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Development and Testing of Promotion Materials on Tissue and Organ Donation

Tihana Brkljačić, Ivana Ferić, Stanko Rihtar

Ivo Pilar Institute of Social Sciences, Zagreb, Croatia

Aim. To develop leaflets that would promote and increase tissue and organ donation and to test their persuasive value.

Method. The study was carried out in two parts. In Study 1, we assessed attitudes, knowledge, and intentions about tissue and organ donation of 200 randomly chosen persons from the population of the capital of Croatia, Zagreb, as well as of 108 health professionals in different hospitals in Zagreb. We also assessed the willingness of health care professionals to ask their patients whether they were willing to donate their tissue and/or organs. Dependent variables in this study were attitudes, knowledge, and intentions. On the basis of attitude and knowledge analyses, two types of tissue and organ donation promotional leaflet were developed: one intended for the community sample and the other for health professionals. The leaflets were used as independent variable. In Study 2, performed a year later, the leaflets were presented to another group of 184 persons from Zagreb population and 50 health professionals. We compared attitudes, knowledge, and intentions of community sample and health professionals presented with leaflets vs those not presented with leaflets, and assessed the persuasive power of the two types of promotional material developed.

Results. The community sample presented with the leaflet in Study 2 showed significantly more positive attitudes towards organ donation when compared with the group not presented with a leaflet in Study 1 ($t = 2.26$; $p = 0.025$), but there was no significant improvement in attitudes towards tissue donation or intention to either donate or receive tissues and organs for transplantation. For health professionals, the Study 2 group presented with a leaflet showed a tendency toward less positive attitudes but significantly more positive intention than those in Study 1 not presented with a leaflet to donate bone marrow ($t = 2.39$; $p = 0.021$) and one's own organs ($t = 2.24$; $p < 0.027$), and to ask others about blood donation ($t = 2.1$; $p = 0.037$).

Conclusion. Presentation of leaflets succeeded in producing a tendency toward more positive attitudes and intentions toward tissue and organ donation. Still, a single presentation is clearly insufficient to produce significant change in all variables – attitudes, knowledge, and intentions.

Key words: *attitude; blood donors; communication; knowledge; motivation; organ procurement*

Attitudes towards tissue and organ donation have been frequently investigated. Studies, mostly conducted in the United States and Western Europe, have shown that people generally hold positive attitudes towards tissue and organ donation, but only a small percentage of the population really decides to donate them (1-7). Many non-donors still hold favorable attitudes towards donor behavior and realize the need for transplants but lack to act upon those attitudes and knowledge (2,3,8). In such situations, a person's behavior can be influenced by promotion through persuasive messages. Different authors suggested different critical points in promoting donor behavior (6,9,10). The usual reason given for tissue and organ donation has been humanitarian motivation. However, several authors have found that such a decision is also influenced by the perception of negative consequences. A multidimensional conceptualization of donor attitudes was proposed, implying that attitudes towards donation are best represented by two dimensions: one referring to positive aspects and the other to negative consequences of donation (11). Positive emotions concerning organ donation mostly arise from feeling of pride in being a donor, whereas negative emotions are influenced by the fear of body mutilation and inadequate medical treatment (12).

Previous research concerning organ donation appeals found that the most effective measure for increasing donation rates was informational message, followed by emotional message, and a message addressing fear (3). A religious message was least effective. It is also very important that a message promoting tissue and organ donation has adequate content and persuasive value. Therefore, the message should be based on empirical evidence derived from attitude analyses and information about knowledge that people have on relevant aspects of donation.

Web-extra: Questionaire appear on the *www.cmj.hr*

Such persuasive messages can easily be conveyed to general public through leaflets, which are easy to use and can simply be implemented in a state policy for increasing the number of donors. Although Croatia uses the so-called "opting-out system" regarding the tissue and organ donation policies, the actual number of tissue and organ donors in Croatia is very small. The Croatian law on tissue and organ donation is a "presumed consent law" – it permits organ and tissue removal unless the donor had explicitly opposed to donation during his or her lifetime. However, in our medical practice, a weak version of the presumed consent law is used, and the permission by the donor's family is asked for before the organs and tissues are removed. Therefore, health professionals play a very important role in organ donation process because they are the ones expected to ask the families about the donations. Some authors argue that health professionals may be responsible for the shortage of tissues and organs for transplantation, as they are the only ones who have the opportunity to ask for donations but hesitate to do so (15-18).

Although the problem of shortage of tissue and organs in Croatia has been acknowledged and approached in various ways, no proper methodical research in donor behavior has been done or systematic effort to promote such behavior and increase the number of donors. Our study is the first methodologically based investigation in this problem in Croatia. It was conducted on a community sample and a sample of health professionals. The main aims of our research were 1) to assess attitudes, knowledge, and intentions regarding donor behavior in the community sample; 2) to assess the attitudes of health professionals towards tissue and organ donation, as well as their intentions to ask people about donations; 3) to develop two separate persuasive leaflets, one designed especially for the community sample to promote donor behavior, and the other one designed for health professionals to improve their willingness to ask people to donate; and 4) to test the persuasive value and efficiency of the leaflets in inducing and increasing donor behavior and intention to receive tissues and organs, and to ask for donations among health personnel.

