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# Factors related to attitudes toward organ donation after death in the immigrant population in Spain

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**Abstract:** Considering the relevance of the migratory processes in western societies, the attitudes toward organ donation after death are analyzed by means of a survey applied to a representative random sample of the resident immigrant population in Spain, comprising 1202 subjects (estimated margin of error of  $\pm 2.88\%$ ,  $p = q$ ,  $p < 0.05$ ). Considered variables were disposition toward own organ donation, disposition toward deceased relatives' donation in different situations, arguments against donation, socio-demographic indicators, religious beliefs, social integration, and information about organ donation and transplantation. Predisposition to donate varies strongly across geographical origin and religious beliefs and also shows relationships with additional socio-demographic, social integration, and informative variables. In turn, the relationship between religious beliefs and attitude toward donation varies as a function of the degree of social integration. In Spain, the immigrant population is a heterogeneous collective that requires differential strategies to promote donation. Such strategies should be aimed at reinforcing the existing positive attitudes of citizens from West Europe and Latin America, and at familiarizing and informing about donation in citizens from the East, and at making specific efforts to break down the cultural and religious barriers toward donation in African citizens, with special emphasis on people of the Muslim faith.

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**Key words:** cultural diversity – immigrant population – organ donation – organ procurement – public attitudes

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Organ transplant is a highly efficacious therapeutic alternative, which, however, is restricted by the need to obtain donations (1). Organ generation through donation is a complex process involving many technical and organizational factors. However, its final result depends closely on the final decision of people who are unrelated to the health system (2). This means that part of the efforts in the field of research and intervention on transplant should also be aimed at the factors that condition the personal decisions in this matter. For the past few years, Spain has maintained the highest worldwide numbers of donations after death (1). These results have been attributed to the combination of a highly specialized system of organ generation and

distribution and the creation of a positive social climate toward donation and transplant (3, 4). However, the Spanish system of coordination of transplants continually faces new challenges that affect obtaining donations. One of the current challenges, shared with other systems of organ generation, derives from the important increase in the past decade of the immigrant population. Thus, if the population of foreign origin in Spain represented 2.28% of the population in the year 2000, in 2010, it was 12.2% of the population (5). Given the universality of the health system in Spain, the growth of the immigrant population has produced a parallel growth in the percentage of potential donors of foreign origin in the Spanish system of transplants (4).

Diverse factors may condition immigrants' disposition to donate. On the one hand, they may involve the existence of cultural and religious beliefs in certain collectives, which have a very important impact on their perception of donation (6–12). On the other hand, more general, high-impact factors related to differences in the cultural or socioeconomic level (11), lack of integration (11, 12), mistrust of the health institutions (9, 13, 14), or the lack of information (10, 14, 15) may also condition the disposition to donate. This furthers our understanding of the results achieved in works carried out in the Spanish context, which reveal the presence of higher percentages of relatives' refusals to donate in diverse collectives of immigrants, compared to the native population (16). Thus, it is particularly relevant to empirically describe the diverse factors related to the disposition to donate in the immigrant population.

Numerous works have been conducted in the USA, which have analyzed diverse aspects of donation in specific ethnic or cultural collectives. The most recent studies have focused mainly on the collectives of Hispanics (12, 15, 17–23) and Afro-Americans (13, 17, 18, 24–26), also including collectives of Asian Americans (8, 9, 27, 28) and Arab Americans (11). In the European sphere, the works have been much scarcer, mainly limited to recent works carried out in the UK (6, 7, 29, 30) and Spain (16, 31, 32). In any event, practically all the above-mentioned studies referred to much delimited geographic areas and to specific ethnic or cultural collectives. To our knowledge, no empirical work has addressed the analysis of the factors that condition the disposition to donate in the entire immigrant population of a national State.

From this viewpoint, this work has the following goals: (i) to determine the attitudes of the resident immigrant population of the Spanish State toward donation of one's own and one's relatives' organs after death, (ii) to explore the socio-demographic, informative, religious, and social-insertion factors that are related to the disposition to donate one's own organs. This would facilitate the design of educational actions targeting the population and of strategies to approach potential donors who are members of the immigrant collective.

## Materials and methods

### Study population

A random sample ( $n = 1202$ ) of the immigrant population (non-Spanish nationality) of both sexes, 18 yr old or older, effectively residing in the Spanish State. The sample was proportionately

stratified by sex, age, and the respondent's original geographical provenance according to official immigrant population figures (33). Geographical origin was clustered in five regions: Latin America, East Europe, West Europe, North Africa, sub-Saharan Africa, and Asia. These geographical layers were configured because of issues of cultural affinity and they included 96.7% of the immigrant population of the State (33). To select the subjects, we also stratified the sample proportionately to the resident immigrant population in each of 19 Autonomous Communities that make up the Spanish State and selected by random proportional assignment in each Community the specific towns in which to locate the subjects. Table 1 shows the nationalities included in each geographical layer, the number of immigrant people residing in Spain that corresponds to each one, and the number of interviews assigned per layer. The estimated margins of error for each layer and for the total sample are also specified. The sample was designed to obtain a reduced margin of error in the estimation of the global percentages of the immigrant population and to allow adequate statistical power in the global analysis of factors related to disposition to donate. However, the size of the diverse subsamples offers a moderate margin of error in the case of the population samples from Latin America, East and West Europe, and somewhat higher for the layer corresponding to North Africa. In contrast, the margin of error is high for the subsamples of sub-Saharan Africa and Asia.

