

# Voluntary body donation in India: perceptions of first year medical students

Sanjib Kumar Ghosh<sup>a</sup> y Soumya Chakraborty<sup>a</sup>

Facultad de Medicina



## Abstract

**Introduction:** Body donation has emerged as the preferred source of human cadavers around the world for anatomical education as medical schools around the world are emphasizing on the ethical acquisition of human cadavers because a neo-model of anatomical education is evolving around the world. In some countries, there is a disinterested gift of a human body, for the benefit of medical education and society. In contrast, there are countries, like India, where cadaver donation programs have a lot of problems and medical schools continue to use unclaimed corpses for anatomical studies, raising ethical concerns.

**Objective:** The present study was undertaken to unearth the factors prevalent in the Indian society that adversely affects the health of body bequest programs in the country.

**Method:** A study was conducted based on a question-

naire that included a representative sample of first year medical students

**Results:** Although it was noted that 74.5% respondents were aware of the shortage of human bodies for teaching anatomy in Indian medical schools and 52% responded in favour of donating their bodies in the future, however, just 6.1% of their relatives had made the same decision.

**Conclusions:** The analysis of study observations helped to identify specific factors that adversely affect the outcome of organ donation programs in the country and the authors made some recommendations to improve the scenario. The religious perception of this reality, in a medical education scenario, should be considered.

**Keywords:** Body donation; Ethics; Unclaimed cadavers; Anatomy education; Medical students.

<sup>a</sup>Department of Anatomy, ESI- PGIMSR & ESIC Medical College, Joka, Kolkata, West Bengal, India.  
Recibido: 10-mayo-2017. Aceptado: 26-julio-2017.  
Autor para correspondencia: Sanjib Kumar Ghosh, Department of Anatomy,  
ESI-PGIMSR & ESIC Medical College, Joka, Kolkata- 700104,  
West Bengal, India. Tel.: +91- 9007187207, +91-033- 24675650  
Correo electrónico: drsanjib79@gmail.com

La revisión por pares es responsabilidad de la Universidad Nacional Autónoma de México.  
2007-5057/© 2017 Universidad Nacional Autónoma de México, Facultad de Medicina. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).  
<http://dx.doi.org/10.22201/facmed.20075057e.2018.27.1741>

© 2017 Universidad Nacional Autónoma de México, Facultad de Medicina. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Donación voluntaria de cadáveres en India: percepciones de estudiantes de primer año de medicina

### Resumen

**Introducción:** La donación corporal ha surgido como la fuente preferida de cadáveres humanos en todo el mundo para la educación anatómica como las escuelas de medicina de todo el mundo están haciendo hincapié en la adquisición de ética de cadáveres humanos porque un neo-modelo de educación anatómica está evolucionando en todo el mundo. En algunos países, hay un regalo desinteresado de un cuerpo humano, para el beneficio de la educación médica y de la sociedad. En contraste, hay países, como la India, donde la donación de cadáver programas tienen un montón de problemas y las escuelas de medicina siguen utilizando cadáveres no reclamados por los estudios anatómicos, planteando preocupaciones éticas.

**Objetivo:** El presente estudio se emprendió para descubrir los factores prevalentes en la sociedad india que afectan adversamente a la salud de los programas de legado en el país.

**Método:** Se realizó un estudio basado en un cuestionario que incluía una muestra representativa de estudiantes de primer año de medicina.

**Resultados:** Aunque se observó que el 74,5% de los encuestados eran conscientes de la escasez de órganos humanos para la enseñanza de la anatomía en las facultades de medicina india y el 52% respondió a favor de la donación de sus órganos en el futuro, sin embargo, sólo el 6,1% de sus parientes habían tomado la misma decisión.

**Conclusiones:** El análisis de las observaciones del estudio ayudó a identificar los factores específicos que afectan negativamente a los resultados de los programas de donación de órganos en el país y los autores formularon algunas recomendaciones para mejorar la situación. La percepción de esta realidad religiosa, en un escenario de educación médica, debe considerarse.

