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REACTIONS OF FIRST YEAR MEDICAL STUDENTS IN THE DISSECTION ROOM, WITH PROSECTED CORPSES, AND THE INCIDENCE ON OWN BODY DONATION

Susana N. Biasutto[1], Isaías E. Molina Vargas[1], Diego M. Weigandt[1], M. Valentina Mora[1], Ramiro A. A. Vargas[1], Atilio J. Bertocchi Valle[1], M. Florencia Uanini[1], Oscar P. David[2], Daniel Urrutia[2], Marcos A. Spinelli[1], Manuel N. J. Olivera[1], Maximiliano Giménez[1], Mariano Nefa Salera[1], Agustín Decouvette[1], Lucio J. Ferrero[1]

[1]Chair of Normal Anatomy, Faculty of Medical Sciences, National University of Cordoba, Cordoba, Argentina
[2]Chair of Anatomy, Faculty of Dentistry, National University of Cordoba, Cordoba, Argentina

ABSTRACT

Student's perceptions in the dissection-room and the relationship with the teaching staff determine their affinity with Anatomy and their introduction in the medical career. Our objective was to evaluate three different instances of the relation student/dissection-room during the Anatomy course, the importance students assigned to the corpses, symptoms and emotions associated to the dissection-room, their causes and also participants' attitudes to the own body donation. Three surveys: initial perception, reactions by the first contact with the corpses and further evolution were performed to 237 first year students. Sixty three per cent were women and 97% argentine, of whom 59% were from Cordoba province and the rest for nearly all the country provinces. Hundred per cent considered very important Anatomy for the career and corpses for Anatomy. For 91% dissection should be compulsory for first year medical students. Most often physical reactions were ocular and nasal irritation, while the most frequent emotions were enthusiasm and surprise, due mainly to corpse and dissection-room smell. Coping strategies to those reactions were: to focus on the topic, to watch the corpse as an object, to relax, humor and others. The will to donate the own body varied from 57% to 49% and 52%. Those percentages were not statistically different (p=0.1606), but higher than others in the literature. Influence of the corpse exposition on the attitude to donation seems to be less important than other articles; probably because our students do not dissect by themselves or because they recognize a great need of corpses.

***Key words**: Anatomy, corpses, cadavers, dissection-room, body donation*

RESUMEN

La percepción de los estudiantes en la sala de disección y la relación con el equipo docente determina su afinidad con la Anatomía y la introducción en la carrera médica. Nuestro objetivo fue evaluar tres diferentes instancias de la relación estudiante/sala de disección durante el curso de Anatomía, la importancia que los estudiantes asignan a los cuerpos, los síntomas y emociones asociados a la sala de disección, sus causas y las actitudes de los participantes hacia la donación del propio cuerpo. Se realizaron 3 encuestas: percepción inicial, reacciones ante el primer contacto con el cadáver y evolución posterior, en 237 estudiantes de primer año. El 63% eran mujeres y 97% argentinos, de los cuales el 59% provenían de la provincia de Córdoba y el resto de casi todas las provincias del país. Cien por ciento consideraron muy importante la Anatomía para la carrera y los cuerpos para la Anatomía. Para el 91% la disección debería ser obligatoria para los estudiantes de primer año de Medicina. Las reacciones físicas más comunes fueron la irritación ocular y nasal, mientras que las emociones más frecuentes fueron entusiasmo y sorpresa, debidas principalmente al olor de los cuerpos y de la sala. Las estrategias usadas para afrontar estas reacciones fueron: enfocarse en el tema, ver el cuerpo como un objeto, relajarse, humor y otros. La voluntad de donar el propio cuerpo varió de 57% a 49% y 52%. Estos porcentajes no fueron estadísticamente diferentes (p=0,1606), pero mayores que otros en la literatura. La influencia de la exposición a los cuerpos sobre la actitud hacia la donación parece menos importante que en otros artículos; probablemente porque nuestros estudiantes no disecan por sí mismos o porque reconocen la gran necesidad de cuerpos.

***Palabras clave**: Anatomía, cadáver, sala de disección, donación de cuerpos*

***** *Correspondence to*: **Prof. Dr. Susana N. Biasutto.** subiasutto@gmail.com

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INTRODUCTION

Study on human bodies is a universally accepted educational method in Anatomy for medical colleges. Instead in the last decades of the past century it was strongly considered the possibility of changing them by digital and interactive resources, it was demonstrated they could not replace the corpses, although are recognized as very useful complementary options (Biasutto et al, 2006; Azer and Eizenberg, 2007; Cahill and Ettarh, 2008; Sugand et al, 2010; Dereje, 2014; Narvaez-Hernandez and Murillo-Rabago, 2014; Arráez-Aybar et al, 2014).

In the National University of Cordoba, as most of Argentina universities and many South American ones, first year students do not dissect by themselves. They use prosected corpses or pieces, which preparation mostly depend on the student-assistants (students who become members of the teaching staff after they have successfully finished the Anatomy course and access this condition by contest) supervised by professors. The small number of corpses limits the possibilities not only for student dissection but also for postgraduate courses, training, and research. Even if the Anatomy course has clinical orientation, we consider as irreplaceable to observe, touch and manipulate real corpses to understand and learn about different texture and elasticity of anatomical structures, three-dimensionality, relations and anatomical variations.

However, symptoms and emotions perceived by students in the dissection room might influence their concept about the teaching-learning of Anatomy. If the contact with the cadaver was really a high stressing experience (Dereje, 2014), it could be decisive for the future of their career.

