

Original Communications**ATTITUDE OF MEDICAL STUDENTS TO BODY DONATION IN THE NATIONAL UNIVERSITY OF CORDOBA – ARGENTINA**

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ABSTRACT

Corpses for teaching and research in Anatomy are fundamental, even having high developed technological resources. Although the National University of Cordoba is receiving bodies by donation, the quantity is very scarce and it barely allows the pre-graduate teaching activities, using prosected specimens for practical activities. It is essential to develop a donation program to increase body supply. The objective of the present study is to obtain data about the attitude of Medicine students in relation to body procurement and donation. We collected demographic data to provided a framework for analysis and specific data on organ and body donation. Samples from students of each and all years of the career were considered. For the 97% of the students cadavers were very important to study Anatomy. Most of the total students (94%) should be willing to donate their organs for transplantation, 84% were interested in getting more information on body donation, 42% should donate their own body and 75% could participate in procurement actions. Women were more willing to donate their organs than men, while men were more willing to donate their own bodies. Students who did not profess any religion had better attitude to donation. Medicine students from the National University of Cordoba have evidenced an important commitment to donation not only of organs but also of whole body because they recognize their importance, care future generations and have high values like altruism and solidarity.

Key words: Body donation; body procurement; Anatomy teaching; Anatomy research

RESUMEN

La utilización de cuerpos humanos para docencia e investigación en el pre y posgrado resultan imprescindibles en Anatomía, aún disponiendo de tecnología de avanzada. Si bien la Universidad

Nacional de Córdoba está recibiendo cuerpos por donación, la cantidad es muy escasa y apenas permite desarrollar las actividades docentes de pre-grado, usando preparados disecados para las actividades prácticas. Resulta imprescindible desarrollar un programa de donación para incrementar la provisión de cuerpos. El presente estudio pretende obtener datos que permitan conocer la actitud de los estudiantes de Medicina en relación a la procuración y donación de cuerpos. Se recabaron datos demográficos que brindaron un marco para el análisis y datos específicos sobre donación de órganos para trasplante y de cuerpos. Se consideraron muestras de alumnos correspondientes a todos los años de la carrera. Para el 97% los cuerpos son importantes para aprender Anatomía. El 94% donaría sus órganos para trasplante, al 84% le interesaría disponer de más información, el 42% donaría su propio cuerpo y el 75% participaría en un programa de procuración. Las mujeres tuvieron mayor disposición a la donación de órganos para trasplante, mientras que los varones hacia la donación de cuerpos (BD) para docencia e investigación. Quienes no profesan ninguna religión fueron más positivos hacia la BD. Los estudiantes de Medicina evidenciaron un importante compromiso con la donación tanto para trasplante como de cuerpos completos, porque reconocen la importancia de ambos, se preocupan por las generaciones futuras y cuentan con valores como el altruismo y la solidaridad.

Palabras clave: Donación de cuerpos; procuración de cuerpos; enseñanza de la Anatomía; investigación en Anatomía

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INTRODUCTION

In the National University of Cordoba (Argentina), students do not dissect during the course of Anatomy. If they become student-assistants, after successfully passing the exam and the annual contest, they will be able to participate in different activities, including dissection. Because of that, the curricular antecedent of having been student-assistant in Anatomy is particularly valuable for surgical specialities residencies. Then, most of the medical students have never dissected but learned with prosected specimens.

The disproportion between the number of students in first year and the very small number of bodies the Chair gets each year not only harms the possibility of dissection during the course, but also the research and postgraduate activities.

The provision of bodies for teaching and research historically depended on patients in public hospital for chronic diseases without known family or friends, who were unclaimed after death. During this century there was a change trying to manage bodies by donation, however the Chair of Anatomy never developed a structured program with that aim. Currently, all dissected bodies are obtained by donation, but the number has reduced to critical levels. Digital and interactive resources have demonstrated not being able to 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). Then, the need of a donation program cannot be delayed for longer. But the university authorities have not shown enthusiastic about the development of a program which could modify the provision of bodies for Anatomy teaching and research. However, in 2018, the University Secretary for Science and Technology approved a research project based on surveys which should reveal data about the opinion of the medical and general community about body donation (BD). This information, not available at the moment in Argentina could be the basement to develop a donation program.

In this way, the opinion of medical students becomes relevant because of their influence on public opinion and potential actions for bodies procurement. They are the future and they can help the next generations.

The objective of the present study is the second of the four instances involved in the project mentioned above (First step is published as Biasutto et al, 2019). Samples of students of each and all the years of medical career were

surveyed about their will to donate the own body, compared with donation for transplantation and the interest in participating on a procurement program.

MATERIAL AND METHOD

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

One sample of students from each year of Medicine was considered. Then, we evaluated 6 groups corresponding to: 1-5) first to fifth year and 6) the group of the students in the mandatory final practice (MFP – 6th year). All students included in the sample were determined by hazard, however, in the group selection we had to consider certain aspects not directly associated to the survey topic. First year sample involved 23 groups of students (from a total of 60 groups), predetermined by the Chair of Anatomy organization. Other year samples were selected by submitting the questionnaire to students in class groups with a number around 100.