**Palabras clave:** Donación de cuerpo; Ética; Cadáveres no reclamados; Anatomía; Educación; Estudiantes de medicina.

© 2017 Universidad Nacional Autónoma de México, Facultad de Medicina. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## INTRODUCTION

Despite recent reforms in medical education techniques, cadaveric dissection continues to remain the cornerstone of anatomy curriculum and body donation constitutes the sole source of human bodies for dissection in most parts of the world.<sup>1,2</sup> Efficiently conducted body donation programs enhance the value of human dissection by inducing moral transformation among medical students, thereby promoting the development of professional competence which is essential for a future physician.<sup>3,4</sup> Moreover professional psychological profile of a physician is not innate but gradually develops during the course of medical curriculum from individuals own experience or are transmitted from or observed in others. Hence dissection room experience contributes to

student's attitude to a cadaver and later physician's approach to the patients.<sup>5</sup> In fact medical schools across the globe are utilising body donation programs to cultivate humanistic qualities of respect, empathy and compassion among first-year medical students.<sup>6,7</sup> Researchers have noted that while dissecting on a donated cadaver, medical students develop emotional attachment with the same, which could possibly help them to comprehend the psychosocial factors contributing to a patient's illness and thus contribute towards the making of empathetic physicians of tomorrow.<sup>8</sup>

Most of the developed nations like the European countries and the United States of America have well established body bequest programs.<sup>9</sup> In contrast there are countries like India where body donation

is yet to emerge as a popular practice among the general population.<sup>10</sup> Increase in demand for human cadavers used in anatomical education due to the rise in the number of medical schools in India has resulted in educators relying mostly on unclaimed bodies for anatomical studies.<sup>11</sup> This is an area of concern from the ethical point of view considering the dubious practices governing the procurement of these unclaimed bodies in most cases.<sup>12</sup> Research reports have attributed the lukewarm response towards voluntary body donation in India to low level of awareness among the general population and have suggested awareness campaigns for sensitizing the same.<sup>13-15</sup> But this appears to be a superficial overview of the situation and an in depth analysis is essential to identify the factors actually responsible for the emaciated state of body donation in the country. Such an analysis would be critical in designing effective strategies to counter the problem which in turn would be a significant step towards addressing ethical concerns regarding procurement of human cadavers for academic activities in India.

In the present study our aim was to unearth the factors prevalent in the Indian society that adversely affects the health of body bequest programs in the country through a study based on a questionnaire that included a representative sample of first year medical students who have completed one year of training in anatomy. The rationale behind selecting such a study population was their first-hand knowledge and baseline sensitization regarding the value of cadaver based teaching in medical education.

## METHOD

The study was conducted at the Department of Anatomy, [Name of Institution], India. We requested all the first-year undergraduate medical students from 2015-16 academic session (batch strength is 100) to participate in this study. The study involved responding to a self-designed, both open and close ended questionnaire (**Box 1**), which was framed to explore perceptions of first-year medical students from 2015-16 batch towards voluntary body donation. A pilot study was conducted with the study questionnaire among the first-year students of the previous batch (2014-15) to test and validate the same. The students were made to understand that participation

### Box 1. A sample of the study questionnaire

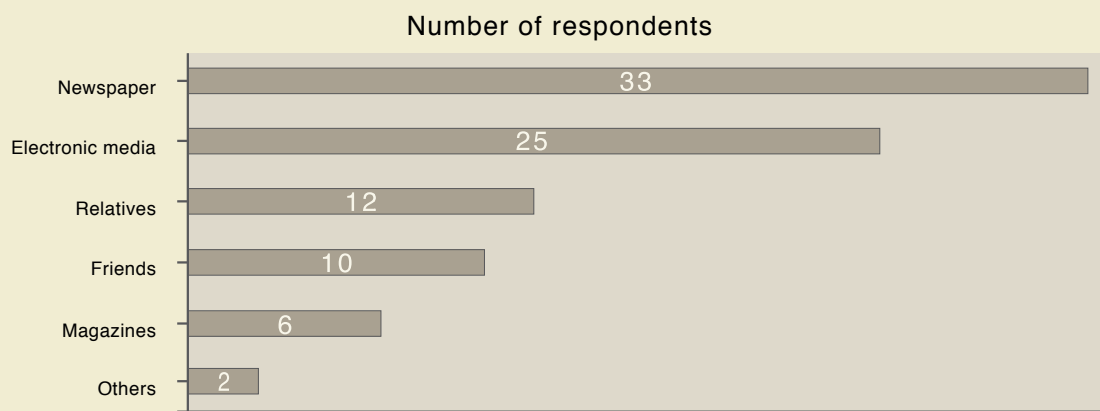
#### Questionnaire for 1<sup>st</sup> Prof MBBS students (Please tick wherever applicable)

Please fill up the Questionnaire without discussing. It will not take more than 10 minutes to fill up completely

