



Revista de la Facultad de Medicina

ISSN: 2357-3848

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Universidad Nacional de Colombia

Colombia

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Association between education about organ transplantation aimed at medical students  
and the acquisition of the organ donor card. A cross-sectional study.  
Revista de la Facultad de Medicina, vol. 62, núm. 4, 2014, pp. 571-578  
Universidad Nacional de Colombia  
Bogotá, Colombia

Available in: <http://www.redalyc.org/articulo.oa?id=576363531009>

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## ORIGINAL RESEARCH

DOI: <http://dx.doi.org/10.15446/revfacmed.v62n4.45544>**Association between education about organ transplantation aimed at medical students and the acquisition of the organ donor card. A cross-sectional study.***Asociación entre la educación en trasplantes de órganos dirigida a estudiantes de medicina y la adquisición del carné de donantes de órganos. Estudio de corte transversal.***Xiomara Benavides-López<sup>1</sup> • David Mauricio Figueroa-Bohórquez<sup>1</sup> • Héctor Camilo Pérez<sup>1</sup> • Diana Paola Escobar-Serna<sup>1</sup> • Juan Pablo Alzate<sup>2</sup> • Eynér Lozano-Márquez<sup>1,3</sup>****Received:** 15/09/2014 **Accepted:** 07/10/2014<sup>1</sup> Grupo de Trasplante de Órganos y Tejidos Humanos, Departamento de Cirugía, Facultad de Medicina, Universidad Nacional de Colombia. Bogotá, Colombia.<sup>2</sup> Instituto de Investigaciones Clínicas, Facultad de Medicina, Universidad Nacional de Colombia. Bogotá, Colombia.<sup>3</sup> Hospital Universitario San Ignacio. Bogotá, Colombia.Correspondence: Xiomara Benavides-López. Carrera 30 N° 45-30. Grupo de Trasplante de Órganos y Tejidos Humanos, Departamento de Cirugía, Facultad de Medicina, Universidad Nacional de Colombia, Ciudad Universitaria. Bogotá, Colombia. Telephone: +57 1 316 5000. Extension: 15105. E-mail: [xbenavidesl@unal.edu.co](mailto:xbenavidesl@unal.edu.co).**| Summary |****Background.** The transplantation group of the National University of Colombia considers that education about transplants is important to raise the donation rate in this country.**Objective.** To find a statistical association between education about transplantation aimed at medical students and the number of students and their families bearing the organ donor card.**Materials and methods.** Cross-sectional analytical study. Two surveys were designed and sent to two different student populations. The first group had taken the course “Human Organ and Tissue Transplantation”, and the second group was composed of students from the fifth semester of medical education. The statistical test used was difference of proportions, sample size of 50 people, statistical power of 80%, difference in proportions 20%, alpha 0.05,  $p < 0.05$ .**Results.** The surveys were answered by 29 students from first group and 74 students from second group. First question: “Do you carry the organ donor card?”,  $p$ -value of 0.03 found. Second question: “Do your family members carry the organ donor card?”,  $p$ -value of 0.732 found. Affirmative answer to the first question,  $p=0.10$  and answer to second question,  $p=0.0005$ .**Conclusion.** An association was found between education about transplantation focused on medical students and bearing the organ donor card and communicating their wishes to their families. Likewise, an association between education and a positive attitude toward donation was found in the families of students that participated on the course “Human Organ and Tissue Transplantation”.**Key words:** Transplantation, Homologous; Direct Tissue Donation; Education, Medical, Undergraduate; Universities; Family (MeSH).**Benavides-López X, Figueroa-Bohórquez DM, Pérez HC, Escobar-Serna DP, Alzate JP, Lozano-Márquez E.** Association between education about transplantation aimed at medical students and the acquisition of the organ donor card. A cross-sectional study. Rev. Fac. Med. 2014;62(4):571-8. <http://dx.doi.org/10.15446/revfacmed.v62n4.45544>.**Resumen****Antecedentes.** El grupo de trasplantes de la Universidad Nacional de Colombia considera que la educación en esta área es importante para mejorar la tasa de donación en el país.