On the basis of previous research, we expected that the presentation of promotional leaflets would improve the attitudes towards tissue and organ donation in both community sample and health professionals (2-4,19). Furthermore, we expected that the leaflets would also increase willingness to both donate and ask for donation. Should our hypothesis be confirmed, further systematic application of the leaflets could, in time, improve the organ donation process and increase the number of donors.

Participants and Methods

This research was carried out in two parts (Study 1 and Study 2), on independent samples: 2 community samples and 2 samples of health professionals. Study 1 included the assessment of attitudes, intentions, and knowledge regarding donor behavior, and the development of adequate persuasive leaflets. In Study 2, we tested the persuasive value and efficiency of the leaflets.

Participants

Participants in the community sample were chosen from the population of the city of Zagreb on the basis of probabilistic random sampling, ie, they were chosen according to the percentage of inhabitants in each region of the city of Zagreb. Health professionals, ie, physicians and nurses, were chosen from different Zagreb hospitals on the basis of non-probabilistic accidental sampling: they were simply approached in the hospitals and asked to participate. The profile of the health workers was not controlled. Participation was anonymous, and participants had to be between 18 and 60 years of age. The total number of approached persons was 230 in each community sample, and 125 and 55 in the sample of health professionals in Study 1 and Study 2, respectively.

Most persons were willing to participate in the research – rejection rate was 5% in Study 1 and 9% in Study 2 for the community sample, and 4% in Study 1 and 2% in Study 2 for health professionals. Respondents who agreed to participate were asked if they had any health problems that would, in their knowledge, prevent them from donating blood or bone marrow. Those who expressed having such health problems were excluded from the survey. The number of excluded respondents was 20 in Study 1 and 18 in Study 2 for the community sample, and 12 in Study 1 and 4 in Study 2 for health professionals. Due to the rather small number of participants in each sample, their knowledge of the Croatian Law on organ and tissue donation as well as their previous donor behavior was not controlled.

The community sample for Study 1 included 200 (121 women and 79 men) participants, with mostly (62%) secondary level of education and a mean age of 39.3 ± 15.4 years. Study 2 involved 184 participants (110 women and 74 men), with mostly (60%) secondary level of education and a mean age of 38.1 ± 11.1 years.

In the sample of health professionals, Study 1 involved 108 participants: 75 nurses (60 women and 15 men) and 33 medical doctors (13 women and 22 men). Their mean age was 38.6 ± 9.2 years. Study 2 involved 50 participants: 36 nurses (31 women and 4 men) and 14 medical doctors (6 women and 8 men), with a mean age of 37.8 ± 9.1 years.

Study 1 – Assessment of Attitudes, Intentions, and Knowledge about Donor Behavior, and Development of Leaflets

Attitude scales, knowledge tests, and measures of intentions regarding donor behavior were handed to 200 persons in the community sample and 108 health professionals. The questionnaires were developed previously, and the whole process of their development is reported in detail elsewhere (20).

We used two attitude scales – one measuring attitudes towards tissue donation, and another measuring attitudes towards organ donation. Each attitude scale consisted of 14 positive and negative statements (e.g.: "Every healthy person should be a tissue donor", or "Tissue donation is dangerous.") and respondents were asked to rate how much they agreed with each statement on a 5-point scale (from 5 – strongly disagree to 1 – strongly agree). Attitude scales emphasized that the statements referred to donation to an unknown person to save or prolong her or his life. Furthermore, for the tissue donation scale, it was emphasized that it referred to blood and bone marrow donation during life. For organ donation, it was emphasized that it referred to posthumous donation of organs, such as kidney or heart.

These attitude scales were applied to both community sample and health professionals.

We used 3 knowledge tests that consisted of "true/false" questions (e.g.: "Person of blood type 0 can receive blood of all other blood groups"). There were 9 questions on knowledge on blood donation, 10 questions on bone marrow donation, and 17 on organ donation. Knowledge tests were applied only to the community sample.

Measures of intentions were questions on intention to donate and receive tissue or organs (e.g.: "Would you donate your bone marrow to a stranger who needs it?"). Respondents were asked to choose the answer on each question on a 5-point scale. For the community sample, we used 4 questions on the intention to donate (intention to donate blood, bone marrow, one's own organs after death, or organs of a deceased relative), and 3 ques-

tions on the willingness to receive tissues and organs (willingness to receive blood, bone marrow, or organ transplant). Health professionals received the same 4 questions on the intention to donate, but the 3 questions on willingness to receive transplants were replaced with questions about their willingness to ask about transplants (e.g.: "If you were in a position to ask a person to donate their bone marrow, would you?").

After analyzing the information on peoples' knowledge and attitudes toward tissue and organ donation by analyzing the questionnaires, we have developed two different leaflets. One leaflet was designed for the community sample with the intention to change their erroneous believes about tissue and organ transplantation and to help them overcome internal barriers towards donation (Web Table 1). The second leaflet was designed for health professionals to reduce their discomfort to ask their patients for tissue and organ donation (Web Table 2).

Study 2 – Testing the Difference in Attitudes, Knowledge, and Intentions between Groups before and after Leaflet Presentation

One year after the Study 1 was completed, we conducted Study 2 using the leaflets with persuasive messages on donor behavior designed according to the results of Study 1 on 184 persons in community sample and 50 health professionals. A few days later (one to three days) we approached the same participants and assessed their attitudes, intentions, and knowledge regarding donor behavior using the same questionnaires as those in Study 1. The interviewer was present during the completion of questionnaires to make sure that the participants did not look in the leaflet.

