

Original Communication**WILLINGNESS TO BODY DONATION AMONG THE POPULATION OF CORDOBA IN ARGENTINA**

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ABSTRACT

Corpses are an irreplaceable resource for teaching and research in Anatomy. Voluntary donation is the source of cadavers, but in the National University of Cordoba we are struggling with a critical shortage due to the lack of an organized donation program. The objective of this study was to know the attitude of general population of the city of Cordoba about this subject and the profile of potential donors to develop a program. A survey was randomly distributed among older than 18 years. The questionnaire included demographic, educational, laboral and religious aspects and specific ones related to the willingness to donate the own body and reasons to do it, knowledge about this possibility, interest in further information. Two thousand and thirty responses were obtained from a population so diverse that we considered it as representative of the city. Among the respondents, 80% should be willing to donate organs for transplantation and 41% the whole body; with 45% who said to know about donation and 54% interested in more information. Main motives to donate were related to support teaching, research and science; while the main reason not to donate was associated with insufficient information. The profile of potential donors was obtained from the analysis of all the variables and we compared with other studies demonstrating that not only cultural and religious aspects may determine the willingness to donate but also the level of public information and facilities to register as donors.

Key words: Body donation; National University of Cordoba; Teaching-learning of Anatomy; Whole body donors; Anatomy research

RESUMEN

Los cuerpos son un recurso irremplazable para la enseñanza e investigación en Anatomía. La donación

voluntaria es la fuente de cadáveres, pero en la Universidad Nacional de Córdoba estamos luchando con una escasez crítica debido a la falta de un programa organizado de donación. El objetivo de este estudio fue conocer la actitud de la población general de la ciudad de Córdoba acerca del tema y el perfil de los potenciales donantes para desarrollar un programa. Se distribuyó una encuesta al azar entre mayores de 18 años. El cuestionario incluyó aspectos demográficos, educativos, laborales y religiosos, y otros específicos sobre la voluntad de donar el propio cuerpo y las razones para ello, el conocimiento sobre esta posibilidad y el interés en mayor información. Se obtuvieron 2030 respuestas de una población tan diversa que la consideramos como representativa de la ciudad. Entre los encuestados, el 80% donaría sus órganos para trasplante y 41% el cuerpo completo, con el 45% que dijo saber sobre la donación y el 54% interesado en obtener mayor información. Los principales motivos para donar se relacionaron con el apoyo a la enseñanza, la investigación y la ciencia; mientras que la principal razón para no donar estuvo asociada a la información insuficiente. El perfil de los potenciales donantes se obtuvo del análisis de las diferentes variables y comparamos con otros trabajos demostrando que no solo los aspectos culturales y religiosos pueden determinar la voluntad de donar sino también el nivel de información pública y la facilidad para registrarse como donante.

Palabras clave: Donación del cuerpo; Universidad Nacional de Córdoba; Enseñanza-aprendizaje de la Anatomía; Investigación anatómica; Donantes de cuerpo completo.

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INTRODUCTION

The study of Anatomy is recognized as basic and essential for medical training since ancient times and the human body is its corner stone. Corpses are an invaluable resource for teaching and research in Anatomy and have demonstrated to be irreplaceable for graduate and postgraduate student's training (Biasutto et al, 2006; Azer and Eizenberg, 2007; Cahill and Ettarh, 2008; Sugand et al, 2010; Cornwall et al., 2012; Dereje, 2014; Narvaez-Hernandez and Murillo-Rabago, 2014; Arráez-Aybar et al, 2014).

Cadaver donation provides 100% of the total corpses used for university teaching in Anatomy in Australia, Austria, Canada, Chile, Czech Republic, Denmark, France, German, Ireland, Japan, Malta, Netherlands, New Zealand, Poland, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Thailand and United Kingdom, and most of the bodies in China, Portugal, South Africa, Taiwan, United States and Uruguay among the participating countries in the study of Habicht et al. (2018). In Netherlands, 0.1% of the total population are registered as donors (Bolt et al., 2010). But in many countries, the access to human remains is still problematic, with educational institutions struggling to get enough corpses for teaching and research (Cornwall et al., 2012).