1. Sex: Male/ Female
2. Age (years):
3. Domicile State:
4. What was the source of the cadaver(s) you have been dissecting during your anatomy training?  
Donated bodies / Unclaimed bodies / Don't know
5. Are you aware of the shortage of bodies for dissection in medical schools in India? Yes / No
6. Are you familiar with body donation? Yes / No
7. If your response to Q.6 is Yes:  
From where did you come to know about body donation?  
Electronic media / Newspaper / Magazines / Friends / Relatives / Other sources (please specify)
8. Do you know the authorities to approach for pledging your body for donation? Yes / No
9. Do you know about the documentation required for pledging your body for donation? Yes / No
10. Are you yourself willing to donate your body? Yes / No/ Not decided
11. If your response to Q. 10 is No/ Not decided:  
Would you change your decision in future if your family members/ relatives/ friends pledge their body for donation?  
Yes / No / Not sure
12. Would you encourage your family members / relatives / friends to donate their bodies? Yes / No/ Not decided
13. If your response to Q. 12 is No/ Not decided:  
Would your decision be influenced in future if human bodies are treated in an empathetic manner during dissection? Yes / No / Not sure
14. If your response to Q. 12 is No/ Not decided:  
Would your decision be influenced in future if human bodies are properly cremated following dissection? Yes / No / Not sure
15. Would you be comfortable in dissecting bodies of your family members / relatives/ friends? Yes / No/ Not sure
16. Have you pledged your body for donation? Yes / No
17. Have any of your family members/ relatives/ friends pledged their bodies for donation? Yes / No
18. Have you ever been involved in awareness programs related to voluntary body donation? Yes / No
19. Would you like to actively participate in such awareness programs in future? Yes / No
20. Please suggest some measures to boost voluntary body donation in India:

THANK YOU FOR YOUR VALUABLE  
SUPPORT AND CONTRIBUTION

**Figure 1.** Graphical representation of source of cognizance regarding body donation as detailed by the participants of the study



The data used in the figure is obtained from the response to question 7 of the study questionnaire (Please refer to **Box 1**). Only those participants who had given a positive response to question 6 (Please refer to **Box 1**) answered to this question (Please refer to **Table 1**).

was voluntary and responses would remain anonymous. They were assured that absolute confidentiality would be maintained regarding their responses, the documents would be retrieved only for a short period of time and would be used only for research purpose. Written informed consent was obtained from all the participants and the objectives of the study were clearly explained to them to reduce the risk of participant bias. The study questionnaire were distributed among 100 first-year medical students in June' 2016, prior to their summative assessment and responded questionnaires were collected by hand.

### Preparation of the study questionnaire

The rationale behind the design of the questionnaire is as follows:

- At the beginning (Q 1-3) the participants were requested to provide their basic demographic data.
- In the second part of the questionnaire (Q 4-9) we tried to assess the baseline knowledge of the participants regarding issues relevant to the present study.
- The third part (Q 10-15) was aimed to gauge the attitude of the participants towards body donation.
- The penultimate part of the questionnaire (Q 16-

19) was framed to find out about the practices among the participants in relation to body donation.

- Finally the questionnaire was concluded by an open ended request (Q 20) to the participants for suggesting measures to enhance voluntary body donation.

### Statistical Analysis

Pearson's chi-square test was used to assess the differences between frequencies observed in relation to the responses and Fisher's exact test was employed when the frequency for any response was less than five. Differences between observations made in the present study and related observations from previous studies were analysed with the help of Student's *t* test. All statistical analyses were performed with the help of SPSS (Statistical Package for Social Sciences) version 18.0 (SPSS Inc., Chicago, IL). A *p* value <0.05 was considered as statistically significant.

### Ethical Considerations

The authors hereby declare that the study was conducted only after approval had been obtained from the Ethics Committee of [Name of Institution], whose guidelines are in accordance with the Declaration of Helsinki (1964) and all subsequent revisions.

**Table 1.** Assessment of baseline knowledge of the participants regarding body donation and issues related

Question	Respondents (n)	Response	P-value
What was the source of the cadaver(s) you have been dissecting during your anatomy training?	98	<ul style="list-style-type: none"> <li>• Donated body - 17 (17.4%)</li> <li>• Unclaimed body - 20 (20.4%)</li> <li>• Don't know - 61 (62.2%)</li> </ul>	<0.05 in each case
Are you aware of the shortage of bodies for dissection in medical schools in India?	98	<ul style="list-style-type: none"> <li>• Yes - 73 (74.5%)</li> <li>• No - 25 (25.5%)</li> </ul>	<0.05
Are you familiar with body donation?	98	<ul style="list-style-type: none"> <li>• Yes - 88 (89.8%)</li> <li>• No - 10 (10.2%)</li> </ul>	<0.05
If your response to above Q is Yes: From where did you come to know about body donation?	88	Please refer to Figure 1	<0.05 in each case
Do you know the authorities to approach for pledging your body for donation?	98	<ul style="list-style-type: none"> <li>• Yes - 13 (13.3%)</li> <li>• No - 85 (86.7%)</li> </ul>	<0.05
Do you know about the documentation required for pledging your body for donation?	98	<ul style="list-style-type: none"> <li>• Yes - 22 (22.5%)</li> <li>• No - 76 (77.5%)</li> </ul>	<0.05