In 2015, when we carried on a study about the perception of first year medical students on the cadaver, dissection room and the possible incidence on their will to donate the own body (Biasutto et al, 2018). Then, we considered present and past physical and emotional manifestations at the same moment. That survey took place on the second semester of the Anatomy course and results were amazing for us, considering we had never had information of this kind on argentine students before; however, we thought student's last experience could hide the process.

In this study our objective was to evaluate three different instances of the relation student/ dissection-room during the Anatomy course: initial perception, reactions by the first contact with the corpses and further evolution. We considered the importance students assigned to the cadaver for the course and the career, symptoms and emotions associated to the dissection room, their causes and also participants' attitude to the own body donation.

MATERIAL AND METHODS

This is a qualitative and relational cross-sectional study, based on anonymous surveys with multiple choice and semi-structured answers on a random sample.

The sample was based on 23 groups according the organization for practical activities in 2018. Each one of those groups formally had 10±1 students. The same groups were evaluated during the three instances. All students included in these groups were surveyed, without exclusion criteria. The first survey (A) was performed in the third week of the course, the second survey (B) was done immediately after the first contact with the corpses in the dissection room, and the third survey (C) was carried on three weeks before the end of the annual course.

In each survey were included some questions about demographic aspects important to provide context to the results and questions about the will to donate the own body.

Survey A included questions on: Age, sex, previous contact with a cadaver under any condition, importance assigned to Anatomy for the career, importance assigned to the cadaver for Anatomy learning, opinion about uploading pictures of the cadaver in social networks, dissection as a compulsory activity for first year students, the desire to be student-assistant in the future and the will to donate the own body.

Students were informed about the survey as part of a scientific research project but they did not get any details about body donation by the time of survey A. Before survey B we provide some brief information, including our availability to clear any doubt.

Survey B included questions on: Age, sex, nationality, provincial origin, if they have just had a direct contact (touched) the cadaver, symptoms and emotions manifested by this first contact, causes to which this manifestations were attributed and the will to donate the own body. The survey provided a long list of physical and emotional manifestations, with the possibility to add others.

Survey C included questions on: Age, sex, religion, change in symptoms and emotions, method used to overcome the unpleasant manifestations and the will to donate the own body.

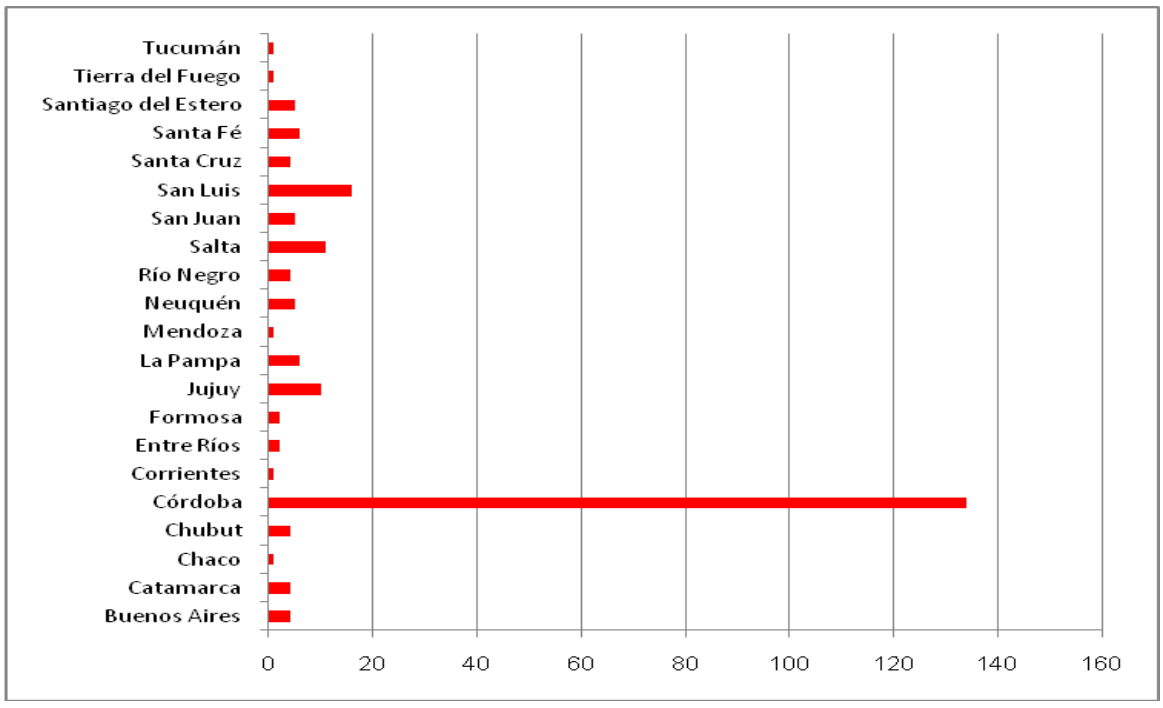
Results will be reported in percentages and the significance of the differences informed by P (<0.05 considered as significant). Chi square test

was used for the analysis of the results to evaluate the association of qualitative variables.
The statistical software used was INFOSTAT.
This study was carried on with the approval of the Science and Technology Secretary of the National University of Cordoba (SECYT-UNC). Proyecto Formar 33820180100313CB01, 2018-19.

RESULTS

The data we report is the first part of a larger investigation into different groups. The study involves the attitude towards the corpses for teaching and research in Anatomy, and the willingness to donate the own body. We considered this as the best way to obtain local data to support the development of a donation program.

