

Information matters: attitude towards organ donation in a general university population web-survey in Italy

Attitude
towards organ
donation

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Abstract

Purpose – Transplantation extends and improves lives, but the shortage of organs is one of the main factors limiting the number of transplants in Italy, as well as in other countries. This study investigated the awareness about organ donation and the socio-demographic factors associated with donation will in a general population.

Design/methodology/approach – In 2019, a survey was carried out by computer-assisted web interviewing. A questionnaire was sent via e-mail to 39,360 individuals (i.e. students, administrative and teaching staff of the University of Milano-Bicocca, Italy). The response rate was 10.6% and 4,191 weighted cases were used in the analysis.

Findings – This study showed a strong, positive attitude towards donation: over 96% of respondents stated to be keen on organ donation. Of the respondents, 40.8% considered themselves informed on medical procedures involving organ donation, and only 15.8% thought to have sufficient legal information. Overall, only 17.7% of respondents thought that the information available was sufficient to make informed decisions. According to the respondents, ethical and religious implications were the main reasons (30% of answers) that limited the level of information. Just 57.9% of respondents had already recorded their willingness to donate. Among them, renewal of the identity card was the most common motivation (55.8%) and the main motivation reported for lack of expression of donation will was the lack of opportunity or time (61.5%).

Originality/value – A positive attitude towards donation demands a wide public education programme and opportunities to declare one's will to donate to increase the population of potential organ donors.

Keywords Transplantation, Organs donation, Opt-in/opt-out system, Information, Survey, Italy

Paper type Research paper

Introduction

A disparity between demand and supply of organs has been reported in Italy, as well as in other countries with the same level of infrastructure to facilitate transplantation. For approximately ten years, according to the data provided by the Italian National Transplantation Centre (CNT), the number of patients awaiting transplantation has been substantially fairly constant, around 13,000 cases per year. Of these, on average a quarter of patients receive transplants, but more than 9,000 people remain on a waiting list. The average

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transplant waiting time has constantly been approximately 33 months. This timeframe has also been confirmed for 2020, a pandemic year, although it appears to be the result both of a slight decrease in the number of people on the transplant waiting list (−6%) and of a lower total number of transplants performed (−9%), whereas the waiting time had increased by two months compared to 2019 (Figure 1).

There are wide differences in the organ donor rate throughout the European countries. In 2019, the number of actual deceased donors (<https://www.irodat.org>) ranged from 49.6 per million people in Spain and 34.6 per million in Croatia to 4.3 per million in Romania. Italy, with 24.7 donors per million people, is in a good ranking compared to the low donor values of some Northern European countries (for example, Germany with 10.8 and Sweden with 19.2 per million population). However, the number of actual deceased donors in Italy has been stable or not significantly increased. In the last decade, the number per million population of utilised deceased organ donors has been quite consistent and although the number of total declarations increased significantly, oppositions to donations have grown even more rapidly (Figure 2).

Although its introduction was provided by Law no. 91/1999 only recently in 2019, Italy has taken the first step toward adopting an “opt-out” system, “whereby organs can be used for transplantation after death unless individuals have objected during their lifetime” (Decreto legge 130/19; Rithalia *et al.*, 2009, p. 1). The full implementation of Law no. 91/1999 is not yet in effect because it provides for three key points: establishment of a transplant information system, a national register of patients and a system of notification to citizens regarding its initiation to enforcement of the law, but only the first provision was implemented in 2019. At this time, a transitional system is ongoing, according to which Italian citizens can record their willingness to donate or not in donor/no-donor registries. Otherwise, in the case in which no declaration was expressed during lifetime, the decision-making process is up to the relatives of the deceased.