P value <0.05 was considered as statistically significant

## RESULTS

Among 100 first year medical students to whom the study questionnaire was administered, 98 returned it after their response. Among the respondents, 61 (62.2%) were male and 37 (37.8%) were female. The median age of the respondents was 19 years (range 18-23 years) and they represented 6 states of India, namely West Bengal (72/ 73.5%), Bihar (8/ 8.2%), Uttar Pradesh (6/ 6.1%), Delhi (6/ 6.1%), Rajasthan (4/ 4.1%) and Madhya Pradesh (2/ 2%).

Analysis of the baseline knowledge among the respondents revealed that 73 (74.5%) of them were aware of the inadequate supply of human bodies for dissection classes in Indian medical schools, however majority of them either didn't know (61/ 62.2%) or had the misconception that donated bodies were being used for dissection (17/ 17.4%) when in reali-

ty we were using unclaimed bodies procured from our hospital wards. An overwhelming number of respondents (88/ 89.8%) were familiar with body donation and most of them i.e. 33 (33/88; 37.5%) respondents identified daily newspaper as the medium from where they came to know about body donation (**Figure 1**). However majority of the respondents were unaware about the procedure of body donation as 85 (86.7%) didn't know about the authorities to approach and 66 (67.5%) had no knowledge about the documentation required for pledging bodies for donation (**Table 1**).

The findings of the present study regarding the attitude towards body donation showed that 52% of the respondents were in favour of pledging their bodies for donation in future. Among those who were against the idea or were yet to decide on it, 59.6%

**Table 2.** Assessment of attitude of the participants towards body donation

Question	Respondents (n)	Response	P-value
Are you yourself willing to donate your body?	98	Yes – 51 (52%) No – 38 (38.8%) Not decided – 09 (9.2%)	<0.05 in each case
If your response to above Q is NO/Not decided: Would you change your decision in future if your family members / relatives / friends pledge their body for donation?	47	Yes – 28 (59.6%) No – 16 (34%) Not sure – 03 (6.4%)	<0.05 in each case
Would you encourage your family members / relatives / friends to donate their bodies?	98	Yes – 66 (67.4%) No – 21 (21.4%) Not decided – 11 (11.2%)	<0.05 in each case
If your response to above Q is No/Not decided: Would your decision be influenced in future if human bodies are treated in an empathetic manner during dissection?	32	Yes – 17 (53.1%) No – 11 (34.4%) Not sure – 4 (12.5%)	<0.05 in each case
If your response to original Q is No/Not decided: Would your decision be influenced in future if human bodies are properly cremated following dissection?	32	Yes – 21 (65.6%) No – 07 (21.9%) Not sure – 04 (12.5%)	<0.05 in each case
Would you be comfortable in dissecting bodies of your family members / relatives / friends?	84*	Yes – 16 (19%) No – 64 (75%) Not sure – 4 (6%)	<0.05 in each case

\*Among the respondents of the present study, 14 did not provide any response to this question. P value <0.5 was considered as statistically significant.

opined that they could change their decision if their known ones from the society donate their bodies for medical education. Among the respondents, 67.4% admitted that they would encourage the individuals known to them to donate their bodies. Moreover, among those who were either averse to this idea or were not sure, 53.1 % opined that their decision could change if human cadavers are treated empathetically during dissection and 65.6% were of the same opinion if human bodies are subjected to cremation following dissection. 75% of the respondents confirmed that they would not be at ease to dissect the body of a person known to them (**Table 2**).

In relation to the practices among the respondents of the present study regarding body donation, it was observed that none of them have actually pledged their body for donation. It was noted that in 6.1% cases, a person known to the respondent have registered themselves for body donation. Among the respondents, 11.2% participated in awareness programs regarding body donation in the past, whereas 23.5% of them were willing to contribute actively towards such programs in the future (**Table 3**).

Various suggestions were documented by the respondents which according to them would enhance the voluntary body donation program in India (**Figure 2**). The most popular (42/98; 42.9%) advice was to increase awareness among general population, followed by display of recognition for donors in anatomy department of respective medical schools which was suggested by 27 (27/98; 27.6%) respondents. 22 (22/98; 22.5%) respondents felt that measures should be taken to ensure that donated bodies are handled with respect, 17 (17/98; 17.4%) were in favour of holding memorial services for those who have donated their bodies and 14 (14/98; 14.3%) respondents opined that identification of interested donors would yield desired output in this regard (**Figure 2**).