We analyzed and compared the results of attitude scale, knowledge test, and measures of intention in Study 1 (before development of leaflets) with those in Study 2 (after the presentation of leaflets). If the presentation of leaflets was successful in inducing donor behavior, it would result in a more positive attitude, better knowledge, and stronger intention to donate.

Statistics

Each attitude scale consisted of 14 statements and the respondents were asked to state their agreement with each statement on a scale from 1 to 5. Negative items, ie, items on which lower results indicate more positive attitude, were inverted for the needs of statistical analysis; thus, higher values were always showing more positive attitude. The total score on each scale was calculated by summing up the scores for all statements (items). Theoretically, response range on both scales was 14 to 70. Item analysis of attitude scales included computing of the means and standard deviations for every item (statement).

Total result on the knowledge test was represented by the percentage of correct answers. Since we had to assume that to some questions the respondents did not know the correct answer and that they only guessed it by chance, we reduced the total of correct answers by the number of correct guessing, which we approximated from a number of wrong guessing (incorrect answers). Following this rationale, the real result was subtraction of percentages of correct and incorrect answers. For example, if a person incorrectly answered to 2 from 10 questions, then his or her total score was 8-2 = 6 (because, statistically, for those two items where a person made incorrect guess, he or she guessed correctly at another two items).

Differences in general attitudes, knowledge, and intentions between groups presented with the leaflet and those not presented with a leaflet were tested with t-test for independent samples. Differences on separate items on attitude scales were also tested with t-test for independent samples. Results were presented as means and standard deviations for groups in both studies, with t-value for the difference in means and probability that the difference in means was significant.

Differences in each knowledge test item between the groups presented with the leaflet and not presented with the leaflet were tested with chi-square test (because of dichotomy of variables).

Statistical software package SPSS, version 6.1 (Chicago, IL, US) was used for all statistical analyses.

Results

Study 1

The main aim was to assess attitudes, knowledge, and intentions towards tissue and organ donation, to develop leaflets that would contain adequate information and carry the efficient persuasive message for donor behavior.

The results of the community sample on the attitude scale towards tissue donation suggested that people were scared of, or at least not indifferent to, negative consequences of tissue donation, although they had generally positive feelings about the benefits of it (Table 1). Our respondents were mostly worried that tissue donation could cause spreading of illnesses, that it was risky and dangerous, and that it ruined donor's health.

On the attitude scale towards organ donation, the respondents expressed very positive attitudes toward almost all items. Items toward which the respondents showed less positive attitudes were those indicating person's belief that it was important to be bur-

Table 1. Community sample's score on attitude scale towards tissue donation before (n = 200) and after (n = 184) the presentation of tissue and organ donation promotional leaflet

Item	Score (mean ± SD)* before leaflet presentation	Score (mean ± SD)* after leaflet presentation	t†	p
Tissue donation saves lives.	4.6 ± 0.7	4.7 ± 0.7	0.39	0.694
Tissue donation is contrary to the laws of nature.‡	4.4 ± 1.0	4.3 ± 1.1	-0.77	0.440
Tissue donation helps build solidarity in society.	4.2 ± 1.0	4.3 ± 0.9	1.10	0.273
Tissue donation can cause illnesses to spread.	3.0 ± 1.2	3.3 ± 1.3	1.88	0.061
Tissue donation is risky.	3.0 ± 1.2	3.4 ± 1.3	1.32	0.188
Tissue donation ruins the donor's health.	3.9 ± 1.1	3.9 ± 1.3	-0.09	0.928
We have received our tissue from "someone" and therefore it is good to give it to someone in need.	4.2 ± 1.0	4.1 ± 1.1	-0.74	0.457
Tissue donation is an important civil duty of every citizen.	3.2 ± 1.3	3.2 ± 1.2	0.36	0.717
Tissue donation is dangerous.	3.6 ± 1.2	3.9 ± 1.2	2.41	0.016
We could also be in a need of tissue transplant - and someone will help.	4.4 ± 0.9	4.3 ± 0.8	-0.59	0.557
Tissue donation is immoral.	4.6 ± 0.9	4.6 ± 1.0	-0.17	0.869
Tissue donors should serve as examples to others.	4.4 ± 0.9	4.4 ± 0.9	0.58	0.563
Every healthy person should be a tissue donor.	3.9 ± 1.1	4.0 ± 1.0	0.97	0.334
There is no reason why I would give a part of me to a stranger.	3.0 ± 1.3	3.9 ± 1.3	-0.24	0.808
Total score§	55.5 ± 8.08	56.2 ± 7.43	0.87	0.384

*Score was expressed as mean score on a scale from 1 (strongly disagree) to 5 (strongly agree).
†t-test for independent samples.
‡All "negative" items were inverted, so that higher value always showed more positive attitude.
§For every participant the total score was defined as a sum of scores on all items.