Survey A included 237 students with 150 women (63.29%), 84 (35.44%) men and 3 (1.27%) who did not respond, with a median age in 19.27±2.25 (max. 30, min. 17).
One hundred and forty seven (62%) had never had contact with a dead body before, under any circumstance, while 57 (24%) reported a previous contact because of the death of a family member, 13 (5%) with an unknown dead person by a circumstantial event, 11 (5%) by the death of a friend and 9 (4%) in a previous career. These results had no significant gender differences (p=0.8497).
Two hundred and thirty six (99.58%) evaluated Anatomy as very important for Medicine and the cadaver was considered very important for teaching-learning of Anatomy by 100% of the participating students. Options for the last two questions were “very”, “less” and “no”.
About uploading pictures of the cadaver in social networks, there were no specifications on the circumstances and objectives of this action mentioned in the survey, but 88 (37.13%) considered it to be irreverent, 66 (27.85%) unethical, for 57 (24.05%) it was indifferent, for 24 (10.13%) was fine and 2 (1%) did not answer.
Dissection compulsory for all first year students was supported for 215 (90.72%) of the respondents. And 177 (74.68%) had expectances on being Anatomy student-assistants in the future.
One hundred and thirty six (57.38%) of the students should be glad to donate their own body for teaching and research in Anatomy. Sixty per cent were women, 38% men and 2% did not answer about gender; however, they represented the 54.67% of the total women and 61.90% of the total men (p=0.2830). Then, the gender difference was not statistically significant (p=0.2830). Neither the previous contact with a cadaver nor the intention to be a student-assistant determined a valid difference about the donation will (p=0.2950, p=0.2646 respectively).



Graphic 1.- Provincial origin of first year students from Argentina.

Survey B collected 234 responses. They belonged from 156 (66.67%) women and 78 (33.33%) men without empty forms. Age average was 19.24±2.23, varying from 17 (min) to 31 (max).

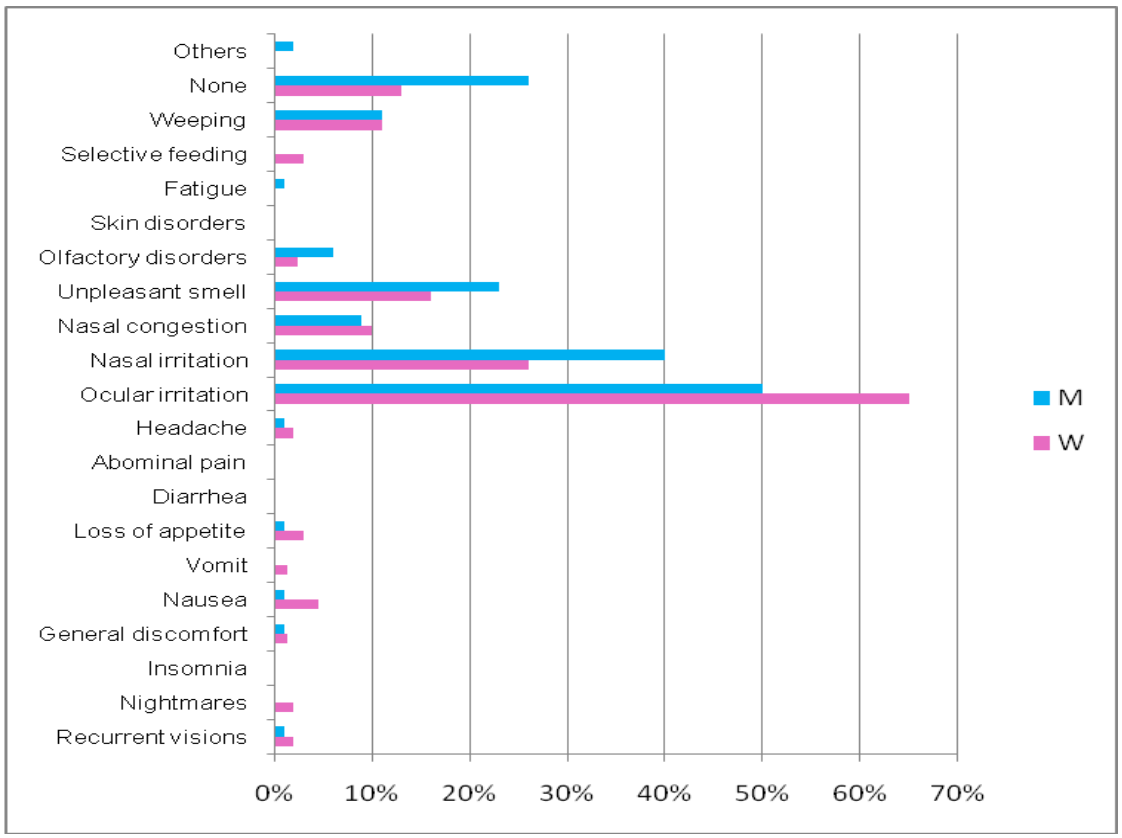
Only three per cent of the respondents (7) were foreigners, coming 3 (1.28%) from Peru and one from Chile, Honduras, Uruguay and Venezuela. Ninety seven per cent (227) were argentine and, of them, 134 (59%) from Cordoba province and the rest from nearly all Argentina provinces. Distribution was represented in Graphic 1.

At the moment of this survey, 89% of the respondents had just had direct contact with (touched) the cadaver, 9% had not and 2% did not answer that item.