### Instrument

To develop the study, we used an expanded version of the Psycho-Social Aspects of Donation Questionnaire (in Spanish, the Cuestionario de Aspectos Psico-sociales de la Donación; CAPD), an instrument specifically designed to collect data about attitudes toward donation and transplant in the general population. The original instrument has been validated and used in diverse samples of general population in previous investigations (34, 35). For this study, certain modifications were carried out and some new items were included on the basis of (i) the priorities expressed by those in charge of coordination and transplant of the National Organization of Transplants, (ii) the existing evidence in recent literature about the reasons and relevant variables for the decision to donate (6–10, 12, 15–17, 19, 20, 22–27, 29–45). Subsequently, the instrument underwent a pilot test process with a small sample ( $n = 15$ ) of immigrant population in order to clarify the terms and adapt the items. To facilitate its administration,

Table 1. Description of the geographic layers included in the sample and associated margins of error

	Total population	Number of interviews	Estimated error (%) for the layer; p = q, confidence level 95.5%*** 10
Latin America: all the American Spanish- or Portuguese-speaking countries	1 735 025	412	±4.8
West Europe: Germany, Austria, Belgium, Cyprus, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, Malta, Holland, Portugal, UK, Sweden, Switzerland, and all countries geographically included west of the frontier of the former Atlantic Block	1 124 333	264	±6.0
East Europe: Bulgaria, Slovakia, Slovenia, Estonia, Hungary, Latvia, Czech Republic, Rumania, Russia, and other countries included in the former Warsaw Pact	1 178 090	281	±5.85
North Africa: Morocco, Algeria, Tunisia, Mauritania, and Egypt	710 012	164	±7.7
Sub-Saharan Africa: the remaining African countries	188 477	49	±14
Asia: Countries included in the Asian continent	131 595	32	±17.3
Total sample	5 067 532	1202	±2.88

we included various clarifications in the questionnaire to explain the terms to the interviewees. The final instrument had 59 close-ended questions.

#### Variables

##### 1 Details of variables are given below:

1. Attitudes toward organ donation after death: Predisposition to donate own organs after death, predisposition to donation a deceased relative's organs in diverse hypothetical situations of knowledge of the deceased's will (favorable, unfavorable, unknown).
2. Arguments against donation.
3. Socio-demographic variables: geographic area of origin, sex, age, civil status, educational level, current occupation, country of origin, nationality, family level of income.
4. Social integration variables: years of residence in Spain, general perception of the subject's situation in Spain, perception of the relations with Spaniards, perception of the relations with compatriots, perception of the relations with the family of origin, perception of the health care received in Spain, perception of the support from social environments when facing difficulties.
5. Informative variables: knowledge of people who need a transplant, knowledge of donors, knowledge of transplanted people, sources of information about donation and transplant, perception of their own information about donation and transplant, perception of the efficacy of transplant, perception of the cost-effectiveness of transplant.
6. Variables linked to religious beliefs: professed religion, importance granted to religion, perception of the opinion of their religion toward donation.

#### Procedure

Access to the subjects in each of the selected populations was carried out by locating them at meeting points of the immigrant population of the diverse nationalities, previously documented by the data collection team. The questionnaire was completed in a personal interview by interviewers especially trained for the task. Before the administration of the questionnaire, all participants were informed that this was a study carried out by the Autonomous University of Madrid and they were reassured about the anonymity and confidentiality of the treatment for their responses. Likewise, the lack of any kind of commitment or later request derived from the responses was clarified. All the interviewers were directly supervised, and 28.7% of the interviews were monitored in order to ensure that they were performed according to the required conditions.

#### Data analysis

Descriptive, bivariate, and multivariate analysis were performed, applying the procedures of contingency tables, analysis of variance and segmentation analysis, the characteristics and specifications of which are described in more detail below for each case. The SPSS-WIN® statistical package 19.0 was used for this purpose. 2

#### Results

##### Characterization of main variables

In Tables 2 and 3 are presented summaries of the results about the predisposition donate own organs after death and the disposition to consent to donating the organs of a deceased relative in the various hypothetical cases of knowledge of their

Table 2. Characterization of the predisposition to donate own organs after death as a function of geographic origin

Predisposition to donate own organs after death	I am a donor		I am not a donor, but I would be willing to become one		I am not a donor and would not be willing to become one		Does not know		No reply		Total	
	n	% Row	n	% Row	n	% Row	n	% Row	n	% Row	n	Col %
	LR = 132.7***											
West Europe	22 (+)	9.1	162 (+)	67.2	24 (-)	10.0	29	12.0	4	1.7	241	20.0
East Europe	3 (-)	1.1	168	59.8	55	19.6	51 (+)	18.1	4	1.4	281	23.4
North Africa	2 (-)	1.2	66 (-)	40.2	62 (+)	37.8	32 (+)	19.5	2	1.2	164	13.6
Sub-Saharan Africa	1	2.0	23	46.9	17 (+)	34.7	8	16.3	0	0.0	49	4.1
Latin America	39 (+)	9.0	281 (+)	64.6	63 (-)	14.5	46 (-)	10.6	6	1.4	435	36.2
Asia	1	3.1	8 (-)	25.0	16 (+)	50.0	7	21.9	0	0.0	32	2.7
Total	68	5.7	708	58.9	237	19.7	173	14.4	16	1.3	1202	100

LR, Likelihood ratio; (+), Adjusted standardized residual > 1.96 (concentration of subjects higher than expected,  $p < 0.05$ ); (-), Adjusted standardized residual < 1.96 (concentration of subjects higher than expected,  $p < 0.05$ ).

