

Preclinical Dental Undergraduates' Experience and Attitudes regarding Cadaver Dissections

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Abstract

Background: The purpose of this study is to investigate the experience and attitudes of preclinical dental undergraduates regarding cadaver dissection at the Faculty of Dental Sciences, University of Peradeniya, Sri Lanka.

Methodology: Two hundred and forty, first, second and third-year preclinical students participated. A structured and open-ended questionnaire containing 28 items was distributed after obtaining informed consent. Ethics approval from the Ethics Review Committee of the Faculty of Dental Sciences, University of Peradeniya was obtained. Data was analysed using (Statistical Package for the Social Sciences) SPSS version 29.

Results: In our study, 28.2% of the total student sample of 240 reported being emotionally shocked when observing dead bodies or cadavers for the first time. Of them, the majority were female (35.5%) in comparison with males (11.3%) and the differences were statistically significant ($p < 0.01$). The commonest symptom was sweating (15.5%) followed by dizziness (13.8%) and nausea (12.6%). The smell (43.7%) was the most common reason for the symptoms, followed by sight (9.2%) and touch (6.9%). However, 47.7% of students reported no symptoms on first entry into the dissecting room. Most of the students used relaxation (25.3%) as the coping mechanism to counter the symptoms, followed by focusing on the task (20.7%).

Conclusion: Emotional shock and related symptoms experienced by the students during dissection vary according to gender and cultural background. The use of more than one coping mechanism is greatly helpful for students to counteract the situation.

Keywords: Attitudes, Cadaver dissection, Dental undergraduates, Experience, Sri Lanka

Introduction

One of the important aspects of cadaveric dissection among first-year preclinical students is the difference in emotional reactions when they face human dissection for the first time.

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The opinions of students towards dissecting a human cadaver are different (Finkelstein & Matters, 1990; Leogn, 1999).

Most previous research has focused on attitudes toward death (Nnodim, 1996), emotional responses to exposure to cadavers (Penney, 1985), and the coping approaches utilized by students (Abu-Hijleh *et al.*, 1997). Some authors conclude that better preparation of students was necessary before dissection (Penney, 1985; Horne *et al.*, 1990). Evans & Fitzgibbon (1992) report that most medical students were able to adapt to any initial upset caused in the dissecting room, but some



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students had persisting problems and, in fact, had higher stress levels after a period of dissection. Some studies reported that about 30% of students experienced physical effects such as dizziness, sore eyes, nausea and feelings of anxiety and disgust, particularly with dissection of certain regions of the body (Horne et al., 1990).

Charlton et al. (1994) in a study done on effect of cadaver dissection on the attitudes of New Zealand medical students mentioned that men were more likely to indicate a lower level of reaction than women and this effect remained significant. A study done by Izunya et al. in 2010 on the attitudes of first year preclinical students in Nigeria towards cadaver dissection revealed that most students are excited in their first visit to the dissection room, and also think dissection is the best method for the study of human anatomy (Izunya et al., 2010).

Getachew in 2014 investigated the reaction of medical students to experience in the dissecting room using preclinical medical students in Ethiopia and reported that the smell of the dissection room, touch and fear of cadaver were the commonest causes of their symptoms experienced while studying in the dissection room (Getachew, 2014). Abu-Hijel et al. in 1997 conducted a study investigating the attitudes and reactions to the dissecting room in Arab medical students and reported that 53.7% of the students did not report any fear when they enter the dissecting room and the rest complained of fear ranging from slight to high degrees (Abu-Hijel et al. 1997).

In the recent past, anatomists have researched medical students' physiological and emotional reactions to cadaver dissection. In addition, previous studies reveal that attitudes towards and emotional aspects related to dissection vary between gender and among ethnic groups. Furthermore, students seem to utilize a wide range of coping strategies with dissection. All this information is very important in planning and implementing a dissection programme, minimizing the emotional and adverse effects due to dissection. Additionally, this information

will help plan the anatomy teaching curriculum as well.

The Bachelor of Dental Surgery programme in Sri Lanka requires knowledge of the anatomy of the thorax and abdomen and head and neck regions. To the best of our knowledge, a study investigating the student's experience regarding anatomy dissections had not been conducted using dental or medical students in Sri Lanka. The purpose of this study is to investigate the experience and attitudes of preclinical dental undergraduates regarding cadaver dissection at the Faculty of Dental Sciences, University of Peradeniya, Sri Lanka. Moreover, coping mechanisms used by the students to counter the adverse experiences are also investigated.

