


# Effectiveness of Interventional Strategies in Modulating Knowledge and Attitude of Health Care Professionals for Promoting Organ Donation: A Study in Tertiary Care Public Hospital of North India

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## Abstract

**Objective:** To evaluate the impact of interventional “educational module” on knowledge and attitude regarding organ donation amongst resident doctors and nurses in the Institute of National Importance.

**Study Design:** Interventional and prospective.

**Methods:** We devised an interactive educational module covering various aspects of organ donation through a series of audiovisual lectures and information booklets. Resident doctors and nurses posted in those areas of the 1948-bedded Postgraduate Institute of Medical Education and Research (PGIMER), where head injury patients were treated and were subject to intervention using this module. The pre and postinterventional scores of their knowledge and attitude regarding organ donation were compared to find out impact of the intervention.

**Results:** A total of 242 nurses and 87 resident doctors participated in this research. Higher knowledge score was observed preintervention amongst doctors as compared to nurses. Significant improvement was seen in total knowledge scores of both groups postintervention. Doctors had better scores for the “concept of organ donation,” while nurses were more familiar with “procedures and protocols.” Both had low knowledge about “clinical criteria for brain death” and “legal issues” preintervention which improved significantly postintervention. The positive impact of intervention was also observed on attitude in both categories. A significant impact of intervention was observed on overall propensity of doctors and nurses to promote organ donation, for pledging their own organs and for counseling of the patient/attendants on this cause.

**Conclusion:** Scientifically designed educational modules have a promising role in improving awareness and attitude of health care professionals regarding organ donation and their propensity to be prospective donors, effective counselors, and advocates of organ donation.

## Keywords

Transplantation, deceased organ donation, brain death, donor conversion rate, organ pledge, interventional study

## Introduction

Organ transplantation, an exemplary achievement of modern health care, has marked a new era of medicine. Dr Francis L Delmonico said, “The work of organ donation is hard, but measures the best of us in humanity....” This trending treatment modality across the globe for end-stage organ failure offers the most cost-effective alternative and ensures tremendous improvement in the quality of life and its span also.<sup>1</sup> Organs and tissues from one donor can save lives of up to eight patients and help up to 50 others.<sup>2,3</sup> Doctors have

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successfully transplanted kidneys, heart, liver, intestines, pancreas, lungs, thymus, ovaries, uterus, hand, face, penis, windpipe, cornea, skin, ligaments, tendons, bones, cartilages, heart valves, blood vessels, nerves, islet of langerhans cells, bone marrow, etc.<sup>4-15</sup> However, a disparity between need and availability of organs persists worldwide. Organs for this purpose need to be made available through donations by living beings and cannot be synthesized artificially in laboratories. For this reason, there is an acute shortage of organs for transplantation globally.<sup>16-20</sup>

Countries like Spain and USA have strategically achieved cadaveric organ donation rates as high as 48.9 and 36.88 per million population (pmp), respectively, in the year 2019.<sup>21,22</sup> India, on the contrary, even after being second most populous country of the world with about every sixth person on this earth being an Indian, is struggling hard to tap its potential of cadaveric organ donations with a donation rate of meager 0.65 pmp in 2019. It stood at 64th rank amongst 70 countries whose cadaveric organ donation statistics were reported to International Registry in Organ Donation and Transplantation (IRODaT).<sup>21</sup> To quantify the need, an estimated 1,80,000 kidneys, 30,000 livers, 50,000 hearts, and 1,00,000 cornea are required for transplantation annually in India. However, only around 6000 kidneys, 1200 livers, 15 hearts and 40,000 corneas are actually transplanted.<sup>23</sup> Compared to the number of brain deaths, number of donations is abysmally low in the country. Post Graduate Institute of Medical Education and Research (PGIMER) is a tertiary health care and research institute with leading organ donation program amongst public-sector hospitals of the country. Based on “Imminent brain death-Glasgow Coma Score (IBD-GCS)” criteria,<sup>24,25</sup> 120 patients were reported as potential organ donors by treating clinicians in the institute in the year 2019. However, consent for organ donation was provided by 41 families, out of which actual donation could be achieved only in 31 cases, thus a donor conversion rate of 25.8% only (hospital data).

Treating doctors and nurses are those health care professionals who are in closest contact with patient and relatives and are considered to influence their thoughts about organ donation the most, and thus are in an advantageous position to motivate relatives of patient for organ donation. Their own awareness, skills, and attitude about organ donation make all the difference in this motivation. Earlier studies in the institute showed overall high level of awareness regarding organ donation amongst these health care professionals.<sup>26</sup> However, information regarding certain practical aspects such as brain death, legislation, and protocols was lacking, which led to confusion and loss of interest to perform. They have expressed the need for more information to be provided regarding the same. Although their attitude was favorable, the reason of avoiding hassles impoverished their intent to get involved in this process.<sup>26,27</sup> An improvement in their awareness level and attitude is supposed to bring about a positive change in their motivating capacity and willingness, thereby increasing donor conversion rate, especially needed

in countries like India who practice the “Opt In” system for organ donation. Hence, this study was conceived to assess their awareness level and attitude and then evaluate the impact of educational intervention on awareness and perception regarding organ donation amongst these resident doctors and nurses. We intended to provide scientific evidence in favor of/against such interventional initiatives targeted toward health care professionals for improving their potential of organ tapping from deceased donors.

