

# Emotional Involvement and Attitude of First Year Medical Students towards Cadaveric Dissection: A Study from Andhra Pradesh, India

VEERRAJU NWV ADABALA<sup>1</sup>, JS SURYA PRABHA KONA<sup>2</sup>, KRISHNA BABU GORU<sup>3</sup>, SESI AVS DEVARAKONDA<sup>4</sup>, BABJI KORUKONDA<sup>5</sup>



## ABSTRACT

**Introduction:** Teaching anatomy in medical colleges has been conventionally based on use of human cadaveric specimens, either whole body specimens for dissection or individual specimens. Cadavers are to be held in high esteem and regarded as the first teacher of a medical student as cadaveric dissection allows students to grasp the three dimensional anatomy and skill development.

**Aim:** To know the physical and psychological effects experienced by students while doing cadaveric dissection and also to know the attitude of the medical students towards dissection in learning anatomy.

**Materials and Methods:** A descriptive cross-sectional study was conducted among the 181 first year medical students in a Government Medical College, Andhra Pradesh, India, during the month of May 2021. The study was undertaken after two months of cadaveric dissection classes and the responses were the cumulative subjective effect of all the classes. Data was collected using a predesigned, prestructured and pretested questionnaire, entered in MS Excel and descriptive statistics like simple frequencies, percentages were used. Chi-square test was used to statistically analyse the data.

**Results:** Total 181 students participated in this study (out of 250 first year medical students). Nearly, 88% of the students were older than 18 years of age. Nearly, 2/3<sup>rd</sup> of the students were females (65.7%). Out of 181 participants, 152 (84%) experienced psychological symptoms while doing dissection. Out of 152 students, who experienced psychological symptoms, 40.8% experienced excitement followed by anxiety 22.4%, fear 17.8% stress 16.4%. Among those who experienced excitement nearly 70% were females. Sweating was the most common physical symptom experienced by the participants. Among the study participants 98.3% students had sense of gratitude to people who donated their body and 96.1% had sympathy and respect for the cadaver. A 20.4% want to donate body for dissection. While assessing the attitude, 97.2% students agreed that cadaveric dissection is important in the curriculum, 97% agreed that dissection is required for understanding the structure of human body.

**Conclusion:** Student-cadaver encounter is of paramount importance in medical education. Computer assisted and multimedia methods should be complementary but not a substitute to dissection. Introducing cadaver oath has resulted in students reflecting about organ donation and body donation, showing respect to the dead body.

**Keywords:** Anatomy, Cadaver, Medical education, Mental health

## INTRODUCTION

Anatomy, the study of human body structure is one of the most fundamental and essential subjects studied by all medical students in their medical education career. Teaching Anatomy in medical colleges is through human cadaveric whole body dissection or specimens which is conventional method. The cadaveric dissection helps students to understand anatomy in three-dimensional picture [1]. Since renaissance in medical education, cadaveric dissection has been most important pillar in learning anatomy [2]. Andreas Vesalius was said to have contributed most innovation to anatomy by human dissection within and outside his territory rectifying the contraventions in the works of earlier anatomists [3,4]. Vesalius's high skill in dissection earned him the professorial title in surgery and anatomy [4].

Cadaver has to be regarded as first teacher for a medical student. Cadaveric dissection is practiced in medical colleges during first year of medical education curriculum as a part of teaching anatomy. Exposure to cadaver during early stages of medical education induces some positive and negative feelings among medical students. The effects can be both physical (nausea, vomiting) and psychological (anxiety, stress, depression). Some studies observed ability of

medical students to cope up with the emotional impact of such exposure. Evidences available in some studies suggest that adaptive mechanisms to cope with such exposure developed soon afterwards in those students [2,5-7]. In recent times, the worth and relevance of dissection has been under discussion at various universities due to problems involved in it like cost and time issues [8].