An “opt-out” pattern or presumed consent model for organ donation is expected to increase donation rate compared to an “opt-in” system (termed “explicit consent”). A research study conducted by the University of Birmingham, which used data from the Global Observatory for Donation and Transplantation (www.transplant-observatory.org),

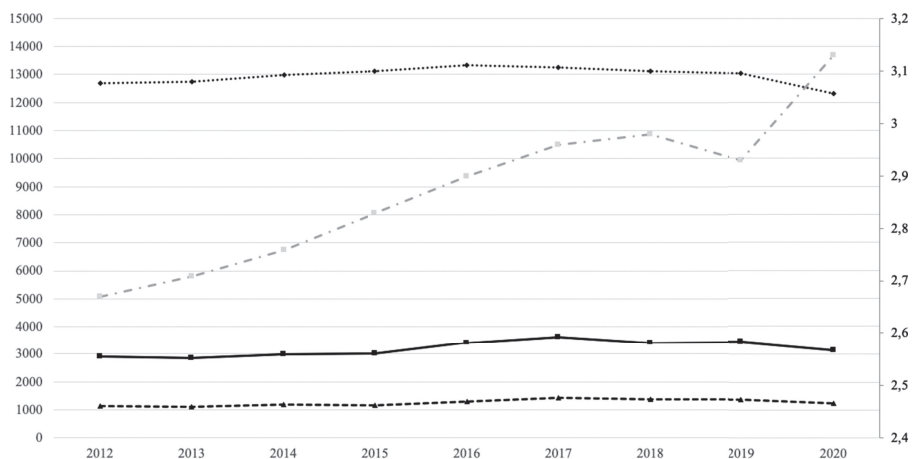


Figure 1. Patients awaiting transplantation (black dot line)^a, patients transplanted (black solid line)^a, used donors (black dashed line)^a, average transplant waiting time (grey dash and dot line)^b in Italy, 2009–2020

Note(s): ^a y-axis left; ^b y-axis right

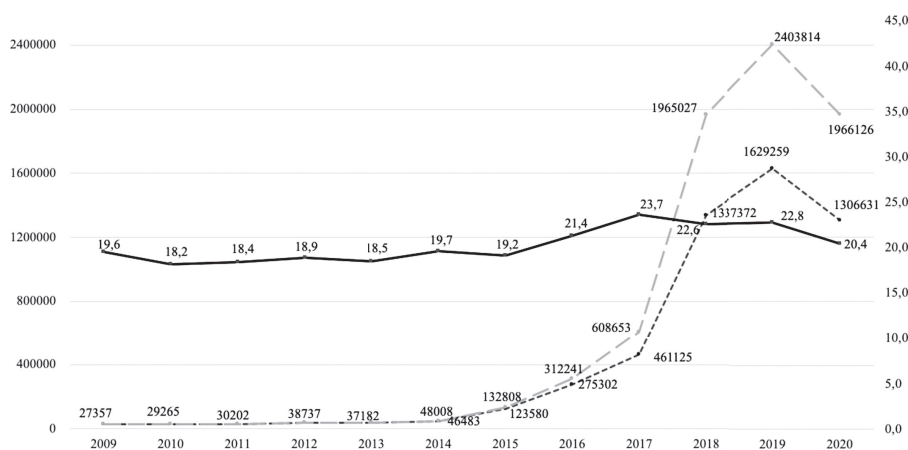
compared the effect of the opt-in system versus the opt-out system among comparable developed countries with adequate infrastructure and resources (35 OECD countries). Their findings suggested that a switch to the “opt-out” model did not provide a “quick fix” to improve donor rates. Statistical analyses could not demonstrate a significant difference in donation between the two models. Therefore, other obstacles to organ donation exist, even when a consent to donation is assumed (Rithalia *et al.*, 2009).

Attitudes towards organ donation and general knowledge of donation procedures have been widely analysed among health care students and professionals in Italy (Fontana *et al.*, 2017; Canova *et al.*, 2006; Pugliese *et al.*, 2001) and in other countries (Hakeem *et al.*, 2021; Elsafi *et al.*, 2017; Mikla *et al.*, 2015; Rios *et al.*, 2014).

The present study, which in our knowledge is the largest population-based study conducted in Italy dealing with the willingness to donate organs, aimed to describe and evaluate the socio-demographic factors associated to: (1) individuals’ will of donating their organs; and (2) people’s level of awareness of donation procedures. “Specifically, we focus on the role of information as crucial dimension to enhance and promote organ donation and bridging the gap between intention (the will to donate organs) and action (formal consent to organ donation).

