

Access this article online

Quick Response Code:



Website:  
www.jehp.net

DOI:  
10.4103/jehp.jehp\_102\_18

# Influence of health education on knowledge, attitude, and practices toward organ donation among dental students

Samata Srinivasula, Adepu Srilatha, Dolar Doshi, Bandari Srikanth Reddy, Suhas Kulkarni

## Abstract:

**OBJECTIVES:** Knowledge, attitudes, and behaviors are essential factors in fostering an environment that positively influences organ donation rates. Thus, the present study aimed to assess the impact of intervention (classroom education) on knowledge, attitude, and practices on organ donation.

**MATERIALS AND METHODS:** A questionnaire-based interventional study was conducted among 112 dental house surgeon students, Hyderabad. A 27-item self-administered questionnaire was distributed to students as a pretest and collected back after completion. Then, a session on organ donation was delivered in a lecture hall setting instilling the basic facts about organ donation. Posttests using the same questionnaire were filled after the intervention and 2 weeks later.

**RESULTS:** Responses on knowledge obtained from the subjects showed significant changes in several key areas from baseline to postintervention and at follow-up. More than 50% of study subjects had a positive attitude regarding organ donation. There was a significant increase in the number of subjects who pledged/signed to donate an organ (before - 14.3%, postintervention - 50%, and at follow-up - 60.7%;  $P < 0.05$ ). Pairwise comparison revealed a significant increase in the mean knowledge, attitude, and practice scores at postintervention and at follow-up of 2 weeks in comparison to the baseline scores. Female subjects and subjects following Hindu religion had good knowledge, positive attitude, and good practice.

**CONCLUSION:** The one brief educational intervention had significantly increased perceived knowledge of organ donation and positively influenced attitude and practices to organ donation among dental students.

## Keywords:

Attitudes, education, knowledge, organ donation, transplantation

## Introduction

With the improvement in science and technology in medicine, lifespan of people is increasing, and mortality is coming down in India.<sup>[1]</sup> However, with changing lifestyle pattern and food habits, the percentage of people suffering from various organ failures have been increasing.<sup>[1]</sup> Organ transplantation is

arguably one of the greatest scientific advances and in fact, is usually the only option of treatment in many end organ diseases.

Organ donation is the process of giving an organ or a part of an organ for the purpose of transplantation into another person. Transplantation is defined as the transfer (engraftment) of human cells, tissues, or organs from a donor to the recipient with the aim of restoring function in the body.<sup>[2]</sup> The

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**How to cite this article:** Srinivasula S, Srilatha A, Doshi D, Reddy BS, Kulkarni S. Influence of health education on knowledge, attitude, and practices toward organ donation among dental students. *J Edu Health Promot* 2018;7:157.

Department of Public Health Dentistry, Panineeya Institute of Dental Sciences and Hospital, Hyderabad, Telangana, India

### Address for correspondence:

Dr. Adepu Srilatha, Road No. 5, Kamala Nagar, Dilsukhnagar, Hyderabad - 500 060, Telangana, India.  
E-mail: dr.adepusrilatha@yahoo.com

Received: 26-04-2018

Accepted: 24-07-2018

For reprints contact: reprints@medknow.com

donated organ may be from a living donor, a deceased donor, or a brain-dead person. The number of organs and tissues that can be donated after natural death is limited whereas following brain death 37 different organs can be transplanted.<sup>[3]</sup>

Human organ donation was legalized in India since 1994 through “The Transplantation of Human Organs Act” and is aimed at regulation of removal, storage and transplantation of human organs for therapeutic purposes and prevention of commercial dealings in human organs.<sup>[4]</sup> Yet the organ donation rate is very poor (0.34 donors per million population) in comparison to western countries (Spain – 35.1 Donors, USA – 26 Donors, Britain – 27 Donors, and Canada – 14 donors per million population).<sup>[5]</sup> The number of transplants done in the country every year in case of major organs is less than a thousand and every year nearly 5 lakh people die due to no availability of organs.<sup>[1]</sup> The inadequacy of organ donation is an important health issue in our country, and the number of patients awaiting organ donations is increasing every day.

