

Does Education About Death and Dying Decrease Stress Generated in the Dissection Room?

¿Disminuye el Estrés Generado en la Sala de Disección la Formación sobre la Muerte y el Moribundo?

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SUMMARY: Positive effects on reducing students' stress have been reported across numerous university settings when anatomy preparatory seminars have been provided. To date, this type of preparation for coping with cadaver dissection has not been studied in Spanish universities. The aim of this study is to evaluate how first-year Spanish medical students face the dissecting room and whether previous preparation about death and dying reduces the stress generated. We performed an interventional study with students who received preparatory classes before the dissection practices (Experimental Group, EG) and with students who did not (Control Group, CG). Sociodemographic data and a self-assessment on stress symptoms were collected through a questionnaire completed before and after the dissection practices. No differences were found in the self-report of symptoms of stress among students who consider themselves religious or not, or between students who had a family member in the healthcare environment or not. However, in the EG, the students who had ample experience with terminally ill patients or death reported fewer stress symptoms. Unexpectedly, the number of self-reported stress symptoms after the dissection practice was higher in EG students. In conclusion the stress levels of first-year Spanish medical students not only did not improve after receiving preparatory classes about death and dying and discussion groups, but it gets worse. We found a relationship between student stress measured and experience with terminally ill patients or death. Additional studies are needed to identify the most suitable preparation for Spanish medical students.

KEY WORDS: Anatomy education; Cadaver dissection; Medical students; Stress.

INTRODUCTION

Human cadaveric dissection has been used as the main teaching tool in anatomy for centuries. However, dissection represents a significant emotional challenge to many medical students, since this is, in most cases, their first intimate experience with death (Finkelstein & Mathers, 1990). Students' encounters with the subject of death and dying and the revelation of the inside of the body during dissection practices is a situation for which, especially considering their age, they may not be prepared. Successfully coping with this situation can be a key element in their subsequent physician--patient relationship (Sándor *et al.*, 2015).

Emotional reactions of medical students to the dissecting room have been previously studied (Horne *et al.*, 1990; Charlton, 1994; Arráez-Aybar *et al.*, 2008; Wisenden *et al.*, 2018). Horne *et al.* described that 30 % of first-year medical students experienced physical and psychological effects, such as depression and anxiety. Other findings indicate that only a small percentage of students showed persistent negative reactions. Most of the negative emotions were instant and reactive, and spontaneously diminished after the first few weeks of dissection (Arráez-Aybar *et al.*, 2008; Mulu & Tegabu, 2012). However, some students show an intense and sustained repulsion towards dissection and

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require more individualized approaches and interventions to enable them to overcome their fundamental fear of death (Kotzé & Mole, 2013; Chang *et al.*, 2018).

Some researchers have advocated introducing preparatory seminars or audiovisual media to help students face death and to reduce their stress (Casado *et al.*, 2012; Dosani & Neuberger, 2016). Giving testimonies or forming group discussions could help to reduce the students' stress before the dissection practices (Lazarus *et al.*, 2017). Positive effects on reducing students' stress have been reported across numerous university settings when anatomy preparatory seminars have been provided (Hull, 1991; Bourguet *et al.*, 1997; Dickinson *et al.*, 1997; Marks, 1997). It is useful to manage undesirable experiences that could have a negative influence during the training of medical students and their future doctor-patient relationships (Sándor *et al.*).

To date, this type of preparation for coping with cadaver dissection has not been studied in Spanish universities. A study was carried out demonstrating higher levels of anxiety in first-year students, before attending the dissection room (Arráez-Aybar *et al.*, 2004). We conducted a study, in which the students received a preparatory talk based on the history of the Anatomy teaching and rules in the dissection room, obtaining a decrease in the self-reported symptoms of stress (Barrio, 2003). Given these results, we decided to complement the preparatory talks with issues related to death and the terminal patient as recommended by Hull.

The aim of this study was to assess how first-year medical students from a Spanish university face the dissecting room. We used self-reporting to measure the stress generated in response to their contact with death with or without previous preparation based on teaching about death and dying.

In addition, we investigated whether certain factors, such as religious beliefs, having parents who work in the healthcare field, or previous experience with terminally ill patients or death, may modulate the stress experienced before and after the dissection practices. These survey items were chosen based on previous studies (Horne *et al.*; Dickinson *et al.*; Leboulanger, 2011).

