ORIGINAL ARTICLE

ASSESSMENT OF THE ATTITUDE AND VIEWS OF SECOND YEAR MEDICAL STUDENTS TOWARDS CADAVER DISSECTION IN ANATOMY COURSE

Abay Mulu[1] , Abebe Muche[1], Desalegn Tegabu[2]*

ABSTRACT

Background: *Even though cadaver dissection forms the cornerstone of anatomy teaching strategy at College of Medicine and Health Sciences, in recent years the use of cadaver dissection for anatomy learning is facing controversies due to emerging ideas of relevance and replacement.*

Objective: *The objective of this study was to assess the attitude and views of second year medical students towards cadaver dissection in anatomy learning.*

Methods: *A cross-sectional study was conducted among second year medical students at the College of Medicine and Health Sciences, the University of Gondar, Ethiopia, in 2008. All second year medical students (108 in number) were included in the study. A structured self-administered, pretested and standardized questionnaire prepared in English was used for collecting the most relevant data from the study subjects. The investigators administered and collected the questionnaire in a classroom setting at the end of the academic year. The data were captured and analyzed using the SPSS version 16 statistical package.*

Results: *Eighty-one (75%) male and 27 (25%) female students with a mean age and standard deviation of 20.1±0.96 years participated in the study. Christian and other students from urban areas account for 76% and 74.1%, respectively. The majority (67.6%) have had information about cadaver handling from somebody else before the first dissection session. Positive feeling about cadaver was reported by 34 (31.5%) at the beginning of the course and 99 (91.7%) at the end of the course. The majority 106 (98.1%) of the students rated the relevance of using cadaver for anatomy learning as highly relevant, and 87 (80.5%) were against the replacement of cadavers with models. Age, sex, religion or residence did not show a statistically significant association with the replacement of cadaver by models.*

Discussion and conclusion: *The attitude of the students shifted from negative to positive at the end of the course. Hence for improving and gaining better advantage on dissection, instructors need to prepare students mentally and emotionally before they enter the dissection room. The majority of the students recognize that cadaver dissection is more relevant than models for studying anatomy. Therefore, medical curriculum developers and policy makers should pay attention to the relevance of dissection.*

INTRODUCTION

Anatomical dissection has been central to medical education since the Renaissance (1, 2) and is an exclusive source of anatomy teaching. It is recognized as the most universal instrument strongly supported and preferred to other methods for professional training and skill development for becoming medical doctor (3, 4).Thus, the practice of anatomy dissection allows students to learn the three dimensional anatomy and the concept of biological variability (5). Knowledge acquisition is most efficient when it involves as many senses as possible. It is therefore most expedient from a pedagogical point of view to bring in as many contextual sensory impressions as possible into educational processes. This approach is fully warranted in the case of a dissection course during which students must activate all senses to literally comprehend. In this respect, dissection courses serve as a unique, powerful tool to convey macroscopic knowledge (6).

Despite recent changes to the organization of the medical curricula, the use of dissection and dissected parts in the study of human anatomy remains important in anatomy education. However, anatomy has currently faced disagreements regarding teaching

[1] *Department of Anatomy, College of Medicine and Health Sciences, University of Gondar, Ethiopia, P. O. Box 196*

[2] *Department of Epidemiology and Biostatistics, College of Medicine and Health Sciences, University of Gondar, Ethiopia, P. O. Box 196*

[1]***Correspondening author:*** *Abay Mulu, abaymulu@gmail.com*

styles, content, and the time allocated to gross anatomical courses within the greater medical school curriculum (7). Many anatomists and clinicians judge anatomy to be in a state of crisis, with traditional teaching marginalized (8).

Criticism in recent decades regarding the overcrowded medical school curriculum delivered via didactic, passive techniques, has resulted in revised medical courses throughout the world. These now cover a spectrum from problem-based to systems-based, delivered via lectures, clinical skills, and small-group classes. Within this, anatomy teaching in the world utilizes a range of formats including dissection, prosection, information technology, living anatomy, and models (9).Yet there is a scant published evidence on outcomes underlying many of these varied teaching styles and techniques.