There has been much argument surrounding the ethics and effectiveness of using human dead body as a learning tool. During the last decade, in US and the UK several universities have abandoned dissection and moved from a cadaver-oriented to a cadaver-less anatomy [8]. But the benefits of orthodox Cadaveric dissection include memory enhancement, peer teaching, three dimensional and spatial orientation [9,10]. Attitude of students towards dissection determines conceptualisation in learning anatomy and professionalisation. Managing emotions and learning through team work from others helps is necessary in developing empathy [11]. Bioethics education is one of the best ways to achieve professionalism which should be started in dissection hall for medical students by taking a 'Cadaveric Oath' [12]. A cadaver oath, a pledge which the students recite on the starting day of Anatomy learning, is a unique and essential aspect of the new competency based

medical education curriculum [12]. The positive influences could be arousing an interest in the subject, or it could lead to specialisation in surgery and allied specialities and sometimes may induce the student to think of organ donation or body donation. This study takes into account the attitude of student in developing empathy by cadaveric oath and student's opinion towards body donation.

The present study was conducted to assess the physical and psychological effects of exposure to human cadaver dissection among first-year medical students, and also further explore their attitude and insight in that area.

## MATERIALS AND METHODS

A descriptive cross-sectional study was conducted among the first year medical students in a Government Medical College, Andhra Pradesh, India from 1<sup>st</sup> May to 31<sup>st</sup> May 2021. The purpose of the study was explained and informed consent was taken from the participants. Anonymity and confidentiality were maintained throughout the study. Ethical committee clearance was obtained from Institutional Ethics Committee. (IEC/RMC/2021/634 dated 10/4/2021).

**Inclusion criteria:** First year Bachelors of Medicine and Bachelors of Surgery (MBBS) students who were willing to participate and gave consent were included.

**Exclusion criteria:** Students who were absent and refused to give consent were excluded.

**Sample size calculation:** Convenient sampling method was used by taking all the first year MBBS students (250 students) in a Government Medical College. Out of 250 only 181 participated in the study.

### Study Procedure

The study was undertaken after two months of cadaveric dissection classes and the responses were the cumulative subjective effect of all the classes. The practical session of the anatomy consisted of two hours of dissection five times in a week.

Data was collected using a self-designed, self-structured questionnaire which was prepared by literature review of previous articles [11] and then peer reviewed and expert reviewed in the Department of Anatomy. Questionnaire was sent through google forms to their mail. Pilot study was done to check the validity and reliability of the questionnaire (Cronbach's alpha value-0.8). Pilot study was done among 20 paramedical students attending dissection classes to test the comprehensibility, appropriateness and consistency of parts of the questionnaire. Subjects of pilot study were not included in the main study. Questionnaire consisted of two parts:

Part 1 with questions related to personal characteristics of the students, like age, sex, place of stay, parents education and occupation etc., (14 questions).

Part 2 with questions related to opinion and attitude towards cadaveric dissection during their regular dissection classes. (43 questions) [Annexure 1].

The questions related to attitude were assessed using 5-point Likert scale [13]. The individual score of each question is considered five for 'Strongly agree' response, four for 'Agree', three for 'neutral', two for 'disagree' and one for 'Strongly disagree' in the attitude domain. Opinion related yes/no type questions were 18 in number, five open ended type questions and two closed ended questions and Likert scale questions were 18 in number. So, for total 18 questions pertaining to Likert scale the maximum overall score would be 90 and minimum score would be 18 in eighteen approaches. But for analysis 'agrees' and 'strongly agrees' was combined and 'disagrees' and 'strongly disagrees' was combined.

## STATISTICAL ANALYSIS

Data was entered in MS Excel and analysed in Statistical Package for the Social Sciences (SPSS) version 20.0 and descriptive statistics

like simple frequencies, percentages were used. Statistical test Chi-square test was used (p-value of <0.5 was taken as significant).

## RESULTS

A total of 181 students participated in this study (out of 250 first year medical students). A 159 (87.8%) of the students were older than 18 years of age. Total 2/3<sup>rd</sup> of the students were females (119, 65.7%). Among the study participants 106 (58.6%) were from urban background, 98 (54.1%) were pink card holders. All the students were from English medium schools. A total of 74 (41%) student's fathers were graduates whereas 86 (47.5%) mothers were undergraduates. A total of 79 (43.6%) fathers of participants were employees followed by agriculturists (33, 18.2%). Majority of the mothers were homemakers (140, 73.3%). Among the study participants 158 (87.3%) were non vegetarians [Table/Fig-1].