Methodology

This is a quantitative, investigatory study, carried out in the Faculty of Dental Sciences, University of Peradeniya, Sri Lanka. Two hundred and forty, first, second and third-year preclinical students of the Faculty of Dental Sciences, University of Peradeniya who took the compulsory discipline of Anatomy including cadaveric dissection as part of their BDS training programme in 2019-2021 academic sessions were recruited.

All 240 dental undergraduates meeting the inclusion criteria were recruited for the study. The objectives of the study were explained to each student and the information sheet and consent form were given in order to obtain the informed consent. A structured and open-ended questionnaire containing 28 items was distributed following informed consent (Izunya et al., 2010; Gatachew, 2014). Ethical approval from the Ethics Review Committee of the Faculty of Dental Sciences, University of Peradeniya, Sri Lanka was obtained before data acquisition (ERC/FDS/UOP/II/2021/09).

The data was analysed using SPSS ver. 29 for the production of descriptive statistics in which the frequency of the replies was determined for each item of the questionnaire.

Results

Of the total of 240 students, 174 (72.5%) completed the questionnaire which included 50 first-year (20.8%), 58 second-year (24.1%) and 66 third-year (27.5%) students. The student experience and attitudes towards cadaveric dissection did not show statistically significant differences among the three student groups

used. Therefore, the data was combined for further analysis. Of the 174 students, 53 (30.5%) were males and 121 (69.5%) were females. The majority of students were Sinhalese (79.2%) followed by Tamils (13.9%) and Muslims (6.9%). Their responses regarding experience and attitudes towards cadaver dissection are given in Table 1.

Table 1: Responses on experience and attitudes towards cadaveric dissection (Izunya et al., 2010)

Question	Yes	No	Undecided
1. Did you find your first visit to the dissection room to be exciting?	143(82.2%)	26(14.9%)	5(2.9%)
2. Were you upset at the beginning of dissection	31(21.3%)	133(76.4%)	4(2.3%)
3. Did you have any prior experience of a dead human body before entering the dissection room?	39(22.4%)	135(77.6%)	0(0.0%)
4. If so, whether the prior experience helped you in developing a better coping mechanism to adjust to cadaver dissection?	30(17.2%)	35(20.1%)	66(37.9%)
5. Did you feel any emotional shock at initial exposure to cadaver?	49(28.2%)	109(62.6%)	16(9.2%)
6. If so, whether the shock decreased gradually?	57(32.8%)	28(16.1%)	44(25.3%)
7. Did you have any fear of touching the cadaver directly?	43(24.7%)	121(69.5%)	9(5.2%)
8. Did you complain of excessive stress and anxiety immediately before and during dissection?	13(7.5%)	156(89.7%)	5(2.9%)
9. Do you prepare mentally for dissection of human cadaver?	113(64.9%)	40(23.0%)	21(12.1%)
10. Did you ever think that the cadaver you dissected was once a living human being similar to yourself?	162(93.1%)	7(4.0%)	5(2.9%)
11. Did you ever experience any kind-heartedness and regard for the cadaver you dissected?	137(78.7%)	21(12.1%)	13(7.5%)
12. Did you believe that you could perform the dissection with the help of your teacher?	168(96.6%)	4(2.3%)	2(1.1%)
13. Do you think that dissection enhance the skill of thinking in a logical manner?	163(93.7%)	3(1.7%)	8(4.6%)
14. Do you think that dissection gives the best method for learning anatomy?	170(97.7%)	0(0.0%)	4(2.3%)
15. Do you think that cadaver dissection for anatomical learning is ethically acceptable?	150(86.2%)	2(1.1%)	22(12.6%)
16. Do you think that Cadaver dissection technique can be replaced by plastic models, computer assisted training programme etc. in the near future?	11(6.3%)	139(79.9%)	23(13.2%)
17. Do you think that actual hands on training on cadaver dissection gives better results than demonstration of prosected Specimen?	163(93.7%)	6(3.4%)	3(1.7%)
18. Do you think that cadaver dissection is still considered important and indispensable in Anatomy learning	166(95.4%)	2(1.1%)	5(2.9%)
19. Was the cadaver dissection helpful for your learning in subsequent years?	156(89.7%)	0(0.0%)	13(7.5%)

28.2% of the students were shocked at the sight of dead bodies or cadavers for the first time and 24.7% of them felt fear of touching the cadaver directly. In both aspects, the majority were female students (shock of seeing cadavers; Female: 35.5%, Male: 11.3%, Fear of touching the cadaver; Female: 31.4% Male: 9.6%) and the differences were statistically significant at $P<0.01$ and $P<0.05$, respectively.

