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## RESEARCH ARTICLE

### Ethical Insight and Safety Principles of Working with Cadaver among the First-year Medical School Students-An Educational Research

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#### Abstract:

#### Background:

This study aimed to conduct a workshop to improve the ethics and safety of working with a cadaver.

#### Materials and Methods:

This interventional study was conducted on 37 freshmen medicine students working with a cadaver. A workshop was held by a medical ethics expert. Two weeks later, the questionnaires were again distributed among the participants. The data were analyzed by Paired-T and Wilcoxon test using SPSS 21 software.

#### Results:

The mean score of the ethical insight increased after the workshop ( $P=0.001$ ). The insight on the safety did not show a significant variation ( $P=0.830$ ).

#### Conclusion:

It is recommended to hold a workshop to teach the ethical points of working with the cadaver before the students' entrance to the dissection hall.

**Keywords:** Anatomy, Medical student, Ethics, Cadaver, Education, Workshop.

#### Article History

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## 1. INTRODUCTION

Although dissection is a usual method in anatomy education, it can be a stressful experience for medical students [1]. Anatomy refers to the knowledge of the different parts of the body and their structural relationships. Understanding human diseases requires a comprehensive knowledge of the body. Cadaver has long been the oldest and the most basic source of morphological details of human anatomy [2, 3]. Despite the computer-aided methods to train the MDs and surgeons [4], cadavers have remained the best educational method [5]. The establishment of values such as respect, responsibility, and appreciation can never be achieved by the use of computer-based tools [6]. The human cadavers should

be respected as the first patients of the medical students. Kindness is one of the most important parts of professional commitment which can be learned by cadavers. Professional commitment should remind the student that the cadaver belongs to an individual who donated his/her body to improve medical science and train future physicians. Therefore, the students must appreciate such generosity and consider these cadavers as their silent teachers [7]. Despite the religious principles regarding the human body dignity in Islam, a limited number of studies have addressed this issue. It seems that this topic has been neglected in Iranian medical education, and we sometimes observe some challenges in this field. For example, if it is required to conduct an invasive act on the cadaver, the students must know that these cadavers are their silent teachers who were one day alive and the love of somebody; therefore, they should be treated with respect and just the same as an alive patient [8]. Developing an ethical and kind attitude

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toward human corpses should be seen as part of the more comprehensive process of becoming aware and reflexive about one's positionality and situated knowledge, and about the need to cultivate a wise stance [9, 10]. Cadaver autopsy helps the students to develop ethical insights, kindness, and care for human beings which are all among the prerequisites of being a professional doctor. Therefore, the students' sense of kindness toward the cadavers should be taught by simple techniques through patient-oriented approaches and educating the humanitarian values. In this regard, the present study aimed to determine the effect of education on ethical insight and safety principles of working with cadavers among the medical students of Arak University of Medical sciences.

## 2. METHODS

This before-after interventional study was conducted on 37 first-year medical school students as a census sampling in the form of a workshop on ethics and safety principles of working with cadavers. After obtaining the approval of the ethics council of Arak University of Medical Sciences (ethics code:IR.ARAKMU.REC.1397.85), the initial version of the questionnaire on the ethics and safety principles of working with cadaver was edited by a team composed of anatomy and ethics experts. First, 30 questions were prepared, and then, they were decreased to 27 questions designed on the basis of the Likert scale ranging from completely agreed to completely disagreed, and divided into 2 sections: safety (6 questions) and ethics (20 questions). After confirming the reliability and validity of the questionnaire content by the experts, its internal correlation was evaluated by Cronbach's alpha test on 30 medicine students in their second year of study whose coefficient was 0.7, which was acceptable. The questionnaires were filled before the workshop. Then a 3-hour workshop was held on the ethics and safety principles of working with cadavers by a medical ethics expert. First, the concepts such as kindness and respect were explained; then using scenario and question-answer methods, group discussions were made to change the students' insight. Before entering the dissection hall and two weeks after the workshop, the questionnaires were again distributed among the participants. After the normality test (Kolmogorov-Smirnov Test), the data were analyzed by the paired t-test for ethics of cadaver and Wilcoxon Test for safety using SPSS 21 software.

## 3. RESULTS

The mean age of the students was 201.3; 60% of them were male and the remaining 40% were female. The ethical insight increased from 56.947.5 (before the workshop) to 82.55.79 (after the workshop) ( $P=0.001$ ). The insight into the safety of working with a cadaver is presented in Table 1. The mean score of ethical insight increased after the workshop ( $P=0.001$ ). The insight on the safety did not show a significant variation ( $P=0.830$ ) (Table 1).