In this perspective, according to the theory of planned behaviour (TPB) an individual’s decision to engage in a specific behaviour can be predicated by his/her intention to engage in that behaviour (Ajzen, 1991). Therefore, intention is the proximal determinant of volitional behaviour. The TPB theory suggests three conceptually independent determinants of intention: attitudes (positive or negative evaluation of the behaviour); subjective norm (the perceived social pressure to perform or not to perform the behaviour); and perceived behavioural control (the extent to which we believe we can control our behaviour) (Ajzen, 1991). To understand the determinants of these three dimensions influencing intentions, the TPB suggest observing the beliefs that underlie them (Hyde and White, 2009).

In this framework, beliefs constitute the informational foundation that ultimately determines behaviour, although the beliefs may be incorrect, reflecting wishful thinking or be



Note(s): ^a y-axis left; ^b y-axis right

Figure 2. Declared consent to organ donation (black dashed line)^a, total declarations about organ donation (grey dashed line)^a, number per million population (pmp) of utilized deceased organ donors (black solid line)^b in Italy, 2009–2020

biased in other ways, and they may be unrepresentative of the information that is considered important in a specific behavioural domain (Ajzen *et al.*, 2011).

To explain the beliefs related to the formation of attitudes toward organ donation, Pauli *et al.* (2017, p. 295) consider four dimensions: the subject's evaluation of the potential need for organs (perceived susceptibility), perception of the gravity of needing an organ (perceived severity), social benefits of organ donation (perceived benefits) and obstacles in terms of the costs versus the benefits of being a donor (perceived barriers) (Rosenstock, 1974).

Several studies applied the TPB to explain the intentions to donate and the differences between organ donors and non-donors (Giles *et al.*, 2004; Hyde and White, 2009; Masser *et al.*, 2009; Siegel *et al.*, 2008; Pauli *et al.*, 2017). In our study we did not use TPB model to explain the intentions to donate or if intentions to donate organs turn into behaviours (Rocheleau, 2013). Based on results of previous research which applied the TPB, we take for grant that according to this theory subjects' beliefs about organ donation affect their attitudes and behavioural intentions and that these intentions are a strong predictor of explicit consent to donation.

Here we are interested to highlight that this deliberative processing model (Conner and Armitage, 1998) implies that individuals make behavioural decisions based on careful consideration of available information. Therefore, a greater emphasis on information (and education) may be effective to overcome cognitive obstacles or apathy to consent (Arshad *et al.*, 2019; Sharif, 2017; Matesanz *et al.*, 2017; Rios *et al.*, 2015) which impact on people's beliefs about organ donation.

Methods

A brief, written and self-administered web questionnaire was sent to 39,360 people (students and employees) attending the University of Milano-Bicocca in 2019. This study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the University of Milano-Bicocca. All participants gave electronic informed consent for their participation.

There were two criteria for exclusion from the survey: noncompletion of the whole questionnaire and ineligibility of the sample, in the case of not belonging to the institution.

The authors designed computer-assisted web interviewing (CAWI) as a questionnaire using LimeSurvey V 3.22.29 + 200731. The eight-minute questionnaire was anonymous and composed of three sections regarding: (1) information level on the topic of transplants and organ donation, (2) personal experience regarding the consent decision, and (3) basic personal information.

An announcement about the survey was posted on the university website and all social networks of the university in order to promote the study in the days prior to publication of the questionnaire. E-mail invitations were sent to everyone attending the University of Milano-Bicocca with an easy-to-use link to connect participants with the questionnaire, and thereby acknowledging their agreement to participate in the survey. A single reminder was circulated by e-mail in the middle of the data collection month to encourage increased participation. The web questionnaire was available online throughout the month of December 2019. In addition, as educational initiatives to obtain awareness feedback, a flyer with answers to the most frequently asked questions on the topic of organ donation was downloadable for participants who completed the survey.

In this work, the following aspects were analysed:

- (1) Respondents' awareness about organ donation, specifically: a) medical information and b) legal information, as reported in Table 1, which details the summed

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- percentages of respondents who answered that they have “very much” or “rather” clinical or bureaucratic information;
- (2) Respondents’ knowledge concerning donation, specifically: a) age limit for donation, b) donation after brain death, and c) the possibility of changing one’s mind after making the decision to donate organs. In Table 2, reported is the percentage of respondents who answered correctly. Moreover, the Knowledge Index was computed as the sum of right answers to the three questions. Index scores ranged between 0 (no right answers) to 3 (right answers to all questions);
 - (3) Reasons why the available information was not sufficient to make aware decisions about organ donation are displayed in Table 3, which reports both the percentage of respondents who stated that the information was sufficient and the main causes, according to individuals who thought that the information was not adequate or limited; and
 - (4) The will to donate. In particular, we report in Table 4 the proportion of respondents who had already expressed, positively or negatively, their will to donate and the formal and informal channels used to express it. Moreover, for those who had not already declared their will, the motivations of this choice are presented.