Of the total sample, only 7.5% (13) of the students complained of excessive stress and anxiety immediately before and during dissection and of them 8 (6.1% of total Sinhalese students responded) and 5 (38.4% of total Muslim students responded) were Sinhalese and Muslim students, respectively. The difference was statistically significant ($P<0.01$). However, 32.8% of the students reported that emotional shock or fear decreased gradually with time. Recovery was more obvious in females (53.5%) than males (25.6%) and the difference was statistically significant ($P<0.01$). Furthermore, 64.9% of students were mentally prepared for dissection of a human cadaver at the beginning and male students (69.8%) reported being mentally more prepared than females (62.8%) ($P<0.05$). The majority of the students (78.7%) had experienced kind-heartedness and regard towards the cadaver they dissected and

females (83.5%) reported experiencing more such feelings than males (67.9%) ($P<0.01$).

The symptoms experienced by the students during dissection are shown in Table 2. Overall, 52.3% of the students reported at least one symptom while 47.7% of students felt no symptom on first entry into the dissecting room. The commonest symptom was sweating (15.5%) followed by dizziness (13.8%) and nausea (12.6%) (Table 2). Of the students who showed no symptoms, 65.9% and 47.8% were male and female students, respectively. In addition, regarding the students who showed at least one symptom, 30.4% were females and 24.4% were males. The causes for the symptoms experienced during dissection are shown in Table 3. Of the students who showed symptoms, smell (83.5%) was the most common reason for the symptoms followed by sight (17.6%) and touch (13.2%). Table 4 shows the coping mechanisms used by the students to counter the symptoms. Most of the students used relaxation (48.3%) as the coping mechanism to counter the symptoms followed by focusing on the task (39.6%). In addition, several students used a combination of coping mechanisms to counter the situation. Our study showed that the majority of male students (50%) did not use any coping mechanisms to deal with this type of difficult situation when compared with female students (38.8%).

Table 2: Symptoms experienced by the respondents on first entry into the dissection room and subsequent exposure to cadaveric dissection

Cause	Total no of respondents	No of male respondents	No of female respondents
Smell	76 (83.5%)	14 (26.9%)	62 (50.8%)
Sight	16 (17.6%)	1 (1.9%)	15 (12.3%)
Touch	12 (13.2%)	0 (0%)	12 (9.8%)
Fear of infection	2 (2.2%)	0 (0%)	2 (1.6%)
Looking at certain parts of the cadaver	9 (9.9%)	0 (0%)	9 (7.4%)
Touching certain parts of the cadaver	8 (8.8%)	2 (3.8%)	6 (4.9%)
Others	19 (20.9%)	8 (15.4%)	11 (9.0%)

Table 3: Causes for symptoms

Coping mechanism	Total no. of respondents	No. of male respondents	No. of female respondents
Focusing on task	36 (39.6%)	9 (17.3%)	27 (22.1%)
Praying	3 (3.3%)	0 (0%)	3 (2.5%)
Relaxation	44 (48.3%)	7 (13.5%)	37 (30.3%)
Staying in a group	26 (28.6%)	4 (7.7%)	22 (18.0%)
Advice from lecturers	8 (8.8%)	1 (1.9%)	7 (5.7%)
Others	20 (21.9%)	9 (17.3%)	11 (9.0%)

Table 4: Coping mechanisms used by the respondents

Symptom	Total no of respondents	No of male respondents	No of female respondents
Fainting	5 (2.9%)	0 (0%)	5 (4.1%)
Dizziness	24 (13.8%)	5 (9.6%)	19 (15.6%)
Nausea	22 (12.6%)	2 (3.8%)	20 (16.4%)
Vomiting	8 (4.6%)	2 (3.8%)	6 (4.9%)
Palpitation	5 (2.9%)	0 (0%)	5 (4.1%)
Sweating	27 (15.5%)	7 (13.5%)	20 (16.4%)
Loss of appetite	19 (10.9%)	2 (3.8%)	17 (13.9%)
Insomnia	3 (1.7%)	0 (0%)	3 (2.5%)
No symptoms	93 (47.7%)	32 (61.5%)	61 (50.0%)
Others	11 (10.3%)	3 (5.8%)	11 (9.0%)

Discussion

The relevance and significance of dissection has recently been under discussion at different health-related institutions. This study aimed to assess students' attitudes to human cadaveric dissection, the main stressors encountered and coping mechanisms to overcome such stressors by undergraduate dental students at the University of Peradeniya, Sri Lanka.