**Objetivo.** Encontrar una asociación entre la educación en trasplante dirigida a estudiantes de pregrado y el número de estudiantes y sus familias que portan el carné de donante de órganos.

**Materiales y métodos.** Estudio de corte transversal analítico. Se realizaron dos encuestas dirigidas a dos grupos estudiantiles. El primer grupo cursó la asignatura “Trasplante de órganos y tejidos humanos” y el segundo grupo se encuentra cursando quinto semestre. La prueba estadística usada fue diferencia de proporciones, tamaño de muestra 50 personas, poder del 80%, diferencia de proporciones 20%, alfa 0,05, valor de  $p < 0,05$ .

**Resultados.** Encuestas evaluadas: 29 del primer grupo y 74 del segundo grupo. En la pregunta: “¿Porta el carné de donante de órganos?”, se encontró un valor de  $p$  de 0,03. En la pregunta: “¿Portan sus familiares el carné de donante de órganos?”, se halló un valor de  $p$  de 0,732. Respuesta afirmativa a primera pregunta  $p=0,10$  y respuesta afirmativa a segunda pregunta  $p=0,0005$ .

**Conclusión.** Existe una asociación entre educar en trasplantes a estudiantes de medicina en pregrado, el porte del carné de donante de órganos y la comunicación de su deseo de ser donante a su familia. Así mismo, se encontró una asociación entre la educación y una actitud positiva hacia la donación en las familias de los estudiantes que cursaron la asignatura de “Trasplante de órganos y tejidos humanos”.

**Palabras clave:** Trasplante Homólogo; Donación Directa de Tejido; Educación de Pregrado en Medicina; Universidades; Familia (DeCS).

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## Introduction

The transplantation of organs and tissues is one of the most altruistic acts that one human can do for another. It means giving a part of oneself, or of deceased family members, to another person so that they may have a better quality of life. In Colombia, the law permits donation from a live donor or from a cadaveric donor with brain death (1). This last category contributes the majority of transplants (2). However, for such an event to occur, there must be consent from the deceased person's family, since, in Colombia, this consent has priority over the fact that the deceased person carried a donor card (3). This can be an obstacle for the organ donation process since often families are not aware of the wishes of their loved ones.

In the year 2013 in Colombia “961 organ transplants were performed, which represents a decrease of 13.3% with respect to the same period in the previous year (2012) where 1108 transplants took place” (2). This event may be related to the reduction in the number of violent deaths and deaths due to traffic accidents that was apparent in the country in 2013 (4), the increase in the number of patients with contraindications against donation, the decrease in the number of donor cards acquired, the increase in negative responses from family members (2), and the absence of a sufficient number operation coordination doctors (5). As a consequence of the reduction in donation rates, establishments like the National Health Institute (2) have proposed holding awareness and training days for health personnel, medical students, and the public in general through conferences, social networks, and radio and television programs (2,6) with the goal of generating an increase in the donation rate to benefit the 1 664 people that are on the transplant waiting list (2).

One way of encouraging a good attitude toward donation and transplantation in Colombia, according to the Organ and Tissue Transplantation Research Group of the Faculty of Medicine at the Universidad Nacional de Colombia, is through targeted education at the undergraduate level. This led to the creation of the elective course “Human Organ and Tissue Transplantation” that aims to focus on teaching basic concepts of transplantation and offering students a space for pursuing research in this area and related pathologies. Also, it is based on an interest in forming well-rounded students who are conscious of the reality of transplantation in their country, capable of promoting transplantation, and of contributing to the improvement of the donation rates.

This article has the objective of finding a statistically significant association between education on transplantation and carrying a card that accredits them as a donor, both among medical students and among their family members. To do this, the difference between proportions for students and their family members -that are donor card carriers- it was established by comparing two population groups: those who had taken the elective course, and a group of fifth semester students that had not taken the course yet. Also, this study intended to find if there is a change in attitude toward organ donation in the students and their family members thanks to this course.