Demography	Variables	N	Percentage (%)
Age (years)	17-18	22	12.2%
	>18	159	87.8%
Gender	Male	62	34.3%
	Female	119	65.7%
Social background	Rural	75	41.4%
	Urban	106	58.6%
Economical background	White card	83	45.9%
	Pink card	98	54.1%
Social status	OC	71	39.2%
	BC	77	42.5%
	SC	24	13.3%
	ST	9	5.0%
Religion	Hindu	154	85.1%
	Christian	17	9.4%
	Muslim	9	5.0%
	Others	1	0.6%
Medium of schooling	English	181	100%
	Telugu	0	0
Father's education	Graduate	74	41%
	Postgraduate	45	24.9%
	Undergraduate	62	34.3%
Father's profession	Agriculture	33	18.2%
	Business	29	16.0%
	Employee	79	43.6%
	Others	23	12.7%
	Professional	17	9.4%
Mother's education	Graduate	63	34.8%
	Postgraduate	32	17.7%
	Undergraduate	86	47.5%
Mother's profession	Business	1	0.6%
	Employee	26	14.4%
	Homemaker	140	77.3%
	Others	3	1.7%
	Professional	11	6.1%
Diet	Non vegetarian	158	87.3%
	Vegetarian	23	12.7%

[Table/Fig-1]: Socio-demographic profile of the study participants (N=181).

\*others in occupation includes jobless, pensioners, daily labourers; For Social status OC: Open category; BC: Backward caste; SC: Schedule caste; ST: Schedule tribe

Out of 181 participants, 152 (84%) experienced psychological problems while doing dissection. Excitement was the most commonly experienced psychological symptom during dissection.

Excitement, stress and anxiety were seen more among female students more than two times compared to males [Table/Fig-2].

Psychological symptoms	Male n (%)	Female n (%)	Total n (%)
Excitement	19 (30.6%)	43 (69.4%)	62 (40.8%)
Stress	7 (28%)	18 (72%)	25 (16.4%)
Anxiety	10 (29.4%)	24 (70.6%)	34 (22.4%)
Fear	12 (44.4%)	15 (55.6%)	27 (17.8%)
Depression	2 (50%)	2 (50%)	4 (2.6%)

**[Table/Fig-2]:** Sex-wise distribution of study participants who experienced psychological symptoms during dissection (N=152).  $\chi^2$  value=2.76 and p-value=0.6 which is not significant

Sweating (27.4%) was the most common physical symptom experienced by the students followed by restlessness (13.2%) and irritation of eyes (12.8%). Female students experienced more physical symptoms compared to male students which are statistically significant. Sleeplessness and vomiting were experienced by very less number of students [Table/Fig-3].

Physical symptoms	Male n (%)	Female n (%)	Total n (%)
Headache	8 (30.8%)	18 (69.2%)	26 (11.9%)
Sweating	15 (25%)	45 (75%)	60 (27.4%)
Vomiting	2 (40%)	3 (60%)	5 (2.3%)
Nausea	9 (34.6)	17 (65.4%)	26 (11.9%)
Irritation of eyes	8 (28.6%)	20 (71.4%)	28 (12.8%)
Reeling sensation	0	7 (100%)	7 (3.2%)
Sleeplessness	1 (100%)	0	1 (0.5%)
Difficulty in breathing	4 (20%)	16 (80%)	20 (9.1%)
Restlessness	8 (27.6%)	21 (72.4%)	29 (13.2%)
Difficulty in consuming non vegetarian food	8 (47.1%)	9 (52.9%)	17 (7.8%)

**[Table/Fig-3]:** Sex wise distribution of study participants who experienced physical symptoms during dissection. (Multiple responses were given by the participants therefore, N=219).  $\chi^2$  value=10.05 and p-value=0.34 which is significant (<0.5)

Among the study participants, 98.3% students had sense of gratitude to people who donated their body and 96.1% had sympathy and respect for the cadaver. A 20.4% want to donate body for dissection. An 86.2% of the students were curious about dissection. An 81.2% liked anatomy as a subject but 16% had desire not to do dissection [Table/Fig-4].

