ORIGINAL ARTICLE

Physical and psychological effects of cadaveric dissection on undergraduate medical students

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Abstract

Objective: To assess the physical and psychological effects of human cadaveric dissection on undergraduate medical students and to observe the role of counseling in this regard.

Methods: The quasi-experimental study was carried out on undergraduate medical students of Foundation University Medical College, Rawalpindi, Pakistan. The batch of 2010 was designated as the control group, while the experimental group comprised the batch of 2011. The 2010 batch began dissection without prior counseling, whereas the batch of 2011 was provided counseling ahead of dissection. At the end of the academic year, both the batches were assessed for the effects of dissection, and preference for it. This was done through a pre-designed questionnaire. The results were analysed using SPSS 10.

Results: The control group had 84 (48.55%) students, while there were 89 (51.44%) students in the experimental group. Overall, there were 138 (79.76%) girls and 35 (20.23%) boys. The students experienced multiple physical symptoms, but, 140 (80.9%) of them agreed that the symptoms disappeared spontaneously. Multiple psychological problems were also encountered.

The percentage of students experiencing these problems was more in the control group as compared to the experimental group (n=56; 63% vs n=41; 49%). The difference was not statistically significant (p <0.062). Despite all the problems, 153 (88.4%) of the students wanted to continue dissections, and 80.9% preferred cadaveric specimen rather than plastic models for studying anatomy. In the experimental group 82 (97.6%) students agreed that the initial preparatory discussions were helpful in overcoming their psychological problems.

Conclusion: Multiple physical and psychological problems are associated with cadaveric dissection, but the latter can be significantly decreased with effective counseling. In spite of all problems, the students still prefer dissection over plastic models and other audio-visual aids.

Keywords: Dissection, Psychological problems, Physical symptoms. (JPMA 63: 831; 2013)

Introduction

Medical students, at the time of admission are under a lot of stress because they are entering an academic course that needs a lot of dedication and emotional involvement. They are exposed to Anatomy which[1] is one of the most important subjects in Basic Sciences and forms the background for all the forthcoming clinical subjects.[2] Students of Anatomy have been using human cadavers as a learning tool for over 500 years and cadaveric dissection still remains the pillar for the teaching and learning of anatomy in most medical colleges.[3] Dissection has survived the most rigorous test — the test of time and the student-cadaver — patient encounter is still of paramount importance in medical education.[4] However, not only is dissection of the human cadaver emotionally disturbing, but the students are also exposed to high levels of formaldehyde which has well-documented toxic effects.[5] Therefore, though the morality of dissection for learning Anatomy is widely accepted,[6] the dissection of human cadaver is also associated with multiple stresses;[7] the emotional impact of which is often ignored.[8] Keeping this in mind, the present study was designed to assess the physical and psychological effects of cadaveric dissection on undergraduate medical students to observe the role of prior counselling.

Subjects and Methods

The quasi-experimental study was carried out at a private-sector medical college, the Foundation University Medical College, Rawalpindi, Pakistan. Medical students of first year inducted in January 2010 and January 2011 were involved in the study and were selected by convenient sampling. Institutional review waived off the requirement of ethical approval.

Freshly inducted students at the institution are made to go through a modular system of teaching which includes intensive sessions on anatomy. Different aspects of the subject are taught by dissection sessions, large-group

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interactive sessions, small-group discussions, problem-based learning sessions and practical laboratory sessions in histology. Dissection sessions lasts 90 minutes four to five times a week, during which the students either dissect the cadaver, or are involved in identifying the structures exposed during dissection. Before initiating the study, the students were informed about the study and their consent was duly taken. Any chance of participant bias was eliminated by clearly explaining to all participants the objective and methodology of the study while obtaining their informed consent.