## DISCUSSION

The merits of cadaveric dissection in medical education have been time tested and till date it constitutes an integral component of teaching/ learning gross anatomy.<sup>16-18</sup> In recent times educators have been promoting the use of multimedia simulation tech-



**Table 3.** Assessment of the practices among the participants in relation to body donation

Question	Respondents (n)	Response	P-value
Have you pledged your body for donation?	98	Yes – Nil No – 98 (100%)	—
Have any of your family members / relatives / friends pledged their bodies for donation?	98	Yes – 6 (6.1%) No – 92 (93.9%)	<0.05
Have you ever been involved in awareness programs related to voluntary body donation?	98	Yes – 11 (11.2%) No – 87 (88.8%)	<0.05
Would you like to actively participate in such awareness programs in future?	98	Yes – 23 (23.5%) No – 75 (76.5%)	<0.05

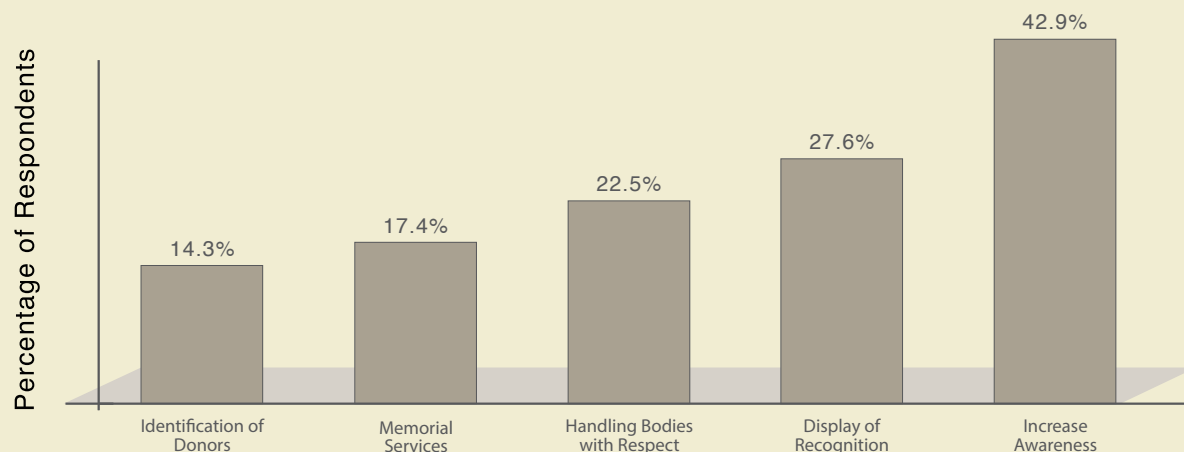
P value <0.5 was considered as statistically significant.

nologies in the anatomy classroom to counter the shortage of human cadavers. However research has found that success of simulation tools is dependent on associated factors like pedagogy, content and individual skills. Hence efficiency of multimedia simulation as compared to traditional dissection is yet to be established.<sup>19</sup> However the issue of procurement of human cadavers for anatomy teaching has been surrounded by controversies throughout the history of human dissection.<sup>20,21</sup> Presently there is a uniform consensus that the emphasis should be on ethical procurement of human cadavers and body bequest programs are considered as the gold standard in this regard.<sup>22</sup> Moreover dissection based teaching has evolved from being primarily considered as just another mode of delivering knowledge to being the ideal place to cultivate ethical values among future medical practitioners.<sup>23,24</sup> Accordingly ethical care for anatomical bodies and handling the same with respect and dignity has emerged as the focus area in gross anatomy education.<sup>25-27</sup> Ethical issues are till date an area of concern in developing countries like India where medical schools mostly rely on unclaimed cadavers for dissection as number of persons who chose to donate body is considerably low.<sup>28</sup> The present study was undertaken to identify the factors responsible for the paucity of donated bodies in India by reflecting on the perceptions of a cross-section of first year medical students.