Our working hypothesis was that students who receive preparatory classes for coping with death during the dissection practices experience less stress than those who face a dead human body without this preparation. It is important to highlight the relevance of the current work as novel research in our country, since students' negative experiences in response to dissection may influence their future physician-patient relationships (Bertman & Marks Jr., 1989).

MATERIAL AND METHOD

Subjects. The present study was approved by the Ethics Committee of our Institution. The questionnaire was administered to first-year undergraduate medical students (336 students) of our University, who participated in the dissection practices programmed for the subject Human Anatomy during five academic years (from 2009-10 to 2013-14). Students who were repeating the anatomy course from the previous year were excluded from the study. No other condition such as age, gender, marital status, education, religion, etc., was considered as exclusion criteria. Participation was voluntary, and anonymity was guaranteed.

Study design. We conducted an experimental study. The distribution of the participants was carried out randomly in two groups, control group (CG) and experimental group (EG). The students on the EG, received preparatory classes before the dissection practices, during the abovementioned academic years.

Data collection. A questionnaire (supplementary material), written in Spanish, was distributed and collected by hand to participants from both study groups before and after the dissection practices. The questionnaire was divided into two parts. In the first part, socio-demographic data was collected. In addition to demographic variables, students had to answer the following questions: "Do you consider yourself a religious person?"; "Does your parent work in the healthcare field (doctor, nurse, etc.)?"; "Do you have any experience with terminally ill patients?"; and "Do you have any previous experience with death?" These survey items to modulate the student' stress were chosen based on previous studies (Horne *et al.*; Dickinson *et al.*; Leboulanger). The second part of the questionnaire consisted of a self-assessment checklist of stress symptoms performed by Neidhart *et al.* (1989). The frequency of the expressed according to a four-level Likert scale: 0 = "never"; 1 = "rarely"; 2 = "frequently"; 3 = "constantly".

Finally, the students were surveyed in relation to their opinion regarding the preparation to face up to the dissection practice with the following questions: "Do you think students should be prepared emotionally before entering the dissecting room?" and "Do you think that expressing emotions and attitudes triggered by the dissecting room helps to reduce your stress level?". The possible answers were: "Yes" "No"; "I do not know".

Procedure. The students performed 24 hours of dissection practices divided into twelve two-hour sessions (two sessions per week, for a total of six weeks). Before beginning

dissection practices, three 50-minute lectures about death and dying were given only to the students from EG. The first lecture addressed the mystery of death for human beings and exposed the difficulty of modern medicine in determining the moment of death. The second lecture was focused on the concept that death is a dimension of life, that is, that death gives meaning to life. The last lecture consisted of a brief overview of anatomy history and dissection techniques and discussed the importance of dissection as a teaching tool, as well as ethical, religious, social and family considerations related to this practice.

In the EG, small discussion groups (six students) were formed two weeks after the beginning of the dissection practices. These groups were asked about their experiences during the dissection practices. Ethical, religious, social and family issues associated with dissection were also discussed. A retired general practitioner with professional experience in these topics coordinated the groups.

Analysis of data. For the categorical variables (symptom frequency), two types of non-parametric tests were applied, a Mann-Whitney U test, for independent samples, and a Wilcoxon pair test, when measures were repeated. For the quantitative variable (number of symptoms), a parametric test, the analysis of covariance (ANCOVA) was used, once the assumptions for use had been verified. The analysis of students' opinion responses was assessed by a McNemar-Bowker test. All statistical analyses were performed with SPSS 22.0 software (SPSS Inc., Chicago, Illinois, USA). A 5 % significance level was used throughout the analysis.

RESULTS

Socio-demographics data. The sample size was 336 students who responded to the questionnaire before and after the dissection practices (145 from CG and 191 from EG). There was a gender distribution of 245 female (72.9 %) and 91 male (27.1 %) and there was no gender significant differences between the control and experimental groups (Table I).

Most participants were born in an urban setting (86.9 %), lived in a city or town (58.6 %) and were of Spanish nationality (94 %). No significant differences were observed between CG and EG in place of birth, place of residence or nationality (Table I).