## Methods

This was an interventional study conducted over a period of six months in PGIMER, which is one of the largest tertiary health care and research institutes of the northern part of country and handles a large number of head injury patients in its 100-bedded Advanced Trauma Center (ATC) and parts of 900-bedded Nehru Hospital. Patients with head injury are most prone to brain death and constitute major proportion of potential organ donors. Hence, all areas receiving head injury patients in these centers were included in the study. Staff nurses and resident doctors posted in the study areas constituted study population. All resident doctors (from departments dealing with such patients namely neurosurgery, general surgery, orthopedics, anesthesia, and internal medicine) and all nursing staff posted in the study area were invited, as all of them were expected to come in contact with such patients invariably while being posted in these areas. Approval from the Institutional Ethics Committee and informed consent of each participant were obtained.

Two study tools were used: (a) a semi-structured self-administered “questionnaire,” prepared by referring similar studies,<sup>27-31</sup> as “assessment tool” to assess the level of knowledge and attitude regarding organ donation amongst study population pre and postintervention and (b) an “educational module” as the “interventional tool” consisting of an information booklet and educational lectures. The questionnaire consisted of 53 questions of different kinds, namely dichotomous (24 items), multiple choice (six items), Likert scale based (11 items), and unstructured questions (one item), collecting demographic details, awareness/knowledge (34 items), and attitude (18 items) related data of the participants. Questions were designed to judge knowledge under four parameters, namely (a) concepts of organ donation, (b) procedures and protocols being followed at PGIMER, (c) clinical criteria for brain death, and (d) legal issues. Attitude was assessed on four parameters, namely (a) willingness for organ donation, (b) negative beliefs regarding organ donation, (c) positive beliefs regarding organ donation, and (d) propensity for promoting organ donation. Two separate printed information booklets as well as educational lectures supplemented with PowerPoint presentation were designed for resident doctors and nurses containing relevant content suiting the two groups. Educational module covered five domains namely introduction

to organ donation, its legal aspects, concept of brain death, organ donation process in PGIMER, and roles and responsibilities of transplant coordinators.

An in-house training program of 1 h 45 min duration was devised. Each participant was given a preintervention questionnaire (to be filled in 30 min), followed by an educational lecture (45 min) and an interactive session of 30 min. Information booklets were distributed in the last, and organ pledging forms were also offered. All were given a week's time to go through the information booklet after which they were subjected to the postintervention questionnaire.

Data from pre and postintervention questionnaires was compiled and analyzed using Microsoft Excel and SPSS 20 software, respectively. Normality of the data was checked using Shipora–Wilk test. Mean values  $\pm$  standard deviations were used to present measurement data, while categorical data being summarized as counts and percentage. Wilcoxon signed-ranks test and Mann–Whitney *U* test were used as the test of significance. Chi-square test was used to analyze qualitative data. All the tests were two sided, and the level of  $\alpha = 0.05$  was taken as significant. Results were compiled in a

manner to demonstrate the impact of intervention on knowledge and attitudes of these doctors and nurses.

## Results

A total of 242 nurses and 87 resident doctors participated in the study. Their demographic details have been depicted in Table 1. Gender representation was converse between the two sections, 76.4% nurses being females, while 82.8% doctors being males. Amongst nurses, about two-third (62.8%) were posted in surgical interventional areas and one-third (37.2%) in medical areas, while doctors were almost equally distributed (51.7% and 48.3%, respectively). Majority of nurses 96.7% were from the nonadministrative cadres (grades I and II) who were responsible for the direct management of patients. There was equal representation of junior and senior resident doctors amongst participants. More than two-third (67.4%) nurses were at least graduate and one-third (36.8%) residents had completed their postgraduation. Two-third nurses (62.8%) had more than three years' experience of