Most of the articles based on body donation surveyed the attitude of students under different circumstances (Cahill and Ettarh, 2008; Asl et al., 2010; Anyanwu et al, 2014; Saha et al., 2015; Quiroga-Garza et al., 2017; Ciliberti et al., 2018; Biasutto et al., 2018a, 2019a, 2019b) or Anatomy professors and researchers (Arráez-Aybar et al., 2010; Anyanwu and Obikili, 2012; Emue et al., 2012; Quiroga-Garza et al., 2017); but only a relatively few are related to the feelings and willingness of general population about this topic (Boulware et al, 2004; Bolt et al., 2010; Rokade and Gaikawad, 2012; Halou et al, 2013; Asad et al, 2014; Larner et al, 2015; Techataweewan et al., 2018; Gürses et al, 2019; Volanek and Rissi, 2019; Jiang et al.,2020).

The National University of Cordoba, despite being one of the oldest universities in the american continent and strongly linked to European universities, never developed a structured whole body donation program. Currently we are only receiving donated bodies, but the lack of organized actions and the ignorance of the population on the subject have conducted our Department to a critical shortage, with risk for Anatomy teaching-learning and research. Many years ago we began to work on the topic, but it was not easy to manage institutional support. In 2018 a two years

research project was approved by the Science and Technology Secretary to investigate the attitude of different groups towards body donation, including general population at the city of Cordoba, with the aim of proposing a donation program (Biasutto et al., 2019a, 2019b, 2019c, 2020).

Then the objective of this study was focused on the general population, considered as potential donors for our university.

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.

Two thousand and thirty surveys were voluntarily completed by people living in the city of Cordoba and surrounding towns (Great Cordoba), excluding medical and dentist students and professionals, who were involved in other studies of the same project (Biasutto et al., 2018a, 2019a, 2019b, 2019c, 2020). Questionnaires were randomly distributed in public places to individuals older than 18 years, trying to include a wide variety of ages and different social conditions. Survey was anonymous and participants were informed about the objectives to obtain consent for publication.

The survey included age, gender, nationality and province of origin, education level, religion, profession or work activity, neighbourhood, willingness to donate his/her organs for transplantation, knowledge about whole body donation, interest in learning about body donation, willingness to donate the own body and reasons for that.

Results were reported in percentages and differences were considered significant if $p < 0.01$. Chi square test was used for the analysis of the results to evaluate the association of qualitative variables.

The statistical software used was INFOSAT.

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

RESULTS

On the 2030 participants, 1040 (51%) were women and 990 (49%) men, with ages from 18 to 92 (mean age: 38.72 ± 16.34). Nine persons did not include their age. For better interpretation we

considered four age groups: a) 18-30 years (mean age: 23.55 ± 3.58) 829 cases; b) 31-45 years (37.87 ± 4.42) 550 cases; c) 46-60 years (52.43 ± 4.36) 390 cases; d) over 60 years (69.28 ± 6.57) 252 cases.

Ninety seven per cent (1967) were Argentine and the 3% (63) of foreigners were from Peru (19), Venezuela (11), Paraguay (6), Bolivia (4), Colombia (3), Chile (2), United States (2), Brazil (1), Haiti (1), Italy (1) and 13 did not specify the country. Argentines from the province of Cordoba were 82% (1612) and the remaining belonged from all the provinces with prevalence of La Pampa, Buenos Aires, Santa Fe, Salta and Jujuy. The options for educational level included: A) university, with 693 (34%); B) superior (non-university), 328 (16%); C) high school, 744 (37%); D) primary school, 245 (12%); E) none, 13 (0.64%) and F) did not answer, 7 (0.34%). These options did not distinguish between complete or incomplete level.

While considering the religion, 1200 (59%) were Catholics, 146 (7%) were non-Catholic Christians, 15 were Jewish, 3 were Muslims, 13 belonged to other religions with minor representation in the country, 630 (31%) did not profess any religion and 33 did not answer.