In addition to demographic variables, certain social characteristics of students that could be relevant for our study were collected in the questionnaire. The percentage of self-

considered religious students (45.4 %) was slightly higher than non-religious students (40.4 %). Most participants did not have parents professionally related to the healthcare field (71.2 %) and there were statistical differences between the groups ($p=.038$). 55.7 % of students reported no experience with terminally ill patients, 40.2 % reported some experience and only 4.2 % had considerable experience. Finally, we found that 46.7 % had no previous experience with death, while 48.5 % and 4.8 % of students reported some or considerable experience, respectively. In this regard, there were no significant differences between the groups in relation to experience with terminally ill patients ($p=.811$) or death ($p=.828$), between the groups (Table I).

Student stress in response to dissection practices. Firstly, to assess the levels of self reported stress in the two study groups, we analysed the frequency of eighteen stress symptoms reported by the students before and after the dissection practices (Table II). In the CG, students showed a similar frequency of most stress symptoms before and after dissection practices. However, we found a significant reduction in three stress symptoms and higher frequency in three symptoms, after the dissection practices. Regarding the EG, the frequency of ten out of eighteen symptoms analyzed showed no significant differences before and after the dissection practices. Participants of this group had higher symptomatology after the dissection practices in six stress symptoms and lower frequency in two symptoms once they had performed the dissection practices.

In order to evaluate whether the preparatory classes before entering the dissecting room may reduce the levels of self reported stress, we compared data from CG and EG using a Mann-Whitney U test (Table III). Only the symptoms that had shown significant differences between both study situations were included in the analysis. We observed a significantly higher frequency of six symptoms in EG when compared to the CG. We also used ANCOVA to analyze the number of stress symptoms reported after the dissection practices, only taking into account whether the symptom was reported or not by each student. Participants who did not report at least five symptoms were excluded from the analysis. Once possible differences between both groups in the pre-dissecting room situation were controlled, EG showed a significantly higher number of symptoms (Mean=5.98; SD=4.11) than CG (Mean=3.49; SD=3.16) after the dissection practices [$F(1,309)=21.76$; $p<.001$; $\eta^2_p=.066$].

Effect of student social factors on dissection-related stress. We studied whether the obtained results could vary according to the social characteristics of the studied participants. For this purpose, we carried out an ANCOVA

Table I. Comparison of sociodemographic variables between Control Group and Experimental Group.

Variable	Category	Total sample (N=336)	Group		P
			Control (N=145)	Experimental (N=191)	
Gender	Female	245 (72.9%)	103 (71%)	142 (74.3%)	.500
	Male	91 (27.1%)	42 (28.9%)	49 (25.7%)	
Place of birth	City/Town	292 (86.9%)	123 (84.8%)	169 (88.5%)	.325
	Village	44 (13.1%)	22 (15.2%)	22 (11.5%)	
Place of residence	City/Town	197 (58.6%)	86 (59.3%)	111 (58.1%)	.826
	Village	139 (41.4%)	59 (40.7%)	80 (41.9%)	
Nationality	Spanish	316 (94%)	133 (91.7%)	183 (95.8%)	.117
	Foreign	20 (6.0%)	12 (8.3%)	8 (4.2%)	
Religious person	Yes	152 (45.4%)	52 (35.9%)	100 (52.6%)	.009**
	No	134 (40.0%)	68 (46.9%)	66 (34.7%)	
	Don't know	24 (14.6%)	25 (17.2%)	24 (12.6%)	
Parents' work in the healthcare environment	Yes	96 (28.8%)	50 (34.7%)	46 (24.3%)	.038*
	No	237 (71.2%)	94 (65.3%)	143 (75.7%)	
Experience with terminally-ill patients	No	187 (55.7%)	80 (55.2%)	107 (56.0%)	.811
	Few	135 (40.2%)	60 (41.4%)	75 (39.3%)	
	Many	14 (4.2%)	5 (3.4%)	9 (4.7%)	
Previous experience with death	No	156 (46.7%)	66 (45.5%)	90 (47.6%)	.928
	Few	162 (48.5%)	72 (49.7%)	90 (47.6%)	
	Many	16 (4.8%)	7 (4.8%)	9 (4.8%)	

Note. Group comparisons were performed using a chi-square test. * $p < .05$; ** $p < .01$.

to compare the number of stress symptoms reported after the dissection practices by students with the same characteristics in both groups, once pre-dissection differences were controlled (Table IV). The Bonferroni correction was carried out to adjust the level of significance ($*p < .017$; $**p < .003$).

