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Analysis of Factors Affecting Emergency Physicians' Attitudes toward Deceased Organ & Tissue Donation

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ABSTRACT

Background: This study aimed to investigate differences in knowledge, and attitudes toward deceased organ and tissue donation of emergency physicians. Additionally, we analyzed factors affecting the attitudes toward deceased organ and tissue donation.

Methods: We conducted a survey of specialists and residents registered with the Korean Society of Emergency Medicine in December 2020. The respondents' sex, age, position, personal registration for organ donation, experience of soliciting organ donation, participation in related education, knowledge, and attitude about brain death organ donation, and attitude toward stopping life-sustaining treatments were investigated.

According to the characteristics of the respondents (specialists or residents, experience and education on organ and tissue donation), their knowledge and attitude toward deceased organ donation were compared. Stepwise hierarchical multiple regression analysis was used to investigate the factors affecting the attitudes toward deceased organ and tissue donation.

Results: Of the total 428 respondents, there were 292 emergency medicine specialists and 136 medical residents. Specialists and those who registered or wished to donate organs had higher knowledge and attitude scores regarding deceased organ and tissue donation. Those who had experience recommending organ and tissue donation more than 6 times had higher knowledge scores on deceased organ and tissue donation and higher overall scores in attitude. Those who received education from the Korean Organ Donation Agency had higher knowledge scores. Specialists, and those who wished to donate or had registered as organ donors and had a higher life-sustaining treatment attitude score and knowledge about deceased organ and tissue donation, had more positive attitudes toward deceased organ and tissue donation.

Conclusion: For more potential deceased organ and tissue donors to be referred for donation, there should be continuous education for emergency physicians on brain-dead organ and tissue donation-related knowledge and procedures. In addition, institutional or

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Disclosure

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Kim H, Park KH².
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systematic improvements that can lead to organ donation when deciding on the withdrawal of life-sustaining treatment should be considered.

Keywords: Brain Death; Tissue and Organ Procurement; Organ Transplantation; Emergency Medicine

INTRODUCTION

Since the Internal Organs, etc. Transplant Act was enacted in 1999, the number of deceased organ tissue donations (OTD) steadily increased to 573 until 2016, but has been declining since 2017 in Korea.¹ Contrarily, the number of people waiting for transplantation has increased yearly from 2,840 people in 2000 to 32,990 in 2019 according to the Korean Organ Donation Agency (KODA) annual report.² This is a serious problem for OTD.

Since February 2018, it has been possible to legally suspend or stop life-sustaining treatment (LST), such as cardiopulmonary resuscitation and mechanical ventilation, for end-of-life patients due to the Decisions on Life-Sustaining Treatment for Patients in Hospice and Palliative Care or at the End-of-life Act (the LST Decision Act) in Korea.³ In the process of discontinuing LST, there may be less opportunity to consider brain death and organ donation.⁴ In the end, the notification of brain death by estimators has decreased, affecting the rate of OTD. In particular, it is unclear whether cessation of LST for potentially brain-dead patients accelerates death and whether such an action is legally problematic.⁵

When a brain-dead patient is notified to the KODA, the coordinator confirms the patient's medical condition, contacts the guardian, and finally, obtains the guardian's consent. Although the total number of notifications has increased, the final consent rate has steadily decreased from 51.7% in 2015 to 33.0% in 2019.² This overlaps with the passage of the LST Decision Act, which may have had an influence. In a previous study analyzing the KODA 2013-2018 annual reports, a reason suggested for the decrease in donations was the tendency of families of brain-dead patients to give up LST due to the enforcement of the LST Decision Act.⁶ As the donations decreased despite the increase in the number of patients, family consent had a major impact. It was suggested that the implementation of the LST Decision Act had the greatest impact. A study by Cho also mentions the LST decision system as a cause of the decrease in donations. Currently, when patients give an advanced directive for LST and registered their wish to donate organs, the systems conflict because there is no national consensus on which decision should take precedence and the order in which to proceed. Additionally, there is a lack of education for medical staff.⁴

In Korea, the number of emergency physicians (EPs) is second only to that of neurosurgeons among the medical staff notifying suspected brain death.² The number of organ donations through EPs increased from 49 in 2015 to 144 in 2019.² In clinical practice, the role of EPs in identifying potential brain-death in patients and linking them to donors is growing. In the United States, Australia, and the United Kingdom, policy statements were made at the academic level, highlighting the significant role EPs play in the process of discovery of brain-dead individuals and subsequent OTD.⁷⁻⁹