A gross insufficiency of cadavers has been reported in most of the medical schools in India and in more than 50% of these medical schools, the available numbers of cadavers were less than half the actual requirement.<sup>29</sup> Due to a lack of donated bodies, most of these institutes rely on unclaimed bodies which are insuffi-

cient considering the number of medical students.<sup>11</sup> In the present study, we observed that majority (74.5%) of the first-year medical students knew about the scarcity in the supply of human cadavers in medical schools in India, however 79.6% students were not aware that actually we were dissecting unclaimed human bodies to teach them gross anatomy (**Table 1**). We noted that an overwhelming number (89.8%) of students were familiar with body donation (**Table 1**), which is close to the findings of recent studies which have reported such awareness among 95.83% and 92% medical professionals in India.<sup>14,15</sup> We further observed that 52% of the first-year medical students were willing to pledge their bodies for donation which is higher than the findings of Rokade and Gaikawad (44.9%) and significantly higher than those of Ballala et al. (22%), both of which were conducted among healthcare professionals.<sup>14,15</sup> Our observation was also significantly higher than what was noted among anatomists (23.9%) from Nigeria.<sup>1</sup> Moreover it was also observed in the present study, that the proportion of potential body donors among the first year medical students could substantially increase in future if they are motivated to do so by their near and dear ones in the society. This was also significantly different from the findings of Ballala et al., where 72% medical professionals confirmed that their decision of 'no body donation' would not change under any circumstances.<sup>14</sup> The first-year medical students were motivated enough to spread the awareness in the society as 67.4% of them were in favour of encouraging the individuals known to them for pledging their bodies (**Table 2**) and this could be due to their young age group i.e. median age 19 years (range 18-23 years) and that majority (62.2%) of the respondents were male as has been observed by previous researchers.<sup>15,30,31</sup>

**Figure 2.** Graphical representation of measures to enhance voluntary body donation in India as suggested by majority of the participants of the study



The data used in the figure is obtained from the response to question 20 of the study questionnaire (Please refer to **Box 1**). As this was an open ended question, multiple responses were documented by each participant which is reflected in the percentages shown in the figure.

Although high levels of knowledge and attitude regarding body donation were noted among the respondents, the findings in relation to practice were disappointing. We observed that none of the students have actually pledged their body for donation, which is significantly lower than previous reports.<sup>14</sup> We further noted that the situation was no better in the society in general as merely 6.1% of the persons known to the respondents have pledged their bodies for donation. Possible reasons for low level of body donation in practice among the first year medical students and their known persons in the society could be poor knowledge about the overall process of body donation i.e. the authorities and the documentation (**Table 1**). The fear that the body may not be treated with respect and dignity is an important factor which prevents one from body donation.<sup>32</sup> This holds true in the present study also as 53.1% respondents, who were averse / unsure of encouraging known persons to donate their bodies, admitted that they could change their decision in future if human cadavers are treated empathetically during dissection.

Another major obstacle towards body donation in India is the overindulgence towards spirituality and religious beliefs.<sup>28,29</sup> India is a Hindu dominated country and the Hindu religion believes in the theory of incarnation. It preaches that though body is mortal, the soul is immortal and it changes body in each birth.<sup>29</sup> This is corroborated by our findings as 65.6% of the respondents who were either not willing to or had not decided whether to encourage near & dear ones to pledge their bodies, opined that their decision could subject to change if human bodies are properly cremated following dissection. Another reason cited in literature towards 'no body donation' is the inability to accept the dissection of own body or body of a known person being dissected, which could be attributed to emotional factors influenced by age old tradition among Indians which prohibit the use of knife on dead corpse.<sup>29,33</sup> Similar observations were made in the present study as 75% of the respondents confirmed that they won't be comfortable in dissecting the body of a person known to them (**Table 2**).



We sought suggestions from the students regarding possible measures required to be adopted to enhance the voluntary body donation program in India (**Figure 2**) and the most popular suggestion was to increase awareness about the issue among the general population (42.9%), which is quite ironical as only 11.2% of the respondents of the present study admitted to have participated in such programs and only 23.5% of the respondents were willing to actively participate in such programs in future (**Table 3**). Awareness campaigns are indeed the need of the hour and they should involve all forms of media, particularly print media as newspaper was identified to have the most penetration regarding familiarization with body donation in the present study (**Fig 1**). Besides social media could also be involved as it has a considerable impact among the young population of a country.<sup>34</sup> Moreover these awareness campaigns should be co-ordinated with the religious authorities as suggested by Alashek et al. (2009).<sup>31</sup> Persistent efforts needs to be undertaken in working out effective strategies by involving the social workers to sensitize the general population and promote voluntary body donation.<sup>35</sup> Individual concerns of prospective donors should be addressed and due assurance should be given regarding respectful treatment of donated bodies as suggested by 22.5% respondents (**Figure 2**). The ideal place to initiate such practice is the dissection lab and anatomists are required to show the way with regards to proper handling of cadavers.<sup>36</sup> Streamlining the donation process is another area of concern in this regard as was observed in the present study (**Table 1**). Absence of a uniform national legislation governing the process of body donation has not helped the cause of body bequest programs in India.<sup>13,20</sup> The practice of honouring the donor either by public display of recognition, which was suggested by 27.6% respondents or holding memorial services as suggested by 14.3% respondents (**Figure 2**) could be fruitful in establishing body donation as a worthwhile option before the society as these strategies have been followed albeit successfully elsewhere in the world.<sup>37</sup> Last but not the least, as the medical schools would be the foremost beneficiary in the backdrop of a successful body donation program, hence they should act as nodal centres in respective pockets of

the country and regulate as well as co-ordinate the body donation program to ensure its success.