The shortage in organ supply is perceived to be due to lack of awareness,<sup>[6]</sup> correct knowledge among public and health-care providers<sup>[6]</sup> and failure to identify the possible donor.<sup>[7]</sup> A study among Indian and Pakistan students identified that religion, awareness, impact of medical education, culture-specific factors, treatment of donor and their organs, and the influence of family were the key factors that influence the attitude toward organ donation.<sup>[8]</sup>

Earlier studies showed that knowledge, attitudes, and behaviors are essential factors in fostering an environment that positively influences organ donation rates.<sup>[5,6,9,10]</sup> In India, only few studies have focused on knowledge, attitude, and practice on organ donation among health-care workers,<sup>[11]</sup> patients,<sup>[12]</sup> college students,<sup>[5]</sup> and medical students.<sup>[3]</sup> However, the literature review revealed only one study conducted among dental health professionals.<sup>[13]</sup> Furthermore, a study in Washington among adolescent population reported that a single classroom exposure can impact knowledge levels, correct misinformation, and effect opinion change on organ donation.<sup>[14]</sup> Hence, the present study aimed to assess the impact of the intervention (classroom education) on knowledge, attitude, and practices on organ donation among undergraduate dental students.

## Materials and Methods

A questionnaire-based interventional study was conducted among dental house surgeon students of Panineeya Institute of Dental Sciences and Research

Centre, Hyderabad, India, to assess the impact of intervention on knowledge, attitude, and practice on organ donation confidentiality of respondents were maintained, and the participation was voluntary.

A 27-item self-administered questionnaire was developed based on previous studies<sup>[7,8,13]</sup> comprising of four sections. The first section of the questionnaire gathered the demographic details from the students, which included gender and religion. The second, third, and fourth sections assessed the levels of knowledge (QK1–K13), positive attitude (QA14–A24), and practice habits (QP25–P27) regarding organ donation, respectively. The responses were recorded on a dichotomous scale (Yes/No). For the response “Yes,” a score of “2” was given and for the response “No,” a score of “1” was given. Reverse scoring was done for the questions (Q6, 9, 10, 21, and 23) where the correct responses were “No.”

The questionnaire was administered to students as a pretest and collected back after completion. Then, a session on organ donation was delivered in a lecture hall setting instilling the basics facts about organ donation, types of organ donations, the statistics of organ donations, constant organ shortage worldwide and in India, organ procurement and allocation procedures, legislations regulating organ donation and ethical aspects of organ donation and transplantation. Posttests using the same questionnaire were filled after the intervention and 2 weeks later.

Statistical analysis was carried out using SPSS version, statistical data 2003 SPSS, Inc., an IBM company, Chicago, Illinois, USA. One-way ANOVA test, *t*-test, and Mann–Whitney U-test were used to compare the before, after and follow-up knowledge, attitude, and practice scores based on gender and religion. Association of before, after and follow-up knowledge, attitude, and practice with respect to gender and religion was done using Chi-square test. Correlation among before, after and follow-up knowledge, attitude, and practice scores was done using Karl Pearson’s correlation coefficient method. In addition, factors affecting approval of organ donation were analyzed using multivariable logistic regression, the results of which are presented as odds ratios (OR) with associated 95% confidence intervals.

## Results

Out of 124 participants, 112 dental intern students completed the questionnaire at baseline, posttest, and at follow-up and were included in the present study (response rate - 90.3%). The study populations included 15 (13.4%) males and 97 (87%) females. When religion was considered, the majority of participants

were Hindus (79.5%), with only a small proportion being Muslim (14.2%) and other religions constituting Christians and Jains (6.3%).

On a positive note, all the subjects had heard the term organ donation and organ transplantation. Correct responses on knowledge obtained from the subjects showed significant changes in several key areas from baseline to postintervention and at follow-up. However, around 45% of the study population significantly continued to express doubts about increased risk of opportunistic infections as a common complication to transplantation (item-K12) [Table 1]. Furthermore, although male subjects and subjects following other religion were in higher number had better knowledge; significant difference was not observed for most of the items.

More than 90% of the study population responded to support organ donation (95.5%), feel comfortable to think or talk about organ donation (96.4%) and agreed to donate organs when they die (91.1%). Further, although more than 50% of study subjects had a positive attitude regarding organ donation

before, postintervention and at follow-up, significant change in the attitude was not noticed for most of the items. On the other hand, majority of the subjects felt that their body will be disfigured following organ donation (before - 17% and postintervention - 18.8% and at follow-up - 12.5%) [Table 1]. Although female subjects and Hindus had a more positive attitude with regard to organ donation, significant difference for most of the items was noted only based on religion.

