

BMJ Open Individual readiness for transplantation medicine of laypersons and the number of deceased organ donors: a cross-sectional online survey in Japan, South Korea and Taiwan

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ABSTRACT

Objectives The gap between the numbers of organ donors and recipients is a common problem worldwide. This study was designed to investigate the importance of ‘individual readiness’, a here introduced novel concept in transplantation medicine and a measure of positive attitudes towards organ donation and transplantation.

Design A cross-sectional online survey was used to collect the research data.

Participants The participants were recruited by a Japanese research company and affiliates in South Korea and Taiwan and fulfilled the following criteria: (1) laypersons aged 18–75 years, (2) residents of the countries and (3) understood the questions in their native languages.

Primary outcome measures The survey investigated the interest and attitude of individuals regarding transplantation medicine by asking multiple choice questions. Based on answers concerning attitude, a positive group was identified as willing to be organ donors and recipients, and a non-positive group was identified as unwilling to be donors and recipients. The ratio between the positive and non-positive group, the P/N ratio, was introduced as an index of individual readiness.

Results 1500 samples were included in this analysis. Individuals with interest agreed more with statements on organ donation than those without interest, and the P/N ratio per country was compatible with the actual deceased organ donors rate per million population (ADODR).

Conclusions Interest in transplantation medicine was associated with positive attitudes, and positive attitudes were associated with a higher ADODR. These results support that individual readiness is an important determinant for the number of donors. The P/N ratio can be used as an index to assess individual readiness in organ transplantation, at least in countries with minor to moderate popularisation. Further studies of individual readiness using the P/N ratio should be undertaken to develop policies and initiatives for increasing organ donations.

INTRODUCTION

The gap between the number of organ donors and recipients is a common problem globally. This study was designed to reveal the importance of ‘individual readiness’ to fill this gap.

Strengths and limitations of this study

- The main strength of this study is that it compares the interests and attitudes of laypersons towards transplantation medicine in a simple, objective manner.
- The here introduced concept of ‘individual readiness’ in transplantation medicine provides a powerful tool for improving the analysis of actual deceased organ donors rate per million population.
- This study was performed in three neighbouring countries in East Asia which, presumably, limited the number of confounding factors.
- The main limitation of the study is the possibility of survey selection bias and, therefore, generalisability issues.
- Limitations of this study include the reliance on self-reported data.

‘Readiness’ is a state of being prepared for something.¹ For example, to develop a new hospital division, the fundamental elements of medicine readiness include administration and coordination; healthcare providers; quality improvement; patient safety; policies, procedures and protocols; support services; and equipment, supplies and medications.^{2,3}

This definition appropriately includes materials and services but does not mention the intention of professionals and people’s interests and understanding of that community, which are related to the individual readiness examined in this study. Therefore, we divided and defined readiness into two concepts: social readiness and individual readiness.

Social readiness is a state of being prepared for implementing a policy in society. The fundamental elements to develop a new division in a hospital mentioned previously are included in social readiness. In transplantation medicine, social readiness includes organ

transplant acts, a national organ allocation system, brain death declaration for organ donors, transplant centres, skillful transplant professionals, healthcare insurance systems and other infrastructure. These are all required to perform transplantation medicine adequately and are mainly issues of social authorities, such as governments.

However, individual readiness is an individual state of being prepared for something; in other words, willingness. In medicine, readiness is usually introduced for the cessation of harmful health behaviours, such as smoking and drug abuse.⁴⁵ However, in the present study, we introduce the concept of individual readiness in transplantation medicine as having a positive attitude towards organ donation and transplantation. Adequate individual readiness by the majority of individuals would provide public support for transplantation medicine.

In this study, we conducted an online survey to determine the individual readiness in the three neighbouring countries: Japan, South Korea and Taiwan. These three selected countries have a similar social readiness, such as organ transplant acts, transplant centres and performance of organ transplant as ordinary medical care^{6–8} but exhibit large differences in the numbers of donated organs from the deceased (actual deceased organ donors rate per million population (ADODR); the worldwide index to compare the development of organ donation) (for details see the Methods section). Our working hypothesis was that differences in individual readiness may, at least partially, explain the difference in ADODR among these three countries with similar social readiness.

Many surveys have been conducted in different countries to understand public attitudes towards organ donation and transplantation.^{9–11} However, most surveys were conducted in only a single country without allowing between-country comparisons. In the present study, we surveyed whether people were interested in—and how their attitudes were towards—transplantation medicine, as these are thought to be an expression mode of individual readiness. We also introduced the ratio of positives and non-positives (P/N ratio) as a quantitative index of individual readiness. We compared these results with the ADODR to reveal the potential effects of individual readiness on transplantation medicine. Our survey results suggest that the differences in ADODR between the countries Japan, South Korea and Taiwan can be largely explained by differences in individual readiness, which in turn appear to correlate with whether individuals are interested in transplantation medicine.