## Materials and methods

Analytical cross-sectional study. Between the months of September and December 2013, the Organ and Tissue Transplantation Research Group at the Universidad Nacional de Colombia administered an online survey directed to students in the Faculty of Medicine of this university. Of this population,

two groups of students were taken. The first was made up by sixth semester medical students and graduated physicians that, during their undergraduate, completed at least one of the three levels of the elective course “Human Organ and Tissue Transplantation” that has been offered for 5 years. The second group was made up of fifth semester students. They were chosen because they were about to finish the basic component of the medicine program and had not yet been exposed to the clinical component of their training or to the elective course. The main objective of choosing both population is to know if bearing the donor card is associated with education or if it is independent from it. The call to participate was emitted in a random and anonymous fashion without offering academic or economic compensation. Surveys that were not completely answered were eliminated.

The construction of the surveys was based on research by Zheng (7), and Ohwaki (8). The sent surveys were divided into personal data and experience with transplants (Survey 1 and 2). Also, survey number 1 had additional questions, since it aimed to evaluate students’ experience during the course and its repercussions in academic and family life. It contained multiple-choice questions with a single possible response. The surveys used discrete variables.

**Survey 1.** Students that took the course “Human Organ and Tissue Transplantation” at the Universidad Nacional de Colombia.

Personal information
<b>1. Sex</b>
a. Female
b. Male
<b>2. Age</b>
a. 20-22
b. 23-24
c. 25-26
d. 27-28
e. 29-30
f. 31-32
<b>3. Current semester</b>
a. Seventh
b. Eight
c. Ninth
d. Tenth
e. Internship I
f. Internship II
g. Graduate
<b>4. If you are a graduate, please specify: year of graduation and your specialization, if any.</b>

Experience in the course
<b>5. ¿How many levels of the course “Human Organ and Tissue Transplantation” did you take?</b>
a. 1
b. 2
c. 3
<b>6. Why did you decide to register in the transplantation course?</b>
a. You liked the topic
b. Because it was touched on in class and you liked it
c. You thought that it was necessary to learn about transplants
d. Because you were unaware of other electives
e. Others. Please elaborate:
<b>7. How did taking the transplantation course influence your professional life?</b>
a. Positively
b. Negatively
c. Don't know/No comment
<b>8. How did it affect your daily life with your family, friends, and community?</b>
a. Positively
b. Negatively
c. Don't know/No comment
<b>9. Do you carry an organ donor card?</b>
a. Yes
b. No, it doesn't interest you
c. No, but you are considering getting one in the future
d. Don't know/No comment
<b>10. Do your family members carry an organ donor card?</b>
a. Yes
b. No, they are not interested
c. No, but they are considering getting one in the future
d. Don't know/No comment
<b>11. Do you continue to work with transplants?</b>
a. Yes
b. No
c. If your response was “Yes”, please specify
<b>12. Would you like to work in this field in the future?</b>
a. Yes
b. No
c. Don't know/No comment
<b>13. Do you think it is important to teach about transplants at the undergraduate level?</b>
Open answer

**Survey 2.** Survey of fifth semester students at the Universidad Nacional de Colombia.

Personal information	<b>1. Sex</b>
	a. Female
	b. Male
	<b>2. Age</b>
	a. 15-17
	b. 18-20
Experience in the area of organ transplantation	c. 21-23
	d. 24-26
	e. Other. Specify:
	<b>3. Do you carry an organ donor card?</b>
	a. Yes
	b. No, you're not interested
	c. No, but are considering getting one in the future
	<b>4. Do your family members carry organ donor cards?</b>
	a. Yes
	b. No, you're not interested
	c. No, but are considering getting one in the future
	d. Don't know/No comment
	<b>5. Do you consider it important to talk about organ donation and transplantation at the undergraduate level?</b>
	a. Yes
	b. No
	<b>6. Do you think that it is important to teach about transplantation at the undergraduate level?</b>
	a. Yes
	b. No
	c. Don't know/No comment