Regarding the religiousness variable, we observed that students who considered themselves religious had a greater number of symptoms in the EG ($p < .001$). No

significant differences were found for those students who declared themselves non-religious ($p > .017$).

Students from the EG whose parents work in healthcare fields reported a greater number of symptoms than those of the CG ($p < .014$).

On the other hand, when we assessed the number of stress symptoms according to students' previous experience with terminally ill patients or death, we found different

Table II. Comparison of students' stress symptom frequency before and after dissecting room in each group.

Item	Control Group			Experimental Group		
	Pre-room	Post-room	Wilcoxon	Pre-room	Post-room	Wilcoxon
	Mean (SD)	Mean (SD)	P	Mean (SD)	Mean (SD)	P
Headache	0.16 (0.43)	0.49 (0.63)	.000**	0.29 (0.50)	0.51 (0.62)	.000**
Difficulty sleeping	0.15 (0.40)	0.09 (0.35)	.222	0.32 (0.61)	0.35 (0.66)	.479
Nervousness	0.89 (0.75)	0.30 (0.53)	.000**	0.84 (0.80)	0.73 (0.71)	.066
Nightmares	0.10 (0.37)	0.16 (0.40)	.414	0.21 (0.43)	0.28 (0.52)	.118
Constipation	0.04 (0.23)	0.04 (0.23)	1.00	0.12 (0.42)	0.14 (0.38)	.623
Alcohol/drug consumption	0.08 (0.30)	0.06 (0.24)	.371	0.15 (0.40)	0.12 (0.39)	.542
Indigestion	0.22 (0.47)	0.23 (0.47)	.430	0.31 (0.52)	0.41 (0.60)	.019*
Heart palpitations	0.44 (0.63)	0.20 (0.44)	.000**	0.50 (0.68)	0.41 (0.59)	.114
Worry thoughts	0.75 (0.74)	0.35 (0.52)	.000**	0.98 (0.90)	0.77 (0.76)	.001**
Menstrual discomfort	0.21 (0.58)	0.16 (0.48)	.430	0.38 (0.77)	0.34 (0.64)	.406
Irritability	0.17 (0.43)	0.22 (0.48)	.217	0.38 (0.63)	0.49 (0.67)	.047*
Diarrhea	0.02 (0.15)	0.01 (0.12)	.564	0.15 (0.37)	0.08 (0.27)	.024*
Neck and shoulder pain	0.33 (0.67)	0.63 (0.82)	.000**	0.68 (0.81)	0.83 (0.85)	.038*
Nausea and/or vomiting	0.26 (0.52)	0.25 (0.45)	.639	0.15 (0.44)	0.28 (0.52)	.001**
Depression	0.07 (0.26)	0.08 (0.34)	.617	0.28 (0.60)	0.23 (0.52)	.174
Cold hands and feet	0.38 (0.69)	0.34 (0.63)	.629	0.81 (0.94)	0.79 (0.96)	.601
Loss of appetite	0.41 (0.69)	0.59 (0.73)	.005**	0.40 (0.66)	0.61 (0.70)	.000**
Inability to concentrate	0.26 (0.47)	0.20 (0.48)	.303	0.52 (0.69)	0.44 (0.61)	.127

Note. Group comparisons were performed using a Wilcoxon test. * $p < .05$; ** $p < .01$.

Table III. Comparison of students' stress symptom frequency between Control Group and Experimental Group in each study situation.

Item	Pre-dissecting room		Post-dissecting room	
	Mann-Whitney		Mann-Whitney	
	Z	P	Z	P
Headache	0.68	.007**	0.37	.709
Nervousness	0.76	.447	6.07	.000**
Indigestion	1.75	.080	3.09	.002**
Heart palpitations	0.61	.543	3.63	.000**
Worry thoughts	2.17	.030*	5.98	.000**
Irritability	3.28	.001**	4.15	.000**
Diarrhea	3.70	.000**	2.68	.007
Neck and shoulder pain	4.50	.000**	2.30	.021*
Nausea and/or vomiting	2.49	.013*	0.24	.808
Loss of appetite	0.09	.928	0.49	.623

Note. Group comparisons were performed using a Mann-Whitney U test. * $p < .05$; ** $p < .01$.

results. Among the students who had no experience or little experience, EG participants showed more stress symptoms than CG participants ($p < .001$). On the contrary, regarding students with ample experiences, no significant differences

between EG and CG were observed ($p > .017$) after the dissection practices.