In relation to the first contact with the cadaver, symptoms and emotions referred by students showed a great variety. The provided list tried to involve most of the possibilities and only exceptionally other options were added. In both cases, the selection of more than one choice was possible.

Only one student indicated 7 symptoms, while 8 (3.42%) chose 5 options, 12 (5.13%) marked 4 options, 41 (17.52%) chose 3 symptoms, 63 (26.92%) chose 2 and 109 (46.58%) marked only one choice. Note that 41 (17.52% of the total and 37.61% of those who selected one choice) opted by “none”. “No symptoms” option was more frequent in men (W=21, M=20, p=0.0209). None of the survey participants informed insomnia, diarrhea, abdominal pain or skin disorders. The most frequent physical perceptions were: ocular irritation (144 – 61.54% of the respondents), nasal irritation (108 – 46.15%), unpleasant smell (52 – 22.22%). Gender statistical significant difference was only observed for ocular and nasal irritation; in case of ocular irritation it was more frequent in women (W=101 - 65%, M=39 - 50%, p=0.0301) and nasal irritation was mostly reported by men (W=40 – 26%, M=31 – 40%, p=0.0270). Added symptoms in “others” option were ocular pain (1) and pharyngeal irritation (2). Graphic 2 shows the frequency of symptoms and physical perceptions, independently of the quantity of options chosen by each respondent and discriminated by gender.

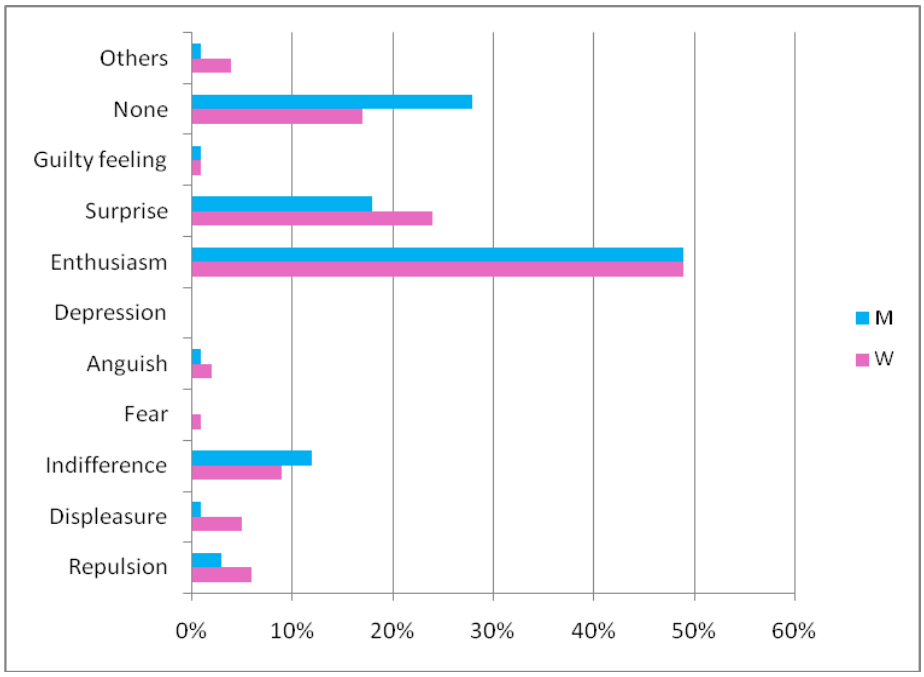
Enthusiasm (115 - 49.15%) and surprise (52 – 22.22%) were the emotions more often indicated in the survey, followed by “none” (49 – 20.94%) and “indifference” (23 – 9.83%). Forty three students chose two emotions and, of them, thirty (70%) reported both: enthusiasm and surprise.



Graphic 2.- Frequency of symptoms and physical perceptions, independently of the quantity of options chosen by each respondent and discriminated by gender.

Only one person marked 3 options by including a guilty feeling. Emotions included as “others” were curiosity (4 – 1.71%), happiness (3 – 1.28%) and respect (1 – 0.43%). Statistically, there were no gender significant differences in any topic. Graphic 3 shows the frequency of reported emotions, independently of the quantity of options chosen by each respondent and discriminated by gender.

Fifteen students (6.41%) had no physical or emotional manifestations on their first contact with the cadaver. Fifty per cent of them were men, representing a significant difference in relation to women (p=0.0235).



Graphic 3.- Frequency of reported emotions, independently of the quantity of options chosen by each respondent and discriminated by gender

