

# Impact of the Life-Sustaining Treatment Decision Act on Brain Death Organ Tissue Donation in Korea: A Qualitative Study of Emergency Physicians' Experiences and Perspectives

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## Research Article

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# Abstract

**Background:** In Korea, a new law was enacted in January 2016 allowing life-sustaining treatment (LST) of patients in end-of-life to be stopped, popularly known as the LST Decision Act. It came into effect in February 2018. Since then, brain death organ tissue donation affiliated with emergency physicians has decreased. This study aimed to explore emergency physicians' experiences of and perspectives toward the impact of the LST Decision Act on brain death in Korea.

**Methods:** A qualitative study was conducted using thematic analysis methods. Ten emergency physicians with experience in brain death, organ tissue donation, and LST were interviewed. Data analysis was performed following the six steps proposed by Braun and Clarke.

**Results:** Data analysis revealed 14 subthemes and 5 themes: 1) The LST Decision Act is a legitimate way to stop LST, but it is not enough; 2) Many family members stop LST first, often more quickly and actively than physicians expect them to; 3) Stopping LST makes the patient more comfortable; thus, caregivers do not wish to opt for organ tissue donation, which is seen as distressing; 4) Not all patients experience brain death, and LST is stopped before brain death; and 5) Since the LST Decision Act, brain death organ tissue donation has decreased.

**Conclusion:** Emergency physicians generally welcomed the LST Decision Act. However, family members seemed to perceive stopping LST as the means to making the patients comfortable, resulting in the loss of potential organ tissue donors. There is a need for a supplementary policy that connects stopping LST to brain death organ tissue donation.

## Background

The Act on Decisions on Life-Sustaining Treatment for Patients in Hospice and Palliative Care or at the End-of-life (hereafter referred to as the LST Decision Act) was enacted in Korea in February 2018 [1]. The Act was informed by two cases: the Boramae Hospital Case in 1997 and the Severance Hospital case in 2008 [2]. Until the introduction of this Act, many physicians in Korea had no legal guidelines to withhold or withdraw the LST of end-of-life patients. This Act defined end-of-life as two phases: the terminal stage, when patients with irreversible medical conditions are expected to die in the next several months, and the end-of-life stage when patients are expected to die with aggravation.

After the enforcement of the LST Decision Act in 2018, the total number of notifications and brain death organ tissue donation (OTD) began to decrease [3]. In Korea, organ transplant management is conducted by the Korean Organ Donation Agency (KODA). From the annual reports of KODA, we see that the number of brain-dead organ donors rose steadily until 2016. From 573 in 2016 (11.28 per million population), the number declined to 515 (10.01) in 2017, and sharply to 449 (8.70) in 2018 [4]. The notification of suspected brain death patients is usually made by neurosurgeons, neurologists, and emergency physicians. Although the overall number of OTD decreased, the number of notifications by emergency physicians increased from 49 in 2015 to 144 in 2019 [4].

In Korea, the responsibility of identifying candidates for OTD is borne by physicians in intensive care units and emergency departments (EDs). The head of a medical institution that treats a patient with suspected brain death or a potential organ donor shall notify the head of an organ procurement organization under the Internal Organs, etc. Transplant Act. The head of the organ procurement organization then shall report it to the head of the National Organ Transplant Management Agency. However, the determination of brain death is only required for organ donation. Thus, a family member or a legal representative/physician of a suspected brain death patient, who had indicated willingness to be a donor of organs prior to illness, can request the determination of brain death. It is a modified version of the broad opt-in system in which family members decide on organ donation [5].

Departments of emergency medicine (EM) have been a core pillar of emergency medical systems in Korea since the first emergency physician was discharged in 1996. These departments have critical care medicine, pediatric emergency medicine, toxicology, and emergency medical system, as its subspecialties. Emergency physicians play a central role in treating survivors who have been revived after cardiac arrest, following sudden cardiac death, intoxication, major trauma, or hanging. Since the introduction of targeted temperature management (TTM) for post-cardiac arrest survivors, the role of emergency physicians has become more important in this field [6]. However, not all survivors have good neurological outcomes, and some have poor conditions such as a persistent vegetative state or brain death. In such cases, emergency physicians have a priority to influence the organ donation rate because of their role in identifying and notifying patients with suspected brain death.