There was a significant increase in the number of subjects who pledged or signed to donate an organ (before - 14.3%, postintervention - 50%, and at follow-up - 60.7%) [Table 1]. After a follow-up of 2 weeks, on comparison based on gender and religion, although there was an increase in the number of subjects who signed to donate an organ (males - 66.7% and females - 59.8%; Hindus - 64%, Muslim - 43.8%, and others - 57.1%), significant difference was not observed. In addition, four subjects following Hindu religion (two males and two females) had donated an organ and only one Hindu male subject had received an organ for transplantation.

**Table 1: Comparison of item wise correct responses on knowledge, attitude, and practice at before, after and follow-up time points of respondents**

Mains	Items	Before n (%)	After, n (%)	Follow-up, n (%)	Pairwise comparisons (P)		
					Before versus after	Before versus follow-up	After versus follow-up
Knowledge	K1	112 (100)	112 (100)	112 (100)	1.00	1.00	1.00
	K2	112 (100)	112 (100)	112 (100)	1.00	1.00	1.00
	K3	53 (47.3)	101 (90.2)	107 (95.5)	0.00*	0.00*	0.08
	K4	5 (4.5)	87 (77.7)	86 (76.8)	0.00*	0.00*	0.88
	K5	96 (85.7)	108 (96.4)	108 (96.4)	0.00*	0.00*	1.00
	K6	70 (62.5)	76 (67.9)	86 (76.8)	0.35	0.00*	0.09
	K7	83 (74.1)	99 (88.4)	107 (95.5)	0.00*	0.00*	0.05*
	K8	105 (93.8)	105 (93.8)	104 (92.9)	1.00	0.80	0.78
	K9	49 (43.8)	58 (51.8)	55 (49.1)	0.13	0.18	0.90
	K10	57 (50.9)	57 (50.9)	66 (58.9)	1.00	0.17	0.18
	K11	63 (56.3)	51 (45.5)	66 (58.9)	0.11	0.61	0.08
	K12	81 (72.3)	62 (55.4)	66 (58.9)	0.00*	0.05*	0.62
	K13	30 (26.8)	46 (41.1)	26 (23.2)	0.02*	0.33	0.00*
Attitude	A14	107 (95.5)	106 (94.6)	107 (95.5)	0.59	1.00	0.68
	A15	106 (94.6)	107 (95.5)	108 (96.4)	0.68	1.00	0.68
	A16	98 (87.5)	103 (92)	102 (91.1)	0.09	0.37	0.52
	A17	65 (58)	88 (78.6)	88 (78.6)	0.00*	0.00*	0.73
	A18	73 (65.2)	88 (78.6)	84 (75)	0.00*	0.03*	0.61
	A19	109 (97.3)	106 (94.6)	106 (94.6)	0.22	0.37	1.00
	A20	86 (76.8)	91 (81.3)	89 (79.5)	0.23	0.63	0.59
	A21	83 (74.1)	79 (70.5)	76 (67.9)	0.66	0.60	0.89
	A22	19 (17)	21 (18.8)	14 (12.5)	0.86	0.32	0.23
	A23	65 (58)	81 (72.3)	80 (71.4)	0.01*	0.04*	1.00
	A24	60 (53.6)	84 (75)	78 (69.6)	0.00*	0.02*	0.36
Practice	P25	16 (14.3)	56 (50.0)	68 (60.7)	0.00*	0.00*	0.15
	P26	4 (3.6)	4 (3.6)	4 (3.6)	0.46	0.76	0.76
	P27	1 (0.9)	1 (0.9)	1 (0.9)	0.10	1.00	0.10

\* $P \leq 0.05$  statistically significant

Among the study subjects, pairwise comparison revealed a significant increase in the mean knowledge, attitude, and practice scores at postintervention and at follow-up of 2 weeks in comparison to the baseline scores. However, the mean scores at follow-up of 2 weeks did not change significantly on comparison to the postintervention mean scores. The mean scores for correct knowledge were higher among males and the mean attitude, and practice scores were higher among females. Nevertheless, only the mean practice scores regarding organ donation showed a significant difference with gender [Table 2].