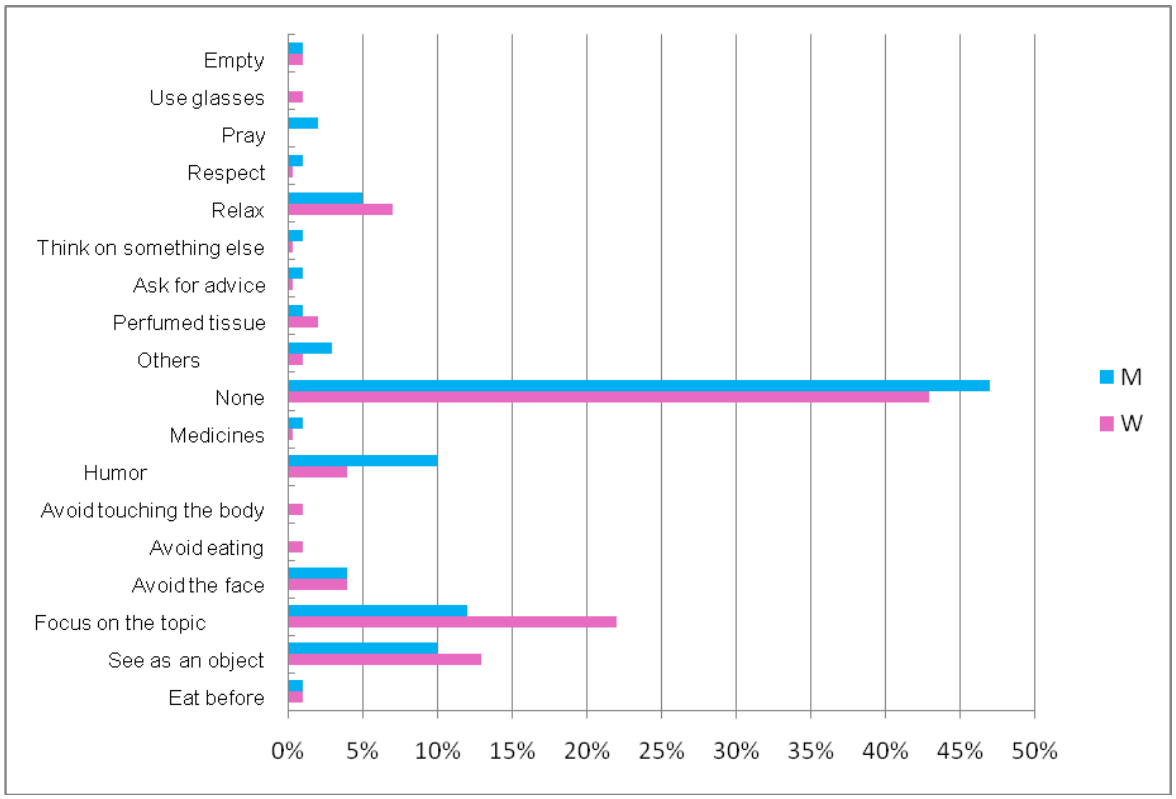
According to physical and emotional manifestations, the dissection room activity was seriously stressing for 5% of the students, considering into this condition those who informed recurrent visions of the cadaver, nightmares, weeping, repulsion and fear.

Students attributed their perceptions to different causes, but 12 (5.13%) did not specify any reason (most of them were the students who did not report any symptom or emotion due to the first contact with the cadaver). One hundred and sixty seven of the remaining 222 survey respondents (75.23%) chose more than one option and considered the causes were: the corpse smell in 204 cases (87.18%), the dissection room smell in 152 (65%), the body manipulation in 27 (11.5%) and the cadaver colour 14 (6%). Other causes were: the exhibition of some regions of the body (8 – 3.42%), the nakedness of the body (4 – 1.7%), fear of the corpse and fear of death.

About the donation of their own body, 114 (49%) of the students continued in a positive attitude, while 119 (51%) were negative and only one did not answer this item. Despite the reduction showed by these results, there is no statistical difference in relation to the survey A (p=0.0662). Students from Cordoba, in relation with the rest, showed a lower percentage of positivity towards body donation (43% - p=0.0450). Students from northwest provinces, which are usually considered to be more traditional and reluctant by cultural and religious reasons, evidenced a higher willingness to donate than the rest (71% - p=0.0042). There was no difference about the donation willingness among those students who had no symptoms, no emotions or enthusiasm during the first contact with the corpses, in relation with the others.

Survey C was completed by 230 students, 153 women (67%), 76 men (33%), while 1 chose

"other". Median age was 19.83±2.24 (min 18, max 31).
Foreign respondents reduced to 1.74% (2 from Peru, 1 from Chile and 1 from Venezuela). While 98.26% were argentine students, of whom 114 (51%) were from Cordoba province.
One hundred and twenty seven (55%) participants were Catholic, 88 (38%) did not profess any religion, 13 (6%) were non-Catholic Christians, 1 Jew and 2 from other religions. Despite of those results, only one catholic man resorted to pray as a way to afford the disorders caused by the exposure to the corpses.
For 175 (76%) symptoms and/or emotions did not change during the course. For the remaining students, manifestations changed by acceptance in 42 (18%) and by suppression in 10 (4%). There were 4 forms empty in this item.
About coping strategies for these manifestations, it was possible to choose more than one option. Then, 128 (44%) answered "nothing" and the following most frequently selected options were: to focus on the topic (53 – 18%), to watch the corpse as an object (34 – 12%), to relax (18 – 6%), humor (18 – 6%) and to avoid looking at the face (12 – 4%). Gender statistical differences were significant in favour of women in "focus on the topic" (p=0.0390) and in favour of men for "humor" (p=0.0324). The full list of options and answers, separated by genders, was represented in the Graphic 4.