There have been studies addressing emergency physicians' attitudes or perspectives on brain death OTD or to withhold and withdraw LST [7, 8]. Since the LST Decision Act, determining LST and discovering potential organ donors often happen together in the ED. However, there remains a gap in the literature in terms of emergency physicians' experiences of and perspectives about the impact of the new Act on brain death OTD. To address this gap, we sought to explore these experiences and perspectives on how the implementation of the LST Decision Act has affected the OTD of brain dead patients in the emergency department. The results of this study could be used to supplement LST decision-making and promote brain death OTD.

## **Methods**

### **Study design**

This was a qualitative study using thematic analysis. This study was approved by the Ethics Committee of Yonsei University Wonju College of Medicine (IRB No. CR320150). All methods were performed in accordance with the relevant guidelines and regulations of Declaration of Helsinki.

### **Study setting**

The data is a part of a project on the exploration of the experiences and perspectives of emergency physicians on brain death OTD. Semi-structured interviews were conducted, and the interview questions

were as follows. This study focused on and analyzed the interview data of emergency physicians regarding the impact of the LST Decision Act on brain death OTD.

How did you come to have so much experience with brain death OTD?

1. Did you experience any challenges during any case of brain death OTD?
2. What do you think is the biggest obstacle for emergency physicians regarding this process, from suspected brain death patient notification to organ donation?
3. What has been the impact of the enforcement of the LST Decision Act on suspected brain death patients in the emergency medical field? Please explain your answer.
4. What measures do you think are necessary for the promotion of brain death OTD in the emergency medical field?

## **Selection of participants and recruitment**

The inclusion criteria were as follows: emergency physicians registered with the Korean Society of Emergency Medicine, who participated in patient care at emergency medical centers in Korea at the time of the study, and who had experienced more than one case of brain death OTD.

Purposeful sampling was performed to select and recruit participants with abundant experience of brain death OTD. To prevent bias according to their regions, specialists in critical care and resuscitation recommended participants by region. E-mails containing the purpose and methods of the study, interview questions, and confidentiality were sent to the recommended participants individually. All study participants provided informed consent.

Data saturation began with the 8th interviewee. When the 10th interview was conducted, we concluded that sufficient saturation was reached, and the recruitment of participants was stopped. The characteristics of the 10 EM physician study participants are listed in Table 1.

Table 1  
General characteristics of the participants (N = 10)

Participants	Gender	Age (year)	Work duration as EM physician (year)	Experiences of brain death organ tissue donation (case)	Subspecialty
A	Man	46	16	> 100	Critical care medicine
B	Man	44	12	> 30	Critical care medicine
C	Woman	52	22	5	Pediatric EM/Resuscitation
D	Man	49	18	5	Critical care medicine
E	Man	40	6	10	Critical care medicine
F	Woman	42	9	5	Critical care medicine
G	Man	49	15	> 100	Resuscitation/EMS
H	Man	42	11	5	Critical care medicine
I	Man	46	7	15	Critical care medicine
J	Man	49	21	8	Emergency medicine

EM: emergency medicine, EMS: emergency medical system

## Data collection

The interviews were conducted between December 2020 and January 2021. At the time of the interview, the COVID-19 social distancing regulations were strict and face-to-face interviews were discouraged. Thus, online interviews were conducted using Zoom (<https://zoom.us/>; Zoom Video Communications, Inc; San Jose, California). The questionnaires were sent to the participants via e-mail in advance. During the interviews, supplementary questions were added to fully clarify the responses.