Before the intervention, although the mean correct knowledge scores were significantly lower among Muslim subjects ( $8.4 \pm 1.6$ ), following the intervention and at a follow-up of 2 weeks, they had higher mean scores ( $9.6 \pm 1.8$ ,  $10.1 \pm 1.1$  respectively), significant difference was not observed. On the other hand, the mean attitude and practice scores were significantly higher among subjects following Hindu religion. Further *post hoc* analysis also revealed that religion had a significant effect on attitude and practice on organ donation [Table 3].

At baseline, when levels of correct response were considered, 44.6% of subjects had high knowledge, 42.8%

had high attitude, and only 0.2% high practice on organ donation. However, there was increase in the number of subjects with high knowledge, attitude, and practice following the intervention (52.7%, 60.7%, and 50.8%, respectively), and at follow-up (58.9%, 58%, and 60.7%, respectively) [Table 4].

High level of correct knowledge, attitude, and practice was observed among males; it did not reveal any significant difference based on gender before and after the intervention. Based on religion, significantly majority of subjects (71.4%) following other religion had high levels of correct knowledge before the intervention. However, following the intervention, Muslim subjects were in majority with high level of correct knowledge (62.5%); nonetheless, this comparison was not statistically significant. Likewise, although high levels of attitude and practice were mostly observed among Hindu religion subjects, significant difference was noted only with respect to attitude [Table 4].

On correlation, it was observed that knowledge, attitude, and practice on organ donation had a positive correlation with each other before, postintervention and at follow-up. Nevertheless, significant correlation was seen only between attitude and practice.

**Table 2: Mean comparison of before, after and follow-up knowledge, attitude and practice scores among study subjects and based on gender**

Variables	Time points	Gender			Mean±SD	Total sample		
		Mean±SD		P		Pair-wise comparison		
		Male	Female			Before versus after	Before versus follow-up	After versus follow-up
Knowledge	Before	9.27±1.58	9.11±1.44	0.7048	9.1±1.5	0.01*	0.00*	0.25
	After	9.27±1.79	9.64±1.57	0.4030	9.6±1.6			
	Follow-up	10.07±1.16	9.79±1.55	0.5145	9.8±1.5			
Attitude	Before	7.93±1.44	7.77±1.83	0.7469	7.8±1.8	0.00*	0.00*	0.21
	After	8.40±1.12	8.54±1.57	0.7483	8.5±1.5			
	Follow-up	8.13±1.30	8.35±1.72	0.6407	8.3±1.7			
Practice	Before	0.05±0.63	0.13±0.39	0.04*	0.18±0.4	0.00*	0.00*	0.26
	After	0.08±0.88	0.45±0.64	0.03*	0.54±0.7			
	Follow-up	0.11±0.83	0.53±0.58	0.01*	0.65±0.6			

\*P≤0.05 statistically significant. Paired t-test. SD=Standard deviation

**Table 3: Mean comparison of before, after and follow-up knowledge, attitude, and practice scores based on religion**

Religions	Mean knowledge, attitude, and practice scores on organ donation Mean±SD								
	Knowledge			Attitude			Practice		
	Before	After	Follow-up	Before	After	Follow-up	Before	After	Follow-up
Hindu	9.2±1.4	9.6±1.6	9.8±1.5	8.2±1.3	8.9±1.1	8.6±1.3	0.17±0.5	0.44±0.7	0.55±0.6
Muslims	8.4±1.6	9.6±1.8	10.1±1.1	5.6±2.4	6.7±2.1	6.8±2.7	0.00	0.07±0.9	0.06±0.8
Others	10.0±1.6	9.4±1.4	9.9±0.2	7.7±1.7	8±1.8	8.2±1.1	0.00	0.02±0.5	0.03±0.5
P	0.04	0.95	0.69	0.00*	0.00*	0.00*	0.19	0.04*	0.03*
Pairwise comparisons by Tukeys multiple <i>post hoc</i> procedures (P)									
Hindu versus Muslims	0.93	0.09	0.81	0.00*	0.00*	0.00*	0.36	0.00*	0.00*
Hindu versus others	0.95	0.65	0.92	0.33	0.41	0.99	0.39	0.00*	0.00*
Muslims versus others	0.99	0.87	0.76	0.69	0.41	0.09	0.94	0.67	0.97

\*P≤0.05 statistically significant. One-way ANOVA test. SD=Standard deviation

At baseline, only religion showed to be a significant predictor for good knowledge, positive attitude, and good practice, wherein, subjects following Hindu religion had higher odds. On following the education intervention, both gender and religion showed to be significant predictors, in which female subjects and subjects following Hindu religion had higher odds of good knowledge, positive attitude, and good practice scores [Table 5].