METHODS

The cross-sectional web-based survey investigated the participants' interest in organ transplantation and their attitudes towards organ donation and transplantation to assess individual readiness.

We selected three countries for this study—Japan, South Korea and Taiwan—because of the similarity in social readiness, such as organ transplant acts, transplant

centres and performance of organ transplant as ordinary medical care and additional reasons:

1. They are all in East Asia and geographically close.
2. The 2015 Health Care Access and Quality Indices for the countries are similar (Japan: 89, South Korea: 86 and Taiwan: 78), indicating their medical care systems are similarly good.¹²
3. There are no great differences in the per capita incomes. The 2019 nominal Gross Domestic Product (GDP) per capita places Japan at US\$40 246, South Korea at US\$31 762¹³ and Taiwan at US\$25 941.¹⁴
4. The internet user penetration percentage is similar (Japan: 94%, South Korea: 96% and Taiwan: 93%).¹⁵
5. The ADODR differs in these countries: Japan: 0.8, South Korea: 8.7 in 2019¹⁶ and Taiwan: 12.3 in 2016.⁸

The questionnaire was administered online in March 2019 to 1500 participants, 500 in each country, comprising equal numbers of men and women, with age segregation. Because the target populations were very large (millions of inhabitants in the right age category per country), according to Cochran's Formula calculation¹⁷ for achieving a confidence level of 95%, with a margin of error of 5%, a total of 385 respondents was required. Therefore, we considered our panels of 500 respondents per country as more than large enough. The participants were collected by a Japanese research company and its affiliates in South Korea and Taiwan and fulfilled the following criteria: (1) laypersons aged 18–75 years, (2) residents in the countries and (3) understood the questions in their native languages.

The questionnaire was sent by an online research company (Cross Marketing Inc, Tokyo, Japan) to panel members recruited from the public who are registered with the company. To start, the participants were asked to read an explanatory text on the screen and provide their consent before answering the questionnaire by pushing 'submit'. Only completed questionnaires could be submitted, and all responses were anonymised. The participants were not given monetary compensation for taking part in the study.

We investigated their interest in transplantation medicine because interest could be a basic component of positive attitudes towards organ donation and transplantation.¹⁸ To assess their interest in transplantation medicine, the participants were asked: 'Are you interested in organ transplantation?'. The answers were yes or no. In this context, 'interest' was used as a general meaning among laypersons, as 'a feeling that causes special attention'. To assess the attitudes towards organ donation, the participants were asked: 'Are you willing to donate your organs after death (brain death/cardiac arrest)?'. The answers were scored on a 5-point Likert scale: 1=yes, 2=probablyyes, 3=unsure, 4=probablyno and 5=no. To assess the attitudes towards receiving donor organs, the participants were asked: 'Are you willing to receive organs from the deceased if necessary?'. The answers were scored on a 3-point Likert scale: 1=yes, 2=unsure and 3=no.

The respondents who answered yes or probably yes to both questions were categorised as having a positive attitude towards organ donation and transplantation (positive group), while respondents who answered no or probably no or unsure to both questions were categorised as having non-positive attitudes towards organ donation and transplantation (non-positive group). The positive/non-positive group ratio, the P/N ratio, was used as an index of individual readiness. The respondents with combinations of answers that fitted in neither category were not included in the calculation of the P/N ratio (and not considered for the estimation of individual readiness), but summaries of their responses can be found in online supplemental tables 1 and 2.

Additionally, we asked the participants if they agreed or disagreed with five positive statements regarding organ donation, such as 'organ donation contributes to society'. The answers were scored on a 5-point Likert scale: 1=strongly agree, 2=agree, 3=unsure, 4=disagree and 5=strongly disagree.

The questionnaire also included items to elicit demographic information on age, gender, residence, educational background, occupation, marital status, children and household income. The questionnaires were presented in the participants' native language. They were originally developed in Japanese, then translated into Korean and Taiwanese by experienced translators, and reverse translated into Japanese to verify them for correctness. For the English translation of the questionnaire, see online supplemental file 2A. For the Japanese, Korean and Taiwanese texts of the questions as used in the survey, see online supplemental file 2B.

The responses and the ADODR in the three countries were analysed using descriptive statistics, and the categorical data were analysed using a χ^2 test. The median ages were compared using a Kruskal-Wallis test. The p values <0.05 were considered statistically significant. All analyses were performed using IBM SPSS V.26.

Patient and public involvement

The participants were not involved in the development of the research question, outcome measures, design, recruitment and conduct of this study.

RESULTS

Characteristics of the respondents

The respondents' median age was 40 years overall; 46 years in Japan, 41 years in South Korea and 37 years in Taiwan ($p < 0.001$). Although the median age differed between the countries, it aligned with the official reported median age of each country's population from the WHO population data by country.¹⁹

Of the respondents, 67% had tertiary education, 59% were employed, 48% were married, 48% had a child/children and 89% had an annual household income of JPY 2 million (US\$19 000) or more. These data are illustrated in table 1 and online supplemental table 3.