The socio-demographic characteristics of the respondents used to compare differences between the groups were as follows: gender; age, stratified in three categories (individuals up to age 24 years, aged 25–40 and over 40 years); level of education dichotomised as undergraduate or graduate (bachelor’s and master’s degree holder), according to the highest educational level or qualification achieved; and distinction between donors (participants who stated to be or have been organ, tissue or blood donors) and nondonors. Finally, we distinguished between participants who worked or studied in the medical field (individuals belonging to Department of Medicine and Surgery or Department of Biotechnology and Biosciences) and participants belonged to other areas.

As we had a non-probability sample, we applied a post-stratification vector to match the known population distribution according to auxiliary variables. The data samples were re-weighted to reflect gender, age, educational level and status in the university (student, academic and non-academic staff) structures of the general population. We employed univariate analysis and multivariate linear and logistic regression.

With respect to univariate analysis, as data were weighted, sub-populations were compared using the design-based F -test for categorical variable, corrected weighted Pearson chi square statistic to confront different groups, and differences were considered significant at a p -value < 0.05 . For the Knowledge Index, a continuous variable, the Sidak correction for multiple comparison test was applied and, also in this case, and differences were considered significant at a p -value < 0.05 .

Considering the multivariate analysis for the dichotomous outcome variable, multivariate logistic regressions were conducted and odds ratios (OR) and 95% confidence intervals (CI) were calculated. For continuous variables (i.e. Knowledge Index), we used a multivariate linear regression and 95% CI of parameters were computed.

Statistical analysis was performed with STATA 16.1 (StataCorp LP, College Station, TX, USA).

Results

This study included 4,191 respondents out of 39,360 participants (10.6%) at the University of Milano-Bicocca; 60.7% were female, the mean age was 24.9 years (standard deviation [SD] ± 11.0). Graduates (Bachelor or Master degrees) accounted for 25.2%, 38.6% were organ, blood and/or tissue donors, and 21.2% worked or studied in health areas

Clinical and bureaucratic information

Overall, 40.8% of respondents considered themselves informed about the clinical aspects of organ donation, but only 15.8% thought to have sufficient legal and bureaucratic information regarding this issue (Table 1). According to the univariate and multivariate analyses, medical information was perceived as significantly lower in graduates (36.6 vs. 42.2%) and non-donors (32.8 vs. 53.5%), whereas it significantly increased both with age (<25 years vs. 25–40 years vs. > 40 years: 38.5 vs. 44.6% vs. 51.3%, respectively) and for those who worked or studied in the medical field (65.7 vs. 33.9%). With the exception of level of education, which was not statistically significant, the same pattern was found for legal information: non-donors (11.2 vs. 23.2%) had lower knowledge; in contrast, older participants (<25 years vs. 25–40 years vs. > 40 years: 13.5 vs. 20.4% vs. 23.4%, respectively) and those involved in the medical field (20.6 vs. 14.5%) claimed to have little knowledge.