## Discussion

Organ donation is a unique social activity dependent on individual attitude, social structure, cultural practices, and religious beliefs.<sup>[15]</sup> Literature review has shown deficient knowledge, diverse attitudes, and myths about organ donation among different sections of the population.<sup>[8,11,12]</sup> Further, a single classroom education within a small group can significantly increase

**Table 4: Association between levels of correct knowledge, positive attitude and good practice with gender and religion**

Variables	Before		After		Follow-up	
	Low, n (%)	High, n (%)	Low, n (%)	High, n (%)	Low, n (%)	High, n (%)
<b>Knowledge</b>						
Gender						
Male	6 (40)	9 (60)	9 (60)	6 (40)	5 (33.3)	10 (66.7)
Female	56 (57.7)	41 (42.3)	44 (45.4)	53 (54.6)	41 (42.3)	56 (57.7)
<i>P</i>	0.199		0.29		0.51	
Religion						
Hindu	47 (52.8)	42 (47.2)	43 (48.3)	46 (51.7)	38 (42.7)	51 (57.3)
Muslims	13 (81.3)	3 (18.8)	6 (37.5)	10 (62.5)	6 (37.5)	10 (62.5)
Others	2 (28.6)	5 (71.4)	4 (57.1)	3 (42.9)	2 (28.6)	5 (71.4)
<i>P</i>	0.03*		0.63		0.72	
<b>Attitude</b>						
Gender						
Male	7 (46.7)	8 (53.3)	5 (33.3)	10 (66.7)	8 (53.3)	7 (46.7)
Female	57 (58.8)	40 (41.2)	39 (40.2)	58 (59.8)	39 (40.2)	58 (59.8)
<i>P</i>	0.37		0.61		0.33	
Religion						
Hindu	45 (50.6)	44 (49.4)	29 (32.6)	60 (67.4)	34 (38.2)	55 (61.8)
Muslims	14 (87.5)	2 (12.5)	12 (75)	4 (25)	9 (56.3)	7 (43.8)
Others	5 (71.4)	2 (28.6)	3 (42.9)	4 (57.1)	4 (57.1)	3 (42.9)
<i>P</i>	0.01*		0.00*		0.28	
<b>Practice</b>						
Gender						
Male	10 (66.7)	5 (33.3)	7 (46.7)	8 (53.3)	5 (33.3)	10 (66.7)
Female	83 (85.6)	14 (14.4)	48 (49.5)	49 (50.5)	39 (40.2)	58 (59.8)
<i>P</i>	0.07		0.83		0.61	
Religion						
Hindu	71 (79.8)	18 (20.2)	43 (48.3)	46 (51.7)	32 (36)	57 (64)
Muslims	15 (93.8)	1 (6.3)	8 (50)	8 (50)	9 (56.3)	7 (43.8)
Others	7 (100)	0	4 (57.1)	3 (42.9)	3 (42.9)	4 (57.1)
<i>P</i>	0.18		0.90		0.30	
Total	62 (55.4)	50 (44.6)	53 (47.3)	59 (52.7)	46 (41.1)	66 (58.9)

**Table 5: Association between correct knowledge, positive attitude, good practices and demographics (adjusted OR - 95% CI)**

Variables	Before			<i>P</i>	After			<i>P</i>	Follow-up			<i>P</i>
	Knowledge	Attitude	Practice		Knowledge	Attitude	Practice		Knowledge	Attitude	Practice	
Gender				0.06				0.04*				0.89
Male	Reference	Reference	Reference		Reference	Reference	Reference		Reference	Reference	Reference	
Female	1.1	1.3	2.9		2.9	1.9	3.5		1.3	1.0	1.1	
Religion												
Hindu	2.7	2.1	1.1	0.04*	3.3	2.2	1.5	0.00*	2.7	1.8	0.9	0.91
Muslim	1.9	1.3	0.6		2.1	1.7	0.7		1.9	1.3	0.5	
Others	Reference	Reference	Reference		Reference	Reference	Reference		Reference	Reference	Reference	

\**P* ≤ 0.05 statistically significant. OR=Odds ratio, CI=Confidence interval

knowledge and positively influence the intentions to donate the organs.<sup>[3,14,16]</sup> Hence, the present study aimed to assess the impact of intervention on knowledge, attitude, and practices on organ donation among undergraduate dental students.