The survey included questions on gender, age, citizenship and provincial distribution of Argentine students, religion, importance assigned to the corpse to learn Anatomy (options: much, little and no important), own will to donate organs for transplantation, if they should like to get further information, if they should donate the own body, if they could be glad to collaborate in procurement, and the reasons for the two last answers (own donation and participation in procurement). Suggestions to be considered at the time of planning to improve the present situation were asked only to first year students.

Anatomy course is in the first year. These students were surveyed in 3 occasions to evaluate their changes towards this topic: A) at the beginning of the course, B) after the first contact with the corpse, C) At the end of the course. The rest of the students were surveyed just once.

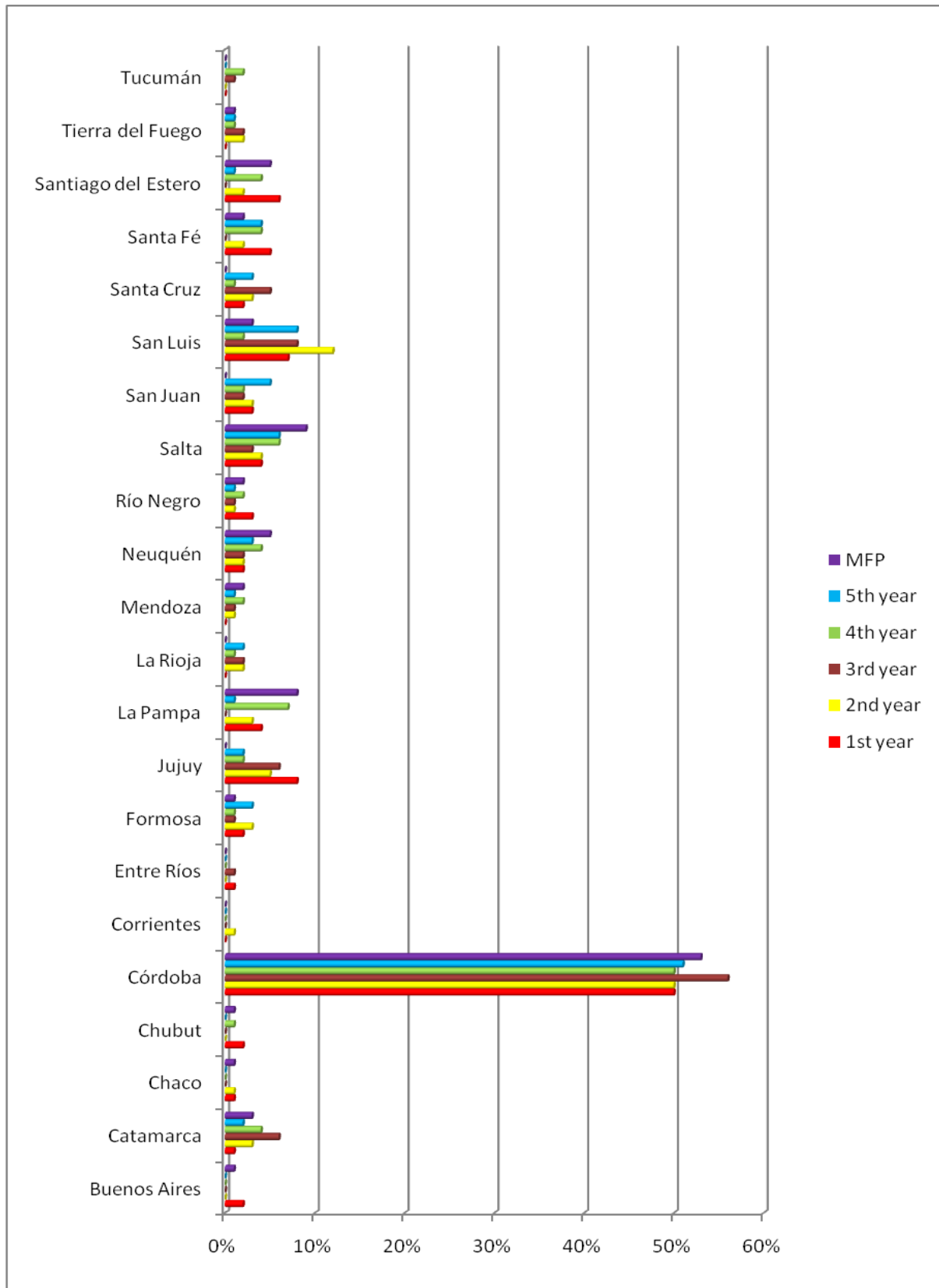
Results will be reported in percentages and the significance of the differences informed by P (<0.05 considered as significant). Chi square test was used for the analysis of the results to evaluate the association of qualitative variables.

The statistical software used was INFOSTAT.