Considering some of the questionnaires on the ethical insight, the results showed that the question of "Is imaging for educational purposes an ethical act?" increased from 63.9 (23) (before the workshop) to 81.6% (28). Moreover, before the workshop, 28 students (7.8%) considered the cadaver

dissection as an entertaining task, while one of them (2.8%) agreed with this statement after the intervention. Before the workshop, 21 (58.3%) students agreed that the cadaver should be completely naked during the education, while the number of these students declined to 5 (13.9%) after the intervention. Before the intervention, 11 (30.6%) students agreed that the cadaver is like a teacher helping in their education, while these statics reached 15 (41.7%) after the workshop. Before the workshop, 12 participants (33.3%) agreed that any displacement of the cadaver should be conducted with respect and dignity; while 20 (55.6%) of the students agreed on that after the workshop. 5.6% agreed that doing amusing acts with the cadaver is against the ethics before the workshop which increased to 75% after that. The other items of ethics insight are presented in Table 2.

Concerning the safety points, 6 (16.6%) of the students disagreed that jewelry is not forbidden in the dissection hall, which reached 14 (38.8%) after the workshop. Before the workshop, 3 (8.3%) of them agreed that the use of formalin does not prevent diseases which increased to 5 (13.9%) after the intervention. The other items of safety are listed in Table 3.

## 4. DISCUSSION

This study was conducted to determine the effect of workshop training on the ethical and safety insights of working with cadavers among the freshmen medical students. No study has addressed the effect of the educational intervention on the ethical and safety principles of working with cadavers, and only descriptive and review studies can be mentioned in this regard. The results of this study showed that this educational workshop managed to affect the ethical insights of working with a cadaver, but it did not influence the safety issues. This showed that the students were sensitive to their safety even before the intervention and they believed that they should comply with the safety principles for their own safety; however, they need education on the ethical aspects of working with a cadaver.

**Table 1. Mean attitude towards ethics and safety aspects of the cadaver in medical students**

-	-	Mean±SD	N	P-value
Ethics	Before	56.94±7.50	36	0.001
	After	82.500±5.79	36	
Safety	Before	21.27±2.36	-	0.830
	After	21.41±1.76	-	

Before the workshop, 12 participants (33.3%) agreed that any displacement of the cadaver should be conducted with respect and dignity, while 20 (55.6%) of them agreed on that after the workshop. Considering the statement "doing amusing acts with the cadaver is against the ethics", 5.6% agreed before the workshop which increased to 75% after that. This amount of increase is not enough; hence, other educational approaches and the role-model effect of the ethics professors should be considered as well. Anatomy professors should consider the emotional aspects of the students, before, during, and after the course of anatomy. Activities such as the role of professor, student groups, and peer education could be useful [11].