Analysis of student opinion. The results from the analysis of students' responses by a McNemar-Bowker test showed that, after performing the dissection practices, a significant increase [$\chi^2(3)=11.84$; $p=.008$] from 22.4 % to 34.6 %, was found in the percentage of CG participants who thought that an emotional preparation was not necessary. By contrast, most EG students supported the emotional preparation in both pre-dissection (77.6 %) and post-dissection (78.9 %) situations, without significant differences ($p=.160$). Regarding the second question, both groups showed a markedly higher percentage of participants who considered that

expressing emotions and attitudes helps to reduce students' stress. This higher percentage was both before and after the dissecting room, but no significant differences were found in the CG [$\chi^2(3)=5.06$; $p=.168$], or EG [$\chi^2(3)=2.67$; $p=.446$].

Table IV. Analysis of covariance (ANCOVA) for social variables.

Variable	Category	Factor	Post-room symptom n° Mean (SD)	ANCOVA P
Religious person	Yes	CG (N=45)	3.36 (2.68)	.000**
		EG (N=89)	6.06 (4.06)	
	No	CG (N=66)	3.26 (3.00)	.023
		EG (N=64)	5.39 (4.10)	
	Don't know	CG (N=25)	4.36 (4.16)	.031
		EG (N=22)	7.00 (4.06)	
Parents' work in the healthcare environment	Yes	CG (N=48)	3.35 (2.53)	.009*
		EG (N=42)	4.98 (3.87)	
	No	CG (N=87)	3.61 (3.46)	.000**
		EG (N=132)	6.27 (4.18)	
Experience with terminally-ill patients	No	CG (N=73)	3.42 (3.00)	.000**
		EG (N=99)	6.04 (4.01)	
	Few	CG (N=58)	3.34 (3.19)	.001**
		EG (N=68)	6.07 (4.25)	
	Many	CG (N=5)	6.20 (4.38)	.302
		EG (N=9)	4.56 (4.56)	
Previous experience with death	No	CG (N=62)	2.73 (2.58)	.000**
		EG (N=83)	5.93 (3.92)	
	Few	CG (N=67)	3.90 (3.41)	.01*
		EG (N=82)	6.11 (4.36)	
	Many	CG (N=7)	6.43 (3.21)	.266
		EG (N=9)	4.89 (4.31)	

Note. Comparison of symptom number between Control Group and Experimental Group after dissecting room. The covariate was the symptom number before dissecting room. ANCOVA was carried out for each level of the variable. Adjusted by Bonferroni test. * $p < .017$, ** $p < .003$

DISCUSSION

The purpose of our work was to analyze the attitudes and stress levels of first-year medical students in a Spanish university facing the dissecting room. Based on our results, we verify that the working hypothesis has not been fulfilled. The students who receive preparatory classes for coping with death during the dissection practices experienced greater stress than those who face a dead human body without this preparation.

The CG, after the dissection practices, showed a significant reduction in the stress symptomatology, suggesting an initial state of uncertainty that dissipates once the students have carried out the dissection practices. These results coincide with those of other studies (Horne *et al.*; Arráez-Aybar *et al.*, 2004; Mulu & Tegabu). However, the participants of the EG reported a significantly higher symptom frequency after the dissection practices, although we expected the opposite results.

We also analyzed whether the differences in the number of stress symptoms between groups would vary according to

the students' sociodemographic characteristics. Many authors have observed a greater degree of reactions or anxiety in women exposed for the first time to cadaver dissection compared to male students (Charlton *et al.*; Dickinson *et al.*; Bernhardt *et al.*, 2012; Quamar *et al.*, 2014; Wisenden *et al.*). In our study, we did not find significant differences according to gender in the stress level of first-year medical students after the dissection practices.