Two researchers (SYP and KHP) conducted the interviews. The participants determined the interviewer in advance: if the participant was acquainted with the interviewer, the latter was not considered as the principal interviewer. The principal interviewer led the interview, and the other interviewer added additional questions at the end of the interview. The interview was recorded in real time and lasted an hour on average. Immediately after the interview, a third member unrelated to the study transcribed the recorded file verbatim.

# Data analysis

We analyzed the data using thematic analysis, proposed by Braun and Clarke [9]. It is a method of identifying, analyzing, and reporting patterns (themes) within data. It is conducted in six steps: Phase 1—familiarizing oneself with data, Phase 2—generating initial codes, Phase 3—searching for themes, Phase 4—reviewing themes, Phase 5—defining and naming themes, and Phase 6—producing the report.

According to these phases, we repeatedly read and reviewed the transcribed data to familiarize ourselves with them. Subsequently, two researchers (SYP and KHP) generated initial codes, combined the codes, and excluded duplicates in the process. The researcher (SYP) found the theme first, and the other (KHP) gave an opinion. The two researchers reviewed and revised the themes several times, and subsequently, defined and named them.

## Rigor

In this study, the following methods were used to minimize bias and increase accuracy. First, we tried to select participants from various regions as much as possible. Although Korea is a small country, there are distinct cultural differences between regions and some variations in medical practice. Second, it was verified that the interview results of the participants were accurately transcribed and described, reflecting their intentions. After the interviews were transcribed and the themes were derived, they were sent to the participants by e-mail for verification. Finally, although the two main researchers generated the codes, the rest of the researchers reviewed the results and presented a wealth of opinions, and all the data collection and analysis processes were described in the researcher's notes to ensure accuracy and transferability in the research.

## Results

### Themes of study

The study revealed 13 subthemes and 5 themes (Table 2).

Table 2  
Themes and subthemes of findings

Theme	Subtheme
The LST Decision Act is perceived to be easier than organ donation but does not fit well in an emergency medical setting.	The LST Decision Act is a legal way to stop life-sustaining care.
	The LST Decision Act is perceived to be an easier and more well-known option.
	However, it does not suit the emergency medical setting always.
Many family members decide to stop LST first, more quickly and proactively than doctors expect them to.	Stopping LST is decided on more proactively by the families than expected.
	Stopping LST is first mentioned by families.
	Families decide more quickly to stop LST.
Stopping LST is about comforting patients without bothering them; thus, decision-makers are no longer willing to try any other option, including OTD.	For families, stopping LST is about making patients feel comfortable and not experience further distress.
	After deciding to stop LST, neither family members nor the physician want to try additional strategies. Family members do not want to donate organs after LST is stopped.
Not all instances of stopping LST result in brain death, but LST is stopped before brain death.	Not all patients who stop LST reach brain death.
	However, once brain death is expected, LST is stopped.
Since the LST Decision Act, TTM declined and so did the number of potential brain death donors, eventually reducing organ donation.	TTM decreased.
	The number of potential brain death donors and brain death OTD also decreased.

LST: life-sustaining treatment; OTD: organ tissue donation; TTM: targeted temperature management

**Theme 1. The LST Decision Act is perceived as easing organ donation but does not fit well in an emergency medical setting.**

The participants had various perceptions of the LST Decision Act. They stated that it was easier to explain LST decisions than brain death OTD. They also mentioned knowing more about the LST Decision Act than the brain death OTD. They welcomed it as a legitimate way to withhold or withdraw LST. However, participants shared the perception that the Act did not fit well with the actual emergency medical practice.

1) The LST Decision Act is a legal way to stop life-sustaining care.

*Participant D: In the end, from a practitioner's perspective, and this is what was felt from before, we could not make decisions to stop LST due to the law (did not exist), but now cessation can be done easily*

*(because the law exists).*

2) The LST Decision Act is considered an easier and more well-known option.