Table 2. Community sample's score on attitude scale towards organ donation before (n = 200) and after (n = 184) the presentation of tissue and organ donation promotional leaflet

Item	Score (mean ± SD)*			
	before leaflet presentation	after leaflet presentation	t†	p
Donating organs to another person is human.	4.4 ± 0.8	4.6 ± 0.8	1.51	0.131
A dead person is ruined by organ transplantation.‡	4.1 ± 1.2	4.1 ± 1.2	0.32	0.750
I don't think my religion allows donation of organs.	4.1 ± 1.2	4.3 ± 1.1	2.12	0.035
Organ donation saves lives.	4.7 ± 0.6	4.7 ± 0.6	1.17	0.244
Organ donation violates human rights.	4.3 ± 1.0	4.4 ± 1.0	0.52	0.606
Organ donation improves life in the community.	3.8 ± 1.1	4.0 ± 1.0	1.77	0.077
If we donate organs after our death, we will prolong the life of another person.	4.4 ± 0.8	4.6 ± 0.7	1.75	0.082
Organ donation disturbs the peace of a dead person.	4.3 ± 1.1	4.4 ± 0.9	1.13	0.259
It is not important for a person to be buried with all their organs.	3.9 ± 1.2	4.0 ± 1.2	1.13	0.258
The spirit of a dead person is not at peace if their organs live in the body of another person.	4.1 ± 1.2	4.4 ± 1.0	2.90	0.004
It is possible to cure some illnesses through organ donation.	4.1 ± 1.0	4.4 ± 0.8	3.53	0.000
If we decide to donate organs, it is like we are ready to die.	4.5 ± 1.0	4.6 ± 0.9	0.46	0.645
A dead person doesn't need any organs.	4.2 ± 1.1	4.3 ± 1.1	1.04	0.297
Organ donation insults human dignity.	4.4 ± 1.0	4.5 ± 1.0	0.62	0.536
Total score§	59.3 ± 9.6	61.4 ± 7.9	2.26	0.025

*Score was expressed as mean score on a scale from 1 (strongly disagree) to 5 (strongly agree).
†t-test for independent samples.
‡All "negative" items were inverted, so that higher value always showed more positive attitude.
§For every participant the total score was defined as a sum of scores on all items.

Table 3. Test results showing community sample's knowledge about blood donation before (n = 200) and after (n = 184) the presentation of tissue and organ donation promotional leaflet

Item	Knowledge test results						
	before leaflet presentation		after leaflet presentation				
	score (%)*	difference†	score (%)*	difference‡	Difference§	Chi-square	p
Anemic persons cannot donate blood.	84.5	69.0	89.0	78.0	9.0	1.62	0.203
Croatian transfusion centers have enough blood supplies.	85.0	70.0	90.1	80.2	10.2	2.21	0.138
People can donate blood every two months.	36.5	-27.0	44.9	-10.2	16.8	2.73	0.098
Blood can be stored for several years.	36.7	-26.6	48.6	-2.8	23.8	5.39	0.020
Person can suffer from dizziness after blood donation.	87.0	74.0	90.1	80.2	6.2	0.90	0.342
More than 5% of Zagreb population donate blood regularly.	44.0	-12.0	45.6	-8.8	3.2	0.10	0.755
Amount of blood in organism recovers during few hours after blood donation.	41.0	-18.0	29.6	-40.8	-22.8	5.34	0.021
During one donation person can donate about 2 dl of blood.	18.1	-63.8	15.6	-68.8	-5.0	0.43	0.511
Person of blood type 0 can receive blood of all other blood groups.	52.3	4.6	66.3	32.6	28.0	7.72	0.005
Total score (after correction for guessing, mean ± SD)	0.7 ± 3.1		1.1 ± 3.1		0.4	t = 1.34‖	0.182

*Percentage of correct answers.
†% correct answers – % incorrect answers before leaflet presentation.
‡% correct answers – % incorrect answers after leaflet presentation.
§Difference between the results after and before leaflet presentation (difference‡ – difference†).
‖t-test for independent samples.

ied with all organs, that organ transplantation mutilated the dead body, and that their religion might not support organ donations (Table 2).

The community sample showed poor knowledge about blood, bone marrow, and organ donation (Tables 3-5), finding several questionnaire items especially difficult. For instance, they thought that blood could be stored for several years (which the standard procedures do not allow), and that more than 5% of the Zagreb city population were donors (only 2-3%). Respondents were also unfamiliar with the fact that a person could donate bone marrow many times in her of his life and that supplies of the bone marrow regenerated in the organism. Furthermore, many did not know that a person could receive bone marrow from a non-relative, but that the possibility to find suitable donors among not-related people was very small, which is why a large pool of potential donors was required. More than half of the participants (51%) thought that their religion did not support organ donation, and 32.5% were afraid that organ transplantation procedure would not allow the open casket funeral.

The attitudes of health professionals towards tissue donation were very similar to those of the community sample (Table 6). Generally, they had positive attitudes toward donation, but some of them thought that tissue donation caused spreading of illnesses, and perceived it as risky. Also, health professionals were not assured that all people should contribute in tissue donation.

Regarding organ donation, health professionals again followed the pattern of the community sample, expressing very positive attitudes toward almost all items and showing the biggest concern about possible bodily mutilation that organ harvesting would entail (Table 7).