Emergency departments (ED) operate 24-hour shifts to provide emergency care. When patients with severe trauma, a need for cardiopulmonary resuscitation, or whose lives are in jeopardy

due to a drug overdose or hanging for suicide, are brought to the ED, the EPs examine the suspected brain-dead patient. Additionally, the EDs of tertiary hospitals in Korea directly admit these critically ill patients to the intensive care unit for treatment. With the enforcement of the LST Decision Act in 2018, LST for patients with no possibility of regaining consciousness in the intensive care unit is also suspended. As a result, EPs examine both the suspected brain-dead patients and patients in whom LST is stopped, which potentially lead to OTD.

Depending on the physicians' experience or knowledge of deceased OTD, attitude towards it, and perceptions of withdrawal of stopping LST, physicians will vary in their organ donation recommendations to the patient's guardian. They will also differ in the degree of notification of a brain death determination. Therefore, in this study, we sought firstly to investigate the knowledge and attitudes towards deceased OTD. Secondly, we compared the differences according to the characteristics of the respondents. Thirdly, we analyzed the factors affecting attitudes toward deceased OTD according to the characteristics of EPs. By understanding this, we intend to identify ways to encourage more organ donation.

METHODS

This study was a cross-sectional online survey, conducted using SurveyMonkey® (<https://en.surveymonkey.com>) in December 2020. The questionnaire link was distributed using the emails of regular members (specialists) and associate members (residents) of the Korean Society of Emergency Medicine. When the survey was conducted, 2,168 regular members and 590 associate members were registered with the society. The calculated sample size for this study was 337 at a 95% confidence level and 5% margin of error.

Survey tools

Since there were no validated survey tools for EPs or medical doctors in Korea, questionnaires were created using material from existing studies. In the study of knowledge and attitudes toward organ donation in Korea, the questionnaire items from 2 master's thesis written in Korean, mainly targeting university students and nurses, were used as drafts.^{10,11} The questionnaire used in a study by Lee after the 2018 enactment of the LST Decision Act on attitudes toward stopping LST was also used as a draft.¹² The 3 questionnaire tools on knowledge and attitudes toward organ donation and attitudes toward stopping LST mainly targeted nurses. As these are not recent studies, the questionnaire items were reviewed for validity. Seven specialist doctors and 9 nurses with extensive experience in organ donation and stopping LST were asked to rate on a 5-point Likert scale (where 5 indicated very valid and 1 indicated very invalid) how appropriate the items were for evaluating the knowledge and attitude of EPs. Additionally, they were asked to indicate what they thought should be consolidated, deleted, or corrected. After two surveys of experts, the final questionnaire items were constructed. The section on the knowledge of deceased OTD contained 19 questions. There were 5 questions on legal knowledge, 2 on the definition of brain death, 9 on the conditions and procedure for organ donation, 1 on managing brain-dead organs, and 2 on medical knowledge. A correct answer earned 1 point, and an incorrect or unknown answer earned 0 points. A higher knowledge score indicated more knowledge. The section on attitudes toward deceased OTD contained 16 questions, covering cognitive, emotional, and behavioral aspects. Respondents were asked to rate on a 5-point scale. The higher the attitude score, the more positive is the attitude toward OTD. Attitudes toward stopping LST were assessed with 13 questions on a 5-point scale. The higher the attitude score, the more positive they were to stopping LST (**Supplementary Table 1**).

We also collected information on the respondents' gender, age, status (specialist or resident), whether they were registered as an organ/tissue donor, position in the hospital, resident grade, experience of organ donation solicitation and actual organ donation, education provided by KODA, and experience of withdrawal of LST.