This study was carried on with the approval and support of the Science and Technology Secretary of the National University of Cordoba (SECYT-UNC). Proyecto Formar 2018-19 - 33820180100313CB01

		1st Year	2nd Year	3rd Year	4th Year	5th Year	MFP
TOTAL SURVEYED		230	112	93	90	100	88
GENDER	Women	153 (67%)	73 (65%)	62 (67%)	66 (73%)	69 (69%)	64 (73%)
	Men	76 (33%)	39 (35%)	31 (33%)	24 (27%)	31 (31%)	24 (27%)
	Other	1 (0.44%)	0	0	0	0	0
AGE	Average	19,83	20,21	22,24	22	22,7	25,44
	Mín	18	18	20	20	21	23
	Max	31	32	35	28	28	34
NATIONAL STUDENTS		226 (98,26%)	110 (98,21%)	90 (96,77%)	89 (98,89%)	99 (99%)	86 (97,73%)
	Cordoba	115 (51%)	55 (50%)	49 (56%)	45 (51%)	50 (51%)	46 (53%)
	Other	111 (49%)	55 (50%)	41 (44%)	44 (49%)	49 (49%)	40 (47%)
FOREIGN STUDENTS		4 (1,74%)	2 (1,79%)	3 (3,23%)	1 (1,11%)	1 (1%)	2 (2,27%)
	Bolivia			1			
	Chile	1	1				
	Colombia			1			
	Ecuador			1			
	Paraguay					1	
	Peru	2			1		
	Spain		1				1
	Venezuela	1					
	No answer						1
RELIGION	Catholic	126 (55%)	76 (68%)	55 (59%)	68 (76%)	75 (75%)	49 (56%)
	Other Christian	13 (6%)	4 (4%)	5 (6%)	2 (2%)	1 (1%)	1 (1%)
	Jewish	1 (0,43%)					
	Others	2 (1%)	1 (1%)		1 (1%)		
	None	88 (38%)	30 (27%)	32 (34%)	19 (21%)	24 (24%)	38 (43%)
CADAVER IMPORTANCE	Much	100%	99%	97%	94%	93%	95%
	Little		1%	3%	6%	7%	5%
	Nothing						
DONATION FOR ORGAN TRANSPLANTATION	Yes	89%	90%	98%	98%	95%	100%
	No	10%	8%	2%	2%	5%	
	No answer	1%	2%				
INTEREST IN BODY DONATION INFORMATION	Yes	86%	60%	78%	73%	77%	73%
	No	13%	40%	20%	24%	23%	27%
	No answer	0,43%					
ATTITUDE TO OWN BODY DONATION	Yes	52%	37,50%	46%	31%	35%	35%
	No	47%	62,5%	54%	69%	65%	65%
	No answer	1%					
ATTITUDE TO PROCUREMENT	Yes	83%	72%	71%	66%	71%	72%
	No	17%	28%	29%	34%	29%	28%
	No answer	0,43%					

Table 1.- Summarized results.



Graphic 1.- Provincial distribution of the students in the different years of the career.

RESULTS

The data we report is the second part of a larger investigation into different groups. First part was published by Biasutto et al. (2019).

To compare different year's results we considered the last survey from first year students.

Group 1 (first year students)

Two hundred and thirty students, 153 women (67%), 76 men (33%), while 1 chose "other". Median age was 19.83±2.24 (min 18, max 31).

Foreign respondents were only 1.74% (2 from Peru, 1 from Chile and 1 from Venezuela). Table 1. While 98.26% were Argentine students, of whom 114 (50%) were from Cordoba province. Even if there were students from most of the provinces, the main percentages were represented by those coming from Jujuy (8%), San Luis (7%), Santiago del Estero (6%) and Santa Fe (5%). Provincial distribution is represented in Graphic 1.

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. Table 1.

One hundred per cent of the surveyed students considered corpses as "very important" to learn anatomy. Table 1.

Two hundred and five (89%) should be willing to donate their organs for transplantation, 10% did not and 1% did not answer. Sixty nine per cent of the potential donors were women, showing a

statistically significant difference (p=0.0017). (Table 2)

Fifty two per cent (119) showed willingness towards own body donation, while 108 (47%) answered negatively and 3 (1%) did not answer. Table 1. 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). The main reason to donate was to provide support for teaching-learning of Anatomy (51 – 45%). Summarizing support to teaching-learning and research of Anatomy this percentage rise to 61%. Those results were followed by 15% of students who wanted to be useful and 7% who considered it as necessary. (Table 3).

The main reasons NOT to donate were: a) They do not like (21%), b) For their families (8.40%), c) Preference for being buried (7.56%) and d) By modesty (6.72%). Table 4.

The interest in procurement activities was informed by 83% of the respondents. Of them, 126 (66%) were women, showing no gender differences statistically (p=>0,9999). Twenty per cent of those who should not collaborate in procurement were willing to donate their own body, and 59% of those who should collaborate in procurement could also donate their bodies.

1st YEAR STUDENTS		Survey A	Survey B	Survey C
Total surveyed		237	234	230
DONATION FOR ORGAN	Yes	214 (90.30%)	208 (89.88%)	
	No	22 (9.28%)	24 (10.26%)	
	No answer	1 (0.42%)	2 (0.85%)	
INTEREST IN BODY DONATION INFORMATION	Yes			198 (86%)
	No			31 (13.48%)
	No answer			1 (0.43%)
ATTITUDE TO OWN BODY DONATION	Yes	136 (57.38%)	114 (48.72%)	119 (52%)
	No	99 (41.77%)	119 (50.85%)	108 (47%)
	No answer	2 (0.84%)	1 (0.43%)	3 (1%)
ATTITUDE TO PROCUREMENT	Yes	139 (58.65%)	167 (71.37%)	190 (82.61%)
	No	92 (38.82%)	64 (27.35%)	39 (16.96%)
	No answer	6 (2.53%)	3 (1.28%)	1 (0.43%)

Table 2.- Variations in the attitude of first year students

Reasons to participate in procurement were very extended and variable, including the support teaching-learning of Anatomy (40%), because it is important (9%), because it is interesting (8%), to support the research (7%) and empty (10%). Table 5.