On the basis of these results, we constructed two separate leaflets. A leaflet for the community sample was designed to reassure people on issues and worries shown to be of most concern in the Study 1 and to correct any possible misbelieves, emphasizing the fact that anybody could need donated tissue or organs and that people should help each other. The message also contained information on the institutions where

Table 4. Test results showing community sample's knowledge about bone marrow donation before (n = 200) and after (n = 184) the presentation of tissue and organ donation promotional leaflet

	Knowledge test results						
	before leaflet presentation		after leaflet presentation				
Item	score (%)*	difference†	score (%)*	difference‡	Difference§	Chi-square	p
We can donate bone marrow only once in a lifetime.	41.9	-16.2	56.6	13.2	29.4	7.82	0.005
While giving bone marrow, person is under anesthesia.	71.7	43.4	72.0	44.0	0.6	0.00	0.961
Bone marrow donors can only be members of the family.	56.1	12.2	62.4	24.8	12.6	1.54	0.215
There is a list of bone marrow donors.	66.2	32.4	86.5	73.0	40.6	20.68	0.000
Person who has received bone marrow transplant can be cured from leukemia.	66.8	33.6	78.7	57.4	23.8	6.54	0.011
Medicine enables substitution of bone marrow with artificial materials.	73.7	47.4	75.6	51.2	3.8	0.17	0.684
Transplantation of bone marrow is done in Croatian hospitals, as well.	90.3	80.6	84.7	69.4	-11.2	2.73	0.099
The main function of bone marrow is generation of blood cells.	89.4	78.8	90.2	80.4	1.6	0.06	0.805
Possibility that a person, to whom you are not related, can receive your bone marrow is less than 1:50 000.	54.6	9.2	64.3	28.6	19.4	3.58	0.058
Bone marrow is donated to a certain person who needs transplantation.	88.4	76.8	87.8	75.6	-1.2	0.03	0.856
No. of correct answers (after correction for guessing, mean ± SD)	3.8 ± 3.1		4.2 ± 3.1		0.4	1.49‖	0.155

*Percentage of correct answers.
†% correct answers – % incorrect answers before leaflet presentation.
‡% correct answers – % incorrect answers after leaflet presentation.
§Difference between the results after and before leaflet presentation (difference‡ – difference†).
‖t-test for independent samples (t-value).

people could donate blood and bone marrow and information on how to become an organ donor.

The main purpose of the leaflet developed for health professionals was to encourage them to act and ask people for tissue and organ donation. The message emphasized the fact that health professionals had the main role in persuading people to donate tissue and organs, and stated clearly that every person had the right to donate his or her tissue or organs, that people should be informed about it and given the possibility to act upon it.

Study 2

After the respondents in the community sample were presented with the leaflet, they expressed more positive attitudes regarding tissue and organ donation (Tables 1 and 2). However, this increase in the total score was statistically significant only for the attitude scale towards organ donation ($t = 2.26$; $p = 0.025$), whereas no significant difference was found for attitude scale towards tissue donation.

On the knowledge tests, respondents showed a slight but not significant tendency toward knowledge improvement. Significant changes were noted in some of the items, but not in the total test scores (Tables 3-5).

The presentation of the leaflets produced no significant change in attitudes towards tissue and organ donation among health professionals. Although the total score on both scales was somewhat lower in the group not presented with the leaflet, this difference was not statistically significant (Tables 6 and 7).

Intentions of the community sample to donate blood, bone marrow, and organs as well as to receive transplants increased in all measures, except for the bone marrow donation, but the increase was not statistically significant (Table 8).

Health professionals' intentions to donate and ask about transplants showed the same increasing tendency (Table 9). Significant difference was found in tree measures of intention: more willingness to donate bone marrow ($t = 2.39$; $p = 0.021$), to donate their own organs ($t = 2.24$; $p = 0.027$), and to ask people about blood donation ($t = 2.10$; $p = 0.037$).

Discussion

Community Sample

The attitude of the community sample towards organ donation showed significant improvement after the presentation of leaflets. Most items on the attitude scale towards tissue donation also showed a positive tendency, but this change was not significant for the total score on the scale. After the presentation of leaflet, attitude items that were scored least positive at the first measurement improved the most. This effect was expected since one of our main intentions in developing the leaflet was to change attitudes that were least positive or even negative into more positive.

The Study 1 showed that community sample had poor knowledge about tissue and organ donation. After the presentation of leaflets, the percentage of correct answers increased. Almost two-thirds of the questions were answered correctly, although the increase in the overall score was not statistically significant. We noted a certain decrease in correct answers to several questions. These results, however, were not inconsistent with previous studies, where the effect of persuasive material was visible, but the total change was relatively small (25). It was found that a single exposure to persuasive messages (as was the case in our study) could sometimes induce both increase and decrease in knowledge because people often have a tendency toward over-generalization.

Many positive changes detected on the knowledge tests can be ascribed directly to the informational content of the leaflets. For example, better knowledge about preservation of blood supplies, im-

Table 5. Test results showing community sample's knowledge about organ donation before (n = 200) and after (n = 184) the presentation of tissue and organ donation promotional leaflet