Statistical analysis

Descriptive analysis was used for the basic demographics of respondents. *T*-tests, analysis of variance with Scheffe (post hoc analysis), and χ^2 -tests were conducted to investigate the differences in knowledge and attitude toward deceased OTD according to the characteristics of respondents. Pearson's correlation coefficient analysis was conducted to examine the relationship between knowledge and attitudes toward deceased OTD and attitudes toward stopping LST. Stepwise hierarchical multiple regression analysis was performed to investigate the variables affecting the attitudes toward deceased OTD. To explore the factors influencing attitudes toward deceased OTD, a 2-stage hierarchical regression analysis was conducted. We used individual characteristic variables (sex, organ donation registration intention, specialist or resident, organ donation experience, organ donation education) and independent variables for knowledge on deceased OTD and attitudes toward stopping LST. In step 1, individual characteristics were analyzed as dummy variables. Knowledge of deceased OTD and attitudes toward stopping LST were put into the 2-step regression equation. We checked the tolerance and variance inflation factor (VIF) statistics to identify problems with multicollinearity of the predictors. The tolerance value of 0.20 or higher, VIF value less than 10, and Durbin–Watson value of 2.071, close to 2, confirmed that there was no multicollinearity. IBM SPSS ver. 23.0 software (IBM Corp., Armonk, NY, USA) was used for the analyses; significance was set at $P < 0.05$.

Ethics statement

The present study was reviewed and approved by the Institutional Review Board of Yonsei University Wonju Christian Severance Hospital (approval No. CR320149). Informed consent was obtained from all participants at the time of the survey.

RESULTS

Reliability of measuring tools

Cronbach's α was 0.739 for the attitude toward deceased OTD and 0.846 for the attitude toward stopping LST.

Demographics of respondents

Among the respondents, a total of 292 emergency medicine specialists responded. Of them, 240 (82.2%) were males, and professors predominated the respondent group at 151 (51.7%). Of the specialists, 51 (17.5%) were registered organ donors, and 166 (56.8%) wished to donate. Among the respondents, 198 (77.7%) EP had experience recommending organ and tissue donation, and 174 (59.6%) responded that it was actually donated. A total of 136 residents responded, of which 114 (83.8%) were male, 42 (30.9%) were registered organ donors, and 62 (45.6%) wished to donate. Seventy-seven (56.6%) of them recommended organ and tissue donation, and 59 (43.4%) responded that it was actually donated (**Table 1**).

Table 1. Respondent demographic data

Variables	Specialists	Residents
Sex		
Male	240 (82.2)	114 (83.8)
Female	52 (17.8)	22 (16.2)
Age, yr		
	41.1 ± 6.0	30.9 ± 3.0
Candidate for organ donation		
Registered	51 (17.5)	42 (30.9)
Wish to register	166 (56.8)	62 (45.6)
Do not want to register	75 (25.7)	32 (23.5)
Position		
Professors at university hospital	151 (51.7)	
Physicians at university hospital (not professor)	49 (16.8)	
Physicians in non-university hospital	82 (28.1)	
Other	10 (3.4)	
Resident grade		
1 st year		25 (18.4)
2 nd year		35 (25.7)
3 rd year		32 (23.5)
4 th year		44 (32.4)
Experiences of recommending organ & tissue donation		
None	94 (32.2)	59 (43.4)
1-5	133 (45.5)	54 (39.7)
≥ 6	65 (22.3)	23 (16.9)
Actually donated		
None	118 (40.4)	77 (56.6)
1-5	144 (49.3)	57 (41.9)
≥ 6	30 (10.3)	2 (1.5)
Experience in registration of stopping life-sustaining treatment		
Yes	232 (79.5)	121 (89.0)
No	60 (20.5)	15 (11.0)

Data are presented as mean ± standard deviation or number (%).

Differences in knowledge and attitude between specialists and residents

Regarding the knowledge of deceased OTD, the specialists scored significantly higher than the residents (8.72 ± 3.26 and 7.09 ± 3.68 , respectively, $P < 0.001$). Among the sub-factors, the specialists' scores were higher in legal knowledge, the actual conditions and procedures of organ donation, brain death management, and medical knowledge. In attitudes toward deceased OTD, the scores of specialists were significantly higher than those of the residents (3.78 ± 0.38 and 3.66 ± 0.42 , respectively, $P = 0.005$). Among the sub-factors, there were differences in cognitive and behavioral aspects (**Table 2**).

Table 2. Comparison between specialists and residents

Items	Specialists		Residents		P
	No.	Mean ± SD	No.	Mean ± SD	
Knowledge of organ & tissue donation					
Legal knowledge	292	1.76 ± 1.06	135	1.52 ± 1.15	0.036
Brain death definition	289	1.56 ± 0.66	134	1.44 ± 0.69	0.079
Actual condition and procedures for organ donation	290	3.90 ± 1.86	134	3.10 ± 2.06	< 0.001
Brain death management	292	0.64 ± 0.48	136	0.40 ± 0.49	< 0.001
Medical knowledge	291	0.83 ± 0.75	136	0.57 ± 0.66	0.001
Total score	286	8.72 ± 3.26	131	7.09 ± 3.68	< 0.001
Attitude toward organ & tissue donation					
Cognitive aspect	290	4.30 ± 0.50	134	4.12 ± 0.54	0.001
Emotional aspect	285	2.18 ± 0.66	134	2.29 ± 0.72	0.129
Behavioral aspect	288	4.02 ± 0.52	133	3.85 ± 0.53	0.002
Total score	282	3.78 ± 0.38	131	3.66 ± 0.42	0.005

SD = standard deviation.