Interest in organ transplantation and attitudes towards organ donation and transplantation

As illustrated in table 2, 732 (49%) respondents out of 1500 were interested in organ transplantation, with the Japanese having the least interest (39%) and the highest number of those without interest (61%). Taiwan had the largest number of respondents interested in organ transplantation (57%). The Japanese also had the lowest number of positive responses (including yes and probably yes) to the questions about donating and accepting transplants, and the Taiwanese had the highest. Additionally, the Japanese had the largest number of negative responses (including no and probably no) and unsure responses to the two questions. For a more exhaustive summary of the survey responses, see online supplemental table 4: tables 2 and 3.

Table 3 shows that respondents with an interest in organ transplantation tended to have positive attitudes. Of the 497 respondents with an interest in organ transplantation, 426 (86%) had positive attitudes. Of the 562 respondents without an interest in organ transplantation, 424 (75%) had non-positive attitudes. Differences in P/N ratios between the countries were compatible with their differences in ADODR.

Agreement with statements on organ donation

As illustrated in table 4, respondents with an interest were more likely to agree with each statement on organ donation than respondents without an interest. Of the

Table 1 Characteristics of the respondents

	Total	Japan	South Korea	Taiwan
Median age (SD)	40 (16.8)	46 (18.4)	41 (16.2)	37 (14.8)
18–39 years	724 (48)	214 (43)	240 (48)	270 (54)
40–59 years	497 (33)	144 (29)	168 (34)	185 (37)
60–75 years	279 (19)	142 (28)	92 (18)	45 (9)
Tertiary education	1003 (67)	284 (57)	330 (66)	389 (78)
Full time/part time/self-employed	880 (59)	252 (50)	278 (56)	350 (70)
Married	718 (48)	236 (47)	262 (52)	220 (44)
Have a child/children	714 (48)	234 (47)	259 (52)	221 (44)

Notes: n (%).

Table 2 Interest in organ transplantation and attitudes towards organ donation and transplantation

	Total	Japan	South Korea	Taiwan	P value
Are you interested in organ transplantation?					
Yes	732 (49)	196 (39)	249 (50)	287 (57)	<0.001
No	768 (52)	304 (61)	251 (50)	213 (43)	
Are you willing to donate your organs after death (brain death or cardiac arrest)?					
Yes/probably yes	849 (57)	208 (42)	292 (58)	349 (70)	<0.001
Unsure	381 (25)	180 (36)	118 (24)	83 (17)	
No/probably no	270 (18)	112 (22)	90 (18)	68 (14)	
Are you willing to accept transplanted organs from the deceased if necessary?					
Yes	720 (48)	129 (26)	250 (50)	341 (68)	<0.001
Unsure	494 (33)	247 (49)	147 (29)	100 (20)	
No	286 (19)	124 (25)	103 (21)	59 (12)	

Notes: n (%).

respondents with an interest in all three countries, more than 89% agreed with the following statements: ‘Organ donation is to save others in need’ and ‘Organ donation contributes to society’. Taiwanese respondents that were interested in organ transplantation indicated stronger agreement with all five statements than those in other countries. For a more exhaustive summary of the survey responses, see online supplemental table 5 and table 4.

DISCUSSION

This study’s findings were that: (1) individuals interested in transplantation medicine tended to have positive attitudes towards organ donation and transplantation and agreed with positive statements on organ donation; and (2) ADODR was compatible with the P/N ratio.

As we described in the Methods section, Japan, South Korea and Taiwan have similar social readiness levels for transplantation medicine. We introduced the P/N ratio as an index of individual readiness, and the differences in the P/N ratio found in our study indicate that individual readiness was different among the three countries. This was compatible with the ADODR differences among the countries.

In her speech to the EU Parliament in 2008, Siiri Oviir, a member of the EU Parliament, emphasised the importance of individual readiness (she used the term ‘public readiness’) in transplantation medicine. She also mentioned that the most effective way to increase individual readiness would be by improving the knowledge of transplant issues among the public and the media.²⁰ As the media greatly influences the public, emotional news on organ transplantation may attract people’s interest. Even in Japan, a low ADODR country, the number of donor registrations in the bone marrow bank increased greatly following a news release on a famous swimming athlete’s leukaemia diagnosis.²¹ When people watch the news, their interests increase, and attitudes, such as willingness to be a bone marrow donor, are activated.

Rummel argued that the strength of a person’s attitude is based on their interest, and attitudes are activated by interests.¹⁸ In a book of *The Theory of Moral Sentiments*, Adam Smith remarks that ‘there are evidently some principles in his nature that interest him in the fortune of others and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it’.²² If so, interest in organ transplantation should lead to positive attitudes towards organ donation for patients in need due to human moral sentiment. This was the case in the news story example previously, where interest in bone marrow transplantation increased donor registration.