Anatomy dissection represents a significant emotional challenge to many medical students and even led to symptoms suggestive of posttraumatic stress disorder in a few students (10). Contact with the cadaver can be highly stressful for some (11). Before the initiation of dissection, the majority of the students express a negative experience and need support (12). Most professionally qualified practitioners vividly remember their first exposure to a cadaver in the dissecting room during their anatomy training in medical schools. However, relatively little was known about how medical students feel about and cope with their first exposure to dissection of the human body (13).

Studies on the relevance, feeling and opinion of medical students on cadaver use is lacking in the College of Medicine and Health Sciences, the University of Gondar, and in the country. The present study was carried out to obtain relevant information about the feeling of medical students on exposure to anatomy dissection and the association, if any, of the perception with demographic factors. The study also intended to assess the effect of prior information on handling the cadaver and the opinion of students towards its use in anatomy learning.

METHODS

A cross-sectional study was conducted among second year medical students at the College of Medicine and Health Sciences, the University of Gondar, Ethiopia, in 2008. All second year medical students (108 in number) were invited to participate in the study at the end of the academic year (June 2008).

Anatomy teaching with cadavers had a long history with the establishment of medical education in the College of Medicine and Health Sciences. Every year, on average, around 100 students are taught anatomy in their second year education, though the number now tends to increase. Anatomy practical groups do not exceed 20 students per cadaver; two demonstrators are responsible for two groups during a 3-hour dissection session per week. The dissection room is large with the necessary facilities conforming to the country's standards for safety in relation to formaldehyde levels.

A questionnaire prepared in English and pre-tested on third year medical students was used for collecting the most relevant data from the study subjects. The questionnaire included items on socio-demographic information about the respondent's age, sex, religion and residence. Questions related to information on handling a cadaver before first contact, feeling about the cadaver upon first contact and at the end of the academic year (after 10 months) were also asked. Opinion about the relevance of the cadaver in anatomy learning and reaction to replacing cadaver by anatomic models was also included.

Adequate explanation was given to the students about the relevance of the study before they filled the well-structured self-administered, pretested, and standardized questionnaire. The principal investigator administered and collected the questionnaire in a class room setting at the end of the academic year.

The data were captured and analyzed using the SPSS version 16 statistical package (SPSS INC, Chicago). Descriptive statistics and a variety of chi square tests were used when appropriate. $p<0.05$ was considered as statistically significant.

Permission to conduct the study was obtained from the Department of Anatomy. In addition, oral consent was obtained from the students who were informed that the information would be used for research purposes and would not be transferred to a third party or would not be used for the assessment or evaluation of student performance. To ensure confidentiality, no names or identifications were requested.

RESULTS

All second year medical students (108 in number) of the College of Medicine and Health Sciences were included in this study. Among them 81(75%) were males and 27 (25%) females. The socio-demographic

characteristic of the study subjects is shown in Table 1. The majority (76%) were Christians and came from urban areas (74.1%). The age ranges between 18 and 24 with a mean and standard deviation of 20.1±0.96 years. The mean age of the male and female students was 20.1±0.96 and was not statistically different (p>0.95).

Table 1: Socio-demographic characteristics of the study subjects

Characteristics	Number (%)
Sex	
Male	81(75)
Female	27(25)
Age (in years)	
≤19	25(23.1)
≥20	83(76.9)
Religion	
Christian	82(76)
Muslim	24(22.2)
No religious affiliations	2(1.8)
Residence	
Urban	80(74.1)
Rural	28(25.9)

The students were asked whether they received any information about cadaver handling before their first contact with it. They were also asked if they were given introduction by the course instructor. The students' response is shown in Table 2. The majority (68.5%) have had information about cadaver handling from somebody else. There is no statistically significant difference in having information about the handling of the cadaver in age, sex, or religion. On the contrary, acquisition of prior information was reported by more students from urban areas (OR=2.8, 95%, p<0.05) as compared to those from rural areas.

Students were also asked about their feeling towards the cadaver at the beginning of the dissection session and at the end of the course. As shown in Table 3, only 34 (31.5%) of the students had a positive feeling towards the cadaver at the beginning of the dissection session. Though not statistically significant, 53 (65.4%) of the males and 21(77.8%) of the females showed a negative feeling towards the cadaver at the beginning of the dissection session. Religion, residence and prior information about dissection did not affect the feeling towards the cadaver at the beginning of the dissection session.