**Table 1.** Demographic Distribution of Participating Nurses and Resident Doctors

Demographic Variable	Category	Nurses		Doctors	
		N <sup>*</sup>	Frequency (%)	N	Frequency (%)
Sex	Male	242	57 (23.6)	87	72 (82.8)
	Female		185 (76.4)		15 (17.2)
Departments grouped	Medical departments	240	90 (37.2)	87	45 (51.7)
	Surgical departments		150 (62.0)		42 (48.3)
Designation	Administrative cadre (DNS + ANS)	241	7 (02.9)	87	Junior Resident 43 (49.4)
	Grade I		32 (13.2)		Senior Resident 44 (50.6)
	Grade II		202 (83.5)		
Qualification	Diploma	242	79 (32.6)	87	Pursuing MD/MS 55 (63.2)
	Graduate		148 (61.2)		Pursuing DM/MCh 32 (36.8)
	Postgraduate		15 (06.2)		
	< 1 year		48 (19.8)		22 (25.3)
Experience	1–2 year	242	13 (5.4)	87	38 (43.7)
	2–3 year		29 (12)		18 (20.7)
	3–6 year		44 (18.2)		7 (8.0)
	6–10 year		53 (21.9)		2 (2.3)
	> 10 years		55 (22.7)		0
Experience grouped	< 3 years	242	90 (37.2)	87	78 (89.7)
	> 3 years		152 (62.8)		9 (10.3)
Religion	Hindu	242	127 (52.5)	87	75 (86.2)
	Muslim		3 (1.2)		3 (3.4)
	Sikh		72 (29.8)		6 (6.9)
	Christian		38 (15.7)		1 (1.1)
	Others		2 (0.8)		2 (2.3)

**Note:** \*A few respondents did not answer few questions. Hence frequencies in some categories do not add up to 242.

working at PGIMER. Contrary to this, 89.7% doctors had less than three years' work experience at PGIMER. Hindu religion majority was observed amongst both the participating groups.

The analysis of "knowledge" levels of nurses and resident doctors regarding organ donation has been depicted in Table 2. A statistically significant ( $P < .001$ ) increase in knowledge scores under all four categories for both nurses and resident doctors was seen postintervention.

The analysis of the "attitude" of nurses and doctors regarding organ donation is shown in Table 3. Regarding "willingness for organ donation" (Q. 35–39), a statistically significant increase was observed in both nurses ( $Z = -8.686$ ,  $P < .001$ ) and doctors ( $Z = -3.125$ ,  $P = .002$ ) owing to the interventions. There was more than two-fold increase in the number of nurses having pledged their organs postintervention, from 22.9% to 48.3% ( $P < .001$ ). Only three doctors pledged their organs postintervention, and the increase in pledge rate, i.e., 28.7% to 32.2%, was statistically insignificant ( $P = .84$ ).

The analysis of impact on the "beliefs" (negative and positive) of participants regarding organ donation has been provided in Table 3. Postintervention, a significant reduction in the prevalent myths and negative beliefs regarding organ donation was observed amongst the nurses (Q. 1–4 and 6). Similar findings were observed amongst the doctors for the myths which were having higher scores preintervention (Q. 1 and 2). A statistically significant improvement was also observed in the positive beliefs having low-score preintervention amongst both the sections (Q. 7 and 8). Both nurses and doctors showed a significant improvement ( $P < .001$ ) in the propensity to promote organ donation (Q. 9 to 11) postintervention. Also, after being subjected to the teaching module, a significant increase in the number of nurses and

doctors who have had counseled patients or their relatives for organ donation was observed (Q. 12 and 13).

## Discussion

Of the total nurses called for contribution in this study, 83.74% participated. Comparatively, a very low proportion of the resident doctors (30%) posted in the study areas consented to participate. In a survey conducted in the same institute by Ahlawat et al.<sup>27</sup> to assess the knowledge and attitude of health care workers toward deceased organ donation, a very high response rate was observed amongst all categories of participants (99%). However, Flanigan et al.<sup>32</sup> have also observed in their literature review that in general, the response rate of physicians is low in surveys. Higher response rate by nurses in this study may also be attributed to the fact that nurses in the institute are directly under the administrative control of the investigator's department and were in routine communication with the investigator for other educational activities, whereas most of the participating doctors were not previously in direct association with the investigator. Also, the proportion of doctors posted in the study areas was comparatively very less as compared to the nurses, so most of them could not afford to participate because of their hectic schedule.

The level of knowledge amongst participating health care professionals was higher as compared to that of general population (nonmedical) established in the studies by Mithra et al.<sup>33</sup> in Karnataka and Mishra et al.<sup>34</sup> in New Delhi states. India has been badly suffering from ignorance on this latest modality of transplantation medicine and has a miniscule organ donation rate of 0.65 pmp. The most important factor