At the time of induction, the batch of 2011, which, for the purpose of the study, was designated as the experimental group, comprised 94 students who underwent sessions that were meant to clear the ethical aspects of dissection and to psychologically prepare them for their forthcoming exposure to cadavers. This group was provided information regarding the source and legal aspects related to cadaveric dissection and their disposal and burial. The group was also told about the advantages of using dissection for a better appreciation of the three-dimensional structure of the human body and spatial arrangement of structures. However, no such discussions had been arranged for the students inducted in 2010, which had 100 students and was taken as the control group. These students had begun their dissection sessions without prior counseling. The students of both the groups were given a 22-item questionnaire at the end of their first academic year. The questionnaire was designed to have two to three options against each question. It was tested through exposure to 4 students to check for reliability. The questionnaire was meant to assess the physical and emotional effects of dissection on the students. Moreover, their attitudes towards this method of learning were also assessed and whether they enjoyed it and wanted to continue these sessions or not.

Only those students were included in the study who had minimum of 75% attendance and had no previous history of significant medical or psychological ailment. This was assessed through a pre-survey interview.

The results were analysed using SPSS 10.0. Means were calculated for quantitative data, and frequencies and percentages were calculated for qualitative data to which Chi square test was applied.

Results

In the control group, 89 (89%) of the 100 students were included in the study, while in the experimental group 84 (89.3%) of the 94 students met the inclusion criteria. Overall, there were a total of 138 (79.8%) girls in the study population. The students experienced multiple physical symptoms (Table-1): 19 (11%) students had to see a doctor for those symptoms; 140 (80.9%) students agreed that the symptoms disappeared spontaneously a few minutes after leaving the dissection hall. However, 124 (71.7%) students felt that the symptoms were more severe in the beginning, but decreased in intensity towards the end of the sessions due to gradual adaptation. The students also experienced a lot of psychological problems as 154 (89%) claimed that it was their first encounter with dead bodies. The percentage of students experiencing these problems was more in the Control group (n=56; 63%) compared to the experimental group (n=41; 49%)

Table-1: Physical symptoms.

	No incidents (%age)	Few incidents (%age)	Mostly (%age)	Always (%age)
Lacrimation	19.1	35.8	31.2	13.3
Eye Soreness	24.9	39.9	23.7	11.6
Eye fatigue	33.5	39.9	18.5	8.1
Throat Irritation	38.7	41.6	15.6	4.0
General fatigue	41.6	34.7	18.5	5.5
Mood swings	50.9	27.2	17.3	4.6
Skin problems	82.7	11.0	4.0	2.3
Breathlessness	75.1	19.7	3.5	1.7
Visit to doctor	89.0	10.4	0.6	0

Table-2: Psychological effects.

		Experimental group (Batch 2011) Yes	Control group (Batch 2010) Yes	Statistical significance
1	Were there any ethical concerns?	48.8	62.9	$p < 0.062$
2	Did you experience any degree of fear?	13.1	30.3	$p < 0.006$*
3	Were there any recurring visual images of cadavers?	8.3	29.2	$p < 0.000$*
4	Did you experience palpitations on handling cadavers?	8.3	25.8	$P = 0.002$*
5	Did you relate with the cadaver as a person?	65.6	83.1	$p < 0.008$*
6	Do you prefer actual cadaveric specimen for studying gross anatomy?	79.8	82.1	$p < 0.692$

*Statistically Significant ($p < 0.05$).

Table-3: Psychological effects on the basis of gender.

		Males N=35 (%) Yes	Female N=138 (%) Yes	
1	Were the dissections helpful in the learning of anatomy?	85.7	94.9	p <0.005
2	Would you like such sessions in future?	88.6	88.4	p <0.978
3	Were there any ethical concerns?	51.4	57.2	p <0.536
4	Did you experience any degree of fear?	11.4	24.6	p <0.092
5	Were there any recurring visual images of cadavers?	20.0	18.8	p <0.876
6	Did you experience palpitations on handling cadavers?	11.4	18.8	p <0.301
7	Did you relate with the cadaver as a person?	71.4	75.4	p <0.633
8	Do you prefer actual cadaveric specimen for studying gross anatomy	77.1	81.9	p <0.525

(Table-2). The percentage of students experiencing psychological problems was more in the females (n=131; 95%) compared to the male students (n=30; 85.7%), but the difference was not statistically significant.