Opinion of the students	N	Percentage (%)
Are you exposed to animal dissection in college?	16	8.8%
Do you have any prior experience of a dead body before entering?	68	37.6%
Do you have any negative feelings towards dead body?	7	3.9%
Were you curious about cadaveric dissection?	156	86.2%
Are you interested in cadaveric dissection?	163	90.1%
Do you have any sense of gratitude to people who donated their body?	178	98.3%
If you think that the cadaver you are dissecting was once a living human being (like you), do you have sympathy and respect for the cadaver?	174	96.1%
Did you have apprehension to handle the cadaver directly?	74	40.9%
Did you feel emotional shock at initial exposure to cadaver?	36	19.9%
Did you get night mares about the dead body?	19	10.5%
Have you ever done dissection?	164	90.6%
Have you done dissection frequently?	102	56.4%
Does each student get a chance for dissection atleast twice a week?	38	21.0%
Are you forced to do dissection by friends/faculty?	16	8.8%
Are you having any physical disability which limits your ability to do dissection	2	1.1%

Are you depressed while attending cadaveric dissection?	14	7.7%
Do you have desire not to do dissection?	29	16.0%
Do you want to donate body for dissection?	37	20.4%
Do you like anatomy as a subject?	147	81.2%
Do you like to choose anatomy as a career?	21	11.6%

**[Table/Fig-4]:** Opinion of the study subjects towards anatomy dissection (N= 181).

While assessing the attitude, 97.8% students agreed that cadaveric dissection is important in the curriculum, 97% agreed that dissection is required for understanding the structure of human body. Active interaction of the students with teachers make dissection interesting was said by 95.3% of the students. A 92.8% of the students found human body as intricate and complex. An 87.9% of the students agreed that hands on training on cadaver dissection is better than demonstration, whereas 42.5% said that dissection consumed a lot of time in curriculum and 15% said models or simulated lab assisted training can replace dissection [Table/Fig-5].

Attitude of students	Agree/ Strongly agree n (%)	Neither agree or disagree n (%)	Disagree/ strongly disagree n (%)
Did you find human body intricate and complex?	168 (92.8)	10 (5.5)	3 (1.7)
Does cadaveric dissection need mental preparation?	142 (78.4)	21 (11.6)	18 (9.9)
Is cadaver dissection ethically acceptable?	110 (60.8)	47 (26.0)	24 (13.3)
Do you think cadaveric oath has a role to play in developing empathy?	151 (83.4)	11 (6.1)	19 (10.5)
Does dissection promote teamwork	161 (89)	17 (9.4)	3 (1.7)
Do you think personal protective equipment is required for dissection?	133 (73.5)	27 (14.9)	21 (11.6)
Do you have recurrent thoughts about cadaver even when away from it?	33 (18.2)	29 (16.0)	119 (65.8)
Do you experience formalin odour after encounter with cadaver even when away from college?	123 (67.9)	9 (5.0)	49 (27.1)
Does active interaction of the students with teachers make dissection interesting?	173 (95.6)	5 (2.8)	3 (1.7)
Do you think that cadaveric dissection remains the best method of learning anatomy?	157 (86.7)	17 (9.4)	7 (3.9)
Does the dissection help you to understand the spatial orientation?	164 (90.6)	11 (6.1)	6 (3.3)
Does models or simulated lab assisted training replace dissection?	27 (15)	32 (17.7)	122 (67.4)
Do you think hands on training on cadaver dissection are better than demonstration?	159 (87.9)	10 (5.5)	11 (5.1)
Does cadaveric dissection help to develop thinking skill?	164 (90.6)	15 (8.3)	2 (1.1)
Is dissection required for understanding the structure of human body?	176 (97.2)	2 (1.1)	3 (1.7)
Does dissection consume lot of time in curriculum?	77 (42.5)	40 (22.1)	64 (35.3)
Is cadaveric dissection important in curriculum?	177 (97.8)	1 (0.6)	3 (1.7)

**[Table/Fig-5]:** Attitude of the students towards anatomy dissection (n=181).

## DISCUSSION

In our study nearly, 88% of the students were older than 18 years of age and 2/3<sup>rd</sup> were female students whereas, in Biswas R and Bandyopadhyay R, study 94.2% of the students were above 18 years and only 29.9% were girls, which was less when compared to our study [11]. In Biswas R and Bandopadhyay R, study 62% students had their schooling in english medium whereas all the participants in our study were from english medium schooling [11]. In Saha N et al., study 92.9% were non vegetarians when compared with our study 87.3% were non vegetarians [14].