The effect of students' ethnicity or their religion was also evaluated. Recently, Wisenden *et al.* reported that students who self-identified as white Christians recovered quickly from the initial stress associated with cadaver dissection while students from other demographic groups did not. We observed that among

students who considered themselves religious, had a higher number of stress symptoms. This may be understood as a contradiction between religious and scientific values (Wisenden *et al.*). Thus, believing in life after death may cause religious students report physical symptoms, since they try to adapt their religious belief to the anatomy practices. These findings are consistent with the fact that ethical and value conflicts frequently result in a high level of anxiety, depression or stress (Dyrbye *et al.*, 2005). In this regard, Martyn *et al.* (2014) found that students who believed in a soul had significantly higher anticipatory stress and experienced higher levels of stress during dissection. The authors suggest that belief in a soul may affect students' experiences of dissecting, and incorporating the teaching of humanities with anatomy may help medical students to assimilate both the biomedical and philosophical aspects of dissection.

Regarding the students' parents' work, the covariance analysis showed that participants whose parents worked in the clinical field had no differences regarding the number of symptoms. These results are in line with those of other authors, where the emotional concerns before beginning the dissection practices between the students with parents or siblings who worked as health professionals and the rest of their classmates were similar (Dyrbye *et al.*). On the contrary, some authors observed a greater adaptation to death in students with

relatives involved in some way with the clinical field (Charlton *et al.*). Discussing issues related to death or anatomy in the family environment of these students could have prepared them to face these practices with greater temperance.

Regarding the experience with terminally ill patients or death, our results showed that talking about death and dying causes a greater number of stress symptoms in students of the EG without previous experience, compared to those with ample experience. These results show the positive effect on reducing students' stress of this variable.

Positive effects on reducing students' stress have been reported across numerous university settings when anatomy preparatory seminars have been provided (Bourguet *et al.*; Hull; Dickinson *et al.*; Marks *et al.*). However, the present study has not shown the reduction expected in the stress symptomatology of EG students, probably due two facts: 1) the characteristics of today's Spanish students; 2) the intervention may have been inappropriate.

One of the factors that we consider fundamental to understand this unexpected result is the institutionalization of death, a frequent practice in many countries such as ours (Britain, North America and Australia) during recent decades (McNamara *et al.*, 1994). The attitude of our present-day society towards death has changed drastically since the mid-twentieth century, when it was understood as a life consequence and was accepted within the family environment. Nowadays, the confrontation of death has become an institutional and professional act: death normally takes place in a hospital or in a private environment. Having removed everything related to death from the social environment, our students arrive into the classroom without having assimilated and integrated the concept of death. It seems that talking about death, rather than mitigating the stress that dissection practices may cause, increases it.

The intervention performed, consisting of teaching preparatory classes about death and dying from a professor in an academic way, does not exert a beneficial effect on the stress symptomatology of first-year medical students in our Spanish university. However, in the EG, most students advocated an emotional preparation before (77.6 %) and after (78.9 %) the dissecting room. Moreover, approximately 84 % of EG students considered that expressing emotions helps to reduce the stress, both before and after the dissecting room. Other authors have also found similar data, encouraging students to discuss difficult issues related to cadaver dissection (Charlton *et al.*). Medical students demand psychological support before the initial confrontation with cadaver dissection, preferably through small-group or peer-group discussions on the first day of the course (Boeckers *et al.*, 2010). As described

by Houwink *et al.* (2004), using third-year medical students as assistants is an easy, inexpensive, educational method to decrease physical and emotional stress among first-year medical students on the first day of gross anatomy dissection. According to this studies, and to our results, we suggest the need to incorporate teaching about death and the dying before clinical training, and if possible, before university studies. We believe that preparation for the dissection room should be taught with the support of students from higher levels or by someone close and related to the health sciences, avoiding teachers and individuals with an academic orientation.

The main limitations of the current work are determined by the material impossibility of conducting a study with a larger sample size, and including students from other countries in order to analyze different ways of understanding human mortality.

Additionally, we also found some difficulties due to the students' reluctance to recognize stress or anxiety problems. For many of the students these problems can be perceived as a lack of aptitude so they tend to hide it during their medical studies.

CONCLUSIONS

In summary, our results have revealed precise data about the stress symptomatology experienced by first-year medical students from a Spanish university when they must cope with cadaver dissection during anatomy practices. The stress levels did not improve after receiving preparatory classes about death and dying and discussion groups. We found a relationship between the student stress measured and religiousness and experience with terminally ill patients or death. Additional studies are needed to identify the most suitable preparation for Spanish medical students.