This idea is also evident in the field of resuscitation. Hallstrom reported that training volunteers in cardiopulmonary resuscitation (CPR) using an automated external defibrillator (AED) and equipping AED increased survival rates in the selected city.²³ AED equipment in shopping malls can be considered as an amelioration of social readiness. Training volunteers, which is familiarising the use of AED application, would ameliorate individual readiness for out-of-hospital CPR. Thus, CPR is another example that both social and individual readiness are needed for optimal participation and survival rates.

In countries with high ADODR, various social policies are available, such as incentives, first-person authorisation and/or presumed consent to fill the gap between donors and recipients. Whatever policy is used for organ donation and transplantation, individual readiness needs to be included.

Interest in organ transplantation tended to result in positive attitudes, and positive attitudes were positively associated with ADODR. By dividing readiness into two elements, social and individual readiness, this study revealed that individual readiness uniquely affects the number of donors. The P/N ratio is a useful index for assessing individual readiness in organ transplantation, at least in countries with minor to moderate popularisation. It is important to continue investigating individual

Table 3 Respondents with/without interest and positive/non-positive attitude

Respondents	With interest				Without interest			
	Three countries	Japan	South Korea	Taiwan	Three countries	Japan	South Korea	Taiwan
Attitudes towards organ donation and transplantation	426 (86)	62 (67)	146 (86)	218 (92)	138 (25)	21 (9)	48 (27)	69 (47)
Positive group*	71 (14)	30 (33)	23 (14)	18 (8)	424 (75)	216 (91)	129 (73)	79 (53)
Non-positive group†	497 (100)	92 (100)	169 (100)	236 (100)	562 (100)	237 (100)	177 (100)	148 (100)
Sum of above two	6.0	2.1	6.3	12.1	0.3	0.1	0.4	0.9
P/N ratio	–	0.8	8.7	12.3				
ADODR								

Notes: n (%).

*Positive group: respondents answering yes or probably yes to both questions on organ donation and transplantation.

†Non-positive group: respondents answering no or probably no or unsure to both questions on organ donation and transplantation.

ADODR, actual deceased organ donors rate (ppm); P/N, positive and non-positive group.

Table 4 Agreement with statements on organ donation, by interest and country

Respondents	All respondents				Without interest			
	Three countries	Japan	South Korea	Taiwan	Three countries	Japan	South Korea	Taiwan
Statement on organ donation	(n=1500)	(n=732)	(n=196)	(n=249)	(n=287)	(n=304)	(n=251)	(n=213)
Organ donation saves others in need	1261 (84)	702 (96)	188 (96)	239 (96)	275 (96)	208 (68)	195 (78)	156 (73)
Organ donation contributes to society	1142 (76)	672 (92)	174 (89)	230 (92)	268 (93)	163 (54)	162 (65)	145 (61)
Donated organs continue to live	958 (64)	568 (78)	126 (64)	186 (75)	256 (89)	118 (39)	133 (53)	139 (65)
Organ donation helps families cope with their grief	844 (56)	516 (71)	109 (56)	175 (70)	232 (81)	84 (28)	116 (46)	128 (60)
Organ donation is altruistic	830 (55)	497 (68)	108 (55)	140 (56)	249 (87)	97 (32)	106 (42)	130 (61)

Notes: n (%).

readiness using the P/N ratio to evaluate policies and initiatives for increasing organ donations.

Limitations of our study include: (1) Respondents to the online survey were limited to people with online access and a willingness to respond, which may limit the generalisability of the study results for the entire population. (2) The cross-sectional design did not allow us to assess causality. (3) It is unclear whether the positive association of P/N ratio with ADODR will also be found in countries with a much higher ADODR than in the three countries that we investigated. (4) Our study relied on self-reported data. (5) Our study relied on the trustworthiness of a single survey company.

CONCLUSION

This study concludes that interest in transplantation medicine tends to result in positive attitudes that are correlated with—and presumably lead to—a higher ADODR. We introduced the P/N ratio as a simple and meaningful index for assessing individual readiness in organ transplantation. It is important to continue to evaluate individual readiness with the P/N ratio to evaluate policies and initiatives for increasing organ donations.

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Contributors TA designed the study. All authors discussed the preparation of the questionnaire. TA mainly analysed all the data, and YTs and YTs provided advice for the analysis. TA prepared the draft of the manuscript, and all authors contributed to the further edits. All authors read and approved the final manuscript. TA is the guarantor.

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Data availability statement No data are available. When this study was approved by the ethics committee of Gifu University, due to the sensitivity issues, the collected raw data should not be distributed or used outside of our laboratory.