And the main reasons not to collaborate were: a) considering this as a personal decision (20%), b) lack of interest (14%), c) lack of time (10%), among a long list of answers, including 28% of empty answers. Table 6.

Suggestions exposed to improve the present situation and be considered at the moment of developing a donation program are summarized in Table 7. The majority of respondents proposed to increase public information and awareness (126 – 54%) and 18% (41) did not answer. Instead we tried to summarize the concepts there was a long list with great variety of options. Even the individual proposals deserve some consideration as they evidence some socio-cultural aspects.

Reasons to donate	1st Year	2nd Year	3rd Year	4th Year	5th Year	MFP
Total	114	42	43	28	35	31
Support for teaching	51 (45%)	16 (38%)		11 (39%)	12 (34%)	6 (19%)
To be useful	17 (15%)	4 (10%)	7 (16%)	8 (28%)	7 (20%)	3 (10%)
Support for teaching/research	10 (9%)		16 (37%)		3 (9%)	
Support for research	8 (7%)	9 (21%)		2 (7%)		5 (16%)
It's necessary	8 (7%)	3 (7%)	1 (2%)	1 (4%)	3 (9%)	
It's important	4 (4%)	2 (5%)	3 (7%)	2 (7%)	2 (6%)	2 (6%)
To help	3 (3%)		2 (5%)			2 (6%)
Priority for transplantation		4 (10%)	1 (2%)	1 (4%)	1 (3%)	1 (3%)
My body won't serve me		1 (2%)		1 (4%)		1 (3%)
Can't justify		1 (2%)				
Corpses were useful for me			1 (2%)		1 (3%)	
Improve knowledge			1 (2%)			
Only yes	2 (2%)					
Reciprocity	1 (1%)					
Support to Cordoba	1 (1%)					
Atheist	1 (1%)					
I just died	1 (1%)					
Empty	7 (6%)		9 (21%)	1 (4%)	6 (17%)	11 (35%)

Table 3.- Reasons to donate the own body distributed according the year of career of the students

Group 2 (Second year students)

It involved 112 students, with median age in 20.21±1.96 years (max 32 and min 18), and seventy three (65%) women.

Two students (1.79%) were foreigners (from Chile and Spain). The Argentine students mostly belonged from Cordoba (50%), San Luis (12%), Jujuy (5%), Salta (4%) and a long list of origins including nearly all the provinces. Graphic 1.

Sixty eight per cent assumed themselves as Catholics, 4% were non-Catholic Christians and 27% were not members of any church.

For 99% of these students corpses are “much” important for teaching-learning Anatomy and only 1% considered it as “little” important.

Ninety per cent of the total students (68% of whom were women) were willing to donate their organs for transplantation. This proportion was statistically different in favour of women (p=0.0344). Eight per cent should not donate and 2% did not answer this item.

Asked if they knew about body donation, 83% answered positively and 60% said they should be glad to learn more, while 38% (42) could be interested in donation of the own body. Table 1. Of this last group 62% were women, however it represented 33% of total women versus 41% of total men (p=0.0375). The highest number of students interested in donation was Catholics (21), but they represented only 27%, while we

realized that 57% of those who did not participate at any church and 50% of non-Catholic Christians were potential donors. Difference among practitioners of religions willing to donate was statistically significant (p=0.02). Thirty eight per cent of students interested in donation belonged from Cordoba, but they represented 27% of total potential donors. Even if students from the other provinces were proportionally a small number, it seems interesting to mention that 100% of students from San Juan, Corrientes and

Misiones, and 66% from Santa Cruz, Catamarca and Formosa were willing to donate.

The main reasons to donate were to “support teaching-learning and research” (59%), “being useful” (10%) and those who declared “priority for transplataction” (10%). Negative attitude to donation was based mainly on “lack of interest” (21%), “mistreatment” (11%), “lack of respect” (10%) and those who did not answer (10%). Tables 3 and 4.