In India, there has been an increase in the number of women taking up dentistry.<sup>[15]</sup> The same scenario is also observed in the present study, with the majority of the subjects being females. However, an equal number of males and female medical students were observed by Ramadurg and Gupta.<sup>[17]</sup>

It was overwhelming that all the students (100%) knew the term organ donation and organ transplantation. This was consistent with the studies done among Karnataka<sup>[18]</sup> and Mangalore medical students.<sup>[19]</sup> This might be due to exposure of students to conditions or patients requiring organ donation. However, apart from knowing the term, more than 50% of the study population had low knowledge (53.6%). This might be due to lack of inclusion of organ donation and transplantation as a part of curriculum.

Vinay *et al.*<sup>[20]</sup> showed that the knowledge did not significantly change during their routine 3 years' medical curriculum and suggested the need for an educational program on organ donation and transplantation. Analogs to the previous studies,<sup>[16,21,22]</sup> exposure to a teaching program had significantly improved the knowledge in several key areas of organ donation. This emphasizes the need for education to bring necessary changes in the perception and intention of the students regarding organ donation. The number of subjects with high level of correct knowledge has increased from baseline (44.6%) to postintervention (52.6%) and at follow-up (59%). This is lower when compared to the data from a study done among Jammu nursing students (baseline - 0% and posttest - 85%). This difference might be due to different cultural and religious background.

Gender comparison revealed that though males had higher knowledge scores and higher odds of having good knowledge before and after the intervention in comparison to females, significant difference was not noticed. However, Huern *et al.*<sup>[6]</sup> found significant high knowledge scores among males ( $15.8 \pm 3.8$ ,  $P = 0.018^*$ ). Likewise, comparison based on religion at baseline revealed that subjects following other religion (Christians and Jainism) had significantly high levels and means of knowledge scores in comparison to Hindus and Muslim subjects. This might be for the reason that the Christianity and Jainism faith strongly believe organ donation as a selfless sacrifice. However, following the intervention, the knowledge on organ donation did not show any significant relation with religion.

Majority of the students expressed positive attitude to support organ donation (95.5%), felt comfortable to talk about it (94.6%), and agreed to donate organs (87.5%). The willingness to donate in the present study is in line with the study done among the Brazilian population (87%),<sup>[23]</sup> but quite different from the one done among nursing students of Jammu (57%).<sup>[22]</sup> This difference might be due to recent mushrooming growth of organ trade and trafficking.

In India, the family is a social agency and most of the times, the final decision whether to donate or not will be taken by the family members. It is enriching to observe that in the present study, more than half of the subjects were in favor of donating their family members organs (58%) and the family do agree with organ donation (65.2%) and further these numbers have significantly improved following intervention (78.6%, 78.6% respectively;  $P \leq 0.05$ ). Similarly, Coad *et al.*<sup>[24]</sup> also noted positive attitude toward organ donation among family members of the British young adults (60%).

The impact of religious beliefs on organ donation with every individual and the difficulty in changing these beliefs remained an important factor significantly associated with negative action in a study done by Ramadurg and Gupta,<sup>[17]</sup> where only 4.3% of medical students said that their religion would allow organ donation and only 1% of subjects changed their opinion following the educational intervention. In the present study, it is heartening to observe that 76.8% believed their religion would allow organ donation and is further increased by 5% following the intervention. This positive impact of religion is also observed by Agarwal.<sup>[18]</sup> (85.8%) and Sugumar *et al.*<sup>[3]</sup> among medical students and by Annadurai *et al.*<sup>[25]</sup> (80.3%) among college students (94.5%).