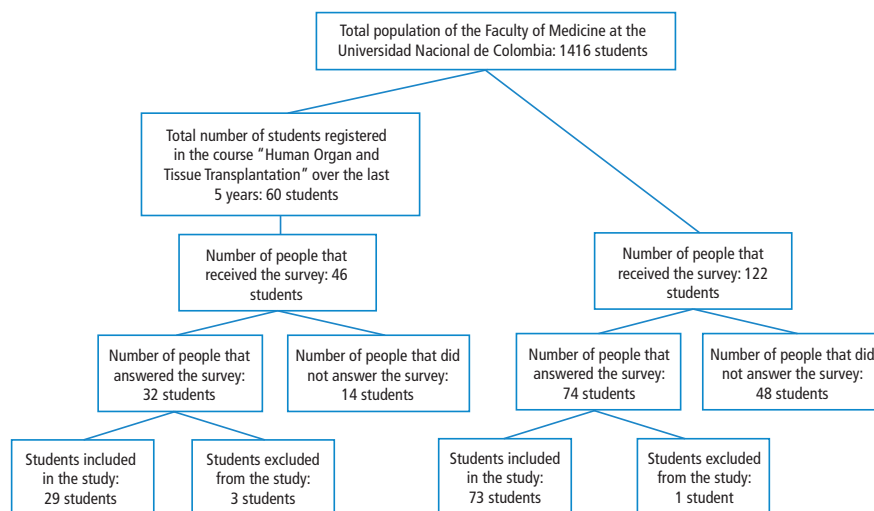
Emphasis was made on carrying the card that accredits the bearer as an organ donor in the case of brain death, since this is a way of objectively measuring the individual's interest in being an organ donor. However, as mentioned earlier, this is not a valid document for initiating the donation and organ retrieval process in the donor body.

The statistical analysis was performed through the program Stata 12.0 (9). The required sample size was 50 participants, with a statistical power of 80%, an alpha of 0.05 and a difference of proportions of 20%. 40% of students have the donor card before taking the course, and 60% of students obtain it after taking the course.

As a statistical method, the difference between proportions test was used to evaluate the discrepancy between the two groups and a p-value <0.05 was considered to be statistically significant. Questions 9 (survey 1) and 3 (survey 2) along with questions 10 (survey 1) and 4 (survey 2) were compared.

## Results

The Faculty of Medicine of the Universidad Nacional de Colombia had 1416 students in the second semester of 2013. Of the first group, we were able to contact 46 of the approximately 60 students that have taken the transplant course. Of these, 32 (69.56%) responded to the survey. However, only 29 (63.04%) finished it. The second survey was sent to a total population of 122 students through an open call for participation. Of them, 74 (23.41%) responded. One survey was eliminated because it had not been completed (Figure 1).



**Figure 1.** Distribution of the student population included in the study.

The first group was made up of 29 participants, 31% female and 69% male. The members of this group had an age between 20 and 28 years, with the 20-22 year old age range predominating (31.03%). Of this group, 41.38% already have the title of surgeon and 20.68% are in their internship year. The second group was made up of 73 fifth semester students, 35.14% female and 64.86% male, with an age range between 18 and 29 years, in which the 18 to 20 age group predominated (54.79%) (Table 1).

**Table 1.** Characteristics of population groups 1 and 2.

	Group 1	Percentage (%)	Group 2	Percentage (%)
<b>Sex</b>				
Female	9	31.03	26	35.61
Male	20	68.96	47	64.38
<b>Age</b>				
15-17	0	0	0	0
18-20	0	0	40	54.79
21-23	12	41.37	30	41.09
24-26	10	34.48	1	1.36
27-29	7	24.13	2	2.73
30-31	0	0	0	0
<b>Current semester</b>				
Fifth	0	0	73	
Sixth	2	6.89		
Seventh	0	0		
Eighth	4	13.79		
Ninth	2	6.89		
Tenth	1	3.44		
Internship I	2	6.89		
Internship II	6	20.68		
Graduate	12	41.37		
<b>If you are graduated, are you studying a specialization? If so, in what?</b>				
General surgery	4	33.33		
Pediatric surgery	1	8.33		
Research	1	8.33		
Pediatrics	1	8.33		
No	5	41.66		
<b>How many levels of the course "Human Organ and Tissue Transplantation" have you taken?</b>				
1	4	13.79		
2	12	41.37		
3	13	44.82		

To know if there was statistically significant difference in the number of students bearing the donor card in group 1 and in group 2, the results from the question, "Do you carry an organ donor card?" (question 9 and 3 in surveys 1 and 2 respectively) were taken. The proportions found were:  $p1=0.482$  (proportion group 1: 14/29) and  $p2=0.260$  (proportion group 2: 19/73). The p-value for the difference of proportions test was 0.03.