Reasons to NOT donate	1st Year	2nd Year	3rd Year	4th Year	5th Year	MFP
Total	119	70	50	62	65	57
I don't like	25 (21%)		3 (6%)	8 (14%)	3 (5%)	3 (5%)
For my family	10 (8.40%)	6 (9%)	8 (16%)	8 (14%)	2 (3%)	3 (5%)
Prefer to be buried	9 (7.56%)			1 (1.61%)		
By modesty	8 (6.72%)	3 (4%)		3 (5%)	4 (6%)	
Mistreatment		8 (11%)	2 (4%)	6 (10%)	3 (5%)	2 (4%)
Preferance for transplataction	7 (5.88%)	7 (10%)	14 (28%)	11 (19%)	13 (20%)	17 (30%)
Preferance for cremation	6 (5.04%)	2 (3%)		3 (5%)	1 (1.54%)	4 (7%)
By religion	5 (4.20%)		1 (2%)	1 (1.61%)		1 (1.75%)
Only no	5 (4.20%)	2 (3%)	1 (2%)		1 (1.54%)	1 (1.75%)
Inadequate handling	4 (3.36%)					
Didn't think it yet	3 (2.52%)		3 (6%)			2 (4%)
By beliefs	2 (1.68%)					
For lack of respect	2 (1.68%)	7 (10%)	1 (2%)	5 (8%)	6 (9%)	5 (9%)
Personal reasons		2 (3%)		1 (1.61%)		
By storage conditions	1 (0.84%)			2 (3%)	1 (1.54%)	
Spiritual issue	1 (0.84%)					
Assign it to something else	1 (0.84%)					
To rest in peace	1 (0.84%)			2 (3%)	1 (1.54%)	
Bad impression	1 (0.84%)				1 (1.54%)	
Inhuman	1 (0.84%)					
By fear	1 (0.84%)					
Long time there	1 (0.84%)					
No reason	1 (0.84%)		1 (2%)	1 (1.61%)	1 (1.54%)	
Don't share it	1 (0.84%)					
Not be recognized	1 (0.84%)					
Not interested	1 (0.84%)	15 (21%)		2 (3%)		
I wouldn't decide	1 (0.84%)					
Personal decision		1 (1.43%)		1 (1.61%)		
Familiar decision						1 (1.75%)
Reification		1 (1.43%)				
Lack of information		1 (1.43%)		1 (1.61%)	1 (1.54%)	1 (1.75%)
Unuseful				1 (1.61%)	1 (1.54%)	
Misused						1 (1.75%)
Material bad conditions				1 (1.61%)		
I don't want					1 (1.54%)	
Empty	20 (17%)	15 (21%)	15 (30%)	4 (7%)	25 (38%)	16 (28%)

Table 4.- Reasons NOT to donate the own body distributed according the year of career of the students

Interest in participating on a procurement program was positive in 77% of surveyed. Those who agreed in both, donation and procurement, were 31%; while 45% should like to collaborate in a donation program but did not want to donate the own body.

Reasons to collaborate in procurement	1st Year	2nd Year	3rd Year	4th Year	5th Year	MFP
Total	167	85	66	59	71	63
For teaching-learning	67 (40%)	36 (47%)		11 (19%)	10 (14%)	4 (6%)
It's important	15 (9%)	9 (11%)	5 (8%)	6 (10%)	14 (20%)	8 (13%)
It's interesting	13 (8%)	8 (9%)	1 (2%)	8 (14%)		4 (6%)
For research	11 (7%)	3 (4%)		2 (3%)		1 (2%)
To inform and raise awareness		10 (12%)	8 (12%)	10 (17%)	6 (8%)	7 (11%)
It's necessary	6 (4%)	4 (5%)	4 (6%)	7 (12%)	10 (14%)	3 (5%)
To have more material	6 (4%)					
To help	5 (3%)	2 (3%)	2 (3%)	1 (2%)	2 (3%)	6 (10%)
Only yes	5 (3%)		1 (2%)		2 (3%)	
For teaching and research	4 (2.40%)		18 (27%)	1 (2%)	3 (4%)	
To be useful	4 (2.40%)				1 (1%)	
It's useful	3 (1.80%)					
To renew/increase the material	2 (1.20%)	2 (3%)	2 (3%)		1 (2%)	
Everybody should participate			2 (3%)			1 (2%)
To change conditions		1 (1%)				
Agreement with the donation	1 (0.60%)					
For medicine advancement	1 (0.60%)			1 (2%)		
To begin by myself	1 (0.60%)					
Contribution to public university	1 (0.60%)					
Better than cremation	1 (0.60%)					
Many don't know	1 (0.60%)					
To provide a different option	1 (0.60%)	1 (1%)				
To inform others	1 (0.60%)		2 (3%)	3 (5%)	1 (2%)	
To encourage donation	1 (0.60%)			2 (3%)		
To fight taboos		1 (1%)				
Free decision				1 (2%)		
Organization is necessary				1 (2%)		
For medical practice				1 (2%)		
For knowledge				1 (2%)		
To improve				1 (2%)		
As an act of solidarity					1 (1%)	
To improve donation process					1 (1%)	
As college extension					1 (1%)	
Non-existent					1 (1%)	
Unclaimed bodies						1 (2%)
It depends on the activity						1 (2%)
Empty	17 (10%)	8 (9%)	20 (30%)	10 (17%)	19 (27%)	25 (40%)

Table 5.- Student motivations to participate in a procurement/donation program

Group 3 (Third year students)

This group is composed by 93 third year medical students, distributed into 62 (67%) women and 31 (33%) men, with 22.24 ± 3.04 average age (Max: 35, min:20).

In this sample only 3 students were foreigners from Bolivia, Colombia and Ecuador respectively. Argentine students were mainly from Cordoba (56%), San Luis (8%), Catamarca (6%) and San Luis (6%) followed by people belonging from other 12 provinces.

Fifty nine per cent of them assumed themselves as Catholics, 6% as non-Catholic Christians and the 34% as no practitioners.

For the 97% (90) corpses were "much" important for teaching-learning of Anatomy and 3% (3) considered them "little" important.