Table 2: Information on handling cadaver before first contact of the cadaver

	Prior Information on handling cadaver		Odds Ratio	p value
	Yes(n=74)	No(n=34)		
Age(in years)				p>0.16
≤19	19 (25.7)	6 (17.6)	1.61	
≥20	55 (74.3)	28 (82.4)	1	
Sex				p>0.5
Male	54 (73)	27 (79.4)	0.7	
Female	20 (27)	7 (20.6)	1	
Religion				p>0.1
Christian	54 (74)	28 (87.5)	0.39	
Muslim	20 (26)	4 (12.5)	1	
Residence				p<0.05
Urban	59 (79.7)	21 (61.8)	2.43	
Rural	15 (20.3)	13 (38.2)	1	

At the end of the course, 73 (91.1%) of the males and 26 (96.3%) of the females had a positive attitude towards the cadaver. Even though the number of students with positive attitude increased, there were no statistically significant differences by age, sex, religion or residence.

The association between the feeling upon first contact and at the end of the course is shown in Table 4.

Sixty-eight respondents out of the total who had a negative feeling upon first contact, changed their feeling to positive at the end of the course. Among the 34 respondents who had a positive feeling to the first contact, three developed a negative feeling at the end of the course. The overall positive feeling about the cadaver increased from 34 (31.5%) at the beginning of the course to 99 (91.7%) at the end of the course (Mc Nemar's X^2=57, p<0.001).

Table 3: Factors affecting feeling of students about cadaver at the beginning and end of the course

	Feeling up on first contact			Feeling at the end of the course		
	Likes (n=34)	Dislikes (n=74)	X^2	Likes (n=99)	Dislikes (n=9)	X^2
Age (in years)			5.1			1 §
≤19	13 (38.2)	12 (16.2)	**(p<0.02)**	23 (23.2)	2 (22.2)	
≥20	21 (61.8)	62(83.8)		76 (76.7)	7 (77.8)	
Sex			1.43*			0.49§
Male	28 (82.4)	53 (71.6)		73 (73.7)	8 (88.9)	
Female	6 (17.6)	21 (28.4)		26 (26.3)	1 (11.1)	
Religion			1.35*			0.67§
Christian	25 (73.5)	57 (79.1)		75 (76.5)	7 (87.5)	
Muslim	9 (26.5)	15 (20.9)		23 (23.5)	1 (12.5)	
Residence			0.14*			0.69§
Urban	26 (76.5)	54 (73)		74 (74.7)	6 (66.7)	
Rural	8 (23.5)	20 (27)		25 (25.3)	3 (33.3)	
Prior information about dissection			0.19*			0.47§
Yes	22 (64.7)	51 (68.9)		68 (68.7)	5 (55.6)	
No	12 (35.3)	23 (31.1)		31 (31.3)	4 (44.4)	

* P value > 0.05, § Fisher Exact test

Table 4: Analysis using McNemar's test on feeling of students towards cadaver upon first contact and at the end of the course

		Feeling at the end of course [1]	
		likes	dislikes
Feeling upon first contact	likes	31	3
	dislikes	68	6

[1] McNemar's test, p<0.001

The majority (82.41%) of the students rated the use of the cadaver for anatomy learning as highly relevant, some (15.74%) rated it as relevant, and only 2 (1.85%) perceived it as irrelevant. Age, sex, religion or residence before joining the university showed no statistically significant difference on the relevance of the cadaver for anatomy learning.

The opinion of the students on the replacement of cadaver is shown in Table 5. Among the respondents, 87 (80.5%) were against the replacement of cadavers with models. However, 12 (11.1%) respondents agreed to the replacement and the rest 9 (8.4%) were not in favor of or against the replacement (this group was excluded in the analysis on age, sex, residence, and religion).

The effect of gender on the replacement of the cadaver with a model is shown in Table 5. The majority (80.3% of the males and 81.5% of the females) were against the replacement of the cadaver by models. Sixty-nine (84%) and 17 (70.8%) of the Christian and Muslim students, respectively, refused the replacement of the cadaver by models. However, none of these variables showed a statistically significant association with the replacement of the cadaver by models.