**Table 2.** Knowledge Scores of Nurses and Resident Doctors in Different Categories Concerning Organ Donation

S. No	Category	Maximum Score Possible	Nurses		Z	P	Resident Doctors		Z	P
			Preintervention	Postintervention			Preintervention	Postintervention		
1	Concept of organ donation	11	5.65 ± 1.54	8.55 ± 1.66	-12.701	< .001	6.94 ± 1.73	10.16 ± 1.12	-7.967	< .001
2	Procedures and protocols for organ donation in PGIMER	6	4.88 ± 0.92	5.75 ± 0.59	-10.495	< .001	4.81 ± 1.40	5.80 ± 0.44	-6.368	< .001
3	Clinical criteria for brain death	3	0.38 ± 0.54	1.49 ± 0.91	-11.404	< .001	1.21 ± 0.98	2.35 ± 0.83	-6.841	< .001
4	Legal issues	9	4.09 ± 1.49	7.55 ± 1.31	-13.341	< .001	5.87 ± 8.75	8.75 ± 0.53	-7.634	< .001
5	Total knowledge	29	18.7 ± 3.46	23.3 ± 3.25	-11.935	< .001	18.8 ± 4.15	27.0 ± 1.89	-8.110	< .001

**Table 3.** Question Wise Change in Attitude of Nurses and Resident Doctors Pre and Postintervention

Q. No.	Question	Nurses					Resident Doctors				
		Likert Score	Preintervention		Postintervention		Likert Score	Preintervention		Postintervention	
			Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
				Z	P			Z	P		
1	If my organs are requested after my death, it would place an additional burden on my family at the time of grief.	1	22 (9.1)	4 (1.7)	-6.865	< .001	1	4 (4.6)	0 (0)	-5.259	< .001
		2	68 (28.1)	41 (17.2)			17 (19.5)	5 (5.7)			
		3	61 (25.2)	65 (27.2)			18 (20.7)	12 (13.8)			
		4	58 (24.0)	78 (32.6)			24 (27.6)	40 (46.0)			
		5	26 (10.7)	51 (21.3)			21 (24.1)	30 (34.5)			
2	Members of my family would object to donate my organs after I die.	1	13 (5.5)	4 (1.7)	-6.702	< .001	1	5 (5.7)	1 (1.1)	-5.077	< .001
		2	69 (29.4)	39 (16.2)			18 (20.7)	3 (3.4)			
		3	89 (37.9)	80 (33.2)			21 (24.1)	20 (23.0)			
		4	53 (22.6)	91 (37.8)			21 (24.1)	38 (43.7)			
		5	11 (4.7)	27 (11.2)			19 (21.8)	25 (28.7)			
3	Donating my organ would place a financial burden on my family because of the cost of procedure.	1	5 (2.2)	2 (0.8)	-5.406	< .001	1	0 (0)	0 (0)	-0.966	.33
		2	18 (7.8)	6 (2.5)			0 (0)	0 (0)			
		3	40 (17.3)	22 (9.1)			9 (10.4)	10 (11.5)			
		4	107 (46.3)	113 (46.9)			39 (44.8)	44 (50.6)			
		5	61 (26.4)	98 (40.7)			36 (41.4)	33 (37.9)			
4	If I express my willingness to donate organ after my death, the doctors or nurses might do something to me before I am dead, so that they may get my organs.	1	14 (6.5)	6 (2.5)	-5.420	< .001	1	3 (3.4)	0 (0)	-1.955	.05
		2	47 (21.8)	28 (11.6)			5 (5.7)	0 (0)			
		3	31 (14.4)	26 (10.7)			12 (13.8)	15 (17.2)			
		4	64 (29.6)	70 (28.9)			23 (26.4)	35 (40.2)			
		5	60 (27.8)	108 (44.6)			44 (50.6)	37 (42.5)			
5	My religion does not allow organ donation, and my next life may be affected.	1	3 (1.3)	2 (0.8)	-1.943	.05	1	1 (1.1)	0 (0)	-0.341	.73
		2	6 (2.5)	8 (3.3)			3 (3.4)	0 (0)			
		3	17 (7.2)	11 (4.6)			4 (4.5)	7 (8.0)			
		4	96 (40.5)	85 (35.4)			22 (25.3)	36 (41.4)			
		5	115 (48.5)	134 (55.8)			57 (65.5)	44 (50.6)			
6	Donating my organ would disfigure/mutilate my body because of extraction of the organ.	1	5 (2.3)	3 (1.2)	-4.069	< .001	1	1 (1.1)	1 (1.1)	-0.746	.46
		2	16 (7.2)	7 (2.9)			1 (1.1)	2 (2.3)			
		3	29 (13.1)	21 (8.7)			11 (12.7)	8 (9.2)			
		4	97 (43.9)	103 (42.6)			32 (36.8)	36 (41.4)			
		5	74 (33.5)	106 (43.8)			42 (48.3)	40 (46.0)			

(Table 3 Continued)

(Table 3 Continued)