Ninety eight per cent of the students should be willing to donate organs for transplantation, 73% knew about body donation, 78% were interested in acquiring further information and 46% should donate their own bodies. In these items, there were no unanswered questions.

Foreigners were less willing to donate (20%) than Argentine students. People from Cordoba (the biggest group) showed willing to donate in 43%, while those from Rio Negro, Santiago del Estero and Tucuman agreed in 100% (they were only one from each province in the group), those from Santa Cruz agreed in 75% and people from Salta in 66%. Non religion practitioners were more willing to donate (66%) than Catholics (38%) or non-Catholic Christians (20%) ($p=0.0219$).

The main reasons to donate were: a) support to teaching and research (37%), b) to be useful (16%) and c) because it is important (7%), while 21% did not answer. Main reasons not to donate were: A) preference for organ's donation, B) for their family, C) I do not like and D) I had to think it, while 30% did not answer.

Students interested in collaborating with a procurement program were 71%.

Reasons to collaborate were mainly "support to teaching and research" (27%), to "provide information and awareness" (12%), because "it is important" (8%) and 30% empty answers; while reasons not to collaborate started with "lack of time" (19%), "just no" (8%) and 58% of empty answers. All answers are represented in Tables 5 and 6).

Group 4 (Forth year students)

Ninety students were included in this group, 66 (73%) were women and the remaining 24 (27%) men.

Mean age was 22 ± 1.57 years (Max: 28, min: 20).

Only one student from Peru was foreigner. From Argentina students, 51% were from Cordoba, 7%

from La Pampa, 6% from Salta followed by people from other 15 provinces.

About religion, 76% were Catholics, 2% were non-Catholic Christians, 1% chose other religion and 21% answered "none".

For 85 (94%) of these students, corpses are "much" important to learn Anatomy and the remaining 6% answered "little". Ninety eight per cent should donate their organs for transplantation, 86% knew about body donation and 73% should be interested in further information, and 31% should be willing to donate the own body.

Twenty nine per cent of students from Cordoba showed interest in own body donation, but the percentage went up to 100% for Chubut and Formosa (only one student from each province), to 75% for Santa Fe and to 50% for Buenos Aires, Jujuy, Neuquen and Rio Negro. Instead 61% of the potential donors were Catholics, they represented only the 25% of the total Catholics included in this group; while the percentage was 53% for non-religion practitioners.

In this group, 66% of surveyed were willing to participate in a donation program and the main reasons to do it were "support to teaching and research" (24%), "provide information and awareness" (17%), "it is interesting" (14%), "it is necessary" (12%), "it is important" (10%). Main reasons not to collaborate were "I am not interested" (29%), "I should not do it" (16%) and not answered (23%). All answers are represented in Tables 5 and 6).

Group 5 (Fifth year students)

One hundred students were surveyed in the 5th year of medical career. They were 69 women and 31 men, between 21 and 28 years old (mean age 22.70 ± 1.32).

With only one foreign student from Paraguay, the remaining 99 Argentine ones were mainly from Cordoba (51%), San Luis (8%) and La Pampa (6%), followed in number by students from other 14 provinces.

Seventy five per cent were Catholics, 1 non-Catholic Christian and 24% did not profess any religion.

For 93% of the students, corpses were very important to study Anatomy, and for 7% they were "little" important.

Ninety five were willing to donate their organs, 91% knew about body donation, 77% were interested in further information and 35% considered the donation of their own bodies.

Potential donors were women in 57%, but it meant only the 29% of the total women, while men represented the 48% of total men. Instead of the appearance, there is not a statistically significant difference ($p=0.0599$). Thirty four percent of students from Cordoba should donate,

as well as 100% from Rio Negro (it was only one), and 50% from Catamarca, Jujuy, La Rioja, Salta y Santa Fe.

The 35% of Catholics and the 37.5% of no-religious professing showed willing to donate.

Reasons to donate were mainly “support to teaching and research” (43%), “to be useful” (20%), “it is necessary” (9%), with 17% not answered. Main reasons not to donate were 20% “priority for transplantation”, 6% by “modesty” and

38% without answering.

In this group, attitude to procurement was positive in 71%. Twenty per cent wanted to participate because “it is important”, 18% to “support teaching and research”, 14% because “it is necessary” and 8% to “inform and awareness people”, while 27% did not answer. Instead of this, “I am not interested” was the main reason not to donate (21%) and 48% did not answer (Table 6).