One hundred and fifty six different professions or work activities were informed, even if some of them were joined under a common nomination (for example: general services). To facilitate the analysis, we grouped these activities in the following way: I) Health professionals (excluding physicians and dentists) 96 (5%); II) Non-health professionals 129 (6%); III) Technicians 49 (2%); IV) Officers 181 (9%); V) Construction workers 274 (13%); VI) Customer service staff 323 (16%);

VII) Housewives 97 (5%); VIII) Educators 110 (5%); IX) Students (except medical and dentistry students) 362 (18%); X) Retired 163 (8%); XI) Unemployed 63 (3%); and XII) Others 183 (9%).

The city of Cordoba has 536 neighbourhoods. Of the total surveyed people, 1872 lived in 312 different neighbourhoods of different financial levels, 147 did not answer this item and 11 were illegible.

Of the whole group, 80% (1613) should be willing to donate their organs for transplantation; 45% (910) said to know about body donation for teaching and research; 54% (1087) would be interested in obtaining more information about the donation of bodies, and 40.64% (825) were willing to donate their own bodies.

The information provided above shows the characteristics of the surveyed people. In the following paragraphs we shall associate those different aspects included in the questionnaire with the willingness to donate the own body.

Women demonstrated more positive attitude to donation than men. Four hundred and fifty two women would be willing to donate, representing 55% of the total potential donors and 43% of total women; while 373 men could donate their bodies, 38% of men ($p=0.0080$).

The table 1 shows each age group attitude towards donation with statistically significant differences ($p<0.0001$), evidencing better disposition in the extreme age groups.

Argentines were more willing to donate than foreigners (41% - 24%, $p=0.0059$) and those residents from other provinces were more willing than natives from Cordoba (49% - 39%, $p=0.0016$).

Age groups	Will to donate	N	%
18-30	YES	397	47,89%
	NO	424	51,15%
	Empty	8	0,97%
31-45	YES	187	34%
	NO	349	63,45%
	Empty	14	2,55%
46-60	YES	137	35,13%
	NO	249	63,85%
	Empty	4	1,03%
Más 60	YES	101	40,08%
	NO	148	58,73%
	Empty	3	1,19%

Table 1- Relation between age groups and willingness to donate of each one.

Education level	Donors	%/total	%/category
None	4	0.48%	30.77%
Primary school	70	8.48%	28.57%
High school	263	31.88%	35.35%
Superior	153	18.55%	46.65%
University	334	40.48%	48.20%
Empty	1	0.12%	16.67%

Table 2- Relation between the educational level of the participants and willingness to donate their own bodies.

The association with educational level showed that the willingness to donate is directly related to higher education, with significant differences ($p < 0.0001$). Table 2 shows the details. Catholics appeared as main donors (53%) because it is the biggest religious cult in

Argentina and most of the respondents profess it; but if we consider each group independently (Table 3) we realize that the highest percentage of donors were those who do not profess any religion (52% vs. 37% of Catholics, $p < 0.0001$).

Religion	Donors	%/total	%/category
Catholics	439	53,21%	36,58%
Non-catholic Christians	52	6,30%	35,62%
Jewish	1	0,12%	6,67%
Muslims	0	0%	0%
Other	4	0,48%	30,77%
None	322	39,03%	51,94%
Empty	7	0,85%	21,21%

Table 3- Relation between religious practice and willingness to donate

Work Activity	Donors	%/total	%/category
Officers	71	8,61%	39,23%
Health professionals	35	4,24%	36,46%
Non-health profes.	58	7,03%	44,96%
Technicians	20	2,42%	40,82%
Construction workers	81	9,82%	29,56%
Students	205	24,85%	56,63%
Educators	46	5,58%	41,82%
Customer service	119	14,42%	36,84
Unemployed	20	2,42%	31,75
Housewives	32	3,88%	32,99
Retired	56	6,79%	34,36%
Others	82	4,04%	44,81%

Table 4- Relation between work activity and willingness to donate.