\*\*\* $p < 0.001$ .

Table 3. Characterization of the predisposition to donate deceased relatives' organs as a function of geographic origin

	Would you give permission to donate the organs of a deceased relative?									
	Yes		No		Does not know		No reply		Total	
	n	% Row	n	% Row	n	% Row	n	% Row	n	Col %
If he/she was favorable to donation (LR = 198)***										
West Europe	223 (+)	92.5	12 (-)	5.0	6 (-)	2.5	0	0.0	241	20.0
East Europe	226	80.4	35	12.5	18	6.4	2	0.7	281	23.4
North Africa	96 (-)	58.5	45 (+)	27.4	22 (+)	13.4	1	0.6	164	13.6
Sub-Saharan Africa	29 (-)	59.2	12 (+)	24.5	7 (+)	14.3	1	2.0	49	4.1
Latin America	375 (+)	86.2	34 (-)	7.8	23	5.3	3	0.7	435	36.2
Asia	17 (+)	53.1	8 (+)	25.0	7 (+)	21.9	0	0.0	32	2.7
Total	966	80.4	146	12.1	83	6.9	7	0.6	1202	100
If you were unaware of his/her attitude (LR=87.6)***										
West Europe	116 (+)	48.1	40 (-)	16.6	83	34.4	2	0.8	241	20.0
East Europe	102	36.3	83	29.5	91	32.4	5	1.8	281	23.4
North Africa	36 (-)	22.0	82 (+)	50.0	45	27.4	1	0.6	164	13.6
Sub-Saharan Africa	13	26.5	24 (+)	49.0	11	22.4	1	2.0	49	4.1
Latin America	192 (+)	44.1	113 (-)	26.0	129	29.7	1	0.2	435	36.2
Asia	5	15.6	17 (+)	53.1	10	31.3	0	0.0	32	2.7
Total	464	38.6	359	29.9	369	30.7	3	0.2	1202	100
If he/she was unfavorable to donation (LR = 16.7) (NS)										
West Europe	33	13.7	169	70.1	39	16.2	0	0.0	241	20.0
East Europe	49	17.4	189	67.3	43	15.3	0	0.0	281	23.4
North Africa	19	11.6	124	75.6	20	12.2	1	0.6	164	13.6
Sub-Saharan Africa	3	6.1	37	75.5	8	16.3	1 (+)	2.0	49	4.1
Latin America	69	15.9	312	71.7	53	12.2	1	0.2	435	36.2
Asia	4	12.5	22	68.8	6	18.8	0	0.0	32	2.7
Total	177	14.7	853	71.0	169	14.1	3	0.2	1202	100

LR, Likelihood ratio; NS, Non-significant relation; (+), Adjusted standardized residual > 1.96 (concentration of subjects higher than expected,  $p < 0.05$ ); (-), Adjusted standardized residual < 1.96 (concentration of subjects less than expected,  $p < 0.05$ ).

\*\*\* $p < 0.001$ .

will concerning donation. Table 4 shows the results about expressed arguments against donation in subjects opposed to own organ donation after death ( $n = 237$ ). All the variables are described in detail as a function of the geographic origin.

In Tables 2 and 3, we used the procedure of contingency table analysis by calculating the likelihood ratio statistic and estimating the significance by means of the Monte Carlo method (46). Besides the absolute frequency of each cell, these tables

Table 4. Characterization of the expressed arguments against donation in subjects opposed to own organ donation after death as a function of geographic origin

How much influence does the following argument to NOT become a donor have on you? 1: "No influence"; 2: "Some influence"; 3: "Quite a lot of influence"; 4: "A lot of influence"	West Europe (n = 24)	East Europe (n = 55)	North Africa (n = 62)	Sub-Saharan Africa (n = 17)	Latin America (n = 63)	Asia (n = 16)	Total (N = 237)
	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Fear of premature pronouncement of death to extract organs ( $F = 0.76$ ) NS	2.4	2.8	2.4	2.6	2.6	2.6	2.6
Mistrust of the health personnel ( $F = 1.18$ ) NS	2.3	2.9	2.5	2.4	2.4	2.5	2.5
Fear that organs will be extracted while still alive ( $F = 0.60$ ) NS	2.9	2.7	2.6	2.7	2.8	2.5	2.7
Doubts about the utility of transplants ( $F = 1.34$ ) NS	2.9	2.9	2.5	2.5	2.6	2.3	2.6
Fear of organs being used improperly or unfairly ( $F = 0.97$ ) NS	2.7	3.0	2.6	2.8	2.8	2.5	2.8
Religious reasons ( $F = 14.87$ )***	1.7	1.8	3.1	2.9	1.7	2.4	2.2
Desire for a traditional funeral in which the corpse has not been touched ( $F = 1.72$ ) NS	2.6	2.4	2.8	3.0	2.3	2.5	2.6
Refusal to think about things involving death ( $F = 1.95$ ) NS	2.3	2.7	2.4	3.0	2.2	2.7	2.5
Rejection of my organs surviving in another body ( $F = 2.63$ )*	2.0	2.3	2.2	2.5	1.7	2.6	2.1
Fear of defying God's natural laws ( $F = 5.31$ )***	2.0	2.2	2.9	3.1	2.0	2.5	2.4
Fear of preventing resurrection or reincarnation ( $F = 3.9$ )**	1.9	2.0	2.5	2.7	1.7	2.4	2.1
Fear of mutilation or deformation of the body ( $F = 2.16$ )*	2.4	2.5	2.4	3.0	2.0	2.4	2.4