**Positive Beliefs Regarding Organ Donation: Q. No. 7 and 8**

Q. No.	Question	Preintervention		Postintervention		Likert Score	P	Z	Preintervention		Postintervention		Z	P
		Frequency (%)	Likert Score	Frequency (%)	Likert Score				Frequency (%)	Likert Score	Frequency (%)	Likert Score		
7	I would feel comfortable if the organs of any family member of mine are asked for donation, after his/her death.	1	40 (17.1)	56 (23.1)	1				23 (26.4)	40 (46.0)				
		2	119 (50.9)	138 (57.0)	2				36 (41.4)	36 (41.4)				
		3	53 (22.6)	39 (16.1)	3	<.001	-4.759		16 (18.4)	10 (11.5)			-2.363	.02
		4	17 (7.3)	3 (1.2)	4				4 (4.6)	1 (1.1)				
		5	5 (2.1)	5 (2.1)	5				2 (2.3)	0 (0)				
8	If necessary, I would accept an organ transplant in order to save my life.	1	36 (16.2)	66 (27.3)	1				28 (32.2)	42 (48.3)				
		2	149 (67.1)	154 (63.6)	2				36 (41.4)	31 (35.6)				
		3	28 (12.6)	18 (7.4)	3	<.001	-5.048		19 (21.8)	13 (14.9)			-0.835	.40
		4	6 (2.7)	0	4				2 (2.3)	0 (0)				
		5	2 (0.9)	0	5				2 (2.3)	1 (1.1)				

**Propensity for Promoting Organ Donation: Q. No. 9-13**

Q. No.	Question	Preintervention		Postintervention		Likert Score	P	Z	Preintervention		Postintervention		Z	P
		Frequency (%)	Likert Score	Frequency (%)	Likert Score				Frequency (%)	Likert Score	Frequency (%)	Likert Score		
9	The staff I work with feels it important to request organ donation from the families of potential donors.	1	27 (12.2)	46 (19.3)	1				16 (18.4)	33 (37.9)				
		2	140 (63.3)	162 (68.1)	2				47 (54.0)	36 (41.4)				
		3	43 (19.5)	26 (10.9)	3	<.001	-4.624		19 (21.9)	17 (19.5)			-2.085	.04
		4	8 (3.6)	2 (0.8)	4				4 (4.6)	1 (1.1)				
		5	3 (1.4)	2 (0.8)	5				1 (1.1)	0 (0)				
10	If I ask the family of any brain-dead patient for organ donation, the grieving family may be burdened and feel offended.	1	11 (4.9)	4 (1.7)	1				4 (4.6)	2 (2.3)				
		2	111 (49.3)	82 (34.6)	2				37 (42.5)	12 (13.8)				
		3	58 (25.8)	84 (35.4)	3	<.001	-5.223		24 (27.8)	15 (17.2)			-6.469	<.001
		4	40 (17.8)	53 (22.4)	4				18 (20.7)	34 (39.1)				
		5	5 (2.2)	14 (5.9)	5				4 (4.6)	24 (27.6)				
11	I am confident about my ability to request an organ donation from the family of a potential donor.	1	22 (9.7)	45 (18.9)	1				16 (18.4)	31 (35.6)				
		2	128 (56.6)	155 (65.1)	2				44 (50.6)	37 (42.5)				
		3	63 (27.9)	33 (13.9)	3	<.001	-5.774		16 (18.4)	15 (17.2)			-1.792	.07
		4	12 (5.3)	4 (1.7)	4				11 (12.6)	3 (3.4)				
		5	1 (0.4)	1 (0.4)	5				0 (0)	1 (1.1)				

(Table 3 Continued)



(Table 3 Continued)

Q. No.	Question	Nurses				Resident Doctors					
		Preintervention		Postintervention		Preintervention		Postintervention			
		N	Frequency (%)	N	Frequency (%)	N	Frequency (%)	N	Frequency (%)		
12	Have you ever counseled the relative/attendants of any patient for organ donation?	242	144 (61.8)	162 (68.1)	87.50	87	50 (57.5)	55 (63.2)	68.40	< .001	< .001
13	Do you think organ donation in PGIMER is sufficient to meet the demand for organs in the institute?	242	164 (71.3)	209 (86.7)	31.08	87	69 (79.3)	85 (97.7)	7.85	< .001	< .001

attributable to this lack of awareness is least efforts being put in for information, education, and communication (IEC) on this topic. However, after the establishment of the national framework consisting of a network of well-coordinated National, Regional, and State Organ and Tissue Transplant Organizations (NOTTO, ROTTOS, and SOTTOS, respectively), the country has witnessed a two-fold increase in its cadaveric organ donation rates over the last five years from 0.36 in 2014 to 0.65 in 2019.<sup>21,22</sup> This is clearly attributable to the increased level of IEC and transplantation activities under the aegis of these organizations and the promising role of media. Compared to the knowledge level of health care professionals observed in the studies by Mithra et al.<sup>33</sup> and Mishra et al.,<sup>34</sup> their preintervention knowledge level was found to be even higher in this study. This may be because of the fact that at the time this study was conducted, PGIMER Chandigarh had already achieved the status of being a public-sector institute with the highest incidence of organ donation in the country. Moreover, the ROTTO for eight northern states is also located in this institute.