Knowledge about donation

To test the respondents' knowledge concerning donation, participants were asked to respond to three specific questions: age limit for donation (A); donation after brain death (B); and the possibility of changing their mind after making the decision to donate organs (C). Only 39.0% of the interviewees correctly responded about age limit (Table 2). Statistically significant differences were found among the age groups (C: < 25 years vs. 25–40 years vs. > 40 years: 37.5 vs. 41.3% vs. 47.3%, respectively), donor vs. non-donor (C: 42.1 vs. 37.0%) and medical field vs. non-medical field involvement (C: 42.4 vs. 37.9%). Among our respondents, knowledge about donation after brain death and the possibility of changing their mind was higher than the awareness of age limits (respectively, 69.4 and 65.8%). Differences were reported between genders (only for brain death, 71.7% male and 66.0% female), age (limited to the possibility to modify a decision, age <25 years vs. 25–40 years vs. > 40 years: 64.2 vs. 67.5% vs. 78.6%, respectively), donor status (A: 75.1 vs. 65.9%; B: 72.5 vs. 61.6%) and field of work and study (A: 83.3 vs. 65.5%; B: 72.6 vs. 63.9%). According to the Knowledge Index mean score (overall mean score = 1.7, SD = 0.014), the level of awareness increased with age ($F = 10.71$, p -value = 0.000), if the respondent was a donor ($F = 73.21$, p -value = 0.000) and if the respondent worked or studied in the health department ($F = 79.59$, p -value = 0.000). These results were confirmed by multiple linear regression model, which showed that the Knowledge Index increased with age, but only for the oldest participants (>40 years: 0.27, CI = 0.13–0.42) and for donors (0.21, CI = 0.15–0.28); however, it decreased if respondents did not work in the medical field (–0.30, CI = –0.38 to –0.21).

Level of information

The answer to the question investigating whether the information was considered sufficient to make decisions about donation showed the respondents' need for information. In fact, only 17.7% of respondents thought that the available information was sufficient, and this percentage was low for all the considered categories. In particular, the available information was lower for graduates (but only in the univariate analysis (15.2 vs. 18.6%), whereas in the multivariate analysis, the difference was not statistically significant [OR = 1.24, CI = 0.98–1.48]) and non-donors (15.2 vs. 21.8%). Respondents stated that the main reasons which limited the availability of information was that "organ donation has strong ethical and religious implications" (29.5%), "it is not a priority topic" (23.6%), "it is a delicate issue" (14.3%) and because "it is a personal choice" (14.3%). As exhibited in Table 3, the reasons for

	Female	Male	Graduates	Undergraduates	<25 years	25-40 years	>40 years	Non-donor	Donor	Medical field	Non-medical field	Total
Total respondents	<i>n</i> 2535	1638	1051	3121	2870	1094	209	2560	1612	875	3253	4191
	% 60.7	34.3	25.2	74.8	68.8	26.2	5.0	61.4	38.6	21.2	78.8	100.0
Respondents have clinical information	<i>n</i> 1029	671	384	1315	1105	488	107	839	862	574	1103	1701
	% 40.6	41.0	36.6*	42.2	38.5*	44.6	51.3	32.8*	53.5	65.7*	33.9	40.8
Multivariate analysis OR (95% CI)	1	1.03 (0.85-1.23)	1	1.44 (1.18-1.75)	1	1.44 (1.16-1.80)	2.10 (1.44-3.06)	1	2.18 (1.84-2.57)	1	0.27 (0.22-0.33)	
Respondents have legal information	<i>n</i> 394	267	146	514	388	223	49	287	373	180	473	661
	% 15.5	16.3	13.9	16.5	13.5*	20.4	23.4	11.2*	23.2	20.6*	14.5	15.8
Multivariate analysis OR (95% CI)	1	1.07 (0.83-1.37)	1	1.55 (1.17-2.06)	1	1.80 (1.34-2.41)	2.245 (1.41-3.59)	1	2.26 (1.80-2.82)	1	0.70 (0.54-0.90)	

Note(s): Abbreviations: OR, odds ratio; CI, confidence interval
* *p*-value < 0.05

Table 1.
Awareness of clinical
and medical
information about
organ donation by
respondent
characteristics

Table 2.
Knowledge concerning
organ donation
procedure by
respondent
characteristics