Under the same parameters described above, the question: "Do your family members carry an organ donor card?" (questions 10 and 4 of surveys 1 and 2 respectively) was evaluated. It was calculated if there were more family members of students who had taken the transplantation course registered in the transplant network compared to those of the fifth semester students. Thus,  $p1=0.103$  (proportion group 1: 3/29), and  $p2=0.821$  (proportion group 2: 6/73), with a p-value equal to 0.732.

On the other hand, to evaluate the positive attitude of the patients, the affirmative responses, like "Yes, I am already registered as a donor" and "No, but I would like to register in the future", to the above evaluated questions from both surveys (questions 9 and 10 from survey 1 and questions 3 and 4 from survey 2) were also considered. Here, 100% of the first group had affirmative responses. This value was 94.5% in the second group ( $p1=1$ ,  $p2=0.94$ ,  $p=0.10$ ). But, in family members group was found that, in the first group, 72.41% of family members want to be organ donors, 17.24% did not want to be donors, and that only 10.34% of the students were unaware of their family's wishes. This is different from what happens in group 2, where only 32.87% of family members had a positive attitude to being a donor, 26.02% of them did not wish to be a donor, and 41.09% of the students were unaware of the wishes of their family. The results found were  $p1=0.724$ ,  $p2=0.342$ ,  $p=0.0005$ .

Given that in this same question, a greater percentage of students, in group 2 compared to group 1, didn't know the wishes of their family on organ donation in case of brain death, a statistical difference test was done. The results were  $p1=0.103$ ,  $p2=0.082$ , with a p-value of 0.0027.

Also, the members of group 1 were evaluated on their experience in the research group. They were asked about the reasons that motivated them to registering for the course from the transplant research group. The majority of the students responded that it was a topic that they enjoyed (25 students, 86.2%), 1 person responded that they thought that learning about transplants was necessary, and 3 of them responded that the group offered a great opportunity to do research. What is noteworthy is that 0% of the students



responded that their decision was made after having touched on the topic in the undergraduate curriculum.

Also, in the group 1 survey, students are questioned about how taking the course influenced their personal life. 96.6% (28 people) responded with “positively”, and 3.4% (1 person) responded with “don’t know/no comment”. None of the students affirmed having had a negative experience. The same question was also asked about the experience of the students’ family members. 89.6% (26 people) considered that the course had influenced “positively”, and 10.34% responded “don’t know/no comment”.

Also evaluated in this group was whether they would consider practicing medicine in a field related to organ transplantation. To do this, they were asked if they currently worked in an area related to transplants and if they would like to continue working in it, or work in it in the future (question 11, survey 1). The results obtained from this question revealed that 15 people currently continue to work with transplants, either in the research area or as part of a special internship in transplantation, while 14 individuals did not. To the question if they would like to work in the area in the future (question 12, survey 1), the majority responded “Yes” (25 people, 86.2%), three responded “don’t know/no comment”, and one individual (3.4%) responded “No”.

Finally, both groups were asked if they considered important to talk about organ donation at the undergraduate level (questions 13 and 16 of surveys 1 and 2, respectively). In the first group, 27 people gave their opinion in the form of an open answer. The other two answered affirmatively, but did not justify their response. Of this population, it was found that the majority (33.3% of the total, 9 people) answered that education at the undergraduate level is important, “since it is the general practitioners who are often the first contact with possible donors, and they must at the same time initiate contact with the donors family members, and report the news to the transplantation network”. Additionally, the students agreed “that transplants and related fields are current topics that should be studied to maintain educational quality” (22.2%, 6 people). Other answers obtained were related to the importance of educating about transplants, “since it is a treatment for prevalent diseases in Colombia” (18.5%, 5 people), “it could lead to a possible increase in donation rates” (18.5%, 5 people), and “may eliminate myths about the topic that exists among the population” (7.4%, 2 people). The question was made to the second group, but with a single answer format. 98.6% of students (72 students) affirmed its importance.