$F$ , Snedecor's  $F$ ; NS, Non-significant relation.

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ .

also include the adjusted standardized residuals (ASR) in order to identify the cells that have a higher (ASR > 1.96) or lower (ASR < -1.96) than expected concentration of subjects in the case of absence of relationship between variables with a confidence level of 95.5%. In Table 4, we used analysis of variance to contrast the differences of means of the diverse groups.

There are differences in the personal disposition to donate as a function of the geographic area of origin, and citizens originally from Western Europe and Latin America are noteworthy for their higher percentages of people who have expressed commitment to donation, donors, and people who are positively predisposed to donate. The citizens from Europe are notable for displaying a high percentage of indecision, and the citizens from Northern Africa, Sub-Saharan Africa, and Asia for their reluctance to donate own organs. There are also differences in the case of a hypothetical decision about organ donation of a relative with a known favorable disposition toward donation, and a better disposition to donate has been observed in citizens from Western Europe and Latin America, and more reluctance and indecision among citizens from Africa and Asia. The profile is similar in the case of not knowing the relative's wishes; in this case, the differences are found in the negative decisions and not in the undecided positions, which are more balanced among the diverse

geographical groups. There are no differences in the case of knowing an unfavorable attitude, and the percentages of reluctance to donate are high in all geographical areas. When exploring the obstacles to donation, the reasons with the most impact are those involving religious beliefs in the African collectives.

Bivariate analysis of personal disposition to donate after death

Tables 5 and 6 summarize the relationships between the diverse predictors and the disposition to donate own organs after death. To save space, the analysis is restricted to this variable, and interested readers can consult the additional Supporting Information for the results about the remaining main variables. To perform the exploratory analysis, we excluded from the analysis the participants ( $n = 16$ ) who did not answer this question and we grouped the subjects of the categories "I am a donor" and "I am not a donor, but I am willing to become one" into a single category to make the analysis more parsimonious. Bivariate analysis was performed using the contingency tables procedure as previously explained.

Among the immigrant population as a whole, women, people with university studies, people with a stable work situation, and a higher than average level of income are more favorable to donating

Table 5. Relationship between predisposition to donate own organs after death and socio-demographic, social integration, and informational variables: summary

Variables	Global relation significance with predisposition to donate own organs	Categories yielding higher positive predisposition rate ( $p < 0.05$ )	Categories yielding higher negative predisposition rate ( $p < 0.05$ )	Categories yielding higher rate of "Doesn't know" answers ( $p > 0.05$ )
<b>Socio-demographic variables</b>				
Sex	LR = 8.07*	Female	Male	–
Age	LR = 10.0 (NS)	–	–	–
Civil status	LR = 17.27*	–	Married	–
Educational level	LR = 54.65***	Has studied a university course	Can only read and write	–
Current occupation	LR = 38.62 **	Worker with permanent contract	Unemployed, housework	–
Level of family income with regard to the mean	LR = 37.93***	Higher	Lower, much lower	Approximately the same
<b>Social integration variables</b>				
Years living in Spain	LR = 10.66 (NS)	–	–	From 3 to 5
Feeling in Spain	LR = 32.58***	Very good–Good	Regular	Regular
Relation with Spaniards	LR = 52.51***	Very good–Good	Regular, Very bad–Bad	Regular
Relation with the people of the own nationality who live in Spain	LR = 18.58**	Very good–Good	Very bad–Bad	Regular
Relation with family members who live in Spain	LR = 12.64 (NS)	–	Very bad–Bad	Regular
Relation with relatives who do not live in Spain	LR = 14.29*	Very good–Good	Regular	–
Rating of the medical care/assistance received in Spain	LR = 6.14 (NS)	–	–	–
When trying to solve an important problem, how much help would be received from other people	LR = 30.68***	Very much help	Not very much help	Not very much help
<b>Informational variables</b>				
Knowledge among relatives or acquaintances of someone who needed a transplant	LR = 11.96**	Yes	No	–
Knowledge among relatives or acquaintances of someone who received a transplant	LR = 8.76*	Yes	No	–
Knowledge among relatives or acquaintances of someone who donated organs after death	LR = 8.58*	–	No	–
Rating of own information in topics of organ donation and transplantation	LR = 24.8***	Sufficient	–	Insufficient
Perceived costs of transplants in comparison to other alternative treatments	LR = 22.5**	Just as expensive, cheaper	Do not know	–
Perceived efficacy of transplants in comparison to other alternative treatments	LR = 63.04***	More efficient	Less efficient, Does not know	Does not know

LR, Likelihood ratio; NS, Non-significant relation.