Association between working activity and donation is provided by Table 4. Students (57%), non-health professionals (45%), educators (42%) and technicians (41%) were the activities with highest percentage of potential donors. However it was notorious that none group of activities showed percentages lower than 30%. In spite of that, differences among working activities was significantly different ($p < 0.0001$).

Forty nine per cent (790) of those who should donate organs for transplantation would also donate their whole bodies for teaching and research.

Sixty three per cent (738) of those who would not donate were unaware of the possibility of donating before the survey and 35% (412) were interested in obtaining information.

Motives to donate	N	%
Teaching-learning	119	17.66
To help	104	15.43
For research	100	14.84
Contribution to science	83	12.31
It does not serve me	39	5.79
Teaching and research	30	4.45
It is important	15	2.23
It is a need	13	1.93
To be useful	8	1.19
A good option	5	0.74
I will not need it	5	0.74
Good deed	4	0.59
Never thought before	4	0.59
Depends on the family	3	0.45
Lack of information	3	0.45
Preference for cremation	3	0.45
To give life	3	0.45
Another option	2	0.30
Better use	2	0.30
Curiosity	2	0.30
Familiar decision	2	0.30
I do not know yet	2	0.30
I do not like	2	0.30
Believes	1	0.15
Does not matter	1	0.15
For knowledge	1	0.15
For life	1	0.15
I do not like burial	1	0.15

I do not want to rot	1	0.15
I like	1	0.15
I will be dead	1	0.15
It interests me	1	0.15
It is mine	1	0.15
It is not mine	1	0.15
Looks fine	1	0.15
Love to Medicine	1	0.15
Matter without life	1	0.15
Nothing is missed	1	0.15
Relatives in Medicine	1	0.15
Social contribution	1	0.15
Thanks to science	1	0.15
To improve life	1	0.15
To improve Medicine	1	0.15
To make it better	1	0.15
To save lives	1	0.15
Empty	99	14.69

Table 5- Reasons expressed by respondents for donating their bodies to teaching and research. Absolute (N) and proportional values within the group (%).

Reasons to donate or not donate were freely expressed by the respondents (not multiple choice answers). In the group of those who would donate, altruism prevailed (Table 5). Those who wanted to support teaching, research and science represented 49.26%, and those who considered donation important, useful and needed were 5.35% of the potential donors. Instead both lists were long (Table 5 and 6), that including the reasons of individuals negative to donation was of a great variety of expressions, not always clear (Table 6).

Motives not to donate	N	%
Lack of information	125	10.65
Just no	89	7.58
For the family	70	5.96
It doesn't like me	69	5.88
Not interested	67	5.71
Priority for transplantati..	62	5.28
Preference for cremation	46	3.92
Religious reasons	38	3.24
Burial preference	35	2.98
Didn't think yet	34	2.90
Modesty	33	2.81
Don't know yet	20	1.70
Distrust	17	1.45

Familiar decision	12	1.02
To rest in peace	12	1.02
Disrespect for the dead	11	0.94
Personal reasons	10	0.85
Believes	9	0.77
For disagreement	9	0.77
I don't want	9	0.77
Bad impression	8	0.68
Fear	8	0.68
It is my body	7	0.60
Personal decision	6	0.51
For the exhibition	5	0.43
Other source	5	0.43
Save lives	4	0.34
Unpleasant	4	0.34
I want a veil	3	0.26
Inappropriate	3	0.26
Useless	3	0.26
Avoid experiments	2	0.17
Business	2	0.17
By manipulation	2	0.17
Donate another	2	0.17
They fight for my life	2	0.17
It is morbid	2	0.17
It make me sick	2	0.17
Keep intact	2	0.17
Look for other option	2	0.17
Moral issue	2	0.17
Never	2	0.17
Nothing	2	0.17
Unnecessary	2	0.17
Use unclaimed bodies	2	0.17
A lie	1	0.09
All negative	1	0.09
Another option	1	0.09
Attached to my body	1	0.09
Avoid body injuries	1	0.09
Because of misuse	1	0.09
Because of reification	1	0.09
Because of research	1	0.09
By principles	1	0.09
Christian burial	1	0.09
Contribute to science	1	0.09
Convictions	1	0.09
Cultural issue	1	0.09
Depends on who receives	1	0.09
To donate as much as possible	1	0.09
Donation only for my family	1	0.09
Doubts	1	0.09
Emotional attachment	1	0.09
Ethical-moral reasons	1	0.09
Feeling of discomfort	1	0.09
Feeling of invasion	1	0.09
For caution	1	0.09
For my age	1	0.09
For respect	1	0.09
Hesitation	1	0.09
I donated	1	0.09
I won't need it	1	0.09
Incomprehensible	1	0.09