	Female	Male	Graduates	Under-graduates	<25 years	25-40 years	>40 years	Non-donor	Donor	Medical field	Non-medical field	Total
<i>Right answers</i>												
Donation age limits	<i>n</i> 1001	624	426	1199	1075	452	99	947	678	370	1232	1626
	%	38.1	40.5	38.4	37.5*	41.3	47.3	37.0*	42.1	42.4*	37.9	39.0
Donation after brain death	<i>n</i> 1791	1062	703	2149	1948	759	146	1160	1193	724	2093	2854
	%	71.7*	66.0	70.0	68.8	70.6	71.6	65.9*	75.1	83.3*	65.5	69.4
Changing your mind after it has expressed	<i>n</i> 1638	1106	692	2052	1842	738	164	1576	1168	635	2075	2746
	%	64.7	67.6	65.8	64.2*	67.5	78.6	61.6*	72.5	72.6*	63.9	65.8
Knowledge index mean score (0-3)	<i>n</i> 2499	1609	1036	3073	2829	1075	204	2520	1589	868	3196	4110
	Mean	1.8	1.7	1.7	1.7	1.8	2.0	1.6	1.9	2.0	1.7	1.7
	score											(SD 0.014)
<i>F</i>	1.86		0.01 (0.92)		10.71			73.21		79.59		
<i>p</i> -value	(0.17)				(0.00)			(0.00)		(0.00)		
Sidak m c test					(a) (b)			(a)		(a)		
Multivariate analysis (95% CI)	0	0.04 (-0.04 - 0.12)	0	0.04 (-0.04 - 0.12)	0	0.09 (-0.01 - 0.18)	0.27 (0.13 - 0.42)	0	0.21 (0.15 - 0.28)	0	-0.30 (-0.38 - -0.21)	

Note(s): Abbreviations: *F*, *F*-test; Sidak m c test, Sidak multiple comparison test; CI, confidence interval; SD, standard deviation

* *p*-value < 0.05

(a) Statistically significant difference between item 1 and item 2, based on Sidak m c test

(b) Statistically significant difference between item 1 and item 3, based on Sidak m c test

(c) Statistically significant difference between item 2 and item 3, based on Sidak m c test

		Female	Male	Graduates	Undergraduates	<25 years	25–40 years	>40 years	Non-donor	Donor	Medical field	Non-medical field	Total
Sufficient information	<i>n</i>	421	318	160	579	526	172	41	389	351	171	562	740
	%	16.7	19.4	15.2*	18.6	18.30	15.7	19.3	15.2*	21.8	19.6	17.3	17.7
Multivariate analysis	OR (95% CI)	1	1.19 (0.96–1.48)	1	1.24 (0.98–1.57)	1	0.86 (0.65–1.11)	1.11 (0.69–1.79)	1	1.55 (1.26–1.89)	1	0.91 (0.72–1.16)	
Reasons because information is insufficient	<i>n</i>	2093	23.6	2003	24.9	2093	29.0	12.6	2093	26.7	2067	23.6	2093
	Non-priority topic	23.8		20.0		22.3			21.8		23.8		23.6
	Complex topic	11.7	11.6	13.9	10.9	11.7	10.0	19.3	12.8	9.5	11.7	11.6	11.6
	Ethical/religious	33.1	28.3	32.3	28.6	28.5	30.6	36.6	29.1	30.2	33.1	28.3	29.5
	Individual choice	9.8	15.5	11.3	15.3	16.0	11.9	5.2	16.3	10.8	9.8	15.5	14.3
	Delicate topic	17.3	13.7	16.4	13.6	13.6	14.1	24.1	13.0	16.5	17.3	13.7	14.3
	Other	5.1	7.1	6.1	6.8	8.0	4.4	2.3	6.9	6.2	5.1	7.1	6.6
	<i>F</i> (<i>p</i> -value)	1.00 (0.412)		2.71 (0.019)		3.91 (0.001)			3.21 (0.007)		1.96 (0.081)		

Note(s): Abbreviations: OR, odds ratio; CI, confidence interval; *F*, *F*-test
* *p*-value < 0.05

Table 3. Level of information possessed about organ donation and reasons because information is not sufficient by respondent characteristics

insufficient information do not seem to vary significantly, according to respondents' characteristics (although with some differences). For example, "ethical and religious motivation" was the main reason for the whole group considered, but this difference was only 1.1% points between donor and non-donor, but 8.1% points between the oldest and the youngest individuals.

Consent to donation

In our sample, just over half of the respondents (57.9%) had already expressed their will to donate (Table 4). Differences related to individual characteristics were considered in this study. Undergraduates (OR = 1.30, CI = 1.08–1.57) and, as we expected, donors (OR = 2.86, CI = 2.41–3.41) had higher chances to have expressed their will, whereas chances decreased in the middle age class (25–40 years: OR = 0.78, CI = 0.63–0.96) and for those who did not work or study in medical area (OR = 0.77, CI = 0.63–0.94).