S. No.	Particulars of question Yes %	Agnihotri G and Sagoo MG [16] 2010 (India)	Karau PB et al., [21] 2012 (Kenya)	Oyeyipo IP and Falana BA [22] 2012 (Nigeria)	Saha N et al., study [14] 2015 (India)	Lalit M et al., study [20] 2018 (India)	Biswas R and Bandyopadhyay R, study [11] 2018 (India)	Present study 2021
1	Do you have any prior experience of a dead human body before entering the dissection room?	34.66	50.7	50	4	42.03		37.6
2	Did you have apprehension to handle the cadaver directly?	46.67	29.3	35	24.2	19.56		40.9
3	Did you feel emotional shock at initial exposure to cadaver ?	-	30.7	-	-	-		19.9
4	Do you want to donate body for dissection ?	-	-	-	-	-	32	20.4
5	Do you have any sense of gratitude to people who donated their body ?	-	-	-	98	98.5		98.3
6	Do you have sympathy and respect for the cadaver ?	70	-	83.3	80.8	95.6		96.1

**[Table/Fig-6]:** Comparison of Opinion of the students towards anatomy dissection in different [11,14,16,20-22].

In a study by Asharani SK and Shashikantha SK, more than 70% of the subjects were excited about dissection whereas only 40.8% experienced excitement in our study [15]. Fear was seen only in 17.8% of the participants which was less when compared to Asharani SK and Shashikantha SK study, where nearly 50% of the students had some fear about cadaver handling [15]. Psychological symptoms like excitement, stress and anxiety among female students were encountered more than two times compared to males in our study. Almost similar finding of females being more evidently symptomatic in the dissection room as compared to males was observed in Agnihotri G and Sagoo MG study (female: male symptom ratio was 1.96:1, nearly two times) [16]. Authors of that study have observed over the years that more females fainted in the dissection hall due to weakness and lack of proper appetite before entering the dissection room [16].

Anxiety among female students associated with dissection has also been reported by Mitchell BS et al., previously [17]. Emotional issues during cadaveric dissection should not be neglected as reported in Tschernig T et al., study [18]. The students need to be prepared emotionally and mentally while entering the dissection hall for better involvement in cadaveric dissection. Nnodim JO in their study suggested that a formal course on death and dying should begin preclinically and extended further into clinical years [19].

The most common physical symptom experienced by the students was sweating (27.4%) in our study. In Asharani SK and Shashikantha SK study nearly 40% of the subjects experienced one or the other symptoms like headache, nausea, giddiness etc., [15]. In Saha N et al., study difficulty in consuming non vegetarian food was found to be the most common physical symptom experienced by the participants [14]. Nausea (20.8%) was most common physical symptom experienced by the students in Lalit M et al., study [20].

In Agnihotri G and Sagoo MG study, apprehension to handle the cadaver was seen in 46.6% participants compared to nearly 41% in our study and it was only 19% in Lalit M et al., study [16,20]. Dissection helps in appreciating anatomy in 3-D way through sense of touch unlike other teaching methods. Cadaver being the first teacher for medical students, they should have gratitude towards the cadaver for helping them to understand the anatomy of the human body by way of dissection, which cannot be compared with any of the modern-day virtual teaching methods. Cadaveric oath recitation, which is a part of new curriculum of medical students, will help the students in developing empathy towards cadaver and in the long run for improving doctor-patient relationship in medical practice. In our study 96.1% had sympathy and respect for the cadaver and 98.3% students had sense of gratitude to people who donated their body which was almost similar to study findings of Lalit M et al., study (95.6% and 98.5%, respectively) [20]. In Saha N et al., study done in Tripura also similar finding was observed regarding sympathy and respect for the cadaver [14].

In Lalit M et al., study and Karau PB et al., 96.3% and 98.7% of the participants agreed that cadaveric dissection remains the best method of learning anatomy whereas it was only 86.7% in our study [20,21]. In this study, 60.8% of the participants agreed that cadaver dissection for anatomical learning is ethically acceptable whereas in Saha N et al., study it was only 38.4% and in Oyeyipo IP and Falana BA study it was 90% [14,22]. In our study, 81.2% liked anatomy as a subject and regarding choosing anatomy as a career 11.6% gave positive opinion whereas in Lalit M et al., study it was 8.6% [20].