GONZÁLEZ-PINILLA, J.; RUIZ GALLEGO-LARGO, T.; BARRIO-ASENSIO, C.; CATÓN, J.; MARTÍNEZ-SANZ, E. & MURILLO-GONZÁLEZ, J. ¿Disminuye el estrés generado en la sala de disección la formación sobre la muerte y el moribundo?. *Int. J. Morphol.*, 38(5):1184-1191, 2020.

RESUMEN: Se han informado efectos positivos en la reducción del estrés en los estudiantes de numerosos entornos universitarios cuando se han impartido seminarios preparatorios de anatomía. Hasta la fecha, este tipo de preparación para hacer frente a la disección del cadáver no se ha estudiado en las universidades españolas. El objetivo de este estudio es evaluar cómo los estudiantes de medicina españoles de primer año se enfrentan a la sala de disección y si la preparación previa sobre la muerte y el moribundo reduce el estrés generado. Realizamos un estudio de

intervención con estudiantes que recibieron clases preparatorias antes de las prácticas de disección (Grupo Experimental, GE) y con estudiantes que no las recibieron (Grupo de Control, GC). Se recogieron datos sociodemográficos y síntomas de estrés mediante un cuestionario de autoevaluación antes y después de las prácticas de disección. No se encontraron diferencias en los síntomas de estrés valorados, entre los estudiantes que se consideran religiosos y los que no, ni tampoco entre los estudiantes que tenían o no un familiar en el entorno sanitario. Sin embargo, en el GE, en los estudiantes que tenían una amplia experiencia con pacientes con enfermedades terminales o con la muerte se observaron menos síntomas de estrés. Inesperadamente, el número de síntomas de estrés recogidos después de la práctica de disección fue mayor en los estudiantes del GE. En conclusión, los niveles de estrés de los estudiantes españoles de medicina de primer año no solo no mejoraron después de recibir las clases preparatorias sobre la muerte y el moribundo y establecer grupos de discusión, sino que empeoraron. Encontramos una relación entre la medición del estrés en los estudiantes y la experiencia con pacientes con enfermedades terminales o con la muerte. Se necesitan estudios adicionales para identificar la preparación más adecuada para los estudiantes de medicina españoles.

PALABRAS CLAVE: Enseñanza de la anatomía; Disección en cadáver; Estudiantes de medicina; Estrés.