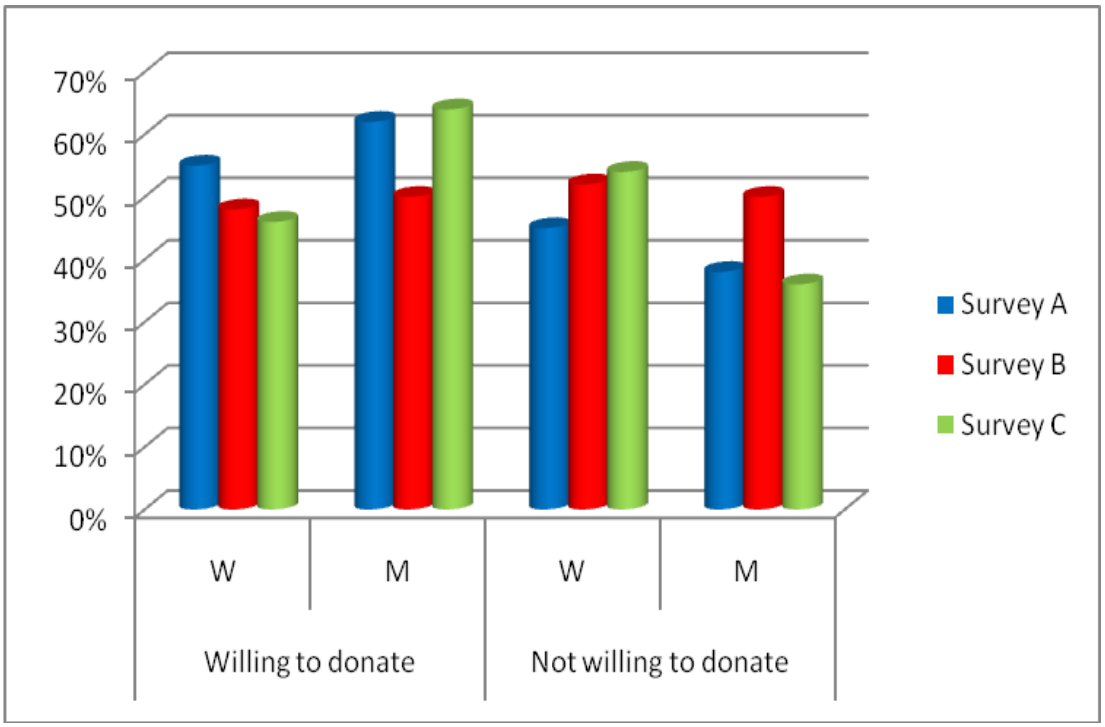
Graphic 4.- Coping strategies separated by gender.

Of those who chose the option "others", one specified "to see the corpse as source of knowledge".
By this time, 119 (52%) of the students answered positively about donation of the own body; 108 (47%) answered negatively and 3 (1%) did not answer. Positive responses came from women in 59% of the cases, however, it represented 46% of the total women, while 49 were the 64% of the total men (p=0.0076). Then, men were more willing to donate than women. Results were similar for members of different religions about their will to donate the own body, but, when we compared them with those who are not members of any church the proportion increased. Sixty six per cent of those who chose the option of "none" religion were positive about donation (p=0.0007).
In spite of the changing percentages among the three surveys in relation with the student's will to donate, neither the reduction observed in the

Survey B or the increase in the Survey C were statistically significant (p=0.0595 and p=0.4264 respectively). Graphic 5 shows the difference in the progression of the will to donate between genders. Among women, the reduction was progressive from the first to the third survey. Among men, the percentage evidently dropped in the second survey to rise again in the third one, over the initial data.

Most of the topics did not show significant gender statistical differences; when happened, they were specifically mentioned.

Table 1 summarizes the main results, without details of the data included in the graphics.



Graphic 5.- Progression of the student's will to donate their own body during the course of Anatomy, discriminated by gender

DISCUSSION

During gross anatomy courses, students not only acquire basic knowledge of human morphology, but also skills and attitudes useful for medical practice and attributes of "professionalism" (Vázquez et al, 2005; Rizzolo and Stewart, 2006; Lachman and Pawlina, 2006; Pawlina, 2006; Moxham and Plaisant, 2007; Sugand et al., 2010; Arráez-Aybar et al, 2014).

Student's perceptions in the dissection room and the relationship with the teaching staff determine, at a large extent, their affinity with Anatomy and their introduction in the medical career.

The development of this study was based on the expectation of getting more precise results than that of 2015 (Biasutto et al., 2018) by dividing the survey into three instances which should allow us to evaluate the changes due by the contact with the corpses at the moment they happened. Changes in the will to donate the own corpse could be a parameter to identify the conseq-uences of these perceptions.

Because of the study design, the most similar articles were those of Miguel Pérez et al. (2007), Abay and Desalegn (2012) and Romo Barrientos (2018) about Spanish and Ethiopian students, with 3 steps survey at similar opportunities (before, immediately after the first contact with the cadaver and at the end of the course), even if the results were not the same and their students dissect by themselves.

Gender distribution was according to the general situation in Medicine and female predominance, even if increasing year to year, did not show statistical difference compared to our study from 2015 (Biasutto et al, 2018) (p=0.6217). This distribution was similar to that reported by Miguel Pérez et al. (2007) in Barcelona University (p=0.0731) and Romo Barrientos et al. (2018) in the University of Castilla-La Mancha (p=0.2106).