The majority of students (82.2%) in the present study were excited when entering the dissection room for the first time and that is probably because many of them (76.4%)

haven't had any prior experience working on a dead human body. Similar findings have been reported by Izunya *et al.* (2010) on preclinical medical students of a Nigerian medical school. Interestingly, in the present study, most of the students were neither upset nor felt any emotional shock at the initial exposure to cadavers. However, a fair number of students who were shocked emotionally responded that the shock did not decrease gradually with time and due attention should be paid to those students who appraise this experience negatively. Few other studies have also demonstrated that some students suffer stress reactions during cadaveric dissection which significantly impair their learning of anatomy

(Finkelstein & Mathers, 1990; Horne *et al.*, 1990; Evans & Fitzgibbon, 1992; Jones, 1997). To ensure such experiences do not unpleasantly affect their academic progress, strategies that can effectively address their concerns should be implemented. This is particularly important in countries where cadaveric dissection is commonly employed in the study of anatomy. As past studies have shown, failure to address the concerns of such students may render them very vulnerable to psychological morbidities (Koochaki *et al.*, 2011). It was also noted that emotional shock and excessive stress have mainly been experienced by female students more than males in the present sample. In addition, Muslim students were more likely to report being excited and affected by the emotional shock during cadaveric dissection in comparison with students of other racial groups, probably due to their religious and cultural background and beliefs. Our results also showed that emotional shock decreased gradually and kind-heartedness and regard for the cadaver they dissected was developed with time among the students. Interestingly, the decrease in the emotional shock and development of kind-heartedness with time are more obvious in female students than male students in spite of the fact that male students were more mentally prepared for cadaver dissection than female students. Our result is also in line with the study done on medical students in the UK which found out that 5% of students were distressed by dissection even after repeated exposure (Evans & Fitzgibbon, 1992). Similarly, a study by Mc Garvey *et al.* (2001) on students of Royal College of Surgeons in Ireland on their initial visit and on the tenth-week visit to the anatomy room noted a significant decrease of nausea, dizziness and fainting. However, it is important for first year students to be adequately prepared for the emotional effects before they commence dissection (Javadnia *et al.*, 2006; Cody, 2013). A recent study (Anyanwu, 2015) has found that playing background music in the dissection room is effective in improving some of the symptoms that are experienced by students. Adopting such strategies will not only make the dissection room less repulsive but also

enhance the extent to which students benefit from dissection sessions.

Further, on the issue of apprehension towards initial exposure to cadavers, we observed that one-fourth (24.7%) of the students expressed apprehension to handle cadaver directly, while 69.5% did not and more than 90% of them didn't complain of any excessive stress or anxiety during dissection. These findings may be due to the fact that nearly two-thirds of the students (64.9%) in the present study were mentally prepared for dissection of human cadavers. Rajkumari *et al.* (2008) also reported that about one-third (32.5%) of the students expressed apprehension to handle cadavers directly, whereas 53.75% did not. Moreover, Inzunza *et al.* (2010) reported that 35% of Nigerian medical students experienced some fear of touching the cadavers and 46% did not feel any fear. Therefore, in comparison with previous studies the present group of students from Sri Lanka felt less fear or anxiety in handling human cadavers before and during dissection. Agreeing with our findings, previous investigations (Mc Garvey *et al.*, 2001; Rajkumari *et al.*, 2008; Dinsmore *et al.*, 2001; O'Carroll *et al.*, 2002; Vijayabhaskar *et al.*, 2005) have demonstrated that first-year pre-clinical students have not reported their first exposure to cadaver dissection as an unpleasant experience. Instead, they found it to be a positive, significant and challenging life event. Rajkumari *et al.* (2008) suggested that the factor of 'not being upset' is attributable to the students' strong motivation, interest and desire to study medical courses at the beginning of their professional career.

The present study shows that 47.7% of students felt no symptoms on first entry into the dissecting room. Sweating was the commonest symptom observed followed by dizziness and nausea. In addition, females showed symptoms during dissection more frequently than males. That is possible because males students are more prepared to cadaver dissection than females initially. Getachew (2014) on Ethiopian medical students noted that 19.5% of year 2 students and 28.4% of year 3 students felt no symptom on first entry into the dissecting room and it is much lower than our study. He further

recorded that for the majority of the students, both in year two and year three, loss of appetite was one of the commonest symptoms. Furthermore, Horne *et al.* (1990) reported that 30% of Australian students showed physical symptoms on first exposure to cadavers in the dissecting room. In addition, the study on Arab medical students in Sultan Qaboos University in Oman, showed that 46% of their students experienced some levels of symptoms before and during the initial dissecting room practical session (Abu-Hijleh *et al.*, 1997). Lee *et al.* (2011) on a group of Korean medical students reported that the most common symptom experienced during dissection is eye soreness followed by dizziness. It is in agreement with our findings. Therefore, it is clear that symptoms experienced during dissection are highly variable among different student groups from different regions of the world possible due to different working conditions, environmental factors, cultural believes, etc.