Similar to the findings of this study, Bener et al.,<sup>35</sup> Alsaied et al.,<sup>36</sup> Akgun et al.,<sup>37</sup> and Jeon et al.<sup>38</sup> also observed higher baseline knowledge scores of doctors as compared to nurses on this topic. A great improvement in total knowledge was observed after intervention amongst both doctors and nurses (28.3% and 16.1% increase, respectively). The positive impact of educational interventions on this topic has also been established amongst the medical and nursing students by Kaiser et al.,<sup>39</sup> Farahani et al.,<sup>40</sup> McGlade et al.,<sup>41</sup> Zahra et al.,<sup>42</sup> Kiberd,<sup>43</sup> Rykhoff et al.,<sup>44</sup> and Ramadurg et al.<sup>28</sup> There is sufficient evidence that strategies to increase the participation of health care professionals and students on voluntary as well as curricular basis in activities related to awareness regarding organ donation would prove to be highly promising in increasing organ donation.

When compared, the knowledge about the “concept of organ donation” was higher in doctors than nurses in both phases and also improved significantly for both groups postintervention. The findings are consistent with Hu et al.<sup>45</sup> in their study on 400 health care professionals. The impact of intervention on awareness about “procedures and protocols in PGIMER” was statistically significant for both groups. A lower proportion of doctors as compared to nurses knew the procedure to be followed for declaring brain death in the institute, probably because nurses in this setup are supposed to organize and complete the procedures related to brain death declaration and, hence, are more familiar with the procedures. Only 41.4% doctors and 14.9% nurses knew initially which all organs can be transplanted. Significant impact was observed postintervention (85.1% and 82.6%, respectively). Interestingly, fewer doctors than nurses could correctly respond that organ donation was possible at “any age”; however, they took a significant lead from nurses postintervention. More than two-third participants confused “brain death” with other medical terms such as coma, persistent vegetative state, etc. wherein life still persists,

similar to the findings of Verma.<sup>46</sup> Cohen et al.<sup>47</sup> concluded in their study that proper understanding and familiarity with the concept of brain death makes health care professionals more comfortable with the situations involving organ donation and facilitates the organ procurement process.

Both groups had poor knowledge regarding “clinical criteria for brain death” prior to the intervention and the scores were least in this knowledge category corresponding with the findings of Bener et al.<sup>35</sup> Knowledge about laws governing organ and tissue donation was also observed to be low in this study as compared to that of Mishra et al.<sup>34</sup> Intervention improved the scores significantly in both these categories, and therefore, continuous education proves to be highly promising.

A more favorable attitude toward organ donation was observed amongst nurses and doctors as compared to general public, similar to the observations of Reddy et al.<sup>48</sup> Much higher willingness has been observed in this study as compared to the study conducted by Ahlawat et al.<sup>27</sup> in the same institute, in a similar setting and on similar population in 2009. This may be attributed to increased activities and awareness regarding organ donation in the institute over the span of time. The positive effect of intervention on attitude as observed in this study has also been established by Ramadurg et al.,<sup>28</sup> Farahani et al.,<sup>40</sup> McGlade et al.,<sup>41</sup> Zahra et al.,<sup>42</sup> Kiberd,<sup>43</sup> and others. Strongly positive attitudes were also observed regarding the advocacy for organ donation by different religions, similar to the observation of Bapat et al.<sup>49</sup> Prior to intervention, only one-fifth of the population feared mutilation or disfigurement of body because of organ donation, which improved further to less than one-sixth postintervention, the observations being in contrast to that of Hu et al.<sup>45</sup>

A very low proportion of nurses and doctors (22.9% and 28.7%, respectively) had pledged their organs before intervention. About one-fourth (58) of the nurses pledged their organs immediately after the interactive session. Only 57.5% doctors and 61.8% nurses working in PGIMER had ever counseled a patient or their attendant for organ donation. In this study, a significant impact of intervention was observed on the overall propensity of doctors and nurses to promote organ donation, for pledging their own organs, and for counseling the patient/attendants on this cause.

One limitation of this study was that it was conducted in one locale of the institution receiving only head trauma patients. Thus, findings may not be generalized to the whole population of doctors and nurses in the institute and might not be representative of similar population in other hospitals. Similar studies are required in future to strengthen generalization of the results. Second, the data have been collected purposefully for certain specific variables pertaining to organ donation and many others may not have been included unintentionally. As such, the results may not be a wholesome reflection of the clinico-administrative perspectives of this topic. Further, no follow up for the retention of the gained knowledge and better attitudes was done.