It is my temple	1	0.09
It is wrong	1	0.09
Lack of control	1	0.09
Lack of security	1	0.09
Misunderstanding	1	0.09
Moral objection	1	0.09
No motives	1	0.09
Not an animal	1	0.09
Not applicable	1	0.09
Not good	1	0.09
Not important	1	0.09
Not my will	1	0.09
Not now	1	0.09
Not suitable	1	0.09
Not sure	1	0.09
Private motives	1	0.09
Reencarnación	1	0.09
Sacred body	1	0.09
Seems odd	1	0.09
Sin	1	0.09
Teaching and research	1	0.09
Tear the body to pieces	1	0.09
Terrorism	1	0.09
To be tree compost	1	0.09
To be useful	1	0.09
To give life	1	0.09
To preserve the whole body	1	0.09
Traffic	1	0.09
Unacceptable	1	0.09
Unethical	1	0.09
Empty	255	21.72

Table 6- Reasons expressed by respondents for not donating their bodies to teaching and research. Absolute (N) and proportional values within the group (%).

The lack of information (10.65%) was the most frequent and reasonable motive to oppose; followed by “just no” (7.58%), “for my family” (5.96%), “doesn’t like” (5.88%), “not interested” (5.71%) evidencing a not well founded opinion, and “priority for transplantation” (5.28%) showing the lack of knowledge of this subject. In both groups (Table 5 and 6) we could observe a high percentage of non-respondents.

We consider this information very valuable for the design of a body procurement and donation program.

DISCUSSION

Only few articles were found evaluating the attitude of local people towards body donation. In those countries with body donation law and/or programs for decades, it should not be necessary, except they evidenced a reduction (Boulware et al., 2004).

In South America all the countries have difficulties with the provision of bodies, except Uruguay with a law involving whole body donation and a program since a century (Biasutto et al., 2018b)

The present study included a sample with sufficient breadth and diversity to be representative of Cordoba population.

We consider 41% of general population with a positive attitude to donation as very auspicious for a donation program, but it is significantly lower than the 49% ($p=0.0022$) reported for Boulware et al. (2004) in Baltimore-USA. However it is important to consider that Boulware conducted the study in a society with a well organized program but a low donation rate, instead of our lack of program and public information. On the other side, of 1500 Greek survey participants (Halou et al., 2013) only 5% were willing to donate their bodies ($p<0.0001$), 19% ($p<0.0001$) among 380 Indians of Maharashtra aware of body donation (Rokade and Gaikawad, 2012) and 25% of Brazilians in Campinas on 100 surveyed (Volanek and Rissi, 2019).

Women were more likely to donate than men, in contrast with studies performed in medical students and professionals with better disposal of men ($p=0.0005$ and $p=0.0012$ respectively) (Biasutto et al., 2019b, c). This information also contrasted with the study of Gürses et al. (2019) on Turkish donors, with 2/3 of men among the respondents, on Indians (Rokade and Gaikawad, 2012) and Jiang et al. (2020) on Chinese with 67% of male donors. But studies carried out in the University of Nijmegen (Netherlands) showed the same percentages than our study (women/men, 51%-49%). (Bolt et al., 2010); Techataweewan et al. (2018) in Thailand and Cornwall et al. (2012) study on New Zealand, South Africa and Ireland donors also evidenced similarity compared with our results ($p=0.6542$, $p=0.0722$ and $p=0.8125$ respectively). Among Greek population (Halou et al., 2013) women were also more willing to donate, even more than our study ($p<0.0001$), on a very small group of potential donors.