	Knowledge test results						
	before leaflet presentation		after leaflet presentation				
Item	score (%)*	difference†	score (%)*	difference‡	Difference§	Chi-square	p
In Croatia, every mentally healthy person older than 18 can become a potential organ donor if he signs a confirmation with his MD.	95.5	91.0	98.9	97.8	6.8	3.98	0.046
When a person once gives a confirmation to donate it can not be withdrawn.	76.4	52.8	68.0	36.0	-16.8	3.19	0.074
Almost all western religions support organ donation.	49.0	-2.0	77.8	55.6	57.6	33.22	0.000
Before the procedure of taking organs begins, the doctor must check that the heart and lung activity of the donor has stopped.	14.5	-71.0	7.1	-85.8	-14.8	5.27	0.022
Procedure of posthumous organ donation is such that it often disables the possibility of open-casket funeral.	67.5	35.0	70.6	41.2	6.2	0.43	0.513
Family of the donor does not take charge for the expenses of transplantation, storage and transportation of donated organs.	95.5	91.0	93.4	86.8	-4.2	1.71	0.424
It is considered unethical to have the potential donor and the person who needs transplantation as patients of the same doctor.	36.4	-27.2	27.8	-44.4	-17.2	3.09	0.079
Persons older than 40 cannot be organ donors.	86.9	73.8	90.0	80.0	6.2	0.87	0.352
One of the positive aspects of posthumous organ donation is that it often covers the expenses of funeral.	71.4	42.8	56.7	13.4	-29.4	8.61	0.003
For some types of illness it is less expensive to do transplantation than to insure lasting care for the patient.	76.9	53.8	87.0	74.0	20.2	6.40	0.011
Demand for most organs is much higher than the available supplies.	98.5	97.0	98.9	97.8	0.8	0.13	0.722
Research in western countries show that the majority of population holds positive attitudes towards organ donation.	79.4	58.8	88.4	76.8	18.0	5.62	0.018
It is almost certain that, if a patient dies in hospital, his organs will be transplanted.	82.0	64.0	82.5	65.0	1.0	0.02	0.895
The current law in Croatia states that it is presumed that a person agrees with organ donation unless they state differently.	32.5	-35.0	37.4	-25.2	9.8	0.97	0.325
Procedure of posthumous organ donation doesn't, in general, prolong significantly the time period between death and funeral.	75.5	51.0	74.9	49.8	-1.2	0.02	0.886
Brain death is the state when the function of all parts of brain, including brain stem, stops irreversibly.	10.5	-79.0	6.2	-87.4	-8.4	2.17	0.141
The ideal organ donor is a young person who died of head injuries.	74.5	49.0	79.4	58.8	9.8	2.27	0.322
No. of correct answers (after correction for guessing, mean ± SD)	5.5 ± 3.3		5.3 ± 3.6		-0.2	-0.80‖	0.424

*Percentage of correct answers.
†% correct answers - % incorrect answers before leaflet presentation.
‡% correct answers - % incorrect answers after leaflet presentation.
§Difference between the results after and before leaflet presentation (difference‡ – difference†).
‖t-test for independent samples (t-value).

portance of donation, and possibility to donate more than once in a lifetime was expected, as these issues were explained in the leaflet. Respondents also learned from the leaflets that most people supported tissue and organ donation, as did most major religions. But there were some positive changes in knowledge that could not result from the leaflet, since they were not related to the facts in the leaflet, e.g., knowledge regarding blood groups. It is, therefore, highly probable that the leaflets motivated people to think and talk about tissue and organ donation, which resulted in better knowledge and understanding of the donation process. If that was the case, the leaflets succeeded in making people more aware of the tissue and organ donation and, besides informing, encouraged discussions, which is another important function of promotion material.

Several negative changes detected in the knowledge test could also be ascribed to the general effect of the leaflets. They were probably the result of both a single exposure to the promotion material and a common tendency to over-generalize. Because the information about donation given in the leaflet was positive, it is possible that people generally formed a very positive idea of the whole process. Therefore, erroneous statements that "the amount of blood in organism recovers during few hours after donation" or that "one of the positive aspects of posthumous organ donation is that it often covers the expenses of the funeral" (both incorrect) were probably influenced by this generally positive view. Probably a longer-term presentation of persuasive material could help avoid such negative changes and induce more significant positive changes.

Regarding the intentions of the community sample to donate and receive tissues and organs for transplantation, no significant improvement was found, although there was a general tendency toward more positive intentions.

Confirming the results of previous research (4,5,12), the intentions towards tissue and organ donation were favorable, indicating that people were rather willing to donate and receive transplants. In accordance with previous findings (13), our results showed that people were most willing to donate blood, then bone marrow and their own organs, and least willing to donate organs of a deceased relative. It is quite understandable for blood donation to be more

acceptable than bone marrow donation, because it is easier, less painful, and takes less time. On the other side, the reasons why people were less willing to donate organs than tissues could be their reluctance to contemplate their own deaths and fear of being declared dead before time (22). The least positive and probably the most sensitive issue was the intention to donate organs of a deceased relative. Since it is the donor's family that makes the final decision about posthumous organ donation, usually under very stressful circumstances (21), it is important that people have a clearly defined attitude toward this issue. The best way to accomplish this is to encourage family discussions about posthumous organ donation; it is the situation where the use of persuasive leaflets may be very helpful.

Regarding the intention to receive transplants, our results showed that people were willing to re-

Table 6. Health professionals' score on attitude scale towards tissue donation before (n = 108) and after (n = 50) the presentation of tissue and organ donation promotional leaflet