## Discussion

This cross-sectional study allowed finding a statistically significant difference of proportions between the students that

took the transplant course and those that did not, concerning the bearing of the donor card ( $p < 0.05$ ). However, upon evaluating the attitude of the two groups, no difference was found, since both populations have a positive attitude towards donation ( $p > 0.05$ ).

Furthermore, upon comparing the families of the two groups, there is no difference with respect to their desire to be organ donors ( $p > 0.05$ ). Nevertheless, there is a statistically significant difference in attitude; since, the family members of group 1 were more willing toward organ donation than family members of group 2. Both groups tended to a negative response toward obtaining the donor card ( $p < 0.05$ ). Above all, there is greater unawareness among the students of the second group of their family members position with regard to organ donation ( $p < 0.05$ ).

In these findings, it was not surprising that the population of health sciences students had a good attitude toward donation, but it was surprising that the families of the students that took the course “Human Organ and Tissue Transplantation” at the Universidad Nacional de Colombia have a better attitude toward organ donation and transplantation, which means, that they would be disposed to acquire the organ donor card. The importance of this association lied in the fact that the families decide whether to offer the organs of their loved ones in case of brain death, what allows the donation and transplantation process to begin.

Furthermore, the results found suggest a positive association between transplant education and the discussion of the topic at home. This may generate a positive attitude toward this topic among the family members. Also, discussing this topic would lead to a family decision that is compatible with the wishes of the possible donor.

In a country like Colombia, where the donation rate is falling, it is necessary to encourage education at the undergraduate and —why not?— high school. Given that the younger population is normally more receptive to this kind of information (10,11), this could constitute a viable option for change in the face of the current situation in the country. Milaniak and cols., in their study directed toward a population in high school, concluded that education is the way to encourage young people to make a positive decision regarding organ donation (12). Elsewhere, Radnuz and cols. affirm that, through a conference on organ donation and transplantation given to a population of medical students, the acquisition of the donor card increased (13). If a single conference increased the acquisition of the donor card, including the classes about organ donation and transplantation, would not only increase the obtainment of the donor card, but would help to educate

well-rounded physicians that are aware of the indications of transplantation and consider it a viable treatment once they begin to practice their profession.

Although not part of the findings of this study, the transplant group at the Universidad Nacional de Colombia considers that the students that have participated in the course “Human Organ and Tissue Transplantation” are trained to respond to the concerns of their future patients and family members regarding the topic of transplants, since they are aware of the generalities, the legislation, and specific aspects surrounding the transplantation of different organs. This also creates a group of individuals with a sense of belonging towards the topic.

Among the limitations of the test were that it could not be defined if the course was what pushed the students and their family members to register as organ donors, since if the student acquired the organ donor card before taking the course was not evaluated. Also, the academic difference between the two groups may confuse the results. Unlike group 1, group 2 did not go through the clinical phase of their professional training, and so it can not be ruled out that part of the interest in officially becoming potential organ donors has been acquired during clinical internship and not only in the elective course. Given these limitations, it is necessary to carry out other comparative studies with the university population that has already gone through the clinical component of the program and with other universities that do or do not offer education about transplants during undergraduate studies.

Also, one of the difficulties of the study was managing to contact the former students of the course and the fifth semester students online, and this may explain the low response from the students, since it is not the most effective method. Also, it may attract only individuals who are interested in the topic or who have a favorable opinion of it.

## Conclusion

An association between education about transplantation and the acquisition of a donor card was found in the group of students. Also, an association was found between taking the course and a positive attitude toward obtaining a donor card among the student’s family members, something which shows a good attitude toward the topic. Finally, an association was found between having taken the course “Human Organ and Tissue Transplantation” and being aware of one’s family members’ wishes with respect to carrying the donor card, which leads us to think that there may be discussion of the topic in the home after exposure to it. The study did not allow for the measurement of the effects that this course may have

on the donation rate in Colombia in the future. Nevertheless, it is hoped that a student would be able to encourage donation in his area of work and in her community with the knowledge that has been imparted to them.

## Conflict of interests

None declared by the authors.

## Financing

None declared by the authors.

## Acknowledgments

None declared by the authors.

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