It was surprising to observe that a large proportion of students had a fear of body disfigurement (83%) and the number did not change even after the educational intervention. Further Sugumar *et al.*<sup>[3]</sup> also reported that it was one of the main reason for organ donation not being popular in India. In contrast, only 7.4% of medical students were concerned about body disfigurement in a study by Agarwal.<sup>[18]</sup>

The mean positive attitude scores did not show any significant difference based on gender throughout the study. However, females had higher mean scores and are at 1.9 times more likely to have a positive attitude. Further, Vinay *et al.*<sup>[20]</sup> and Annadurai *et al.*<sup>[25]</sup> also observed females having significantly more positive attitude as they have more emotional values and selfless concern for well-being of others.

Most of the Hindus believe that by donating organs, it would give positive effect for the rebirth process after death.<sup>[26]</sup> This may be one of the reasons for observing a significantly higher mean and higher odds (2.2) of positive attitude. Similar findings were also observed by Huern *et al.*<sup>[6]</sup> among Malaysian medical students. Cultural specific issues such as to have an intact body after death or as sense of sacredness of body, might be accountable for low levels of positive attitude among Muslims and subjects following other religion.

It is disappointing that despite students having good knowledge and positive attitude, only a minority of students have signed organ donation card (14.3%). However, following the intervention, the number has significantly increased to 60.7%. A similar increase was also observed by Murakami *et al.*<sup>[27]</sup> (50%–64%) and Radunz *et al.*<sup>[28]</sup> (64%–67%) among medical students and by McGlade and Pierscionek<sup>[16]</sup> (33%–38%) among nursing students, but significant increase was noticed only by Murakami *et al.*<sup>[27]</sup> Thus an intensified education can give an important insight into the improvement of acceptance and agreement with organ donation.

The mean practice scores showed a significant association with both gender and religion throughout the study, wherein, female subjects and subjects following Hindu religion had higher mean practice scores and higher odds of good practice (Baseline – OR = 2.9, 1.1; postintervention – OR = 3.5, 1.5 respectively).

The present study has limitations such as sample restricted to single university and overrepresentation of women, may affect the ability to generalize our findings to a wider population. The pretest and posttest design might sensitize participants and thereby may affect the results. However, the follow-up was done to identify whether the intervention has led to behavior change among the students.

## Conclusion

Based on the findings, at baseline, although majority of students had good knowledge and positive attitude, the level of practice on organ donation was very poor. The one brief educational intervention had significantly increased perceived knowledge of organ donation and positively influenced attitude and practices to organ donation among dental students. Female subjects and subjects following Hindu religion had higher means of good knowledge, positive attitude, and good practice. Further studies are required to confirm the effectiveness of this type of intervention and effective measures should be taken to educate people with relevant information.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## References