Reasons to NOT participate in procurement	1st Year	2nd Year	3rd Year	4th Year	5th Year	MFP
Total	64	26	26	31	29	28
Personal decision	13 (20%)					
Not interested	9 (14%)	10 (38%)	1 (4%)	9 (29%)	6 (21%)	4 (16%)
Lack of time	6 (10%)	3 (12%)	5 (19%)	1 (3%)		3 (12%)
I wouldn't do it	5 (8%)			5 (16%)	1 (3%)	1 (4%)
I don't agree	2 (3%)					1 (4%)
I don't like	2 (3%)			1 (3%)		1 (4%)
Only no	2 (3%)		2 (8%)			
Replacement by technology		1 (4%)			1 (3%)	
Fear		1 (4%)				
It's important			1 (4%)			
I'm impressionable			1 (4%)			
Develop a program				1 (3%)		
Immoral				1 (3%)		
Mistreatment of bodies				1 (3%)	1 (3%)	1 (4%)
Unuseful				1 (3%)		
Other priorities				1 (3%)		
Depends on the activity					1 (3%)	
Unpreparedness					1 (3%)	
By my family					1 (3%)	
Not good for this actions					1 (3%)	
To work seriously					1 (3%)	
To teach with current material	1 (1.6%)					
For my family	1 (1.6%)					
Not now	1 (1.6%)					
Not enough information	1 (1.6%)		1 (4%)		2 (8%)	
There shouldn't be a program	1 (1.6%)			1 (3%)		
No reason	1 (1.6%)			1 (3%)		
To devote time to study	1 (1.6%)					
By desecration of the body	1 (1.6%)					
By religion	1 (1.6%)			1 (3%)	1 (3%)	
Leave everyone alone	1 (1.6%)					
Empty	18 (28%)	11 (42%)	15 (58%)	7 (23%)	14 (48%)	12 (48%)

Table 6.- Student motivations to NOT participate in a procurement/donation program

1st Year students	Survey A	Survey B
Proposals for donation	237	234
Information and awareness	133 (56%)	129 (55%)
Payment	6 (2.53%)	1 (0.43%)
I don't know	5 (2.11%)	7 (3%)
Clarify proposals		6 (2.56%)
Education		3 (1.28%)
Payment to the family		3 (1.28%)
Improve storage		3 (1.28%)
To be more respectful	2 (0.84%)	3 (1.28%)
A registry of donors	2 (0.84%)	
I don't agree	2 (0.84%)	
Improve Chair of Anatomy	2 (0.84%)	1 (0.43%)
Look for terminally ill		2 (0.85%)
Develop a donation program		2 (0.85%)
Explain burial or cremation		2 (0.85%)
Benefits for familiars (burials)	1 (0.42%)	
Unknown bodies	1 (0.42%)	
Ashes to family members	1 (0.42%)	1 (0.43%)
It's difficult	1 (0.42%)	
Talk with students	1 (0.42%)	
To investigate	1 (0.42%)	
Law	1 (0.42%)	4 (1.71%)
Nothing	1 (0.42%)	11 (4.70%)
Not possible	1 (0.42%)	
Awards	1 (0.42%)	
Propose another option	1 (0.42%)	
Organized system	1 (0.42%)	
Acceptance of death		1 (0.43%)
Students informing people		1 (0.43%)
Web announcements		1 (0.43%)
Last day's benefits		1 (0.43%)
Unclaimed bodies		1 (0.43%)
Fight against taboos		1 (0.43%)
Massive requests		1 (0.43%)
Offer donation as option		1 (0.43%)
Highlight the importance		1 (0.43%)
Inform respectful treatment		1 (0.43%)
Survey student's family		1 (0.43%)
Encourage dissection		1 (0.43%)
Respectful request		1 (0.43%)
Document registry		1 (0.43%)
To be the example		1 (0.43%)
Empty	74 (31%)	41 (17.52%)

Table 7.- Proposals to improve body donation

Group 6 (Sixth year students – In mandatory final practice)

The last year of the career is mainly dedicated to supervised professional practice and a final integrated evaluation.

This group included 88 students, median age 25.44±2.46 (Max: 34, min: 23), with 73% women and 27% men.

There was only one foreign student from Spain and Argentine students were distributed in 53% from Cordoba, 9% from Salta, 8% from La Pampa and 5% from Neuquen and La Pampa, followed by minor percentages from other ten provinces.

Catholics were 56% in this sample, non-Catholic Christians were 1% and 43% did not profess any religion.

Ninety five per cent considered corpses very important for Anatomy learning and in any case the choice was “no important”.

These students, at the end of their career, were all (100%) decided to be organ’s donors. Eighty three per cent knew about body donation and 73% were interest in getting more information.

About donation of their own body, 35% were positive, and the main reasons for this option were “support of teaching and research” (35%), “to be useful” (10%), “to be helpful” (6%) and 35% of blank answers. The main reasons not to donate were “donation only for transplantation” (30%), “lack of respect” (9%), “preference of cremation” (7%), “for the family” (5%) and “I do not like”, including 28% of no respondents.

Interest in participation at the donation program was manifested by 72% of group members, based on “its importance” (13%), “to provide information and awareness” (11%), “to help” (10%), “it is interesting” (6%), “it is necessary” (5%), with 40% of blank answers. The long list of reasons not to donate were headed by “not interested” (16%), “lack of time” (12%), “lack of information” (8%), with 48% of not answered. (Tables 3 and 4).

Considering all students together, we could realize that women represented the 68.30%, foreigners were only 1.80%, while argentine students were 50.50% from Cordoba and 47.70% from the rest of the provinces. Sixty two per cent were Catholics, 32.40% did not profess any religion, 3.65% were non-Catholic Christians, 0.14% were Jews, 0% were Muslims and 1.33% profess other religions. For the 97% of the students cadavers were very important to study Anatomy and for the remaining 3% it was little important. Most of the total students (94%) should be willing to donate their organs for transplantation, 84% were interested in getting more information on body donation for teaching

and research, 42% should donate their own body and 75% could participate in procurement actions. There were significant statistical differences among the year of the career groups in the importance assigned to the corpses ($p=0.0024$) which reduce in the second half of the career; in the will for organ donation ($p=0.0015$) which progressively increased; in the interest for further information ($p<0.0001$) and the attitude to own body donation ($p=0.0014$), higher in the first year; and in the interest to participate in procurement ($p=0.0146$) which was higher in the first year and lower in the fourth. (Table 1).