Differences in perception according to organ donation registration

Regarding the knowledge and attitude about deceased OTD, the knowledge scores of the organ donor registrants and intenders were significantly higher ($P = 0.037$, $P < 0.001$). The overall cognitive and behavioral scores of those who did not intend to donate were significantly lower than the registered donors or respondents willing to donate (Table 3).

Differences according to experience in soliciting organ and tissue donation

EPs who had experience recommending organ and tissue donation more than 6 times had higher knowledge scores on deceased OTD ($P < 0.001$) and higher overall scores in attitude ($P = 0.003$) (Table 4).

Differences according to education participation

The knowledge score for deceased OTD was higher in those who received education on OTD (9.00 ± 3.23 vs. 7.21 ± 3.52 , $P < 0.001$). The attitude toward deceased OTD was higher in the behavioral aspect for respondents who had received education on OTD (4.05 ± 0.50 vs. 3.87 ± 0.54 , $P = 0.001$) (Table 5).

Table 3. Differences according to registration for organ donation

Items	Registered		Wish to register		Do not want to register		P
	No.	Mean \pm SD	No.	Mean \pm SD	No.	Mean \pm SD	
Knowledge of organ & tissue donation							
Legal knowledge	92	1.78 \pm 1.15	228	1.68 \pm 1.08	107	1.61 \pm 1.06	0.526
Brain death definition	93	1.52 \pm 0.65	223	1.57 \pm 0.62	107	1.43 \pm 0.79	0.190
Actual conditions and procedures for organ donation	90	3.56 \pm 1.70	227	3.83 \pm 1.95	107	3.33 \pm 2.14	0.078
Brain death management	93	0.56 \pm 0.50	228	0.61 \pm 0.49	107	0.47 \pm 0.50	0.050
Medical knowledge	93	0.77 \pm 0.72	227	0.78 \pm 0.74	107	0.65 \pm 0.73	0.338
Total score	89	8.26 \pm 3.22	221	8.53 \pm 3.32	107	7.49 \pm 3.89 ^a	0.037
Attitude toward organ & tissue donation							
Cognitive aspect	93	4.28 \pm 0.51	225	4.34 \pm 0.49	106	3.99 \pm 0.53 ^{a,b}	< 0.001
Emotional aspect	91	2.23 \pm 0.67	223	2.28 \pm 0.73	105	2.08 \pm 0.58	0.055
Behavioral aspect	92	4.13 \pm 0.51	225	4.09 \pm 0.49	104	3.58 \pm 0.43 ^{a,b}	< 0.001
Total score	90	3.83 \pm 0.38	220	3.84 \pm 0.36	103	3.45 \pm 0.33 ^{a,b}	< 0.001

SD = standard deviation.

^a $P < 0.05$ when compared with "Wish to register" in Scheffe post hoc analysis; ^b $P < 0.05$ when compared with "Registered" in Scheffe post hoc analysis.

Table 4. Comparison of experiences in recommending organ & tissue donation to the family of brain-dead patients