Younger than thirty was the age group with higher percentage of potential donors, probably due to the concept that death is something distant for them, an unconscious certainty that it will never happen to one. However, the second most frequent group were those over 60 years, with opposite life conditions. For Boulware et al. (2004) increasing age was associated with 50-60% less odds of willingness to become a whole body donor, similar to the decrease reported by Rokade and Gaikawad (2012).

Gürses et al. (2019) identified nearly 50% of donors with tertiary educational level, in a great similarity with our study ($p=0.6087$). Many

authors (Boulware et al., 2004; Rokade and Gaikawad, 2012; Halou et al., 2012) reported greater education associated with increasing will to donate. In contrast, Bolt et al. (2010) found that 59% of Dutch donors had secondary education and 22% had tertiary education ($p<0.0001$), and Cornwall et al (2012) reported 63-72% who had completed secondary school and 26-43% had attended tertiary education.

Non-professing people showed the highest percentage of willingness to donate but, considering the total number, Catholics showed the highest rate of positive attitude, similar to Cornwall et al. (2012) about Christians, and differentiating from Gürses et al (2019) who informed a higher percentage of "irreligious" ($p<0.0001$) and Bolt et al. (2010) reporting only 21% as members of a church or religious community ($p<0.0001$). Boulware et al. (2004) associated strong religious faith with lower percentages.

For Cornwall et al. (2012) clerical and trade occupations were more involved in donation than professionals and managers, evidencing a difference with our results. Motivations described for body donation among Dutch (Bolt et al., 2010), South Africans, New Zealanders and Irish (Cornwall et al., 2012), Thai (Techataweewan et al., 2018) and Brazilians (Volanek and Rissi, 2019) were the same than ours, evidencing altruism and solidarity as prevalent feelings. However, in those other articles appeared the dislike of funerals and concern about costs not present in our study; in any case Cordoba survey respondents considered the bodies to be useful rather than being buried or cremated. For Bolt, donors "choose to be different, to make a nonconformist decision". In this way body donors were described as "independent, strong and self-determined" (Bolt, 2010).

In India (Rokade and Gaikawad, 2012) the main reasons not to donate were related to the interest in performing religious rituals and fear about misuse of bodies. Consistent with our study, in Pennsylvania a high percentage of respondents reported they had insufficient information (Larner et al., 2015), despite which, 54% had interest in donating ($p=0.0246$) but only 5 were just registered. These authors considered that lack in education about whole body donation and registration process may be the cause of shortage of cadaveric donors.

It is clear that there are important differences between countries, not only due to ethnic (in some countries), cultural and religious aspects but also associated to the popular information and facilities to register as donors; then, no recipe could be applied for a body donation program but it has to be adapted to the local profile.

The study is conclusive in showing that women, young and old, with high educational level and preferently non-professing any religion are the best candidates to donate their own bodies. However, increasing information could modify this profile as it was one of the main requests during the survey. Procurement should consider that altruism and solidarity are the main feelings supporting this attitude.

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: Conceptualization, data curation, formal analysis, funding acquisition, methodology, resources, project administration, supervision, writing. LMN: Investigation, methodology and resources. SGS: Investigation, methodology and resources. FT: Investigation, methodology and resources. NL: Investigation, methodology and resources. AJBV: Investigation, methodology and resources. MAS: Methodology, resources, supervision, investigation. OPD: Conceptualization, funding acquisition, investigation, project administration, methodology, validation. DU: Data curation, methodology, resources, investigation. DMW: Investigation and resources. FNDO: Preparation and reception of the surveys. IEMV: Preparation and reception of the surveys.

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