**Table 2. The items of Ethical Insights in the first-year medical school students.**

		Pre Test		Post Test	
		N	%	N	%
1. Taking photos of the donated corpse is useful for educational purposes.	totally disagree	10	27.0	25	67.6
	disagree	13	35.1	6	16.2
	no idea	6	16.2	5	13.5
	totally agree	2	5.4	1	2.7
2. Taking photos of the donated corpse is fun.	totally agree	1	2.7	19	51.4
	agree	0	0	10	27.0
	no idea	4	10.8	5	13.5
	totally disagree	17	45.9	1	2.7
3. It is necessary to strip all the limbs of the corpse while training.	totally agree	15	40.5	2	5.4
	totally agree	1	2.7	10	27.0
	agree	4	10.8	12	32.4
	no idea	9	24.3	10	27.0
4. There is no need to know about moral considerations to work with the donated corpse.	totally disagree	15	40.5	3	8.1
	totally agree	8	21.6	2	5.4
	totally disagree	0	0	6	16.2
	disagree	1	2.7	14	37.8
5. There are no moral limitations to remove parts of the corpse out of the dissection room for learning.	no idea	4	10.8	9	24.3
	agree	18	48.6	5	13.5
	totally agree	14	37.8	3	8.1
	totally agree	0	0	8	21.6
6. There is no moral problem with doing fun things with the donated corpse.	agree	1	2.7	4	10.8
	no idea	1	2.7	8	21.6
	disagree	12	32.4	7	18.9
	totally disagree	23	62.2	10	27.0
7. Removing some parts of the corpse in tests is justified.	totally agree	0	0	20	54.1
	agree	0	0	13	35.1
	no idea	-	-	2	5.4
	disagree	10	27.0	-	-
8. While working with the corpse, I always ask GOD to forgive the person who donated the body.	totally disagree	27	73.0	2	5.4
	totally disagree	0	0	9	24.3
	disagree	1	2.7	9	24.3
	no idea	5	13.5	11	29.7
9. While working with the corpse, I refrain from any unnecessary talk.	agree	14	37.8	4	10.8
	totally agree	17	45.9	4	10.8
	disagree	1	2.7	0	0
	no idea	5	13.5	9	24.3
10. Caring for and keeping the removed parts of the corpse is considered as respect for the corpse.	agree	12	32.4	18	48.6
	totally agree	19	51.4	10	27.0
	totally disagree	-	-	2	5.4
	disagree	3	8.1	3	8.1
10. Caring for and keeping the removed parts of the corpse is considered as respect for the corpse.	no idea	12	32.4	9	24.3
	agree	15	40.5	21	56.8
	totally agree	7	18.9	2	5.4
	totally disagree	0	0	1	2.7
10. Caring for and keeping the removed parts of the corpse is considered as respect for the corpse.	-	1	2.7	0	0
	no idea	3	8.1	8	21.6
	agree	16	43.2	16	43.2
	totally agree	17	45.9	12	32.4
10. Caring for and keeping the removed parts of the corpse is considered as respect for the corpse.	disagree	1	2.7	-	-

(Table 4) contd.....

		Pre Test		Post Test	
		N	%	N	%
11. In my opinion, the donated corpse is like a teacher who helps me to learn the science of anatomy.	no idea	1	2.7	5	13.5
	agree	20	54.1	21	56.8
	totally agree	15	40.5	11	29.7
12.The provision of human organs and bodies for science advancement and training in any possible way is justifiable.	totally agree	2	5.4	4	10.8
	agree	0	0	6	16.2
	no idea	9	24.3	12	32.4
	disagree	18	48.6	10	27.0
13. Identification of the corpse is important to me.	totally agree	8	21.6	5	13.5
	totally agree	1	2.7	10	27.0
	agree	2	5.4	9	24.3
	no idea	2	5.4	11	29.7
	disagree	18	48.6	3	8.1
14.I have no moral obligation to the professors' moral performance while working with the corpse.	totally disagree	14	37.8	4	10.8
	totally agree	0	0	5	13.5
	agree	0	0	12	32.4
	no idea	4	10.8	13	35.1
	disagree	25	67.6	5	13.5
15.I have no moral obligation to the ethical performance of the dissection room crew.	totally disagree	8	21.6	2	5.4
	totally agree	0	0	6	16.2
	agree	0	0	15	40.5
	no idea	3	8.1	10	27.0
	disagree	24	64.9	4	10.8
16.In my opinion, dissecting a corpse is basically immoral.	totally disagree	10	27.0	2	5.4
	totally agree	0	0	17	45.9
	agree	0	0	16	43.2
	no idea	6	16.2	4	10.8
	disagree	8	21.6	0	0
17.The identity of corpses must remain confidential.	totally disagree	23	62.2	0	0
	totally disagree	1	2.7	1	2.7
	disagree	0	0	3	8.1
	no idea	9	24.3	13	35.1
	agree	10	27.0	9	24.3
18.I do not consider it immoral to name corpses.	totally agree	17	45.9	11	29.7
	totally disagree	0	0	6	16.2
	disagree	0	0	6	16.2
	no idea	3	8.1	14	37.8
	agree	15	40.5	8	21.6
19.Any relocation of corpses must be done with respect and dignity.	totally agree	19	51.4	3	8.1
	disagree	0	0	1	2.7
	no idea	2	5.4	7	18.9
	agree	15	40.5	17	45.9
20.I would like to donate my body after my death to be used in educational matters.	totally agree	20	54.1	12	32.4
	totally disagree	13	35.1	10	27.0
	disagree	9	24.3	3	8.1
	no idea	11	29.7	11	29.7
	agree	3	8.1	2	5.4
21.It is permitted to bring other people (both students and non-students) to the dissection room for non-educational purposes.	totally agree	1	2.7	11	29.7
	totally agree	2	5.4	8	21.6
	agree	2	5.4	15	40.5
	no idea	5	13.5	9	24.3
	disagree	15	40.5	5	13.5
	totally disagree	13	35.1	8	21.6