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Supplementary Table 1. Interest in organ transplantation among respondents, by attitudes toward organ donation and transplantation

		Respondents							
		with interest				without interest			
		Three countries	Japan	South Korea	Taiwan	Three countries	Japan	South Korea	Taiwan
Attitudes toward organ donation and transplantation	Positive group*	426(58)	62(32)	146(59)	218(76)	138(18)	21(7)	48(19)	69(32)
	Non-positive group**	71(10)	30(15)	23(9)	18(6)	424(55)	216(71)	129(51)	79(37)
	DY/TN group***	176(24)	86(44)	58(23)	32(11)	109(14)	39(13)	40(16)	30(14)
	DN/TY group****	59(8)	18(9)	22(9)	19(7)	97(13)	28(9)	34(14)	35(16)
	Total	732(100)	196(100)	249(100)	287(100)	768(100)	304(100)	251(100)	213(100)

Notes: n (%) Because of rounding, not all percentages total 100.

* Positive group: Respondents answering yes or probably yes to both questions on organ donation and transplantation.

** Non-positive group: Respondents answering no or probably no to both questions on organ donation and transplantation.

*** DY/TN group: Respondents answering yes or probably yes to donate organs after death and no or unsure to accept transplanted organs from the deceased.

**** DN/TY group: Respondents answering no or probably no or unsure to donate organs after death and yes to accept transplanted organs from the deceased.

Supplementary Table 2. Agreement with statements on organ donation, by country and attitude toward organ donation and transplantation

Statement on organ donation	Japan					South Korea					Taiwan				
	Total (n=500)	Positive group* (n=83)	Non-positive group** (n=246)	DY/TN group*** (n=125)	DN/TY group**** (n=46)	Total (n=500)	Positive group* (n=194)	Non-positive group** (n=152)	DY/TN group*** (n=98)	DN/TY group**** (n=56)	Total (n=500)	Positive group* (n=287)	Non-positive group** (n=97)	DY/TN group*** (n=62)	DN/TY group**** (n=54)
Organ donation saves others in need	396(79)	81(98)	157(64)	117(94)	41(89)	434(87)	189(97)	104(68)	92(94)	49(88)	431(86)	277(97)	51(53)	58(94)	45(83)
Organ donation contributes to society	337(67)	77(93)	122(50)	101(81)	37(80)	392(78)	187(96)	75(49)	87(89)	43(77)	413(83)	271(94)	45(46)	52(84)	45(83)
Donated organs continue to live	244(49)	63(76)	85(35)	67(54)	29(63)	319(64)	157(81)	70(46)	58(59)	34(61)	395(79)	259(90)	45(46)	47(76)	44(82)
Organ donation helps families cope with their	193(39)	56(68)	56(23)	57(46)	24(52)	291(58)	149(77)	55(36)	62(63)	25(45)	360(72)	238(83)	42(43)	43(69)	37(69)
Organ donation is altruistic	205(41)	57(69)	74(30)	48(38)	26(57)	246(49)	118(61)	50(33)	45(46)	33(59)	379(76)	254(89)	39(40)	43(69)	43(80)

Notes: n (%)

* Positive group: Respondents answering yes or probably yes to both questions on organ donation and transplantation.

** Non-positive group: Respondents answering no or probably no to both questions on organ donation and transplantation.

*** DY/TN group: Respondents answering yes or probably yes to donate organs after death and no or unsure to accept transplanted organs from the deceased.

**** DN/TY group: Respondents answering no or probably no or unsure to donate organs after death and yes to accept transplanted organs from the deceased.

Supplementary Table 3. The demographic data of each country respondents (N=1,500).

	Total (n=1,500)		Japanese (n=500)		South Korean (n=500)		Taiwanese (n=500)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Male	750	50%	250	50%	250	50%	250	50%
Age								
18-39 years	724	48%	214	43%	240	48%	270	54%
40-59 years	497	33%	144	29%	168	34%	185	37%
60-75 years	279	19%	142	28%	92	18%	45	9%
Employment								
employed full-time	675	45%	175	35%	200	40%	300	60%
employed part-time	121	8%	54	11%	38	8%	29	6%
self-employed	84	6%	23	5%	40	8%	21	4%
taking care of home or family but not working for pay	187	12%	50	10%	44	9%	93	19%
student	210	14%	97	19%	84	17%	29	6%
others	223	15%	101	20%	94	19%	28	6%
Marital status								
married	718	48%	236	47%	262	52%	220	44%
separated, divorced, widowed	111	7%	57	11%	33	7%	21	4%
single/never been married	671	45%	207	41%	205	41%	259	52%
Have a child/children	714	48%	234	47%	259	52%	221	44%
Education								
less than high school graduate	50	3%	16	3%	15	3%	19	4%
high school graduate	409	27%	185	37%	141	28%	83	17%
Technical/Vocational training	73	5%	41	8%	2	0%	30	6%
technical/vocational training graduate	127	8%	51	10%	34	7%	42	8%
university/college graduate	695	46%	174	35%	264	53%	257	51%
Post-graduate	108	7%	18	4%	30	6%	60	12%
Others	10	1%	5	1%	5	1%	0	0%
(refused)	28	2%	10	2%	9	2%	9	2%
Income								
less than JPY2,000,000	148	10%	48	10%	48	10%	52	10%
JPY2,000,000 or more, but less than JPY4,000,000	196	13%	106	21%	26	5%	64	13%
JPY4,000,000 or more, but less than JPY6,000,000	224	15%	81	16%	57	11%	86	17%
JPY6,000,000 or more, but less than JPY8,000,000	233	16%	57	11%	76	15%	100	20%
JPY8,000,000 or more, but less than JPY10,000,000	181	12%	49	10%	69	14%	63	13%
JPY10,000,000 or more, but less than JPY12,000,000	114	8%	17	3%	61	12%	36	7%
JPY12,000,000 or more, but less than JPY15,000,000	94	6%	7	1%	56	11%	31	6%
JPY15,000,000 or more, but less than JPY20,000,000	73	5%	3	1%	47	9%	23	5%
JPY20,000,000 or more	31	2%	2	0%	19	4%	10	2%
(refused)	206	14%	130	26%	41	8%	35	7%