Items	Those who have experienced more than 6 times		Those who have experienced less than 5 times		Those who have never experienced		P
	No.	Mean \pm SD	No.	Mean \pm SD	No.	Mean \pm SD	
Knowledge of organ & tissue donation							
Legal knowledge	88	2.07 \pm 1.06 ^{a,b}	187	1.71 \pm 1.06	152	1.43 \pm 1.08	< 0.001
Brain death definition	88	1.70 \pm 0.53 ^b	184	1.54 \pm 0.64	151	1.40 \pm 0.76	0.003
Actual conditions and procedures for organ donation	86	4.33 \pm 1.66 ^{a,b}	186	3.68 \pm 1.96	152	3.22 \pm 2.01	< 0.001
Brain death management	88	0.73 \pm 0.45 ^b	187	0.59 \pm 0.49	153	0.44 \pm 0.50	< 0.001
Medical knowledge	88	0.98 \pm 0.79 ^b	187	0.80 \pm 0.73	152	0.55 \pm 0.66	< 0.001
Total score	86	9.88 \pm 2.92 ^{a,b}	183	8.37 \pm 3.32	148	7.03 \pm 3.55	< 0.001
Attitude toward organ & tissue donation							
Cognitive aspect	86	4.34 \pm 0.50	186	4.21 \pm 0.52	152	4.22 \pm 0.52	0.136
Emotional aspect	84	2.31 \pm 0.65	184	2.16 \pm 0.67	151	2.24 \pm 0.71	0.212
Behavioral aspect	85	4.16 \pm 0.49 ^{a,b}	185	3.95 \pm 0.52	151	3.89 \pm 0.54	0.001
Total score	84	3.87 \pm 0.39 ^{a,b}	181	3.71 \pm 0.38	148	3.70 \pm 0.40	0.003

SD = standard deviation.

^a $P < 0.05$ when compared with "Those who have experienced less than 5 times" in Scheffe post hoc analysis; ^b $P < 0.05$ when compared with "Those who have never experienced" in Scheffe post hoc analysis.

Table 5. Comparison of the participation in educational programs about organ & tissue donation

Items	Participated		Never participated		P
	No.	Mean scores	No.	Mean scores	
Knowledge of organ & tissue donation					
Legal knowledge	236	1.86 ± 1.06	191	1.46 ± 1.09	< 0.001
Brain death definition	234	1.61 ± 0.62	189	1.42 ± 0.72	0.004
Actual conditions and procedures for organ donation	234	4.03 ± 1.85	190	3.17 ± 1.99	< 0.001
Brain death management	236	0.61 ± 0.49	192	0.51 ± 0.50	0.030
Medical knowledge	236	0.85 ± 0.71	191	0.61 ± 0.74	0.001
Total score	232	9.00 ± 3.23	185	7.21 ± 3.52	< 0.001
Attitude toward organ & tissue donation					
Cognitive aspect	235	4.25 ± 0.52	189	4.23 ± 0.52	0.691
Emotional aspect	232	2.21 ± 0.65	187	2.23 ± 0.72	0.696
Behavioral aspect	234	4.05 ± 0.50	187	3.87 ± 0.54	0.001
Total score	231	3.77 ± 0.38	182	3.70 ± 0.41	0.056

Data are presented as mean ± standard deviation.

Correlation between knowledge and attitude toward deceased organ and tissue donation and attitude toward life-sustaining treatment

Among the respondents, the attitude score for stopping LST was 3.87 ± 0.55 . There was a correlation between knowledge and attitudes toward deceased OTD ($r = 0.271, P < 0.001$). Attitudes toward stopping LST correlated with the knowledge of OTD ($r = 0.175, P < 0.001$) and with attitudes toward OTD ($r = 0.268, P < 0.001$) (Fig. 1).

Factors affecting attitudes toward deceased organ and tissue donation

Organ donation intenders ($\beta = 0.472$), organ donation registrants ($\beta = 0.377$), and specialists ($\beta = 0.111$), attitude toward stopping LST ($\beta = 0.242$), and knowledge about deceased OTD ($\beta = 0.153$) were variables affecting the attitude toward deceased OTD as shown in Table 6. Experience of recommending organ and tissue donation was not an affecting factor.

DISCUSSION

In this study, differences in knowledge and attitudes on deceased OTD were investigated according to the characteristics of EPs. Deceased OTD knowledge and attitude scores were higher in specialists or respondents who were registered as donors or intended to donate organs. Those who had experience soliciting organ donation and those who received KODA's OTD education had higher deceased OTD knowledge scores. Additionally, regarding factors influencing attitudes toward deceased OTD, specialists, those who wished to donate or had registered as organ donors, and those with a higher stopping LST attitude score and knowledge about deceased OTD had a more positive attitude.