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ .

their organs. Among the immigrant population, men, people with only an elemental level of training, unemployed people, or homemakers, and those with lower than average income are more reluctant to organ donation after death. There was no contrastable relationship between the will donate one's organs and age.

With regard to the informative variables, people who have known someone who needed or received a transplant, people who have received information through diverse means (billboards/posters, radio, TV, specialist doctor, schools, relatives, or Internet), people who consider their information about the topic as being sufficient, those who consider

transplants equally or less expensive than other treatments, and those who consider them more efficient than other alternatives are more apt to donate.

Neither the number of years residing in Spain nor the perception of the medical attention received in Spain had any relation to the personal posture toward donation. Nor was there any relation with the relationships maintained with the family living outside of Spain. The rest of the measures referring to social integration showed contrastable relations with the disposition donate after death. Thus, people who feel good or very good in Spain, people who perceive good or very

Table 6. Relationship between predisposition to donate own organs after death and the variables linked to religious beliefs

	Predisposition to donate own organs after death							
	Positive predisposition		Negative pre-disposition		Does not know		Total	
	n	Row %	n	Row %	n	Row %	n	% Col
What is your religion? *** (LR = 131.9)								
Practicing Catholic	141	70.5	35	17.5	24	12.0	200	16.9
Non-practicing Catholic	250 (+)	74.2	40 (-)	11.9	47	13.9	337	28.5
Practicing Muslim	57 (-)	36.8	74 (+)	47.7	24	15.5	155	13.1
Non-practicing Muslim	16	55.2	4	13.8	9 (+)	31.0	29	2.5
Practicing Orthodox Christian	39	65.0	13	21.7	8	13.3	60	5.1
Non-practicing Orthodox Christian	35	62.5	10	17.9	11	19.6	56	4.7
Evangelical	20	76.9	6	23.1	0 (-)	0.0	26	2.2
Protestant	12	85.7	1	7.1	1	7.1	14	1.2
Jewish	5	50.0	5 (+)	50.0	0	0.0	10	0.8
Adventist	7	70.0	2	20.0	1	10.0	10	0.8
Buddhist	3 (-)	30.0	5 (+)	50.0	2	20.0	10	0.8
Other religions	8	80.0	0	0.0	2	20.0	10	0.8
Indifferent	76	69.7	18	16.5	15	13.8	109	9.2
Atheist	43	65.2	8	12.1	15	22.7	66	5.6
Agnostic	32	78.0	3 (-)	7.3	6	14.6	41	3.5
No reply	29	60.4	12	25.0	7	14.6	48	4.1
How important is religion in your life?*** (LR = 34.86)								
Very important	165 (-)	60.4	84 (+)	30.8	24 (-)	8.8	273	23.5
Fairly important	192	61.7	68	21.9	51	16.4	311	26.8
Not very important	240 (+)	70.6	48 (-)	14.1	52	15.3	340	29.3
Not at all important	159 (+)	71.3	26 (-)	11.7	38	17.0	223	19.2
Does not know	5 (-)	38.5	5	38.5	3	23.1	13	1.1
With regard to organ donation for transplant, I think my religion is (LR = 193.47)***								
In favor of donation	410 (+)	83.7	43 (-)	8.8	37 (-)	7.6	490	42.4
Against donation	61 (-)	36.5	83 (+)	49.7	23	13.8	167	14.4
I have no religious beliefs	111	69.8	26	16.4	22	13.8	159	13.8
Does not know	177 (-)	52.1	78	22.9	85 (+)	25.0	340	29.4

“Non-practitioners” and “practitioners” were grouped into a single category in the religious creeds that did not exceed 5% of the total sample.  
 LR, Likelihood ratio; (+), Adjusted standardized residual > 1.96 (concentration of subjects higher than expected,  $p < 0.05$ ); (-), Adjusted standardized residual < -1.96 (concentration of subjects less than expected,  $p < 0.05$ ).  
 \*\*\* $p < 0.001$

good relations with Spaniards, people who have good relations with their family that resides in the country of origin, and people who perceive that they can count on a lot of help if they have a serious problem are more prepared to donate.

The disposition to donate is also clearly different as a function of diverse aspects related to religious beliefs. Practicing Muslims, Jews, and Buddhists are particularly reticent. The importance granted to religion is also closely related; there is little disposition to donate among those who grant much importance and a better disposition among those who grant little or no importance to religion. The position toward donation is closely related to the perception of the opinion of one’s religion about donation.