In spite of all the physical and psychological problems, 153 (88.4%) students felt that they wanted to continue with dissections, and 140 (80.9%) felt that they preferred cadaveric specimen rather than plastic models for studying Anatomy. Besides, 82 (97.6%) of the experimental group agreed that the initial preparatory discussions were helpful in overcoming their psychological problems and 124 (71.9%) of these students felt that these discussions increased their respect for human life and they felt grateful to the individuals whose bodies they were using for acquiring knowledge.

Discussion

For doctors, the human body is a continuous focus of attention, and therefore the study of Anatomy is necessary for safe medical practice.[9] In the 18th century, the study of gross anatomy was dependent on cadaveric dissection because that was the only available method of three-dimensional studies of the gross anatomical structures. However, with the passage of time and, as a result of advances in science and technology, there have been revolutionary changes in teaching methodologies.[10] In spite of that, cadaveric dissection cannot be dismissed as obsolete and is still of paramount importance in medical education.[4]

It is, however, important to realise that dissecting cadavers has a multifaceted impact on the student both physically and psychologically. The present study showed that the students experience multiple physical symptoms upon exposure to formaldehyde fumes during dissection. These symptoms included watering from the nose and eyes and difficulty in breathing and some skin problems. Similar symptoms such as itching and paresthesia of the hands, dizziness, burning eyes, headache, sneezing, epistaxis, gingival bleeding, oral or pharyngeal itch, and shortness of breath were reported by students doing dissection.[11] Another study claimed that students with history of atopic dermatitis and allergic rhinitis were more susceptible to formaldehyde exposure, and developed mucocutaneous symptoms.[12] All these evidences are supported by studies which clearly indicate that even low levels of exposure to formaldehyde induce genotoxic effects in epithelial cells and in peripheral blood lymphocytes.[5,13]

This can be explained by the fact that formaldehyde, which is a common component of most embalming solutions utilised to preserve cadavers, is a toxic irritant and the International Agency for Research on Cancer classifies it as carcinogenic to humans.[4] Studies claim that a person working on cadavers at the gross anatomy laboratory is exposed to 2 to 3 times more formaldehyde than the mean concentration in the room. Therefore, it is understandable that the toxicity of formaldehyde should be considered a significant risk factor in gross anatomy laboratories.[14]

It is well documented that medical students are prone to psychiatric problems such as anxiety and depression[15] much of which is associated with the academics.[16] The present study revealed multiple psychological disturbances upon exposure to cadaveric dissection. Similar complaints have been documented in previous studies and include varying degree of fear on first entering the dissection hall, recurring visual images of cadavers and palpitations.[17] The present study showed that the psychological disturbances were more in the female students compared to the male students, but the difference was not significant. This shows a difference in trend, because earlier studies claimed a significant gender difference in attitudes toward dissection[18] with female

students showing a higher level of fear.[19]

The majority of students in this study enjoyed working in the dissecting room, and considered it a valuable tool for learning. Most of them were of the opinion that cadaveric dissection was indispensible to the teaching of Anatomy and that audio visual dissection and models could complement and not replace dissection. Similar opinions were expressed by students in previous studies as well.[19,20] This view is also reflected in studies which showed that the students who had gone through cadaveric dissection did better in all aspects of the examinations with a significant difference between the mean scores of both groups.[9]

The present study showed that the psychological problems were significantly higher in students who had not undergone the preparatory sessions before beginning dissection. This is also in accordance with other studies which emphasise the need for effective counseling programmes.[7,21]

In the present study some confounding factors were present which might psychologically affect the students. This can be considered as a limitation of the study which can be overcome in future studies.

Conclusion

Multiple physical and psychological problems are associated with cadaveric dissection, but the latter can be decreased with effective counselling and preparatory sessions that may prepare them for the stresses they will face upon encountering cadavers. In spite of all the physical and psychological effects of dissection, the students still prefer the use of cadavers over plastic models and other audio-visual aids.

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