Table 5: Opinion of students on replacing cadavers with models in anatomy learning

	Opinion on replacing cadaver with models		
	Favorable (n=12)	Against (n=87)	P value
Age (in years)			p>0.45*
≤19	1 (8.3)	20 (23)	
≥20	11 (91.7)	67 (77)	
Sex			p>1*
Male	9 (75)	65 (74.7)	
Female	3 (25)	22 (25.3)	
Religion			p>0.24*
Christian	7 (63.6)	69 (80.2)	
Muslim	4 (36.4)	17 (19.8)	
Residence			p>0.73*
Urban	8 (66.7)	64 (73.6)	
Rural	4 (33.3)	23 (26.4)	

Fisher exact test

DISCUSSIONS

In recent years, the relevance and value of dissection has been under discussion at different universities. As a result of high cost and shortage of time some medical schools in Europe and US have abandoned dissection and moved to cadaverless anatomy. However others persist on cadaver-oriented anatomy to teach the basic constructional principles of the human body by dissection. This argument results in a fundamental discussion on the relevance of "dissection course" for teaching anatomy in the medical curriculum (7). The present study tried to assess the medical students' experience of cadaver and their opinion on the relevance of dissection based anatomy.

The study showed that the majority (67.6%) of the students had information about cadaver handling from somebody else prior to the first dissection session. The odds of having prior information about dissection is 2.8 times more among students from urban areas compared to students from rural areas. A quasi-experimental study conducted in Pakistan among medical students also showed that the rate of anxiety among students with prior information (experimental) and control group (with no prior information) was significant. Javadani and his colleagues (12) after an experimental study suggested the need to prepare students mentally and emotionally before they enter a dissection room. In addition,

McGarvey et al. (10) recently reported that medical students felt the need for more mental preparation before the first visit to the anatomy dissection room.

One of the principal findings of the present study suggests that the majority (68.1%) of medical students showed a negative feeling on the first exposure to cadavers. A similar study which was conducted among medical students in Benin (14) and UK (15) found out that 25% and 5%, respectively were distressed by dissection initially. This result is in line with what Charlton et al. reported about the fact that dissection elicits strong reactions in students (16).

This could be accounted for by lack of information about cadaver dissection and the concept of death and dying. However, by the end of the academic year, only 8.3% of the students had a negative attitude towards the cadaver. McNemar's chi-square statistic applied, also suggested that there was a statistically significant difference in the proportion of students with positive attitude towards the cadaver at the beginning of dissection and at the end of the course. The aforementioned studies (14, 15) also showed a shift to positive attitude by the end of the course. This indicates that medical students rapidly develop coping mechanisms which enable them to view the cadaver in dissection as quite divorced from a living human body. On the contrary, O'Carroll and his colleagues (13) argue that there is no change in the actual feeling of students over a period of time, rather it is habituation of students to the dissection environment. They advocate the use of Appraisal of

Life Events Scale (ALES) to control confounding effects which happen as a result of social desirability bias and to test relationships to other facets of stress (e.g. coping mechanism). Authors suggest further research on the emotional impact of cadaver dissection to medical students by using ALES. However, both agree that for improving and gaining better advantage on dissection, students need to be mentally and emotionally prepared before entering the dissection room.

According to this study, the majority of the respondents (98.1%) reported that dissection is relevant and necessary for learning anatomy. The current finding is in agreement with the result reported by Azer and Eizenberg (17) .

This study also tried to measure the opinion of students on the replacement of the cadaver by other modes of teaching learning process. The result of our studies showed that 81% of the students disagree with the replacement of dissection based teaching of anatomy by other modes of teaching, and this accords with studies done by Azer & colleague (17). In addition, both male and female medical students as well as followers of different religions strongly opposed the replacement of the cadaver by other modes of teaching.

A similar study done in India by Rajkumari and his colleagues found out that the majority of the students (96.25%) agreed on actual hands training on cadaver dissection rather than the demonstration of prosected specimen (18). It also enhanced learning and confidence in the subject matter (18, 19). This can be justified by the fact that using the cadaver has educational features that are particularly valuable for teaching anatomy. One vital function is the provision of real and three dimensional views of the human body structures, the concept that is difficult to capture in the text book and atlas. Most students are astonished by the extent to which their specimen differs from the images in their atlas. This is a common source of confusion in early sessions of dissection, so any substitute for the dissection method would have to address this variability in a substantial way (2, 6).