Supplementary Table 4. Interest in -attitudes toward- ransplant medicine

	Total (n=1,500)		Japanese (n=500)		South Korean (n=500)		Taiwanese (n=500)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Are you interested in organ transplantation?								
yes	732	49%	196	39%	249	50%	287	57%
no	768	51%	304	61%	251	50%	213	43%
Are you willing to donate your organs after death(brain death or cardiac arrest)?								
yes	451	30%	97	19%	132	26%	222	44%
probably yes	398	27%	111	22%	160	32%	127	25%
unsure	381	25%	180	36%	118	24%	83	17%
probably no	136	9%	57	11%	39	8%	40	8%
no	134	9%	55	11%	51	10%	28	6%
Are you willing to accept transplanted organs from the deceased if necessary?								
yes	720	48%	129	26%	250	50%	341	68%
unsure	286	19%	124	25%	103	21%	59	12%
no	494	33%	247	49%	147	29%	100	20%

Supplementary Table 5. Agreement with statements on organ donation

	Total (n=1,500)		Japanese (n=500)		South Korean (n=500)		Taiwanese (n=500)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
	Organ donation saves others in need							
strongly agree	633	42%	159	32%	206	41%	268	54%
agree	628	42%	237	47%	228	46%	163	33%
unsure	186	12%	76	15%	51	10%	59	12%
disagree	21	1%	13	3%	6	1%	2	0%
strongly disagree	32	2%	15	3%	9	2%	8	2%
Organ donation contributes to society								
strongly agree	495	33%	105	21%	153	31%	237	47%
agree	647	43%	232	46%	239	48%	176	35%
unsure	275	18%	125	25%	78	16%	72	14%
disagree	45	3%	17	3%	20	4%	8	2%
strongly disagree	38	3%	21	4%	10	2%	7	1%
Donated organs continue to live								
strongly agree	395	26%	78	16%	105	21%	212	42%
agree	563	38%	166	33%	214	43%	183	37%
unsure	341	23%	141	28%	114	23%	86	17%
disagree	121	8%	64	13%	47	9%	10	2%
strongly disagree	80	5%	51	10%	20	4%	9	2%
Organ donation helps families cope with their grief								
strongly agree	324	22%	48	10%	89	18%	187	37%
agree	520	35%	145	29%	202	40%	173	35%
unsure	465	31%	219	44%	142	28%	104	21%
disagree	114	8%	42	8%	48	10%	24	5%
strongly disagree	77	5%	46	9%	19	4%	12	2%
Organ donation is altruistic								
strongly agree	362	24%	48	10%	103	21%	208	42%
agree	468	31%	145	29%	143	29%	171	34%
unsure	472	31%	219	44%	138	28%	99	20%
disagree	122	8%	42	8%	81	16%	11	2%
strongly disagree	76	5%	46	9%	35	7%	11	2%

Supplementary File 2A

Questionnaire (English translation)

This is an important study of people's opinions about organ donation. Your assistance in this study is voluntary, but your opinions are needed to provide an accurate understanding of the public's views. Your answers are confidential and will be combined with those of others. You, as an individual, will never be identified. The questions will require about 15 minutes of your time. Please provide your consent before answering the questionnaire, pushing "submit".

Transplantation medicine is the only fundamental treatment for patients with end-stage diseases of solid organs, which cannot be replaced by any other therapeutic modalities. Organ transplantation need organs donated from the deceased donor or living donor.

Q1) What is your sex?