		Survey A	Survey B	Survey C
Total		237	234	230
Gender	*Women*	150	156	153
	Men	84	78	76
	Other/Empty	3	0	1
Age		19.27±2.25	19.24±2.23	19.83±2.24
Previous contact with corpses	*Yes*	38%		
	Never	62%		
Geographic distribution (Graphic 1)	*Cordoba province*		57%	51%
	Other provinces		40%	47%
	Foreigners		3%	2%
Religion	*Catholic*			55%
	Christian non Catholic			6%
	Jewish			0.43%
	Islamism			0%
	Others			0.85%
	None			38%
Importance of Anatomy	*Much*	99.58%		
	Little	0.40%		
Importance of corpses	*Much*	100%		
Images in social networks	*Fine*	10.13%		
	Unethical	27.85%		
	Irreverent	37.13%		
	Indifferent	24.05%		
	Empty	0.84%		
1st year dissection	*YES*	90.72%		
	NO	9.28%		
To be assistant	*YES*	74.68%		
	NO	23.63%		
	Empty	1.69%		
Physical reactions	*YES (Graphic 2)*		83%	
	NO		17%	
Emotional reactions	*YES (Graphic 3)*		79%	
	NO		21%	
Cause of the reactions	*Room smell*		65%	
	Corpse smell		87%	
	Corpse colour		7%	
	Some regions		3%	
	Corpse nakedness		2%	
	Corpse manipulation		9.40%	
	Corpse fear		0.43%	
	Death fear		0.85%	
	Empty		17%	
Change in the reactions	*NO*			76%
	By acceptance			18%
	By repression			4%
	Empty			2%
Coping strategies	*None*			44%
	Some (Graphic 4)			56%
Will to donate	*YES*	57.38%	48.72%	51.74%
	NO	41.77%	50.85%	46.15%
	Empty	0.84%	0.43%	1.30%

Table 1.- This table summarize the main results. Geographic distribution, physical and emotional reactions and coping strategies were only mentioned, because they were represented in detail in the respective graphics. Percentages mean persons.

Among students from the Complutense University of Madrid (Arraez-Aybar et al., 2007) women predominance was higher (81%) than the current study (p=<0.0001). Otherwise, Abay and Desalegn (2012) and Anyanwu et al (2014) showed an opposite situation in Ethiopia and Nigeria, with a majority (86% - 61% respectively) of men.

The importance students assigned to Anatomy and corpses for teaching-learning could be considered as a popular concept because, at the moment of beginning their medical studies, it was impossible they have developed this opinion by themselves. However, Anatomy has always been (and still is) the subject that mostly approximate first year students to Medicine according their own point of view.

Ninety one per cent of students answering positively to the compulsory dissection confirm the importance assigned to study on real corpses, more yet when not all of them were interested in a future as student-assistants and not all of those who should like to work in the Chair of Anatomy agreed with the compulsory dissection during the first year. We could associate these results with the 90% who preferred dissection than prosection among Ethiopian students (p=0.9372).

There were no further considerations when we asked about downloading pictures of the cadaver in the social networks and the main objective was to get a parameter on the ethical profile of the students, even if those answers were not determinative. Ethical basements are of essential to work with corpses and body donation programs. The only conclusion was 65% of answers including irreverent and unethical, and 10% for whom it was fine.

Foreign students are limited by university regulations and international agreements, and the percentage reduced between second and third survey. As the number was so small, it is not advisable to draw conclusions on this topic.

Of the argentine students, more than half were from Cordoba province, printing the local profile to the group. But the participation of students coming from nearly all the argentine provinces is associated to the history of the National University of Cordoba and its location in the second largest city of Argentina.

Cultural and religious profile of northwest population is usually considered as an obstacle to afford some topics like body donation. However, this study proves the opposite. It has been mentioned that probably the northwest students mimic the local ones while being in Cordoba. Even so, this article could be useful for other universities to afford the challenge. Religions are usually mentioned as playing an important role in relation to the corpse dissection and donation, instead none of the main religions in our country have specifications against them. However, students who declared themselves as “not religious”, showed a greater propensity to donation.

The long list of symptoms and emotions included in the survey B was the same list used in 2015, but it was deeply reviewed by the authors before submitting it again. Options were written in such way to be accessible for first year students who do not know clinical terminology.

The choice of ocular and nasal irritation as the most frequent symptoms were the same result than our previous study (Biasutto et al, 2018), and it is due to the formaldehyde solution used for embalming (Onyije and Avwioro, 2012; Sarmiento Acosta et al., 2014). Percentages were different with lower amount for ocular irritation and higher for nasal irritation in the current report; but that difference was not statistically significant (p=0.1136 and p=0.2440 respectively).

For Korean students (Lee et al, 2011), eye soreness (only ocular manifestation included) was the main symptom (72%) and, compared with eye irritation in our survey, results were similar (p=0.626). Instead the following more frequent symptoms: headache, dizziness, appetite decrease, nausea and disgust had very small incidence on our study.

The great similarities with the chemical odour from the cadaver (52%) and eye irritation (27%) observed by Abay and Desalegn (2012) as some of the main symptoms, were statistically different to the third and first physical manifestations in our study (p=<0.001 in both cases). Both agree to be among the most mentioned, but differ in their frequency of presentation, being ocular irritation of more often presentation for us and perception of unpleasant smell for ethiopians.

In contrast, for Spanish (Arraez-Aybar et al.,2007) nerves and stomach upset were the most frequent “physiological-motor reactions”, and disgust, palpitations and sweating for Miguel Perez et al (2007).

But the major difference was found by comparing results from Irish students (Cahill and Ettarh, 2009) who answered “no symptoms” in 48.4% of the cases (p=<0.0001) by the end of the course.

Enthusiasm, as the most frequent emotion, was similar the previous report but the percentage was significantly higher (49%-38%, p=0.0241). There were no significant differences in the results obtained for the other emotions.

Discussing these manifestations with some published articles has the risk of falling into an error by comparing students who performed their activities with prosected specimens with those

who did them with dissection. Once that reservation was made, we could mention a great difference with Ethiopian students for who fear was the main stressing factor during dissection (58.5%) (Abay and Desalegn, 2012) while it was insignificant in our study (0.43%), and completely different than enthusiasm (p=0.3823).