REFERENCES

- Arráez-Aybar, L. A.; Casado-Morales, M. I. & Castaño-Collado, G. Anxiety and dissection of the human cadaver: an unsolvable relationship? *Anat. Rec. B New Anat.*, 279(1):16-23, 2004.
- Arráez-Aybar, L. A.; Castaño-Collado, G. & Casado-Morales, M. I. Dissection as a modulator of emotional attitudes and reactions of future health professionals. *Med. Educ.*, 42(6):563-71, 2008.
- Barrio, P. *Estudio sobre el Estrés Provocado en los Estudiantes de Medicina del Primer Curso durante su Experiencia en la Sala de Disección. Trabajo de Suficiencia Investigadora*. Madrid, Universidad Complutense de Madrid, 2003.
- Bernhardt, V.; Rothkötter, H. J. & Kasten, E. Psychological stress in first year medical students in response to the dissection of a human corpse. *GMS Z. Med. Ausbildung.*, 29(1):Doc12, 2012.
- Bertman, S. L. & Marks Jr., S. C. The dissection experience as a laboratory for self-discovery about death and dying: Another side of clinical anatomy. *Clin. Anat.*, 2(2):103-13, 1989.
- Boeckers, A.; Brinkmann, A.; Jerg-Bretzke, L.; Lamp, C.; Traue, H. C. & Boeckers, T. M. How can we deal with mental distress in the dissection room?-An evaluation of the need for psychological support. *Ann. Anat.*, 192(6):366-72, 2010.
- Bourguet, C. C.; Whittier, W. L. & Taslitz, N. Survey of the educational roles of the faculty of anatomy departments. *Clin. Anat.*, 10(4):264-71, 1997.
- Casado, M. I.; Castaño, G. & Arráez-Aybar, L. A. Audiovisual material as educational innovation strategy to reduce anxiety response in students of human anatomy. *Adv. Health Sci. Educ. Theory. Pract.*, 17(3):431-40, 2012.
- Chang, H. J.; Kim, H. J.; Rhyu, I. J.; Lee, Y. M. & Uhm, C. S. Emotional experiences of medical students during cadaver dissection and the role of memorial ceremonies: a qualitative study. *BMC Med. Educ.*, 18(1):255, 2018.
- Charlton, R.; Dovey, S. M.; Jones, D. G. & Blunt, A. Effects of cadaver dissection on the attitudes of medical students. *Med. Educ.*, 28(4):290-5, 1994.
- Dickinson, G. E.; Lancaster, C. J.; Winfield, I. C.; Reece, E. F. & Colthorpe, C. A. Detached concern and death anxiety of first-year medical students: before and after the gross anatomy course. *Clin. Anat.*, 10(3):201-7, 1997.
- Dosani, F. & Neuberger, L. Anatomy and humanity: Examining the effects of a short documentary film and first anatomy laboratory experience on medical students. *Anat. Sci. Educ.*, 9(1):28-39, 2016.
- Dyrbye, L. N.; Thomas, M. R. & Shanafelt, T. D. Medical student distress: causes, consequences, and proposed solutions. *Mayo Clin. Proc.*, 80(12):1613-22, 2005.
- Finkelstein, P. & Mathers, L. H. Post-traumatic stress among medical students in the anatomy dissection laboratory. *Clin. Anat.*, 3(3):219-26, 1990.
- Horne, D. J.; Tiller, J. W.; Eizenberg, N.; Tashevskaya, M. & Biddle, N. Reactions of first-year medical students to their initial encounter with a cadaver in the dissecting room. *Acad. Med.*, 65(10):645-6, 1990.
- Houwink, A. P.; Kurup, A. N.; Kollars, J. P.; Kral Kollars, C. A.; Carmichael, S. W. & Pawlina, W. Help of third-year medical students decreases first-year medical students' negative psychological reactions on the first day of gross anatomy dissection. *Clin. Anat.*, 17(4):328-33, 2004.
- Hull, F. M. Death, dying and the medical student. *Med. Educ.*, 25(6):491-6, 1991.
- Kotzé, S. H. & Mole, C. G. Talking about death: implementing peer discussion as a coping mechanism to overcome fears about dissection, death, and dying. *Anat. Sci. Educ.*, 6(3):191-8, 2013.
- Lazarus, L.; Sookrajh, R. & Satyapal, K. S. Reflective journals: unmasking student perceptions of anatomical education. *Folia Morphol. (Warsz.)*, 76(3):506-18, 2017.
- Leboulanger, N. First cadaver dissection: stress, preparation, and emotional experience. *Eur. Ann. Otorhinolaryngol. Head Neck Dis.*, 128(4):175-83, 2011.
- Marks, S. C. Jr.; Bertman, S. L. & Penney, J. C. Human anatomy: a foundation for education about death and dying in medicine. *Clin. Anat.*, 10(2):118-22, 1997.
- Martyn, H.; Barrett, A. & Nicholson, H. D. A belief in the soul may contribute to the stress experienced in the dissecting room. *J. Anat.*, 224(3):345-51, 2014.
- McNamara, B.; Waddell, C. & Colvin, M. The institutionalization of the good death. *Soc. Sci. Med.*, 39(11):1501-8, 1994.
- Mulu, A. & Tegabu, D. Medical students' attitudinal changes towards cadaver dissection: a longitudinal study. *Ethiop. J. Health Sci.*, 22(1):51-8, 2012.
- Neidhart, J.; Weinstein, M. & Conry, R. *Seis Programas para Prevenir y Controlar el Estrés*. Madrid, Deusto, 1989.
- Quamar, K.; Kiani, M. R.; Ayyub, A.; Khan, A. A. & Osama, M. Higher stress scores for female medical students measured by the Kessler Psychological Distress Scale (K10) in Pakistan. *J. Educ. Eval. Health Prof.*, 11:27, 2014.
- Sándor, I.; Birkás, E. & Gyorffy, Z. The effects of dissection-room experiences and related coping strategies among Hungarian medical students. *BMC Med. Educ.*, 15:73, 2015.
- Wisenden, P. A.; Budke, K. J.; Klemetson, C. J.; Kurtti, T. R.; Patel, C. M.; Schwantz, T. L. & Wisenden, B. D. Emotional response of undergraduates to cadaver dissection. *Clin. Anat.*, 31(2):224-30, 2018.

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