## Conclusion

Both nurses and doctors were aware of organ donation, and their attitudes were also favorable, but information regarding some basic and practical aspects of organ donation was relatively lacking. This not only prevented them from being prospective donors, but also acted against them being effective counselors and advocates of organ donation. Besides ensuring a promising role of educational interventions in improving awareness and attitude of health care professionals regarding organ donation, the moot point worth pondering which emerged out of this study was whether the IEC measures being taken by the government and other organizations are sufficient and aptly framed especially observing the lower scores in various categories preintervention amongst the study population, particularly considering the fact that it comprised of the section of society expected to be most informed on this topic. Also, coupling of the promotional activities for organ pledging with scientifically designed educational sessions can greatly enhance the organ pledge rates.

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## Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Ethical Statement

This study was approved by the Institutional Ethics Committee of PGIMER Chandigarh with the Reference Number NK/2088/MHA/5457-58. The written informed consent was obtained from the participants in the study.

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## Questionnaire

Name					
Age		Sex :	Male <input type="checkbox"/>	Female <input type="checkbox"/>	
Email					
Contact No.					
Department					

Designation					
Doctor	<input type="checkbox"/>				
Junior Resident	<input type="checkbox"/>	Senior Resident	<input type="checkbox"/>		
Nurse	<input type="checkbox"/>				
DNS	<input type="checkbox"/>	ANS	<input type="checkbox"/>	Grade I	<input type="checkbox"/>
				Grade II	<input type="checkbox"/>

Qualification					
Doctor :					
Pursuing MD / MS	<input type="checkbox"/>	Pursuing MCh / DM	<input type="checkbox"/>		
Nursing :					
Diploma	<input type="checkbox"/>	Graduate	<input type="checkbox"/>	Post Graduate	<input type="checkbox"/>

Experience in PGIMER					
< 1 year	<input type="checkbox"/>	1-2 years	<input type="checkbox"/>	2-3 years	<input type="checkbox"/>
3-6 years	<input type="checkbox"/>	6-10 years	<input type="checkbox"/>	>10 years	<input type="checkbox"/>

Religion					
Hindu	<input type="checkbox"/>	Muslim	<input type="checkbox"/>	Sikh	<input type="checkbox"/>
Christianity	<input type="checkbox"/>	Others	<input type="checkbox"/>		

<p><b>1. Can non-functioning (damaged) organs of one person be replaced by the healthy organ from another person?</b></p> <p>YES <input type="checkbox"/> NO <input type="checkbox"/></p>
<p><b>2. Does organ transplantation help a patient lead a better life:</b></p> <p>YES <input type="checkbox"/> NO <input type="checkbox"/></p>
<p><b>3. Organ Transplantation is a type of medical treatment:</b></p> <p>YES <input type="checkbox"/> NO <input type="checkbox"/></p>
<p><b>4. Which of the following organs do you know that can be transplanted ? (multiple options may be marked )</b></p> <p>Brain <input type="checkbox"/> Kidney <input type="checkbox"/> Lungs <input type="checkbox"/> Heart <input type="checkbox"/> Stomach <input type="checkbox"/> Eyes <input type="checkbox"/></p>
<p><b>5. When can the organs be harvested / taken from an organ donor ?</b></p> <p>Only after death <input type="checkbox"/> At any time, even when alive <input type="checkbox"/> Depends on the Organ <input type="checkbox"/></p>
<p><b>6. Which of the following organs can one donate even before death ? (multiple options may be marked )</b></p> <p>Brain <input type="checkbox"/> Kidney <input type="checkbox"/> Lungs <input type="checkbox"/> Heart <input type="checkbox"/> Skin &amp; Bone <input type="checkbox"/> Eyes <input type="checkbox"/></p>
<p><b>7. What can be the age of an organ donor ?</b></p> <p>Adult but &lt; 60yr of age <input type="checkbox"/> Any Adult <input type="checkbox"/> Any Age <input type="checkbox"/></p>
<p><b>8. Can a person with a beating heart be dead ?</b></p> <p>YES <input type="checkbox"/> NO <input type="checkbox"/></p>
<p><b>9. Do you know the concept of brain death ?</b></p> <p>YES <input type="checkbox"/> NO <input type="checkbox"/></p>
<p><b>10. "Brain death is irreversible"</b></p> <p>TRUE <input type="checkbox"/> FALSE <input type="checkbox"/></p>
<p><b>11. Which of the following means same as "Brain Death" ?</b></p> <p>Coma <input type="checkbox"/> Persistent Vegetative State <input type="checkbox"/> Locked in Syndrome <input type="checkbox"/> None <input type="checkbox"/></p>
<p><b>12. Is brain death certification required for DCD (Donation after Cardiac Death) ?</b></p> <p>YES <input type="checkbox"/> NO <input type="checkbox"/></p>
<p><b>13. What is the source of your knowledge regarding organ donation ? (multiple options may be marked )</b></p> <p>Mass Media <input type="checkbox"/> Course Curriculum <input type="checkbox"/> Organ Transplantation Coordinator <input type="checkbox"/></p>
<p><b>14. Was the concept of Organ Donation ever taught in your graduation course curriculum (in MBBS / Nursing Dip or Degree syllabus)?</b></p> <p>YES <input type="checkbox"/> NO <input type="checkbox"/></p>
<p><b>15. Were you ever asked a question regarding organ donation in your examinations during these courses?</b></p> <p>YES <input type="checkbox"/> NO <input type="checkbox"/></p>