1. male
2. female

Q2) What is your age? (record numeric)

Q3) Where is your prefecture(city)? (select one from options)

Q4) What best describes your current employment status? (single answer)

1. employed full-time
2. employed part-time
3. self-employed
4. taking care of home or family but not working for pay
5. student
6. others

Q5) What is your current marital status? (single answer)

1. married
2. separated, divorced, widowed
3. single/never been married

Q6) Do you have a child or children? (single answer)

1. yes
2. no

Q7) What is the highest level of education you have completed? (single answer)

1. less than high school graduate
2. high school graduate
3. technical/vocational training graduate
4. university/college graduate
5. post-graduate
6. others
7. (refused)

Q8) What is your total ANNUAL household income, before taxes? (single answer)

1. less than JP¥2,000,000
2. JP¥2,000,000 or more, but less than JP¥4,000,000
3. JP¥4,000,000 or more, but less than JP¥6,000,000
4. JP¥6,000,000 or more, but less than JP¥8,000,000
5. JP¥8,000,000 or more, but less than JP¥10,000,000
6. JP¥10,000,000 or more, but less than JP¥12,000,000
7. JP¥12,000,000 or more, but less than JP¥15,000,000
8. JP¥15,000,000 or more, but less than JP¥20,000,000
9. JP¥20,000,000 or more
10. (refused)

Q9) Are you interested in organ transplantation? (single answer)

1. yes
2. no

Q10) Are you willing to donate your organs after death (brain death/cardiac arrest)? (single answer)

1. yes
2. probably yes
3. unsure
4. probably no
5. no

Q11) Are you willing to accept transplanted organs from the deceased if necessary? (single answer)

1. yes
2. unsure
3. no

Q12) Do you agree these statements on organ donation? For each one, please choose 1. strongly agree, 2. agree, 3. unsure, 4. disagree, or 5. strongly disagree.

- Organ donation saves others in need
- Organ donation contributes to society
- Donated organs continue to live
- Organ donation helps families cope with their grief
- Organ donation is altruistic

Supplementary File 2B

質問文	No	日本語	韓国語	中国語
設問文1		あなたの性別をお知らせください。	귀하의 성별을 알려 주십시오.	請選擇您的性別。
回答	1	男性	남성	男性
回答	2	女性	여성	女性
設問文2		あなたの年齢をお知らせください。	귀하의 만 연령을 알려 주십시오.	請填寫您的年齡。
回答	1	__歳	__세	__歲
設問文3		あなたのお住まいの地域をお知らせください。	귀하가 거주하고 계신 지역을 알려 주십시오.	請選擇您居住的地區。
回答	1	北海道	서울특별시	台北市
回答	2	青森県	부산광역시	新北市
回答	3	岩手県	대구광역시	桃園市
回答	4	宮城県	인천광역시	台中市
回答	5	秋田県	광주광역시	台南市
回答	6	山形県	대전광역시	高雄市
回答	7	福島県	울산광역시	基隆市
回答	8	茨城県	경기도	新竹市
回答	9	栃木県	강원도	嘉義市
回答	10	群馬県	충청북도	其他
回答	11	埼玉県	충청남도	
回答	12	千葉県	전라북도	
回答	13	東京都	전라남도	
回答	14	神奈川県	경상북도	
回答	15	新潟県	경상남도	
回答	16	富山県	제주특별자치도	
回答	17	石川県	세종특별자치시	
回答	18	福井県	기타	
回答	19	山梨県		
回答	20	長野県		
回答	21	岐阜県		
回答	22	静岡県		
回答	23	愛知県		
回答	24	三重県		
回答	25	滋賀県		
回答	26	京都府		
回答	27	大阪府		
回答	28	兵庫県		
回答	29	奈良県		
回答	30	和歌山県		
回答	31	鳥取県		
回答	32	島根県		
回答	33	岡山県		
回答	34	広島県		
回答	35	山口県		
回答	36	徳島県		
回答	37	香川県		
回答	38	愛媛県		
回答	39	高知県		
回答	40	福岡県		
回答	41	佐賀県		
回答	42	長崎県		
回答	43	熊本県		
回答	44	大分県		
回答	45	宮崎県		
回答	46	鹿児島県		
回答	47	沖縄県		
設問文4		あなたの就業、就学状況についてお知らせください。	귀하의 취업, 취학 상황에 대해 알려 주십시오.	請選擇您的就業、就學狀況。
回答	1	就業(フルタイム雇用)	취업(상근 고용)	就業 (全職雇用)
回答	2	就業(パートタイム雇用)	취업(시간제 고용)	就業 (兼職雇用)
回答	3	就業(自営業主)	취업(자영업자)	就業 (自營業人士)
回答	4	就学	취학	就學
回答	5	家事従事者	전업주부	從事家事
回答	6	いずれにも該当せず	어느 쪽에도 해당하지 않는다	以上皆非
設問文5		あなたの婚姻状況をお知らせください。	귀하의 혼인 상황을 알려 주십시오.	請選擇您的婚姻狀況。
回答	1	既婚	기혼	已婚
回答	2	離婚・死別後	이혼·사별 후	離婚、喪偶後
回答	3	未婚	미혼	未婚
設問文6		あなたはお子様がいっぱやいますか。	귀하는 자녀분이 있으십니까?	請問您有孩子嗎?
回答	1	はい	네	有
回答	2	いいえ	아니요	沒有
設問文7		あなたの最終学歴をお知らせください。	귀하의 최종 학력을 알려 주십시오.	請選擇您的最高學歷。
回答	1	小中学校	초등학교	國小、國中
回答	2	高等学校	고등학교	高中
回答	3	専修学校・各種学校等	전수학교·각종 학교 등	專修學校、各種學校等
回答	4	高専・短期大学	고등전문학교·단기대학	高專、短期大學
回答	5	大学	대학교	大學
回答	6	大学院	대학원	研究所
回答	7	その他	기타	其他
回答	8	回答拒否	응답 거부	拒絕回答
設問文8		あなたのご家庭の世帯収入をお知らせください。	귀하의 세대 연수입을 알려 주십시오.	請選擇您的家庭年收入。
回答	1	200万円未満	1,000만 원 미만	不滿30萬元
回答	2	200~400万円未満	1,000~2,000만 원 미만	30~不滿60萬元
回答	3	400~600万円未満	2,000~3,000만 원 미만	60~不滿90萬元
回答	4	600~800万円未満	3,000~4,000만 원 미만	90~不滿120萬元
回答	5	800~1000万円未満	4,000~5,000만 원 미만	120~不滿150萬元
回答	6	1000~1200万円未満	5,000~6,000만 원 미만	150~不滿180萬元
回答	7	1200~1500万円未満	6,000~7,500만 원 미만	180~不滿225萬元
回答	8	1500~2000万円未満	7,500만~1억 원 미만	225~不滿300萬元
回答	9	2000万円以上	1억 원 이상	300萬元以上
回答	10	回答拒否	응답 거부	拒絕回答