Getachew (2014) who investigated the reaction of Ethiopian medical students in the dissecting room indicated that the smell of the dissection room was the commonest cause for symptoms followed by site, touch and fear of infections in both year two and three students. In the present study, we too observed that smell was the commonest cause for symptoms followed by sight and touch. Our results are also in line with another study done on Arab students which reports smell is the reason for symptoms in 91% of the cases (Abu-Hijleh *et al.*, 1997). It is necessary to ensure that dissection rooms are adequately ventilated and properly maintained to minimize the discomfort to students during dissection and make the dissecting environment more comfortable and pleasant. In addition, most of the symptoms are attributable to the fact that the chemical that is most commonly used to preserve cadavers, namely, formaldehyde, is known to cause adverse symptoms, especially in those with allergies. In the Faculty of Dental Sciences, a solution containing formaldehyde, alcohol, glycerine, and water is used to preserve the cadavers. Therefore, most of the symptoms experienced by the undergraduate students of the present study are possibly due to this preservation technique. Thus, it is important to be vigilant in

selecting and using a better cadaver processing technique for preservation that may minimize discomforts such as palpitations, dizziness, eye irritation, difficulty breathing, etc. during dissection (Pietrzyk *et al.*, 2016; Elshaer & Mahmoud, 2017).

In the present study, the main coping mechanism used by the students to overcome the symptoms was relaxation (25.3%) followed by focusing on task (20.7%) and staying in a group (14.9%). Meanwhile, in a study done on Ethiopian medical students by Getachew in 2014 the main coping strategies used were focusing on tasks (62.88%) and staying in a group (58.76%) (Getachew, 2014). Furthermore, the most frequent method of coping in Arab students was rationalization (65%), while relaxation was used by 39% of the students (Abu-Hijleh *et al.*, 1997). Meanwhile, Australian students have used discussion with fellow students, friends and family as a coping mechanism (Horne *et al.*, 1990). Interestingly, a study that was conducted in 1995 by Paloutzian & Kirkpatrick found that spirituality is an important factor that helps individuals cope with stressful events (Paloutzian & Kirkpatrick, 1995). This evidence confirms that most students perceived dissection as a challenge and therefore, instead of avoiding dissection, they focused on the task at hand.

On the other hand, the majority of the students (95.4%) in the present study considered cadaver dissection as important and crucial in the study of human anatomy. This finding is supported by a study done by Izunya *et al.* (2010), which showed 90% of respondents considered cadaver dissection is essential in studying human anatomy. Older (2004) have recommended that cadaver dissection is essential in learning gross anatomy particularly the three-dimensional aspect of human anatomy. On the preferred method of learning anatomy, it has been observed that majority (97.7%) of the respondents agreed that dissection remains the best method of learning anatomy (Cahill & Leonard, 1997). Our finding is also consistent with those by Rajkumari *et al.* (2008) and Jones *et al.* (2001), who emphasized that actual hands on training on cadaver dissection gave better results than

demonstration of prosected specimen, as it greatly enhances the understanding of the objectives of the course and skill of thinking in a logical manner. However, our finding is in disagreement with certain arguments by Pepler *et al.* (1985), Nnodim *et al.* (1996), and Jones *et al.* (1998), who have reported against the use of cadaveric material in anatomy teaching.

Conclusion

In conclusion, the present study has affirmed that most students found their first visit to the dissection room exciting. In addition, we confirm that emotional shock varies according to gender and cultural background. Our study further affirms the fact that although the smell is the main reason for most of the symptoms experienced during dissection they are highly variable among different student populations from different countries of the world. The use of more than one coping mechanism is greatly helpful for students to counteract the situation. In addition, most students think that dissection is indispensable and gives the best method for the study of human anatomy. The results of the present study are beneficial in planning a dissection programme for medical undergraduates minimizing its emotional and adverse effects. Further studies are recommended on other contributory factors towards the students experience and attitudes toward cadaveric dissection.

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