## CONCLUSIONS

Analysis of the results from the present study leads to the emergence of four factors which are possibly responsible for the poor health of body donation programs in India:

- a) Low level of awareness among population which is further influenced by religious concerns, social apprehensions and age old beliefs
- b) Lack of uniform legislation(s) governing the process of body donation which applies all over the country
- c) Complications at the administrative level pertaining to documentation and authorities
- d) Lack of incentive measures to encourage/ motivate people to come forward for body donation

Based on the identification of the above factors we may suggest some possible measures to counter them and improve the present scenario in the country:

- i) Awareness campaigns to be conducted extensively with the involvement of religious authorities, social leaders including political persons and the media.
- i) Medical schools should be made nodal centres for planning and conducting awareness campaigns in relation to body donation
- i) Introduction of uniform legislation possibly in line with the Uniform Anatomical Gift Act (UAGA) that entitles an individual with the sole right to decide whether to donate his/her body after death
- i) Streamlining and simplification of official procedures required for body donation with documentation being made an online exercise
- i) Introduction of incentives like memorial services, public display of recognition to make body donation a worthwhile option for the people

Finally we would like to emphasize on the importance of conducting surveys in line with the present study periodically and across medical schools of the country as the same would provide access to an ex-

tensive body of comparable data. Analysis of such multicentre data may provide valuable insights into the situation and could be useful in designing more precise strategies to make voluntary body donation popular in India. A streamlined and robust body donation program is essential for the future of medical education in India and convergence of efforts from all sections of the society is critical to the success of body donation in the country.

### AUTHOR CONTRIBUTIONS

- **SKG and SC** designed and co-ordinated the research and the implementation and evaluation of assessment tools drafting, discussion and conclusions. SKG and SC conducted the review of written, statistical, methodological analysis and analysis of results.

### ACKNOWLEDGEMENT

The authors express heartfelt gratitude to all the students, clinical tutors and technicians of the Department of Anatomy, [Name of Institution] for their unconditional support throughout the study. We are grateful to the authorities of [Name of Institution] for their kind cooperation during the course of this study.