**Table 3. The items of safety in hall dissection in the first-year medical school students.**

		Pre Test		Post Test	
		N	%	N	%
It is necessary to use a white uniform or gun in the dissection room.	no idea	0	0	2	5.4
	agree	7	18.9	10	27.0
	totally agree	30	81.1	25	67.6
While dissecting the corpse, it is necessary to wear gloves and a mask.	disagree	0	0	1	2.7
	no idea	0	0	7	18.9
	agree	10	27.0	17	45.9
	totally agree	27	73.0	12	32.4
There is no problem with eating and drinking in the dissecting room.	totally agree	21	56.8	-	-
	agree	9	24.3	2	5.4
	no idea	7	18.9	10	27.0
	disagree	0	0	13	35.1
	totally disagree	0	0	12	32.4
By using formalin to preserve the corpse, diseases may be transmitted to me.	totally agree	1	2.7	3	8.1
	agree	3	8.1	2	5.4
	no idea	17	45.9	19	51.4
	disagree	14	37.8	12	32.4
	totally disagree	2	5.4	1	2.7
Using ornaments (ring and bracelet, etc.) in the dissection room is not prohibited.	totally disagree	3	8.1	2	5.4
	disagree	7	18.9	6	16.2
	no idea	12	32.4	23	62.2
	agree	8	21.6	3	8.1
	totally agree	7	18.9	3	8.1
I am not allowed to take unnecessary things (such as bags and books) to the dissection room.	totally disagree	0	0	6	16.2
	disagree	9	24.3	17	45.9
	no idea	7	18.9	5	13.5
	agree	12	32.4	6	16.2
	totally agree	9	24.3	3	8.1

Scientific board members of the universities are the role models of the students, leading them to positive or negative attitudes. Evidence has shown that educators learn more professional ethics from their role models and hence these role models can deeply affect the students' behavior [12]. The present study has shown that education can improve the belief of respect towards the cadaver. Respect for the cadaver should be the same as respecting the passed away individual; therefore, any disrespect towards the cadaver is disrespecting his/her relatives. In a study, 82% of the students agreed that the dissected cadaver was a human just like them and 87% of them respected the cadaver [3, 13]. From the religious point of view, disrespect towards the cadaver not only means improper ethical insight towards the passed away person, but it also implies disrespect towards humans [12].

In terms of the safety of working with the cadaver, the studies have suggested that the students should wear gloves and do not apply contact lenses in the dissection hall, do not bring their bags to the hall, and avoid eating and drinking [13, 14]. In the present study, 6 (16.6%) of the students disagreed that jewelry is not forbidden in the dissection hall which reached 14 (38.8%) after the education. Before the workshop, 3 (8.3%) of them agreed that the use of formalin does not prevent diseases which increased to 5 (13.9%) after the intervention. The insight on the safety did not show a significant variation

( $P=0.830$ ). For safety, the teacher as a model can sensitize students regarding their health [15]. Dissection is like surgery, so students should be on the lookout for sudden injuries. The risk of transmission of infections such as hepatitis B, tuberculosis, HIV, and hepatitis C could be considered. Therefore, in the dissection hall, students should use gloves and special tools such as scissors and forceps for the autopsy [16]. In a 4-year (2009-2012) study on injuries to students in the anatomy course, the results showed that 10 students out of 835 were injured. Injuries included cuts with a scalpel blade, one on the index finger, five were contaminated, and three were injured by other students. 4 people were injured by scalpel removal. Six of the eight blade injuries were in the left hand. Formalin was also spilled on 2 students [17].

## CONCLUSION

As the workshop training was effective in enhancing the students' beliefs regarding the ethical points of working with the cadaver, the authors recommend that the anatomy professors, in cooperation with the ethics experts, should conduct some educational and awareness interventions to enhance the ethical insight of the students toward working with cadavers. Moreover, some ethical guidelines and standards should be considered in their curriculum regarding working with cadavers. Furthermore, an ethical oath before dissection

can help protect the dignity of the cadaver.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the ethical committee (ethics code:IR.ARAKMU.REC.1397.85) of Arak University of Medical Sciences, Iran.

## HUMAN AND ANIMAL RIGHTS

No Animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

## CONSENT FOR PUBLICATION

Written informed consent was obtained from each participant prior to the study.

## AVAILABILITY OF DATA AND MATERIALS

The datasets generated and/or analyzed during the current study are not publicly available due to the moral rules of Arak university of medical sciences.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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