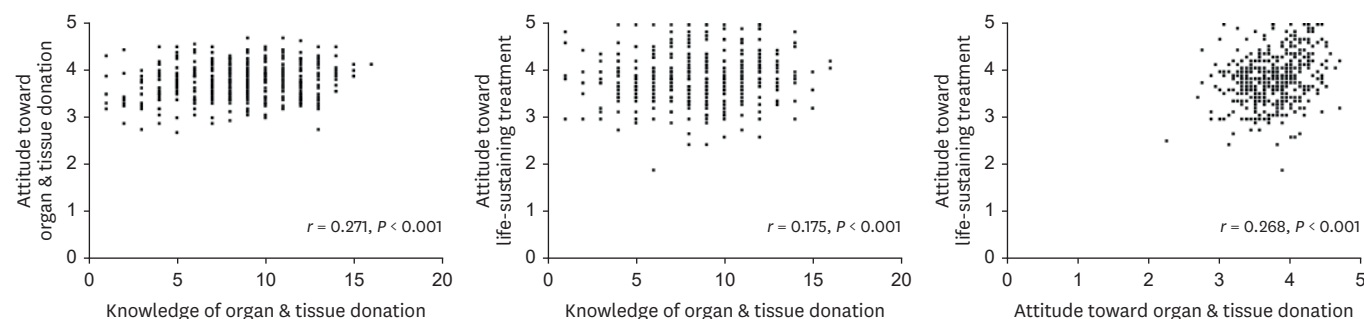


Fig. 1. Correlations of scores of knowledge and attitude toward organ and tissue donation and attitude toward stopping life-sustaining treatment.

Table 6. Variables affecting attitudes toward organ & tissue donation

Variables	B	SE	β	t	P	
Step 1						
(Constant)	3.369	0.045		74.427	< 0.001	$R^2 = 0.197,$
Organ donation registration intention (intender vs. none)	0.388	0.043	0.491	8.989	< 0.001	$F = 32.033$
Organ donation registration intention (registered vs. none)	0.377	0.053	0.395	7.176	< 0.001	$(P < 0.001)$
Specialist vs. Resident	0.124	0.039	0.146	3.185	0.002	
Step 2						
(Constant)	2.580	0.127		20.342	< 0.001	$R^2 = 0.290,$
Organ donation registration intention (intender vs. none)	0.373	0.041	0.472	9.121	< 0.001	$\Delta R^2 = 0.113,$
Organ donation registration intention (registered vs. none)	0.360	0.050	0.377	7.241	< 0.001	$F = 31.814$
Specialist vs. Resident	0.094	0.038	0.111	2.510	0.012	$(P < 0.001)$
Attitude toward stopping life-sustaining treatment	0.174	0.031	0.242	5.588	< 0.001	
Knowledge of organ & tissue donation	0.018	0.005	0.153	3.454	0.001	

SE = standard error.

According to Siminoff et al.,^{13,14} the positive attitude of healthcare professionals toward organ donation may affect the processes of organ donation and consent acquisition from caregivers. Studies have reported that when potential organ donation recipients are notified in the ED, there is a high probability that the organ donation will proceed successfully.¹⁵⁻¹⁷ Therefore, the advantage of this study is that we investigated EPs' responses regarding factors related to attitude toward deceased OTD. This has not been previously reported in Korea. It is also significant because this study reported the correlation between the attitudes toward stopping LST and deceased OTD, which can affect the notification of brain-death estimates.

Although the gap was not large, specialists were more knowledgeable and had more positive attitudes toward deceased OTD than residents. This may be due to specialists having relatively longer clinical experience and experience related to brain death decisions or OTD procedures than residents. Those who have already registered as donors or wish to donate might have a high interest in donation, which seems to have led to a higher organ and tissue donation-related knowledge score and a more positive attitude toward deceased OTD. In a survey of EPs in Canada, it was reported that those who expressed their intention to be a donor were 5.8 times more likely to refer potential donors than those who did not.¹⁸ Emergency medicine specialist, and more than 10 years of working experience were also reported as factors related to referral for organ donation.¹⁸ Although only 2.8% responded that negative attitudes toward OTD could be a barrier, the above results suggest that clinicians' values can influence the decision-making process of OTD.¹⁸ In this study, individual characteristics, such as registration, intent to donate, or specialist status, were related to a positive attitude toward deceased OTD. These factors may affect the procedure for deceased OTD referral. Due to the fact that specialists have a more positive attitude toward deceased OTD than residents, it is necessary that specialists actively participate in the treatment and referral process for suspected brain-dead patients.