Item	Score (mean ± SD)* before leaflet presentation	Score (mean ± SD)* after leaflet presentation	t†	p
Tissue donation saves lives.	4.6 ± 0.7	4.3 ± 1.1	-2.07	0.040
Tissue donation is contrary to the laws of nature.‡	4.4 ± 1.0	4.0 ± 1.3	-2.27	0.025
Tissue donation helps build solidarity in society.	4.2 ± 0.9	3.4 ± 1.5	-4.13	0.000
Tissue donation can cause illnesses to spread.	3.2 ± 1.3	3.7 ± 1.2	2.40	0.018
Tissue donation is risky.	3.3 ± 1.3	3.7 ± 1.3	1.55	0.124
Tissue donation ruins the donor's health.	3.8 ± 1.1	3.9 ± 1.4	0.26	0.799
We have received our tissue from "someone" and therefore it is good to give it to someone in need.	4.0 ± 1.1	3.5 ± 1.4	-2.33	0.021
Tissue donation is an important civil duty of every citizen.	3.5 ± 1.2	3.3 ± 1.2	-0.93	0.352
Tissue donation is dangerous.	3.9 ± 1.1	3.7 ± 1.4	-0.74	0.462
We could also be in a need of tissue transplant - and someone will help.	4.2 ± 1.0	4.2 ± 1.0	-0.17	0.865
Tissue donation is immoral.	4.4 ± 1.1	4.3 ± 1.2	-0.47	0.636
Tissue donors should serve as examples to others.	4.1 ± 1.1	4.0 ± 1.1	-0.52	0.603
Every healthy person should be a tissue donor.	3.7 ± 1.1	3.5 ± 1.3	-1.03	0.302
There is no reason why I would give a part of me to a stranger.	4.0 ± 1.2	3.9 ± 1.3	-0.40	0.687
Total score§	54.4 ± 8.1	53.5 ± 12.1	-0.57	0.057

*Score was expressed as mean score on a scale from 1 (strongly disagree) to 5 (strongly agree).
†t-test for independent samples.
‡All "negative" items were inverted, so that higher value always shows more positive attitude.
§For every participant the total score was defined as a sum of scores on all items.

Table 7. Health professionals' score on attitude scale towards organ donation before (n = 108) and after (n = 50) the presentation of tissue and organ donation promotional leaflet

Item	Score (mean ± SD)* before leaflet presentation	Score (mean ± SD)* after leaflet presentation	t†	p
Donating organs to another person is human.	4.40.9	4.2 ± 1.3	-1.22	0.225
A dead person is ruined by organ transplantation.‡	4.0 ± 1.2	3.9 ± 1.1	-0.26	0.797
I don't think it is part of my religion to donate organs.	4.1 ± 1.3	4.1 ± 1.2	0.44	0.659
Organ donation saves lives.	4.6 ± 0.8	4.4 ± 1.1	-1.18	0.239
Organ donation insults human rights.	4.2 ± 1.2	4.2 ± 1.1	0.09	0.931
Organ donation improves life in the community.	3.8 ± 1.0	3.3 ± 1.2	-2.74	0.007
If we donate organs after our death we will prolong the life of another person.	4.3 ± 0.9	4.1 ± 1.3	-1.50	0.135
Organ donation disturbs the peace of a dead person.	4.2 ± 1.2	4.3 ± 1.1	0.35	0.728
It is not important for a person to be buried with all their organs.	3.3 ± 1.5	3.7 ± 1.4	1.64	0.103
The spirit of a dead person is not peaceful if their organs live in the body of another person.	4.2 ± 1.2	4.0 ± 1.2	-0.56	0.576
It is possible to cure some illnesses through organ donation.	4.0 ± 1.1	3.6 ± 1.5	-1.64	0.104
If we decide to donate organs it is like we are ready to die.	4.3 ± 1.1	4.1 ± 1.5	-1.07	0.285
A dead person doesn't need any organs.	3.4 ± 1.5	3.8 ± 1.5	1.37	0.174
Organ donation insults human dignity.	4.3 ± 1.0	4.1 ± 1.2	-1.10	0.272
Total score§	56.1 ± 9.6	55.5 ± 13.5	-0.33	0.743

*Score was expressed as mean score on a scale from 1 (strongly disagree) to 5 (strongly agree).
†t-test for independent samples.
‡All "negative" items were inverted, so that higher value always shows more positive attitude.
§For every participant the total score was defined as a sum of scores on all items.

Table 8. Intentions of community sample towards tissue and organ donation and towards receiving tissues and organs before (n = 200) and after (n = 184) the presentation of the tissue and organ donation promotional leaflet

Item	Score (mean ± SD)* before leaflet presentation	Score (mean ± SD)* after leaflet presentation	t†	p
Would you donate your blood to a stranger who needs it?	4.7 ± 0.6	4.7 ± 0.6	0.42	0.672
Would you donate your bone marrow to a stranger who needs it?	4.1 ± 1.0	3.9 ± 1.2	-1.36	0.174
Would you donate organs after your death to a person you do not know who needs it?	4.0 ± 1.1	4.2 ± 1.2	1.56	0.119
Would you donate the organs of your next-of-kin following their death to a stranger who needs it?	3.4 ± 1.2	3.5 ± 1.2	1.05	0.294
Would you receive a blood transfusion from a stranger if you needed it?	4.6 ± 0.7	4.7 ± 0.6	1.11	0.269
Would you receive a bone marrow transplant from a stranger if you needed it?	4.3 ± 1.0	4.5 ± 0.7	1.92	0.055
Would you receive an organ transplant from a dead person you do not know if you needed it?	4.3 ± 0.9	4.3 ± 0.8	0.17	0.862

*Score was expressed as mean score on a scale from 1 (strongly disagree) to 5 (strongly agree).
†t-test for independent samples.