	以下の質問についてあてはまるものをお選びください。 (それぞれひとつずつ)	아래의 질문에 대해 해당하는 것을 선택해 주십시오. (각각 하나씩)	請就以下問題，選擇符合的項目。 (每項各選一個答案)
設問文9	あなたは臓器移植に関心がありますか	귀하는 장기 이식에 관심이 있습니까?	請問您對器官移植是否有興趣？
回答	1 はい	네	是
回答	2 いいえ	아니요	否
設問文10	自分が脳死と判定された場合、または心臓が停止し死亡と判断された場合に、臓器提供をしたいと思いませんか。	본인이 뇌사 관정을 받은 경우 또는 심장 정지로 인해 사망했다고 판단을 받은 경우에 장기 제공을 하고 싶으십니까?	若您自己被判定腦死，或心跳停止判定死亡，請問您是否願意捐贈器官？
回答	1 提供したい	제공하고 싶다	願意提供
回答	2 どちらかといえば提供したい	굳이 따지자면 제공하고 싶다	算願意提供
回答	3 どちらともいえない	어느 쪽도 아니다	沒有意見
回答	4 どちらかといえば提供したくない	굳이 따지자면 제공하고 싶지 않다	不太願意提供
回答	5 提供したくない	제공하고 싶지 않다	不願意提供
設問文11	あなた自身、臓器移植が必要となった場合、亡くなった人から提供された臓器の移植を受けたいですか？	귀하 본인께서 장기 이식이 필요할 경우에 사망한 사람이 제공한 장기 이식을 받고 싶으십니까?	若您自己需要器官移植，請問您是否願意接受移植已往生者捐贈的器官？
回答	1 受けたい	받고 싶다	願意接受
回答	2 受けたくない	받고 싶지 않다	不願意接受
回答	3 わからない	모르겠다	不清楚
設問文12	死後の臓器提供について、どう思いますか？	사후의 장기 제공에 대해 어떻게 생각하십니까?	關於死後器官捐贈，請問您有什麼想法？
設問文	移植が必要な患者を救うことができる	이식이 필요한 환자를 살릴 수 있다	可以救助需要移植的病患
設問文	臓器だけでもどこかで生きることができる	이식만으로도 어딘가에서 살아갈 수 있다	器官本身也可以在他人的身體存活下來
設問文	社会貢献の1つの方法である	사회에 공헌하는 방법 중 하나이다	社會貢獻的方法之一
設問文	他愛的な行為である	이타적인 행위이다	他愛行為
設問文	ドナー(臓器を提供した人)の家族の癒しとなる	도너(장기를 제공한 사람)의 가족에게 위안이 된다	能慰藉器捐者(捐贈器官的人)家屬
回答	1 とてもそう思う	매우 그렇다고 생각한다	非常這麼認為
回答	2 そう思う	그렇다고 생각한다	這麼認為
回答	3 どちらでもない	어느 쪽도 아니다	沒有意見
回答	4 あまりそう思わない	별로 그렇게 생각하지 않는다	不太這麼認為
回答	5 そう思わない	그렇게 생각하지 않는다	不這麼認為