After students spend some hours on locating and cleaning a specimen, moving it around to view it from all sides, they will have a three dimensional understanding that can not be replicated by an atlas. In addition, knowledge acquisition of anatomy is most efficient when it involves as many senses as possible. This is fully warranted during cadaver dissection when students activate all senses to literally

comprehend. In this respect, cadaver dissection serves as a unique, powerful tool to convey macroscopic knowledge (6). On top of this, dissection introduces students to team work and fosters communication skills between individual students and groups. It also helps the students to work through their feeling about the reality of death and teaches respect for the body as well as introducing them to their role as medical professionals (20).

The result of the present study revealed that the majority of the students preferred cadaver dissection which creates a three-dimensional figure of the human body in anatomy learning. On the other hand, the idea of replacement of cadaver dissection by other models was opposed by the majority of the students. Therefore, medical curriculum developers and policy makers should pay attention to the relevance of dissection for anatomy learning.

ACKNOWLEDGEMENT

REFERENCES

1. Parker LM. What's wrong with the dead body? Use of the human cadaver in medical education. The Medical Journal of Australia. 2002;176 (2):74-6.
2. Vázquez R, Riesco JM, Carretero J. Reflections and challenges in the teaching of human anatomy at the beginning of the 21st century. European Journal of anatomy. 2005;9(2):111-6.
3. McLachlan JC, Bligh J, Bradley P, Searle J. Teaching anatomy without cadavers. Medical Education. 2004;38(4):418-24.
4. Arráez-Aybar L-A, Castaño-Collado G, Casado-Morales MI. Dissection from the Spanish anatomist's perspective: aims, attitudes, and related aspects. New Anatomist. 2004;281(1):15-20.
5. Winkelmann A. Anatomical dissection as a teaching method in medical school: a review of the evidence. Medical Education. 2007;41(1):15-22.
6. Korf H-W, Wicht H, Snipes RL, Timmermans J-P, Paulsen F, Rune G, et al. The dissection

course - necessary and indispensable for teaching anatomy to medical students. Annals of Anatomy - Anatomischer Anzeiger. 2008;190 (1):16-22.

7. Patel KM, Moxham BJ. Attitudes of professional anatomists to curricular change. Clinical Anatomy 2006;19(2):132-41.

8. Older J. Anatomy: A must for teaching the next generation. Surg J R Coll Surg Edinb Irel. 2004;2:79-90.

9. Heylings D. Anatomy 1999–2000: The curriculum, who teaches it and how? . Medical Education. 2002;36:702-10.

10. Mc Garvey MA, Farrell T, Conroy RM, Kandiah S, Monkhouse WS. Dissection: a positive experience. Clinical Anatomy 2001;14(3):227-30.

11. Vijayabhaskar P, Shankar PR, Dubey AK. Emotional impact of cadaver dissection: a survey in a medical college in western Nepal. Kathmandu University Medical Journal 2005;3(2):143-8.

12. Javadnia F, Hashemitabar M, Kalantarmahdavi R, Khajehmougahi N. How to decrease the emotional impact of cadaver dissection in Medical Students. Pak J Med Sci. 2006;22(2):200-3.

13. O'Carroll RE, Whiten S, Jackson D, Sinclair DW. Assessing the emotional impact of cadaver dissection on medical students. Medical Education. 2002;36(6):550-4.

14. Nnodim JO. Preclinical student reactions to dissection, death, and dying. Clinical Anatomy 1996;9(3):175-82.

15. Evans EJ, Fitzgibbon GH. The dissecting room: Reactions of first-year medical students. Clinical Anatomy. 1992;5:311-20.

16. Charlton R, Dovey SM, Jones DG, Blunt A. Effects of cadaver dissection on the attitudes of medical students. Medical Education. 1994;28 (4):290-5.

17. Azer SA, Eizenberg N. Do we need dissection in an integrated problem-based learning medical course? Perceptions of first- and second-year students. Surgical and Radiologic Anatomy: SRA. 2007;29(2):173-80.

18. Rajkumari A, Das BK, Sangma G, Singh YI. Attitudes and views of first year medical students towards cadaver dissection in anatomy learning. Calicut Medical Journal. 2008; 6(4): e2. Available at http://www.calicutmedicaljournal.org/2008/4/e2.pdf

19. Johnson J. Importance of dissection in learning anatomy: personal versus peer teaching. Clinical Anatomy. 2002;15:38-44.

20. Rizzolo LJ, Stewart WB. Should we continue teaching anatomy by dissection when ...? New Anatomist. 2006;289(6):215-8.