001
Overall knowledge Score	11.0±3.2	16.4±2.5	5.4	24.5	<0.001
Attitude Score	30.8±5.2	35.9±4.8	5.1	15.6	<0.001
Belief Score	14.2±3.5	17.1±3.1	2.9	12.4	<0.001
Willingness to Donate	3.5±1.0	4.3±0.8	0.8	10.8	<0.001
Overall Score	48.5±7.1	57.3±6.4	8.8	18.7	<0.001

The educational intervention resulted in a significant improvement in knowledge regarding organ donation across all domains. The overall knowledge score increased from 11.0 ± 3.2 in the pre-test to 16.4 ± 2.5 in the post-test, with a mean improvement of 5.4 points, which was statistically significant ($t = 24.5$, $p < 0.001$). Domain-wise, the greatest improvement was observed in legal aspects (mean difference = 1.5), followed by the organ donation process (1.4), brain death knowledge (1.3), and general knowledge (1.2) and showed highly significant differences ($p < 0.001$), this shows the educational intervention was effective in enhancing participants' knowledge of organ donation across all assessed domains. The mean attitude score increased from 30.8 ± 5.2 at pre-test to 35.9 ± 4.8 at post-test, with a mean improvement of 5.1 points, which was statistically significant ($t = 15.6$, $p < 0.001$). Similarly, the willingness to donate organs improved significantly from 3.5 ± 1.0 to 4.3 ± 0.8 (mean difference = 0.8, $t = 10.8$, $p < 0.001$). The overall score also showed a marked increase from 48.5 ± 7.1 to 57.3 ± 6.4, with a mean difference of 8.8 points ($t = 18.7$, $p < 0.001$), indicating the overall effectiveness of the intervention in improving attitudes and willingness towards organ donation. (Table 4)

Table 5: Change in Willingness to Donate Organs Before and After Intervention

Willingness	Pre-test n (%)	Post-test n (%)	McNemar χ^2	p-value
Yes	210 (65.6)	275 (85.9)	42.6	<0.001
No	40 (12.5)	15 (4.7)		
Undecided	70 (21.9)	30 (9.4)		

The proportion of students willing to donate their organs increased from 210 (65.6%) before the intervention to 275 (85.9%) after the intervention. At the same time, the proportion of participants who were undecided decreased from 40 (21.9%) to 30 (9.4%), and these changes were statistically significant with $p < 0.001$, indicating that the educational intervention effectively improved participants' willingness to donate organs. (Table 5)

Table 6: Factors Associated with Positive Change in Attitude

Variable	Positive Change n (%)	No Positive Change n (%)	Chi-square	p-value
Gender				
Male	95 (67.9)	45 (32.1)	1.8	0.18
Female	140 (77.8)	40 (22.2)		
Academic Year				
First	90 (81.8)	20 (18.2)	6.9	0.031*
Second	75 (71.4)	30 (28.6)		
Third	70 (66.7)	35 (33.3)		
Previous Awareness Program				
Yes	110 (84.6)	20 (15.4)	14.1	<0.001
No	125 (65.8)	65 (34.2)		
Family History of Organ Donation				
Yes	40 (88.9)	05 (11.1)	5.4	0.02*
No	195 (70.9)	80 (29.1)		

The analysis showed that academic year, previous exposure to an organ donation awareness program, and family history of organ donation were significantly associated with a positive change in attitude following the educational intervention. First MBBS students demonstrated the highest proportion of positive attitude change 90 (81.8%) compared with second 75 (71.4%) and third MBBS students 70 (66.7%), with the association statistically significant with $p = 0.031$. Students who had previously attended an organ donation awareness program were significantly more likely to show a positive change in attitude than those without prior exposure. (Table 6)

DISCUSSION

In the present study, 90.6% of Undergraduate medical students were aware of organ donation at baseline which is similar to the study done by Shrivastav et al. reported 90% of students aware of organ donation. However, this study reported 65.6% identified the brain death criteria at baseline which is higher than Shrivastav et al. with 27.5% reported for the same parameter.[8] This change is because of inter-institutional variability in how brain death is addressed within the pre-clinical curriculum indicating that baseline knowledge cannot be assumed to be uniform across Indian medical colleges.

The willingness rate of 80.7–82.0% among medical students reported in the meta-analysis by Iniesta-Sepúlveda et al. was higher than the willingness to donate organs at baseline in the current study (65.6%).[7] In the current study, desire to contribute rose to 85.9% following the case vignette-based intervention which was greater than the pooled estimates. This implies that students' desire to give organs may be increased by systematic educational interventions.

Knowledge, attitude and belief frequency in this study improved significantly across all domains following the intervention, with higher frequency in legal aspects and knowledge of the donation process. This is similar among Indian medical students by Shrivastav et al. and Krishna et al. with persistent knowledge-action and legal-knowledge gaps.[8,9] Similarly results from from systematic reviews and meta-analyses indicating that case-based learning is particularly effective compared with conventional didactic teaching.[11-13] In the present study, the increase in willingness to donate was concentrated among previously undecided students rather than those who were initially opposed similar to the study done by Dávila-Navarrete et al[6] which reported that structured programmes are more effective at resolving ambivalence than at reversing firmly held refusal.[14-15]

In this study, students who had previously been exposed to organ donation interventions and who had any family members registered as organ donors showed a much higher change in attitude regarding desire to donate an organ. This result is consistent with research by Sinda et al., Zhang et al., and Yao et al. showing that nursing curricula that included organ donation and anatomy integration led to a shift in attitudes toward donation.[16-19]

Limitations

Based on the findings of the present study, the limitations where the outcome were self-reported and may lead to social desirability bias and participants were from single College and from one stream which may limit the generalizability. Also, no actual donor registration behaviour was verified.

Recommendations

The case-based learning content could be introduced early in the curriculum and reinforced longitudinally across subsequent academic postings. Undecided students should be specifically targeted as this group will show the major shift in willingness to donate. Self-reported willingness can be cross checked against actual donor registration for actual real-life improvement.

CONCLUSION

A structured case vignette-based educational intervention was associated with significant improvement in knowledge, attitude, belief and willingness toward organ donation among undergraduate medical students, with willingness to donate rising from 65.6% to 85.9%. These findings support the value of the intervention in areas requiring applied and procedural reasoning. Multi-centre trials with longer follow-up should be done and then can be adopted for application in undergraduate medical curriculum.

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