Given the relevance of the group of variables linked to religious beliefs, we specifically explored the relationship between the importance granted to religion and the predisposition to donate as a

function of the religious creed, taking the three most relevant beliefs in number (Catholic, Muslim, and Orthodox Christians) and grouping practitioners and non-practitioners in each creed. For this purpose, we used contingency table analysis and we examined the ASR. The difference in the predisposition to donate between those who granted a lot-pretty much importance and those who expressed little-none reached global significance in the Catholics (16.8% vs. 9.7% of people opposed to donation; LR = 19.5;  $p < 0.001$ ), in the Muslims (46.2% vs. 20%; LR = 8.6;  $p < 0.05$ ), but not in the orthodox Christians (23.4% vs. 15.7%; LR = 5.6;  $p = 0.67$ ). With a view to further our understanding of the relationships between geographic area of origin, professed religion, and predisposition to donate, we describe also the majority creeds in each one of the geographic subsamples: West Europe: Catholicism (53.5%); East Europe: Orthodox Christians (42%)



and Catholicism (24.9%); Latin America: Catholicism (75.4%); North Africa: Muslim creed (87.8%); sub-Saharan Africa: Muslim creed (55.1%) and Catholicism (22.4%); Asia: Muslim creed (31.3%) and Buddhism (25%).

Multivariate analysis of the personal disposition to donate after death

In order to specifically delimit the sectors of population with differentiated dispositions toward own organ donation and, likewise, to assess the discriminant capacity of the diverse variables with regard to disposition toward donation, we used segmentation analysis (47). This analysis divides the original sample into different groups, using sequentially the predictor variables and, as the criterion, the maximization of the differences in the grouping variable (personal disposition to organ donation, in this case). To offer results with greater conceptual coherence, we selected the variables of a mainly structural nature (socio-demographic variables, religious variables, and social integration variables) excluding the informative variables. We also decided to exclude from

the analysis the geographical origin, which has been explored in detail in the above sections, so that its close relation with donation would not monopolize the variability of the analysis, and so that other relations could emerge that may be of special interest to operationally understand the processes that condition diverse attitudes toward donation. To perform this analysis, we used the CHAID algorithm from the Answer Tree Program, taking as selection criterion the likelihood ratio statistic. Bonferroni's adjustment (48) was applied to correct Type 1 Error. In Fig. 1 are displayed the final results of the analysis, showing in detail how the sample was segmented and displaying the characteristics of the 10 resulting groups, numbered from 1 to 10 in decreasing order of percentage of positive disposition to donate own organs. The variable with the highest predictive power is professed religion, which initially divides the total sample into four groups. Next, the variables referring to social integration best discriminate the differences in disposition to donate in each of the four initial groups. In the last step, only in one case, a group was subdivided as a function of level of income.

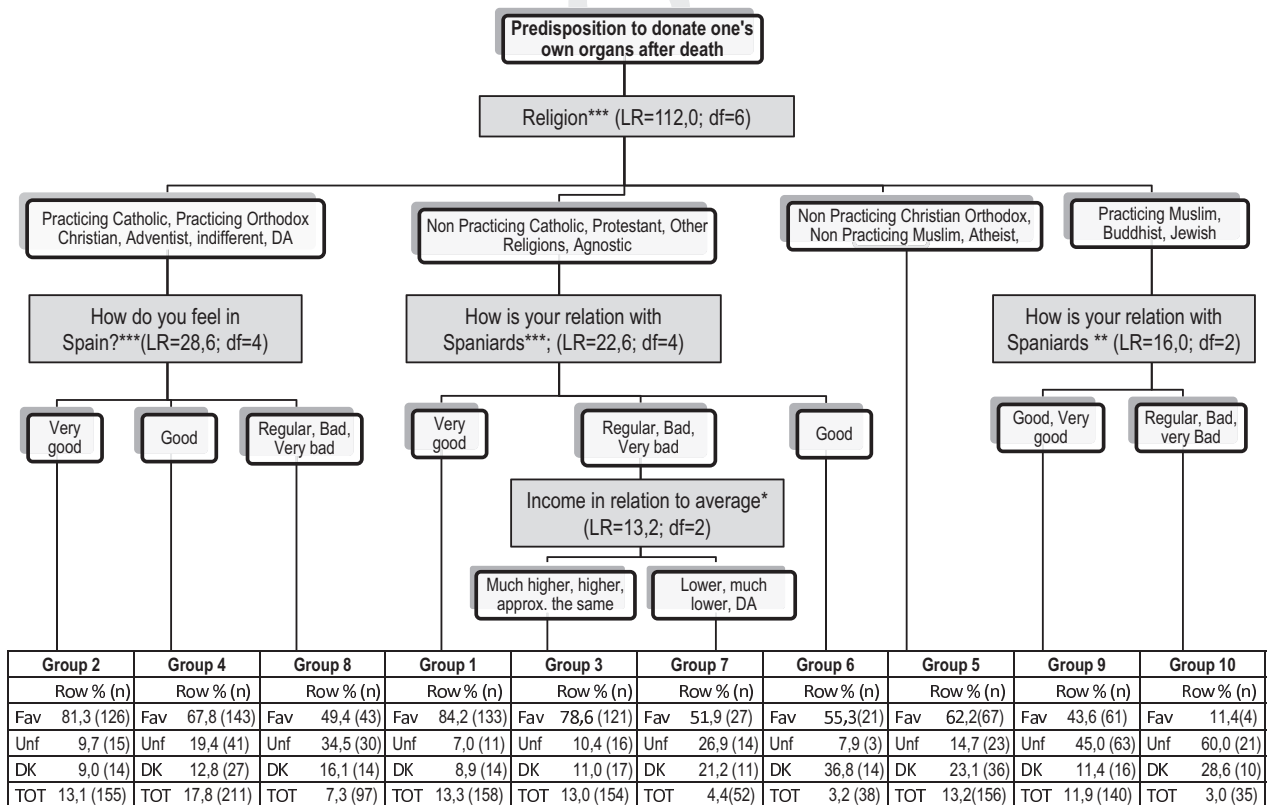


Fig. 1. Segmentation analysis of predisposition toward own organ donation after death with socio-demographic, religious, and social integration variables.