Opinion of the students towards anatomy dissection in present study is compared with various study [Table/Fig-6] [11,14,16,20-22].

In Biswas R and Bandyopadhyay R, study, 83.2% of the study participants agreed that cadaveric dissection is important in the curriculum when compared to 97.8% students in our study [11]. In Lalit M et al., study, 16% said models or simulated lab assisted training can replace dissection which was almost similar to our study finding (15%) [20].

Body donation for medical education is a noble gesture by which a person can give back to the society by helping the medical students. In our study, 20.4% students wanted to donate body for dissection whereas it was 32% in Biswas R and Bandyopadhyay R, study [11]. The oath taking ceremony for paying respect to the cadaver creates awareness among the medical students about the noble gesture of body donation and remembering them that those cadavers were also people who were alive once and hence deserve to be treated with empathy and respect as living people, It also encourages students for body or organ donation [23].

In Popoola SO and Sakpa CL study, 92.1% agreed that participating in cadaver dissection as a group provides more opportunities to develop professional skills whereas 95.6% of the students in our study said that active interaction of the students with teachers make dissection interesting [24]. Changes in the undergraduate medical education curriculum in UK were made without any research into various methods of teaching and their pros and cons [25].

### Limitation(s)

Due to COVID-19 lockdown period, the students with only two months offline classes for anatomy dissection were included in the study.

### CONCLUSION(S)

Cadaver dissection still remains the most important means of learning anatomy and it can be made more interesting through interaction with teachers and team work. Computer assisted and multimedia methods act as complementary part but not a substitute to dissection. Introducing cadaver oath has resulted in students reflecting about organ donation and body donation and showing respect to the dead body. Students opinion should be considered for making dissection interesting and for better learning of anatomy.

## Acknowledgement

The authors would like to express their gratitude to all students who enthusiastically participated in the study and also thank Dr. Vineela K, postgraduate in Community Medicine Department for her enormous help throughout the study.