Among the respondents who already expressed their will to donate organs, the issue or renewal of the identity card was the most common way (55.8%). Approximately a quarter of the respondents (23.2%) declared that they previously communicated their decisions to family members and 14.4% subscribed to the organ donor association card. On the other side, in terms of the reasons why respondents had not yet expressed their will, 61.5% stated that "no opportunity or time" and 11.5% were searching for more information. Lack of opportunity or time is the main motivation suggested by all respondents, regardless of sociodemographic characteristics.

Discussion

We aimed to assess attitude and awareness regarding organ donation in a select adult population with a high level of education and cognitive skills in Italy. Our study showed a generally strong, positive attitude toward donations. Over 96% of respondents stated that they are inclined to donate organs, 72.8% certainly and 23.4% probably, confirming results in medical students or staff personnel in other Italian studies (Fontana *et al.*, 2017; Pugliese *et al.*, 2001; Burra *et al.*, 2005). Only 57.9% of our sample, however, had already expressed, negatively or positively, their willingness about donation.

The striking discrepancy between the strong favour of organ donation and expression of will is probably due in part to lack of information and occasions in which people can express their decisions about donation.

It is true that information which individuals have in behavioral domain is of central importance for the decisions they make, but from the perspective of the TPB, information accuracy is neither necessary nor sufficient. Therefore, more than its accuracy, information might be more relevant about expression of will to donate if it modified the subjectively held information which determines intentions and actions (i.e. beliefs) (Ajzen *et al.*, 2011).

The findings of four logistic regression models (data not shown), in which the dependent variable was the attitude to donate (respondents who answered "certainly yes"), the independent variables were medical awareness, legal knowledge, sufficient grade of information and knowledge index, and respondents' sociodemographic characteristics as control variables, which showed a clear relationship between information and will to donate. The higher was the available information, the greater was the probability that individuals expressed their will (in the four models, ORs, all statistically significant, spanned from 1.6 to 2.2).

Overall, only one-sixth of the respondents were thought to have sufficient legal information about the bureaucratic procedures related to organ donation and 41% possessed medical knowledge. As expected, whomever had expressed in their lifetime to serve as a donor (those who are or were organ, tissue or blood donors) showed higher awareness about

	Female	Male	Graduates	Undergraduates	<25 years	25–40 years	>40 years	Non-donor	Donor	Medical field	Non-medical field	Total
Expressed will about donation	<i>n</i> 1427	898	538	1787	1649	564	112	1180	1145	554	1746	4015
	% 58.6	56.9	52.4*	59.8	60*	53.4	54.1	48.5*	72.4	65.2*	55.9	57.9
Multivariate analysis	1	0.89	1	1.30 (1.08–1.57)	1	0.78	0.75	1	2.86	1	0.77	
		(0.75–1.07)				(0.63–0.96)	(0.52–1.09)		(2.41–3.41)		(0.63–0.94)	
How the willingness about donation was expressed	<i>n</i> 2325	592	2325	55.8	2325	48.8	34.6	2325	51.0	2300	58.8	2325
	53.6	12.8	57.3	59.6	59.6	48.8	34.6	60.4	51.0	46.3	58.8	55.8
	15.4	20.3	14.0	14.5	12.3	17.8	27.7	5.2	23.9	22.5	11.6	14.4
Organ donor association card	25.0	20.3	20.9	23.9	22.9	26.0	13.8	27.1	19.1	27.1	22.0	23.2
Communicate to family members	6.0	7.7	7.8	6.3	5.3	7.4	23.9	7.3	6.0	4.1	7.5	6.7
Other	2.38	0.95 (0.41)	10.39	36.4	11.82	36.4	11.82	36.4	6.0	11.82	36.4	6.7
	(0.069)		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	
Reasons why you have not expressed your will to donate	<i>N</i> 1696	64.3	1696	60.3	1696	65.9	67.0	1696	69.4	1645	60.9	1696
	59.6	8.3	64.3	60.3	59.0	65.9	67.0	58.7	69.4	64.5	60.9	61.5
No opportunity/time	13.6	10.2	10.2	12.0	11.6	11.7	8.4	10.9	13.1	16.2	10.5	11.5
Searching for information	10.2	11.7	8.9	11.6	13.4	6.4	3.6	11.8	8.1	11.9	10.5	10.8
It's too early	10.0	6.3	9.5	8.1	8.4	8.9	8.3	9.9	4.7	3.1	9.6	8.5
It's a scary topic	6.7	9.3	7.1	8.0	7.6	7.0	12.7	8.8	4.7	4.3	8.4	7.8
Other	3.00	0.98	0.98	2.22 (0.02)	2.22 (0.02)	4.49	4.58	4.58	4.49	4.49	4.49	4.49
	(0.02)		(0.416)					(0.001)		(0.002)		