## Discussion

By means of the present work, we have explored the disposition to donate own organs after death in the immigrant population of the Spanish State, analyzing its relation with diverse factors linked to socio-demographic characteristics, levels of social integration, information about donation and transplants, and religious beliefs. The results reveal that the Spanish immigrant population is actually made up of a very heterogeneous group of people, formed by collectives with very varied cultural and social profiles, and consequently, with differentiated attitudes toward donation.

Our results strengthen the tendencies already noted by studies of a more circumscribed nature in Spain (16, 31, 32) showing a predominantly positive predisposition to donate own and one's relatives' organs among the immigrant collective from West Europe. Of special interest is the confirmation of clearly favorable attitudes in the population from Latin America, similar to the collective from West Europe. This result supports some evidence obtained in Spain (16) and contrasts with the results obtained in the Anglo Saxon context, where this population was more reluctant (49, 50). Although the immigrant collective of Latin Americans should be considered to have a very different profile in the diverse countries, this result suggests that the disposition to donate may be conditioned not only by the characteristics of the culture of origin, but also by the characteristics of the host society and the level of affinity with it. The similarity with the culture and religious beliefs of the Spanish society, which would simplify the acculturation process, could be contributing to these differences. Our results are in accordance with the works that reveal greater reluctance to donate in African citizens in specific areas of Spain (16) and in other contexts (6), with the citizens of North Africa displaying more opposition to donate own organs and a comparable reluctance in both groups to donate their relatives' organs when unaware of the relatives' will or even when aware of the relative's favorable will to donate. Our data also provide evidence about a collective, the citizens from East Europe, which has received scant attention in the literature, showing a somewhat less favorable attitude than the rest of the European citizens in the will to donate own organs, not so much focused on greater opposition to donation, but on the existence of higher levels of ambiguity. The reduced size of the layer of citizens from Asia contemplated in our study obliges us to estimate the absolute percentages of response to

the diverse assumptions with precaution. However, the values of the percentages of reluctance to donate one's own and one's relatives' organs are so high that they allow us to empirically affirm their worse disposition compared to the total sample, also coinciding with studies carried out in other contexts (8, 28, 49, 51).

There are many contrastable variations in the disposition donate own organs as a function of the indicators employed. Especially noteworthy is the relation of the disposition to donate with religious beliefs owing to its magnitude, and in turn, it is closely linked to the geographical origin, given the predominance of certain creeds in each of the provenances. The previous works show that the relationship between the disposition to donate and Muslim beliefs is complex and varies as a function of the geographic context (7, 11). In any case, our data clearly reveal more reluctance to donate among people who profess the Muslim religion, and it is even higher among those who say they are practitioners. Likewise, our data support other works that reveal greater barriers to donation among people with Buddhist beliefs (8) and they provide evidence of more reluctance among those who profess Judaism, although the presence in the sample of both collectives was very low. Our results also show that a higher importance granted to religion is linked in general terms to more negative dispositions. Of particular interest is the finding that this relative variation can be seen in the two majority beliefs, the Catholic and the Muslim, although the absolute percentages in each one are much differentiated. Our data also show a worse disposition in the people with low socioeconomic status, low cultural status, indicating the results that already appear in the literature in different types of samples (34, 36, 37, 42). Of particular interest is the relationship between a worse disposition to donate and diverse indicators of deficient social integration, which affect both general appraisals of the situation in the host country and the relation with Spaniards, and the sense of existing support in case of trouble. This tendency, noted in recent works on immigrant population (11, 12), indicates the influence of identifying with the host society on performing an altruistic gesture aimed at that society. The lack of a relationship between the disposition to donate and age seems clearly linked to the scarce representation of the layers of older people in the immigrant population, who are those who habitually show more reluctance in the literature (34, 38, 52–54). The greatest predisposition to donate in female immigrants obtained in our results is clearly related to the differential migration profiles as a function of gender in Spain, with the migration of some of the more

reluctant groups (North Africans and sub-Saharan Africans) mainly made up of men (33). Noteworthy is the lack of a relationship between the perception of health care in Spain and the will to donate, present in many studies (9, 13, 14, 23), although it seems clearly conditioned by the scarce representation of the layers of negative ratings. However, and with regard to the informative variables, the will to donate in the immigrant population also varies as a function of diverse aspects of the available information on the topic, underscoring the perception of efficacy, direct knowledge, and the existence of qualified information as the elements most closely linked to a positive disposition, and also following the general tendencies previously found in this field (20, 40, 49–51). The results obtained through multivariate analysis reinforce the evidence of the predictive power of religious beliefs on the disposition to donate and define differentiated groups that are somewhat homogeneous internally in this aspect, grouping the beliefs that already appeared as the most reluctant in the bivariate analysis (practicing Muslims, Buddhists, and Jews). However, it underlines the results that show that the differential predisposition to donate among people of certain religious creeds and practices can become polarized depending on their perception of the relationships with the context, tending toward the favorable pole when such perception is appropriate and toward the reluctant pole when it is negative. In any event, despite the clear differences, not even the combination of different variables leads to the definition of “pure” groups in favor or against donation. This underlines the complexity of the factors that condition donation and indicates that there are individuals who are willing to donate even among the socio-demographic collectives that are, globally, more reluctant.