1. Ranganath TS. Organ Donation. *Natl J Public Health* 2016;1:5.
2. World Health Organisation. *Global Glossary of Terms and Definitions on Donation and Transplantation*. Geneva: World Health Organisation; 2009. p. 14.
3. Sugumar JP, Padhyegurjar MS, Padhyegurjar SB. An interventional study on knowledge and attitude regarding organ donation among medical students. *Int J Med Sci Public Health* 2017;6:402-8.
4. Laws of Organ Donation in India | Laws Made Easy. Available from: <http://www.organindia.org/laws-made-easy/>. [Last accessed on 2017 Dec 18].
5. Keerthana P, Lajju LV, Monteiro M, Thomas N, D'Souza RP, Shetty AP. Organ donation: Knowledge and attitude among adolescents. *Am Int J Res Sci Technol Eng Math* 2016;16:52-5.
6. Huern SY, Yee KC, Rajah JS, Ponniah MP, Sapini MIB. Knowledge, awareness and attitudes on organ donation among undergraduate medical students in Malaysia: An analytical cross sectional study. *Br J Med Res* 2016;16:1-14.
7. Chung CK, Ng CW, Li JY, Sum KC, Man AH, Chan SP, *et al.* Attitudes, knowledge, and actions with regard to organ donation among Hong Kong medical students. *Hong Kong Med J* 2008;14:278-85.
8. Gauher ST, Khehar R, Rajput G, Hayat A, Bakshi B, Chawla H, *et al.* The factors that influence attitudes toward organ donation for transplantation among UK university students of Indian and Pakistani descent. *Clin Transplant* 2013;27:359-67.
9. Feeley TH. College student's knowledge, attitudes and behaviours regarding organ donation: An integrated review of the literature. *J Appl Soc Psychol* 2007;37:243-71.
10. Mekahli D, Liutkus A, Fargue S, Ranchin B, Cochat P. Survey of first-year medical students to assess their knowledge and attitudes toward organ transplantation and donation. *Transplant Proc* 2009;41:634-8.
11. Ahlawat R, Kumar V, Gupta AK, Sharma RK, Minz M, Jha V, *et al.* Attitude and knowledge of healthcare workers in critical areas towards deceased organ donation in a public sector hospital in India. *Natl Med J India* 2013;26:322-6.
12. Mithra P, Ravindra P, Unnikrishnan B, Rekha T, Kanchan T, Kumar N, *et al.* Perceptions and attitudes towards organ donation among people seeking healthcare in tertiary care centers of coastal South India. *Indian J Palliat Care* 2013;19:83-7.
13. Chakradhar K, Doshi D, Srikanth Reddy B, Kulkarni S, Padma Reddy M, Sruthi Reddy S, *et al.* Knowledge, attitude and practice regarding organ donation among Indian dental students. *Int J Organ Transplant Med* 2016;7:28-35.
14. Cárdenas V, Thornton JD, Wong KA, Spigner C, Allen MD. Effects of classroom education on knowledge and attitudes regarding organ donation in ethnically diverse urban high schools. *Clin Transplant* 2010;24:784-93.
15. Tandon S. Challenges to the oral health workforce in India. *J Dent Educ* 2004;68:28-33.
16. McGlade D, Pierscionek B. Can education alter attitudes, behaviour and knowledge about organ donation? A pretest-post-test study. *BMJ Open* 2013;3:e003961.
17. Ramadurg UY, Gupta A. Impact of an educational intervention on increasing the knowledge and changing the attitude and beliefs towards organ donation among medical students. *J Clin Diagn Res* 2014;8:JC05-7.

18. Agarwal S. Are medical students having enough knowledge about organ donation. IOSR J Dent Med Sci 2015;14:29-34.
19. Ilango S, Nandhini UM, Manikandan S, Sembulingam P. Awareness of organ donation among fresh students in medical field. Int J Med Sci Clin Invent 2014;1:274-83.
20. Vinay KV, Beena N, Sachin KS, Praveen S. Changes in knowledge and attitude among medical students towards organ donation and transplantation. Int J Anat Res 2016;4:2873-7.
21. Feeley TH, Tamburlin J, Vincent DE. An educational intervention on organ and tissue donation for first-year medical students. Prog Transplant 2008;18:103-8.
22. Shantha SG, Sharma E. Effect of structured teaching programme regarding organ donation on knowledge and attitude among nursing students. Int J Recent Sci Res 2016;7:12464-7.
23. Coelho JC, Cilião C, Parolin MB, de Freitas AC, Gama Filho OP, Saad DT, *et al.* Opinion and knowledge of the population of a Brazilian city about organ donation and transplantation. Rev Assoc Med Bras (1992) 2007;53:421-5.
24. Coad L, Carter N, Ling J. Attitudes of young adults from the UK towards organ donation and transplantation. Transplant Res 2013;2:9.
25. Annadurai K, Mani K, Ramasamy J. A study on knowledge, attitude and practices about organ donation among college students in Chennai, Tamil Nadu, 2012. Prog Health Sci 2013;3:59-65.
26. British Broadcasting Corporation; 15 October 2003. Hinduism and Organ Donation; 2014. Available from: <http://www.bbc.co.uk/religion/religions/hinduism/hinduethics/organdonation.shtml>. [Last retrieved on 2007 Dec 18].
27. Murakami M, Fukuma S, Ikezoe M, Nakamura M, Yamamoto Y, Yamazaki S, *et al.* Effect of an educational program on attitudes towards deceased organ donation. Ann Transplant 2015;20:269-78.
28. Radunz S, Benkö T, Stern S, Saner FH, Paul A, Kaiser GM, *et al.* Medical students' education on organ donation and its evaluation during six consecutive years: Results of a voluntary, anonymous educational intervention study. Eur J Med Res 2015;20:23.