Note(s): Abbreviations: OR, odds ratio; CI, confidence interval; *F*, *F*-test
* *p*-value < 0.05

Table 4. Expression of will of organ donation by respondent characteristics

organ and tissue donation than participants who were not donors. Also, respondents who worked and studied in the medical field showed a higher level of information compared to other groups, although only 20% of them stated to have sufficient information on this topic. This percentage was not statistically different (even in multivariate analysis) from that obtained from participants in other disciplines of study, as in other Italian studies on this issue (Canova *et al.*, 2006).

These results, as highlighted in many studies on this topic, confirmed that a wider level of public education is needed if we want to increase propensity to organ donation. The findings also highlighted the importance of information that covers different areas of interest, such as medical, legal, psychological, sociological and ethical. This also indicates that if Italy switched from “opt-in” to “opt-out” mechanisms for organ donation, as has happened for policies on this issue in other contexts (Chatterjee *et al.*, 2015) automatic increases in organ donation rates or solid organ transplantation activity are not guaranteed (Arshad *et al.*, 2019; Rithalia *et al.*, 2009).

Information is not only a crucial factor to enhance and promote organ donation; it is also important to multiply opportunities to register one’s will. In fact, as exhibited in Table 4, approximately 55% of respondents expressed their willingness to donate organs during the renewal of the identity card, whereas over 60% of respondents did not register consent or opposition to be a donor due to lack of occasions or time. We believe that this issue deserves attention in countries with a soft opt-out system, in particular in countries, as in Italy, in which registrations of declaration of will to donate are very low (Fontana *et al.*, 2017).

This study was subject to several limitations. First, the response rate was 10.6%. Despite this low rate, more than 4,000 interviews were performed; hence, as far as we are aware, this is the largest survey ever carried out about organ donation in Italy. Second, the survey was based on a convenience, non-probability sample. This could have introduced important selection bias, as suggested by the highly unbalanced education and age ratios observed in comparison to the general Italian population. However, it should be considered that the aim of the present study was not to focus on any particular group, but on a population that was heterogeneous for gender, age, level of education and status in a university. Third, differences between the respondents and non-respondents could have led to biased results, although we applied a post-stratification vector to our data in order to match the known Milano-Bicocca University population distribution. However, in the e-mail of invitation to the study we have included a statement about the public health relevance of the survey, therefore we can suppose that respondents answered because they may have been more interested in health issues than non-respondents. This means that the true awareness concerning organ donation might be less than reported.

Policy implications

Based on the insufficient knowledge demonstrated by our respondents, the overall positive attitude toward deceased donation was interestingly very high among them. Our results demonstrated that expression of will was influenced by information level and, therefore, education regarding donation addressed to the general population was a pivotal step in the process to increase the population of potential organ donors. In this regard, it should be remembered that campaigns to promote organ donation have led to increases in negative opinions, i.e. an overflow effect (Verble and Worth, 1996). Therefore, as previously reported, the content of the information, but also the way in which it is presented may meaningfully affect public opinion and attitudes toward donation. In addition, to reach selected population subgroups different means of communication can be used, and specific and effective communication plans should be developed to address the issue (Conesa *et al.*, 2004).

Moreover, in the TPB perspective, it is important to highlight that many educational campaigns which focus on imparting accurate information fail to achieve socially desirable behaviour. As we discussed above, this does not mean that knowledge is irrelevant or secondary to increase the expression of willingness to donate, but we should focus on what information people possess and how this information affects their intentions and actions. In this way we can provide the people with information to challenge beliefs that are contrary to donation, that supports their existing positive beliefs about donation, or that leads to the formation of new beliefs favourable to organ donation (Ajzen *et al.*, 2011).

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