There was significant statistical difference for organ and body donation between genders. Women were more willing to donate their organs than men (97% - $p<0.0001$), while men were more willing to donate their own body (50% - $p=0.0036$).

DISCUSSION

Using cadavers to teach Anatomy has been regular practice from centuries and has proved to continue being an cornerstone instead of the most modern technological resources (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).

However, unclaimed bodies as source of cadaveric material is not acceptable anymore, based on human rights. Free and voluntary body donation appears as the most reasonable and correct way to manage corpses for Anatomy teaching and research.

Many countries all over the world have developed donation programs to reach this goal from decades ago, and they were successful. Latin-American countries, except Uruguay, are the continentally more delayed. In these last years, many individual efforts started to organize programs with this aim in Brazil, Chile and Costa Rica (Biasutto et al., 2018), however they did not provide quick results. Donation programs require a long hard and continuous work.

Planning a donation program, one of the initial aspects to consider is the perception and attitude of the medical community (students and professionals) towards BD, because of the characteristics and importance of their support. Being a sensitive topic to the general population, we considered it was not convenient to initially spread it by massive communications, but the opinion and information of their trustworthy doctor or medicine student could certainly help.

Most of the published articles addressed surveys to students in the course of Anatomy (Abbasi Asl et al., 2017; Cahill and Ettarh, 2008; Perry and Ettarh, 2009; Arráez-Aybar et al., 2014; Biasutto et al., 2018b; 2019) but only a few have involved medical students from different years.

In our study, we can observe similarities and significant variations among these student's groups.

Favourable willingness to BD was different among years ($p=0.0014$) with the higher percentage in the first (52%), followed by the third year (46%); however, when we consider age groups (up to 22, 23-27 and from 28) we realized that students older than 27 had a significantly higher positivity to donation than the younger ($p=0.0233$).

The religious distribution of medical students at the University of Genoa (Italy) had no statistically difference and, like ours ($p=0.0550$), those students who did not hold any religious belief were the most positive to BD (Ciliberti et al., 2018). Also the relation between the importance assigned to the corpses to Anatomy teaching-learning and BD was similar ($p=0.8804$).

Like the report from Anyanwu et al. (2014), the difference among the willingness to donate organs for transplantation and donation of the whole body for teaching and research was significant ($p<0.0001$ in both cases). Italian students (Ciliberti et al., 2018) had similar results for both organ and body donation and significantly different to ours ($p<0.0001$); but they were not asked about their own BD but about their attitude towards BD. Even if the concept is different we should also consider that most of European countries have a long time of development of BD programs with great success. In our case, awareness campaigns for organ donation have been developed for long, compared with BD ones which were never organized.

Ciliberti et al. (2018) reported a very high percentage of students who declared that they had not been introduced to the topic of organ and tissue donation during their academic training; point never mentioned by our students during the survey, even if they did not received specific training.

Awareness about BD and desire to participate in a procurement campaign were significantly higher than willingness to donate like in Nigeria (Anyanwu et al., 2014), and informed students were more willing towards donation ($p=0.0081$).

Support to teaching and research was the main reason to donate in our study (68%) with 50% exclusively to contribute to teaching-learning of Anatomy. The following most frequent reasons were "to be useful" (15%), "because it is

necessary" (5.7%) and "because it is important" (5%). Then, they were all very altruistic motivations and evidenced their solidarity with the next generations.

On the other side, reasons to not donate were a long list of not so clear motivations (Table 4) with a 23% of empty answers. Preference for transplantation (17%) leads the list despite it is obvious; sometimes this answer is due to ignorance and others used as an excuse. Similar situation happened with the family concerns (9%). Dislike (10%), lack of respect (6%) and mistreatment (5%) were the causes which deserve our efforts to work on.

Main unwillingness reason to donate was related to family concerns among Nigerians and Italians (Anyanwu et al., 2012; Ciliberti et al., 2018), but these authors did not make any consideration about the topic. Not being psychologically ready, mistreatment of cadavers and religious believes were the following reasons in Nigeria (Anyanwu et al., 2012), which differ from ours. Even if mistreatment of the cadavers appeared in our results, it was not so relevant. Opposed to our university findings (Biasutto et al., 2019), for Anyanwu et al (2012) the dissection room experience affected the attitude of medical students to BD and participation in procurement actions.

For Ciliberti et al. (2018) "public orientation towards this practice is of high moral and medical value, and media and other social bodies could take an important role in promoting this generous act in our country". We prefer small groups or personal communication, as it is a sensitive topic and we are not sure on public reactions.

In conclusion, medicine students from the National University of Cordoba have evidenced an important commitment to donation not only of organs for transplantation but also of whole body for Anatomy teaching and research, because they recognize the fundamental importance of corpses as source of knowledge and of organs to save lives. They manifested much interest in collaborate with procurement actions and also in donation of their own body.

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, answering it was strictly voluntary.

Contributions

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

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