Table 9. Intentions of health professionals towards tissue and organ donation and towards asking other people for donation before (n = 108) and after (n = 50) the presentation of tissue and organ donation promotional leaflet

Item	Score (mean ± SD)*			
	before leaflet presentation	after leaflet presentation	t†	p
Would you donate your blood to a stranger who needs it?	3.8 ± 0.9	4.1 ± 0.9	1.34	0.181
Would you donate your bone marrow to a stranger who needs it?	3.9 ± 0.9	4.2 ± 0.8	2.39	0.021
Would you donate organs after your death to a person you do not know who needs it?	4.4 ± 0.7	4.7 ± 0.6	2.24	0.027
Would you donate the organs of your next-of-kin following their death to a stranger who needs it?	4.6 ± 0.7	4.7 ± 0.6	0.77	0.442
If you were in position to ask a person to donate their blood, would you?	3.6 ± 1.1	4.0 ± 0.8	2.10	0.037
If you were in position to ask a person to donate their bone marrow, would you?	3.8 ± 1.2	4.2 ± 1.0	1.85	0.067
If you were in position to ask a person to donate organs of their deceased relative, would you?	3.4 ± 1.2	3.7 ± 1.0	1.15	0.252

*Score was expressed as mean score on a scale from 1 (strongly disagree) to 5 (strongly agree).
†t-test for independent samples.

ceive all kinds of transplants if needed. Very high values obtained on these measures indicate that people largely consider transplantation a regular way of healing and that they are not afraid of the transplantation process.

Health Professionals

Presentation of the leaflets produced a tendency to less positive rather than more positive attitude towards tissue and organ donation among health professionals, but this difference was not statistically significant.

The items that produced least positive scores in the first measurement showed the tendency of improvement on both scales, following the same pattern observed in the community sample. We also noted several significantly negative changes in attitudes towards same items. All items that produced less positive attitudes after the leaflet presentation referred to positive aspects of donation: "tissue donation saves lives; it helps build solidarity in society; and it improves life in the community". This decrease in positive attitudes might be due to the fact that these particular aspects were not explicitly stated in the leaflet designed for the health professionals. When designing the leaflets, we found it more important to emphasize the role of health professionals in persuading people to donate tissues and organs, and our results showed that their attitudes increased indeed in accordance with the messages presented. However, it was not our intention to induce a decrease in their previously positive attitudes towards donation. If this decrease was due to the fact that the messages referring to social solidarity and positive aspects of donation were left out, then the persuasive leaflets for health professionals should be modified.

However, the leaflets succeeded in producing more positive intentions in health professionals' sample: significant differences were found for the intentions to donate bone marrow and own organs, and to ask people to donate blood.

It is interesting that health professionals were generally more willing to donate their own organs and the organs of their deceased relative than to donate blood or bone marrow. This is probably because the health professionals have a different view of death compared with the community sample, take it as more final, and are less afraid that organs could be taken by mistake before time.

This difference between the community sample and health professionals implies that consistent exposure to information (such as that received through work in a hospital or medical training) increases the relative willingness to donate tissues and organs. Therefore, presenting people with more information about organ donation and emphasizing the fact that this is a normal and acceptable thing to do, would presumably raise more discussions about organ donation, lessen discomfort of thinking about death, and consequently shape peoples' feelings regarding posthumous organ donation.

Regarding the health professionals' intentions to ask about donation, results showed that their intentions, although present, were not as strong as they should have been. Health professionals should have a clearly defined position with regard to asking about donation, because they have to react promptly when the situation arises. This finding is consistent with other studies indicating that health professionals still hold doubts about asking for donations and are least ready to ask about donation of organs of deceased relatives (18,26). Health professionals showed discomfort about declaring brain death (22), and many held views counter to medical or legal standards (23). This may be the reason for reluctance to ask for organ donation. Further research should clarify the origins of health professionals' dilemma, thus facilitating a systematic approach to doctors and nurses to help them overcome these barriers.

As far as limitations of our study are concerned, the method we used – drawing independent samples in two points of time – is far from perfect for testing the effect of persuasive material. Since we decided to take the participants of the first study as a control group in the second study, we only could presume that the attitudes, knowledge, and intentions of the participants in our second study were, prior to the presentation of leaflets, similar to those of the participants in our first study.

Second, previous donor experience was not controlled for due to the rather small number of participants. This could have been an important element that might have influenced both the attitudes and the future decision to donate and should therefore be included in the further research.

Furthermore, this research concludes with measures of intention but without evidence of actual behavior. The reason was that we tried to assure the anonymity of the participants in our research and there-

fore were not able to associate individual results with actual data on donations. We can only assume, on the basis of previous research (26), that the improvement in intention would have led to more common behavior. Further research in this area should try to avoid this limitation and explore not only the changes in attitudes and intentions, but also the effect of leaflets on actual behavior.

In conclusion, analysis of attitudes and intentions towards tissue and organ donation confirmed that people held positive thoughts about tissue and organ donation, but knowledge tests analysis showed that they, in general, had very poor knowledge about donation. The presentation of persuasive leaflets could be successful in improving the attitudes towards tissue and organ donation and increasing the willingness to donate. This improvement was not statistically significant for all measures used, but a clear general tendency toward more positive attitudes and intentions towards tissue and organ donation was noted, as well as improvement of knowledge after the presentation of leaflet. Obviously, a single presentation of the persuasive material was not enough to make significant improvement in attitudes or intention to donate. Longer-term promotional interventions should be investigated as a potentially efficient method for increasing donor behavior.

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Correspondence to:
Tihana Brkljačić
Ivo Pilar Institute of Social Sciences
Marulićev trg 19/I
10000 Zagreb, Croatia
tihana@pilar.hr