From the viewpoint of policies to promote donation, our results reveal that the immigrant population in Spain requires specific strategies as a function of the diverse collectives. If we take into account previous studies performed in Spain, which report percentages between 56% (52) and 67% (53) in the general population that are favorable to donating own organs, it does not seem a priority to designate specific efforts aimed at the West European and Latin American collectives in comparison with the efforts already made with the general population in Spain. In contrast, citizens from East Europe, who display a high level of hesitance and whose arguments against donation are not linked to religious or cultural elements, could benefit from actions of information and familiarization with donation and transplantation. It does seem a priority to channel specific efforts

toward the citizens from North Africa and sub-Saharan Africa to deal with elements that are an obstacle to donation. There are some interesting experiences in diverse work contexts with Muslim population that include, among others, interventions with intercultural mediators and religious leaders to adequately channel communication concerning donation (16, 54–56). Likewise, in view of the evidence of our data, there may be permeability to donation even in the most reticent beliefs, and the attitude toward donation within a religious creed may be modulated by factors from other spheres (i.e., related to social integration) that are the target of modification. Along these same lines, in view of the fact that reluctance to donate is clearly linked to factors that affect the capacity of the collectives and individuals to live in a suitable relationship with their context, as their life conditions improve and the immigrant population becomes more integrated, this is expected to lead to a more favorable disposition to donate. Lastly, our results only allow us to indicate the reluctance of the collective of Asian immigrants, and more studies focused on this collective are needed to better describe their perceptions and determinants.

When valuing the results obtained, the following aspects should be taken into account; firstly, the potential difference between the attitudes expressed in the opinion surveys and behaviors of real commitment (57). Likewise, the existence of social desirability in the response about one’s own attitude toward donation in a context like the Spanish society, where donation is highly valued, must be considered. This process may also be present in the responses about the perception of social integration in Spain. In any event, despite this possible phenomenon, the exploration of the variations among groups leads us to conclusions that do not strictly depend on the absolute values obtained in the predictors.

Possible lines of research in this field should contemplate exploring in detail the beliefs and discourses that are barriers to donation in specific collectives and contemplate the development of works of a more procedural and qualitative nature. Likewise, research should examine more deeply the collectives that, in terms of the general immigrant population, constitute a minority but which, from a qualitative viewpoint, can create important obstacles to donation.

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### Supporting Information

Additional Supporting Information may be found in the online version of this article:

**Table S1.** Detailed relation between predisposition to donate own organs after death and socio-demographic variables.

**Table S2.** Detailed relation between predisposition to donate own organs after death and social-integration variables.

**Table S3.** Relation between predisposition to donate own organs after death and informative variables.

**Table S4.** Relation between predisposition to relatives organ donation in case deceased wishes were unknown and socio-demographic variables: data.

**Table S5.** Relation between predisposition to relatives organ donation in case deceased wishes were unknown and socio-demographic variables: contrast statistics.

**Table S6.** Relation between predisposition to relatives organ donation in case deceased wishes were unknown and informative variables: data.

**Table S7.** Relation between predisposition to relatives organ donation in case deceased wishes were unknown and informative variables: contrast statistics.

**Table S8.** Relation between predisposition to relatives organ donation in case deceased wishes were unknown and religious variables: data.

**Table S9.** Relation between predisposition to relatives organ donation in case deceased wishes were unknown and religious variables: contrast statistics.

**Table S10.** Relation between predisposition to relatives organ donation in case deceased wishes were unknown and social-integration variables: data.

**Table S11.** Relation between predisposition to relatives organ donation in case deceased wishes were unknown and social-integration variables: contrast statistics.

**Table S12.** Relation between predisposition to relatives organ donation in case deceased was favorable to donation and socio-demographic variables: data.

**Table S13.** Relation between predisposition to relatives organ donation in case deceased was favorable to donation and socio-demographic variables: contrast statistics.

1 **Table S14.** Relation between predisposition to  
2 relatives organ donation in case deceased was  
3 favorable to donation and informative variables:  
4 data.

5 **Table S15.** Relation between predisposition to  
6 relatives organ donation in case deceased was  
7 favorable to donation and informative variables:  
8 contrast statistics.

9 **Table S16.** Relation between predisposition to  
10 relatives organ donation in case deceased was  
11 favorable to donation and religious variables: data.

12 **Table S17.** Relation between predisposition to  
13 relatives organ donation in case deceased was  
14 favorable to donation and religious variables:  
15 contrast statistics.

**Table S18.** Relation between predisposition to  
relatives organ donation in case deceased was  
favorable to donation and social-integration vari-  
ables: data.

**Table S19.** Relation between predisposition to  
relatives organ donation in case deceased was  
favorable to donation and social-integration vari-  
ables: contrast statistics.

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