## REFERENCES

- [1] Mulu A, Tegabu D. Medical students' attitudinal changes towards cadaver dissection: A longitudinal study. *Ethiopian J Health Sci.* 2012;22(1):51-58.
- [2] Rajkumari A, Singh Y. Body donation and its relevance in anatomy learning: A review. *J Anat Soc India.* 2007;56:01-06.
- [3] Andreas V. Anatomy in the age of enlightenment. [Available at: [https://www.umich.edu/~ece/student\\_projects/anatomy/people\\_pages/vesalius.html](https://www.umich.edu/~ece/student_projects/anatomy/people_pages/vesalius.html)]. Accessed on June 20, 2021.
- [4] History of anatomy-WikiVividly. [Available at: [https://wikivividly.com/wiki/History\\_of\\_anatomy](https://wikivividly.com/wiki/History_of_anatomy)]. Accessed on June 20, 2021.
- [5] Dinsmore CE, Daugherty S, Zeitz HJ. Student responses to the gross anatomy laboratory in a medical curriculum. *Clin Ana.* 2001;14(3):231-36.
- [6] Mc Garvey MA, Farrell T, Conroy RM, Kandiah S, Monkhouse WS. Dissection: A positive experience. *Clin Anat.* 2001;14(3):227-30.
- [7] Bataineh ZM, Hijazi TA, Hijleh MFA. Attitudes and reactions of Jordanian medical students to the dissecting room. *Surg Radiol Anat.* 2006;28(4):416-21.
- [8] Korf HW, Witch H, Snipes RL, Timmermans JP, Paulsen F, Rune G, Vogt EB. The dissection course-necessary and indispensable for teaching anatomy to medical students. *Annal Anatomy.* 2008;190(1):16-22.
- [9] Bentley BS, Hill RV. Objective and subjective assessment of reciprocal peer teaching in medical gross anatomy laboratory. *Anat Sci Educ.* 2009;2:143-49.
- [10] Gangata H, Ntaba P, Akol P, Louw G. The reliance on unclaimed cadavers for anatomical teaching by medical schools in Africa. *Anat Sci Educ.* 2010;3:174-83.
- [11] Biswas R, Bandyopadhyay R. Attitude of first year medical students towards cadaveric dissection: A cross sectional study in a medical college of West Bengal, India. *Int J Community Med Public Health.* 2019;6:2679-83.
- [12] Keche HA, Thute PP, Gajbe UL, Keche AS, Fulmali DG. Cadaveric oath-perceptions of first year medical students. *J Evolution Med Dent Sci.* 2020;9(37):2722-25.
- [13] McLeod SA. Likertscale. *Simply Psychology.* 2019. <https://www.simplypsychology.org/likert-scale.html>.
- [14] Saha N, Chaudhuri S, Singh MM. Attitude of first year medical students in dissection hall. *IOSR.* 2015;14(5):74-78.
- [15] Asharani SK, Shashikantha SK. Attitude towards dissection among first year students in a medical college in Mandya. *IOSR.* 2015;14(5).
- [16] Agnihotri G, Sagoo MG. Reactions of first year Indian medical students to the dissection hall experience. *NJIRM.* 2010;1(4):04-09.
- [17] Mitchell BS, Mccrorie P, Sedgwick P. Student attitudes towards anatomy teaching and learning in a multi professional context. *Med Edu.* 2004;38:737-48.
- [18] Tschernig T, Schlaud M, Pabst R. Emotional reactions of medical students to dissecting room bodies: A conceptual approach and its evaluation. *Anatomical Rec. Part B: New Anatomist.* 2000;261:11-13.
- [19] Nnodim JO. Preclinical student reactions to dissection, death, and dying. *Clin Anat.* 1996;9(3):175-82.
- [20] Lalit M, Mahajan A, Arora AK, Piplani S. Attitude and response of first-year medical students toward cadaver, dissection, and subject of anatomy: A qualitative study. *Curr Trends Diagn Treat.* 2018;2(2):121-29.
- [21] Karau PB, Wamachi A, Ndede K, Mwamisi J, Ndege P. Perception to cadaver dissection and views on anatomy as a subject between two pioneer cohorts in a Kenyan medical school. *Anat J Afr.* 2014;3(2):318-31.
- [22] Oyeyipo IP, Falana BA. Attitude of preclinical students to cadaver dissection in a South West Nigerian Medical School. *Int J Trop Med.* 2012;7(1):01-05.
- [23] Ajitha R, Singh YI. Body donation and its relevance in Anatomy learning-a review. *J Anat Soc India.* 2007;56(1):44-47.
- [24] Popoola SO, Sakpa CL. Attitude and knowledge acquisition of medical students in dissection room. *Edorium J Anat Embryo.* 2018;5:100023A04SP2018.
- [25] Older J. Anatomy: A must for teaching the next generation. *Surgeon.* 2004;2(2):79-90.

### PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Anatomy, Rangaraya Medical College- Dr. NTR University of Health Sciences, Kakinada, Andhra Pradesh, India.
2. Assistant Professor, Department of Community Medicine, Rangaraya Medical College- Dr. NTR University of Health Sciences, Kakinada, Andhra Pradesh, India.
3. Professor and Head, Department of Community Medicine, Rangaraya Medical College- Dr. NTR University of Health Sciences, Kakinada, Andhra Pradesh, India.
4. Professor and Head, Department of Anatomy, Rangaraya Medical College- Dr. NTR University of Health Sciences, Kakinada, Andhra Pradesh, India.
5. Professor, Department of Surgery, Rangaraya Medical College- Dr. NTR University of Health Sciences, Kakinada, Andhra Pradesh, India.

### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Veerraju NVW Adabala,  
Kakinada East Godavari, Kakinada, Andhra Pradesh, India.  
E-mail: adabalaveerraju23@gmail.com

### AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. No

### PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Aug 13, 2021
- Manual Googling: Nov 05, 2021
- iThenticate Software: Dec 18, 2021 (14%)

### ETYMOLOGY: Author Origin

Date of Submission: **Aug 12, 2021**  
Date of Peer Review: **Sep 11, 2021**  
Date of Acceptance: **Oct 27, 2021**  
Date of Publishing: **Apr 01, 2022**

## Annexure 1- Questionnaire

Emotional involvement (Attitude) of first year medical students towards cadaveric dissection in a government medical college, East Godavari district, Andhra Pradesh

### Questionnaire:

1. Age:
2. Sex: Male/Female
3. Religion: Hindu/Muslim/Christian
4. Social status: OC/BC/SC/ST
5. Social Back ground: Tribal/Rural/Urban
6. Economic background: Pink card/White card
7. Address: Village/Mandal/District
8. Do you have any of the following at home? Car/Bike/AC/ Refrigerator
9. Diet: Vegetarian/Non Vegetarian:
10. Father's Education:
11. Father's Profession:
12. Mother's Education:
13. Mother's Profession:
14. Medium of schooling: English/Telugu/Others
15. Exposed to animal dissection in college: Yes/No
16. Do you have any prior experience of a dead body before entering dissection room Yes/No
17. Describe your first impression about dead body in dissection hall?
18. Do you have any negative feelings towards dead body? Yes/No
19. Were you curious/exciting for Cadaveric dissection: Yes/No
20. Are you interested in Cadaveric dissection: Yes/No
21. Did you have apprehension to handle the cadaver directly? Yes/No
22. Did you feel emotional shock at initial exposure to cadaver? Yes/No
23. Did you get nightmares about the dead body? Yes/No
24. Number of students in your group?
25. Have you ever done dissection? Yes/No
26. Have you done dissection frequently? Yes/No
27. Does each student get a chance for dissection at least twice a week? Yes/No
28. Are you forced to do dissection (by friends/faculty)? Yes/No
29. Who helps you to identify structures? Colleague/Faculty/Dissector
30. Describe the precautions you take before/after dissection?
31. Are you having any physical disability which limits your ability to do dissection? Yes/No
32. Are you depressed while attending Cadaveric dissection: Yes/No

33. Do you have desire not to attend dissection: Yes/No
34. Do you have any physical symptoms while doing dissection: Headache/Sweating/Vomiting/Nausea/Irritation of eyes/ Reeling sensation/Sleep disturbance/Difficulty in breathing/Restlessness/Difficulty in consuming Non Vegetarian food
35. Do you experience any psychological symptoms while doing dissection: Excitement/Stress/Anxiety/Fear/Depression
36. Do you want to donate body for dissection? Yes/No
37. DO you like anatomy as a subject? Yes/No
38. Do you like to choose anatomy as a career? Yes/No  
[Likert Scale: 1- Strongly disagree, 2- Disagree, 3- Neither agree or disagree, 4- Agree, 5- Strongly agree]
39. Is Cadaveric dissection important in curriculum: 5/4/3/2/1
40. Does dissection consume lot of time in curriculum? 5/4/3/2/1
41. Is dissection required for understanding the structure of human body: 5/4/3/2/1
42. Does cadaveric dissection help to develop thinking skill: 5/4/3/2/1
43. Do you think hands on training on cadaver dissection is better than demonstration? 5/4/3/2/1
44. Does models or simulated lab assisted training replace dissection? 5/4/3/2/1
45. Do you think that Cadaveric dissection remains best method of learning anatomy? 5/4/3/2/1
46. Does active interaction of the students with teachers make dissection interesting? 5/4/3/2/1
47. Do you experience formalin odour after encounter with cadaver even when away from college? 5/4/3/2/1
48. Do you have recurrent thoughts about the cadaver even when away from college? 5/4/3/2/1
49. Do you think personal protective equipment is necessary for dissection? 5/4/3/2/1
50. Does dissection promote teamwork? 5/4/3/2/1
51. If you think that the cadaver you are dissecting was once a living human being (like you), do you have sympathy and respect for the cadaver? 5/4/3/2/1
52. Do you have any sense of gratitude to people who donated their bodies? 5/4/3/2/1
53. Do you think Cadaveric oath has a role to play in developing empathy? 5/4/3/2/1
54. Is Cadaver dissection ethically acceptable? 5/4/3/2/1
55. Does cadaveric dissection need mental preparation? 5/4/3/2/1
56. Did you find human body intricate and complex? 5/4/3/2/1
57. Describe the difficulties you faced during dissection?