Curiosity and interest in Spanish (Arraez-Aybar et al., 2007; Romo Barrientos et al, 2018), even if not directly comparable with enthusiasm and curiosity, evidenced similar orientation in student's feelings.

Surprise among Korean students (Lee et al., 2011) was similarly frequent (38% - p=0.2264), but it was the first emotion due by the first contact with the cadaver, followed by very negative ones as depression, sadness, fear, feeling of guilt and others.

Aside of the strict statistical analysis, enthusiasm to study a subject like Anatomy, which many consider as a static discipline, deserves a special consideration and may call the attention of university authorities and all those who underestimate its importance.

If students attributed their symptoms and emotions mostly to the smell of corpses and dissection room, it could be improved but not avoided. To take care of adequately airing the room and extracting the corpses from the immersion solution some time before the students arrive, may significantly improve the current conditions.

Miguel Perez et al (2007) also reported corpse and dissection room smell and cadaver appearance as the main causes of student reactions; and relaxation, humor and staying with friends as the usual ways to overcome them. For Romo Barrientos et al. (2018) the smell of the dissection room increased to 72% among their respondents at the end of the course as main cause of displeasure, without a significant difference compared to our report (p=0.3179). But Romo Barrientos et al. (2018) did not discriminate among corpse and room smell. Considering them together (76% in this study) results were significantly different (p=<0,0001).

For most of the students (76%) symptoms and emotions did not modify during the course and 44% did nothing to avoid these manifestations. Then, we had to assume they were not so traumatic to require major measures to afford them. Also Abay and Desalegn (2012) reported that symptoms did not modify significantly; but differed from Lee at al. (2011) who considered the reactions decreased during the course.

We could emphasize, once more, the enthusiasm at the time of considering the will to donate the own body. In this topic the attitude was extremely positive (57%) and, instead it reduced after the first contact with the cadaver (49%), increased again at the end of the course (52%). In any case, modifications were not statistically significant (p=0.1606). Comparing the last one (because of the evolution time of the course) with the 29% registered from the students in 2015 (Biasutto et al., 2018), there was a significant improvement (<0.0001).

For Cahill and Ettarh (2008) "...Attitudes of students to the idea of being donors of their own body for science was significantly affected by the dissection experience...". Their study showed a significant increase of those who opposed and strongly opposed to being donors themselves (from 23% to 40% and 7% to 19%, respectively), while the proportion of students in favour and strongly in favour decreased from 31% to 20% and from 10% to 9% respectively).

Based on their study, Anyanwu et al. (2014) considered that people exposed to the dissection room are less likely to donate their body. Comparing the 10% of the surveyed Nigerian students exposed but not involved in dissection who were willing to donate, the difference is remarkable (<0,0001), leading us to a different interpretation.

Analyzing the literature, it is evident that there is a reduction in the will to own donation after being exposed to dissection or prosected specimens; however in our study the difference was not significant and the proportion of students was significantly higher than other publications (p=0.001 compared with Cahill and Ettarh [2008] and <0.0001 compared with Anyanwu et al. [2014]).

From the previous comparisons we could conclude that experiences in the dissection room, even with similar reactions, have different incidence on the attitude to own body donation among students who dissect and those who use prosected corpses. However, we think that the personal reactions in the dissection room were important but not enough to determine, by themselves, the student's attitude towards donation. As we mentioned before, the support of the teaching staff and own developed strategies had an important role to endure the negative manifestations, and the importance assigned to the Anatomy course for the rest of the career and the professional practice is higher than those negative symptoms and/or emotions.

Assuming the need for more bodies, mainly for teaching-learning, might be an additional incentive to stimulate the altruistic will to donate.

The National University of Cordoba, like most of the universities in our country and most of the South American countries, needs to develop a whole body donation program for teaching and research in Anatomy. We consider students as

very important direct or indirect participants as their point of view could be essential to influence and convince the potential donors. On this way, this article provides necessary and appropriate information to serve as basement for this objective.

As conclusion, we could consider that students showed mainly mucosal irritation reactions which could be attributed to the formaldehyde used as cadaver embalming solution, which determined the corpses and dissection room smell. In the emotional field, enthusiasm and surprise could be considered as very positive manifestations and were the most frequent ones. Those physical and emotional reactions seems to have low incidence on the career while confronting with the absolute importance assigned to the corpses for the teaching-learning of Anatomy and to Anatomy for the development of the career. In addition, the attitude of the students towards the own body donation, confirms the low importance assigned to these reactions and the generous attitude towards the next generations of students.

Conflict of interest
None

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Ethical Approval
Not necessary

Informed Consent
Survey participants were informed about the scope of the project and, in every case, answer it was strictly voluntary.

Contributions
SNB: Project design, group director, references, preparation and coordination of surveys, data registration, statistical analysis and manuscript redaction. IEMV: Preparation and reception of the surveys, and graphic designs. DMW: Preparation and reception of surveys, and collaboration in manuscript redaction. MVM: Preparation and reception of surveys, and collaboration in manuscript redaction. RAAV: Preparation and reception of surveys, and graphic designs. AJBV: Preparation and reception of surveys, and graphic designs. MFU: Preparation and reception of surveys. OPD: Project design, project vice-director, references, preparation of surveys and collaboration in manuscript redaction. DU: Project design and preparation of surveys. MAS: Project design and preparation of surveys. MNJO: Preparation and reception of surveys, references. MG: Preparation and reception of surveys. MNS: Preparation and reception of surveys. AD: Preparation and reception of surveys. LJF: Preparation and reception of surveys

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