**16. Is Organ Transplantation done in PGIMER ?**

YES  NO

**17. Does PGIMER has Transplantation Coordinators ?**

YES  NO

**18. Do you know whom to contact if you feel your patient is a potential donor ?**

Director PGIMER  Medical Superintendent  HOD Transplant Surgery   
Transplant Coordinator  Officer Incharge of Emergency/ATC

**19. Are you aware of the procedure for declaring brain death in PGIMER ?**

YES  NO

**20. Do you know the clinical criteria for declaring a patient as brain dead ?**

YES  NO

**21. In which of the following cases the patient can NOT be declared brain dead ?**

( multiple options may be marked )

Serum Sodium=170mEq/L  Blunt Abdominal Trauma  Myocardial Infarction   
Sepsis  Random Blood Sugar = 110 mg/dl  All of the above

**22. In which of the following conditions, brain death cannot be declared ?**

Patient of hanging  Ruptured Spleen  Hypothermia

**23. Which of the following Reflexes must NOT be present while declaring a patient brain dead? (**

multiple options may be marked )

Corneal Reflex  Plantar Relflex  Pupillary Reflex  All of the above

**24. When can brain dead declaration be done in PGIMER ?**

During office hours in week days  9 to 5 pm on all days  Any Day & Any Time

**25. Which of the following organs are transplanted in PGIMER ? ( multiple options may be marked )**

Brain  Kidney  Liver  Heart  Pancreas  Eyes

**26. What is THOA ?**

A clinical criteria for declaring brain death  Organ retrieval body in PGIMER   
Law governing Organ Transplantation  "The Human Organs Assosiation"

**27. Which of the following systems for organ donation is followed in India ?**

Opt In  Opt Out  Both of these depending on the situation

**28. Can the organs be pledged during life time (i.e. when alive) ?**

YES  NO

**29. Which of the following is not considered a "next of kin" for giving consent as per law ?**

Parents  Siblings  Spouse  Grand Parents  Nephew

30. If a person has pledged his own organs, is the consent of anyone else required for donation ?

YES  NO

31. Can the donor be paid in cash or kind for the organ he donated ?

YES  NO

32. Is a license mandatory for any hospital to carry out organ transplantation ?

YES  NO

33. Brain Death committee consists of the following members EXCEPT :

Hospital Administrator  Treating Physician  Neurologist  HOD Transplant Surgery

34. What maximum fine can be imposed for breach of law regarding Organ Donation in India ?

Rs. 10,000  Rs. 20,000  Rs. 10 lakh  Rs. 20 Lakh  Rs. 1 Crore

35. Would you like to donate your organs after your death ?

YES  NO

36. Given that kidney donation is possible when alive, would you donate your kidney if needed by a family member or a friend?

YES  NO

37. Have you pledged your organs ?

YES  NO

38. Do you have a donor card ?

YES  NO

39. Have you ever donated blood in a camp for an unknown person ?

YES  NO

From 40 to 53, Tick  $\checkmark$  the "most appropriate" option as per your view

40. If my organs are requested after my death, it would place an additional burden on my family at the time of grief :

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

41. Members of my family would object to donate my organs after I die :

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

42. Donating my organ would place a financial burden on my family due to cost of procedure :

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

43. If I express my willingness to donate organ after my death, the doctors or nurses might do something to me before I am dead, so that they may get my organs :

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

**44. My religion does not allow organ donation, and my next life may be affected:**

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

**45. Donating my organ would disfigure / mutilate my body due to extraction of the organ :**

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

**46. I would feel comfortable if the organs of any family member of mine are asked for donation, after his / her death :**

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

**47. The staff I work with feels it important to request organ donation from the families of potential donors :**

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

**48. If I ask the family of any brain dead patient for organ donation, the grieving family may be burdened and feel offended :**

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

**49. I am confident about my ability to request an organ donation from the family of a potential donor :**

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

**50. If necessary, I would accept an organ transplant in order to save my life :**

Strongly Agree  Agree  No Opinion  Disagree  Strongly Disagree

**51. Have you ever counseled the relative / attendants of any patient for organ donation ?**

YES  NO

**52. Do you think organ donation in PGIMER is sufficient to meet the demand for organs in the institute ?**

YES  NO

**53. If your answer is "No" in above question, then what do you think should be done to promote organ donation in the institute ?**

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