### CONFLICT OF INTEREST

None to declare. 🔍

### REFERENCES

1. Anyanwu EG, Obikili EN. Dissecting the dissectors: Knowledge, attitude, and practice of body bequests by Nigerian anatomists. *Anat Sci Educ.* 2012; 5: 347-353.
2. Winkelmann A. Anatomical dissection as a teaching method in medical school: a review of the evidence. *Med Educ.* 2007; 41: 15-22.
3. Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. Dissection as a modulator of emotional attitudes and reactions of future health professionals. *Med Educ.* 2008; 42: 563-571.
4. Warner JH, Rizzolo LJ. Anatomical instruction and training for professionalism from the 19<sup>th</sup> to the 21<sup>st</sup> centuries. *Clin Anat.* 2006; 19: 403-414.
5. Arráez-Aybar LA, Castaño-Collado G, Casado-Morales MI. Dissection from the Spanish anatomist's perspective: Aims, attitudes, and related aspects. *Anat Rec* 2004; 281B: 15-20.
6. Rizzolo LJ. Human dissection: An approach to interweaving the traditional and humanistic goals of medical education. *Anat Rec B New Anat.* 2002; 269: 242-248.
7. Crow SM, O'Donoghue D, Vannatta JB, Thompson BM. Meeting the family: Promoting humanism in gross anatomy. *Teach Learn Med.* 2012; 24: 49-54.
8. Halpern J. From detached concern to empathy: Humanizing medical practice. 1<sup>st</sup> Ed. 2001; New York: Oxford University Press. p.196.
9. Jones DG, Whitaker MI. Anatomy's use of unclaimed bodies. *Clin Anat.* 2012; 25: 246-254.
10. Guru A, Kumar N. Body donation in India: myths versus facts. *Rev Arg de Anat Clin.* 2016; 7: 122.
11. Rath G, Garg K. Inception of cadaver dissection and its relevance in present day scenario of medical education. *J Indian Med Assoc.* 2006; 104: 331-333.
12. Dar R, Dar SK, Kumar MV. Organ and Tissue donation in India: Towards eliminating confusions, optimizing resources and standing united. *Sch J Appl Med Sci.* 2016; 4: 2400-2404.
13. Ajita R, Singh I. Body donation and its relevance in anatomy learning- a review. *J Anat Soc India.* 2007; 56: 44-47.
14. Ballala K, Shetty A, Malpe SB. Knowledge, attitude, and practices regarding whole body donation among medical professionals in a hospital in India. *Anat Sci Educ.* 2011; 4: 142-150.
15. Rokade SA, Gaikwad AP. Body donation in India: Social awareness, willingness, and associated factors. *Anat Sci Educ.* 2012; 5: 83-89.
16. Elizondo-Omaña RE, Guzmán-López S, García-Rodríguez Mde L. Dissection as a teaching tool: past, present and future. *Anat Rec B New Anat.* 2005; 285: 11-15.
17. Bundi KP, Wamachi A, Ndede K, Mwamisi J, Ndege P. Perception of cadaver dissection and views on anatomy as a subject between two pioneer cohorts in a Kenyan medical school. *Anat J Afr.* 2014; 3: 318-323.
18. Ghosh SK. Cadaveric dissection as an educational tool for anatomical sciences in the 21<sup>st</sup> century. *Anat Sci Educ.* 2017; 10: 286-299.
19. Saltarelli AJ, Roseth CJ, Saltarelli WA. Human cadavers Vs. multimedia simulation: A study of student learning in anatomy. *Anat Sci Educ.* 2014; 7: 331-339.
20. Ghosh SK. Human cadaveric dissection: a historical account from ancient Greece to the modern era. *Anat Cell Biol.* 2015; 48: 153-169.
21. Tubbs RS, Jones DG. Special issue on ethics in anatomy. *Clin Anat.* 2016; 29: 1-128.
22. Kahn PA, Champney TH, Hildebrandt S. The incompatibility of the use of unclaimed bodies with ethical anatomical education in the United States. *Anat Sci Educ.* 2017; 10: 200-201.
23. Hildebrandt S. 2016. Thoughts on practical core elements of an ethical anatomical education. *Clin Anat.* 2016; 29: 37-45.
24. Pawlina, W, Drake RL. 2016. Moving towards a moral era in anatomical sciences education. *Anat Sci Educ.* 2016; 9: 407-410.
25. Ghosh SK. 2017. Paying respect to human cadavers: We owe this to the first teacher in anatomy. *Ann Anat.* 2017; 211: 129-134.

26. Wilkinson TM. 2014. Getting consent into perspective. *Clin Anat.* 2014; 27: 844-846.
27. Riederer BM. Body donations today and tomorrow: What is best practice and why? *Clin Anat.* 2016; 29, 11-18.
28. Copeman J. Godless people and dead bodies: Materiality and the morality of Atheist Materialism. *Soc Anal.* 2015; 59: 40-61.
29. Rokade SA, Bahetee BH. Body donation a review. *Med J West Ind.* 2013; 41: 36-41.
30. Boulware L, Ratner LE, Cooper LA, Laveist TA, Powe NR. Whole body donation for medical science : a population-based study. *Clin Anat.* 2004; 17: 570-577.
31. Alashek WA, Ehtuish EF, Elhabashi A, Emberish W, Mishra A. Reasons for unwillingness of Libyans to donate organs after death. *Libyan J Med.* 2009; 4: 110-113.
32. Bolt S, Venbrux E, Eisinga R, Kuks J, Veening JG, Gerrits PO. Motivation for body donation to science: more than an altruistic act. *Ann Anat.* 2010; 192: 70-74.
33. Sehirli US, Saka E, Sarikaya O. Attitudes of Turkish anatomists toward cadaver donation. *Clin Anat.* 2004; 17: 677-681.
34. O'Keeffe GS, Clarke-Pearson K, Council on Communications and Media. The impact of social media on children, adolescents, and families. *Pediatrics.* 2011; 127: 800-804.
35. Conesa C, Rios Zambudio A, Ramirez P, Canteras M, Rodriguez MM, Parrilla P. Influence of different sources of information on attitude toward organ donation: a factor analysis. *Transplant Proc.* 2004; 36: 1245-1248.
36. Arráez-Aybar LA, Bueno-López JL, Moxham BJ. 2014. Anatomists' views on human body dissection and donation: An international survey. *Ann Anat.* 2014; 196: 376-386.
37. Zhang L, Xiao M, Gu M, Zhang Y, Jin J, Ding J. 2014. An overview of the roles and responsibilities of Chinese medical colleges in body donation programs. *Anat Sci Educ.* 2014; 7: 312-320.