Those who have donation solicitation experience and education on OTD have a high organ donation knowledge score as they have encountered information about organ donation procedures. Although the attitude score in the behavioral aspect was higher in individuals who have prior education, previous education itself was excluded from the factors related to the attitude toward deceased OTD in this study. However, in the Canadian EPs study, the clinician's unfamiliarity with the organ donation procedure was the biggest perceived barrier to organ donation.¹⁸ Additionally, it was reported that EPs who received organ donation education had a high organ donation request rate.^{18,19} In the UK, since most donors are ED patients who die in intensive care units due to brain injury, the National

Health System published the “Organ Donation and the Emergency Department. A strategy for implementation of best practice.” The strategy includes organ donation specialist nurses providing regular training to key medical staff in EDs, as EPs are important for donor discovery.⁹ Approximately 55.6% of the respondents had prior education on OTD. The knowledge mean score related to the OTD was 8.72 ± 3.26 for specialists and 7.09 ± 3.68 for residents out of a total of 19 points, indicating that the relevant knowledge and prior education were insufficient. Therefore, improving legal knowledge and knowledge of organ donation procedures through regular education for EPs in Korea is recommended. An educational program connected with the academic level or maintenance education should be organized, and the content should be included in the residents’ training curriculum.

The stopping LST attitude score was correlated with the knowledge and attitude toward deceased organ and tissue donation in our study. According to a survey of healthcare professionals and workers in a Korean tertiary hospital, there was a significant positive correlation between the attitudes towards organ donation and the knowledge and perception of hospice palliative care.²⁰ This is consistent with the results of this study. However, we should be cautious in assuming that a more positive attitude toward stopping LST results in a more positive attitude toward OTD. In fact, in previous domestic studies, one of the causes of the decrease in brain-dead organ donation was the tendency of the family of the brain-dead potential donor to decide to withdraw or withhold LST after the enactment of the life-sustaining treatment decision law.^{4,5} In our study, the positive correlation between the attitude scores for the opposing situations can be explained by the fact that EPs deal with both situations in the process of treating patients. In other words, they seem to have a positive attitude toward both situations because they think and decide both situations in the best interest of the patient. Overseas, the organ donation procedures are linked with the clinician’s awareness of the possibility of organ donation in the process of deferring end-of-life care or stopping LST.²¹⁻²³ The Australian College of Emergency Medicine publishes and revises the document stipulating the role of EPs in the donation process every 3 years. If a suspected brain death occurs in the ED, the patient is admitted to the intensive care unit, where the medical staff must contact the department or staff responsible for OTD before stopping the patient’s LST.⁸ Therefore, unlike the domestic situation where 2 conflicting medical decisions are being dealt with separately, a process is needed to determine the possibility of organ or tissue donation before LST is discontinued, as is done in the EDs of foreign systems. To improve the recent decrease in deceased OTD in Korea, policy and institutional measures that can simultaneously address organ donation in the process of making LST decisions should be discussed.

This study has the following limitations. First, the survey’s response rate was 15.5%. The survey’s response rate was lower for specialists than for residents, which may act as a potential bias. Second, because the questionnaire items were made based on those for nurses, there is a possibility that the attitudes of EPs could not be accurately evaluated. In addition, as the attitude toward stopping LST was evaluated with the questionnaire items devised before the implementation of the LST Decision Act, the clinical situations after implementation may not be actually reflected. Third, a socially desirable bias may occur when measuring attitudes, as respondents tend to provide responses in a positive direction.²⁴ Whether positive attitude scores lead to actual behavior changes should be evaluated through a qualitative study using interviews. Fourth, the reason for the lack of deceased OTD in Korea includes factors other than the doctors, such as donation refusal, non-brain death, and incompatible donors.^{6,25} However, since such factors were not addressed in this study,

understanding the factors affecting physicians' attitudes toward deceased organ donation in clinical situations may be limited. Lastly, the questionnaire items used in this study were all questions reflecting the Korean system and medical environment, and were based on the thesis in Korean. Therefore, in countries with different medical systems or environments, the results of the study should be generalized with caution.

In conclusion, emergency medicine specialists, those who had registered or wished to be organ donors, and those who had higher knowledge score regarding deceased OTD, and higher attitude scores toward stopping LST were more positive toward deceased OTD. For more potential deceased OTD donors to be referred, continuous educational efforts toward increased deceased OTD-related knowledge and better procedures for EPs should be provided. In addition, when deciding on the withdrawal of LST, there is a need for institutional or systemic improvements that can lead to organ donation.

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SUPPLEMENTARY MATERIAL

Supplementary Table 1

Survey items selected after evaluation of validity

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