*Participant D: (LST) is well recognized. It is going on, and the medical staff seems to be actively explaining it as well. Organ donation is actually not well explained if they are not the subject for it (organ donation)... Though they are the subject (of suspected brain death)... they tend to be reluctant about organ donation as well. Even medical staff know how to easily explain life-sustaining care.*

*Participant F: It is easy to explain the suspension of LST, but there seems to be an obstacle that makes it difficult to explain organ donation.*

*Participant I: To explain organ donation, I must explain a lot and build up rapport with the family members, so it seems very difficult.*

Some participants expressed discomfort, saying that the applying the LST Decision Act to patients could lead to another legal problem for them due to its lack of fitness in emergency settings.

3) However, the Act is not always fit for the emergency medical setting.

*Participant C: And I do not know if I am mistaken, but the doctors um... (after) the Boramae Hospital case and the Severance Hospital case, (they) are much more afraid that they will be harmed in various legal cases. If I keep digging, the discomfort is about the decision to stop LST, that is, the discomfort in the paperwork, the legal (aspects). The responsibility will be finally returned to us, the precedent legal (verdicts) that have been given until now show that. So, I think (stopping LST) would have been reduced. I think it's because (physicians) do not want to be involved in the legal aspect of things.*

## **Theme 2. Many family members decide to stop LST first, more quickly and proactively.**

Commonly, participants stated that after the LST Decision Act, the incidence of withholding or withdrawal of LST was more than they expected. It is noteworthy that suspension of LST is often mentioned by the family members before the physician's explanation, and the decision is made in a short time. They reported that withholding or withdrawing LST is increasingly active in the case of elderly patients. They also mentioned that, in many cases, family members had already come to a decision within the family before meeting a physician.

1) Stopping LST is decided more proactively by the families than the physicians expected them to do.

*Participant A: As the law on LST decision is implemented, it seems that families give up their own family members' treatment more easily than before.*

*Participant D: It seems that there is a strong tendency to give up a little more easily and end a little sooner because of the law on LST decisions. Therefore, even in the emergency room, they have already given up on LST.*

2) Stopping LST is mentioned first by families.

*Participant I: In the media, the suspension of LST has been promoted. Many people know that part. In many cases, they bring it up first, asking "Can't LST be stopped in this case?" Many people say that. Thus, it is difficult for us to explain organ donation.*

*Participant B: Um... Honestly, it is a situation where family members have been thinking about ending LST. Even if I do not say anything about it, they seem to already have some knowledge about stopping LST or organ donation and are searching for it as well.*

3) Families decide more quickly to stop LST.

*Participant B: When I actually tell them about it, because they make a decision faster than I think and give me an answer, most of the time they decide to stop the LST. So, uh, it's a little disheartening. When I hear their decision, or because they decide it earlier than I thought, I think I am a little embarrassed these days.*

*Participant E: Nowadays, once I get consent to stop the LST, it is just done, and it seems that there are some people who decide to stop the treatment quickly because this has become a culture. Even if it has not been more than a few days, or only a day or two has passed, they decide to stop the LST right away.*

*Participant E: The decision to stop the LST seems to be made quicker than I would have thought. If in the emergency room, I just say (that in) a brain death presumption state, there are probably many cases where families decided to stop LST much quicker than expected.*

### **Theme 3. Stopping LST is about comforting patients without bothering them; thus, decision makers are no longer willing to try any other option.**

Participants mentioned that family members seem to recognize withholding or withdrawing LST as making patients feel comfortable and not distressing them anymore. They stated that family members did not want to do try anything else after they decided to stop the LST. According to them, family members seemed to perceive organ donation as "pestering by adding something" to patients who were medically unable to recover. They said that some physicians also seemed to be unwilling to take action after family members decided to withhold or withdraw LST.

1) For families, stopping LST is about making patients feel comfortable and not making them more distressed.

*Participant A: Suspension of LST is just not treating the patient, but organ donation is taking out the patient's organs. First, the family members focus on wishing that they would no longer bother this patient.*

2) After deciding to stop LST, neither the family members nor the physician want to try additional strategies.

*Participant A: I ask the family that has decided to stop LST, "Then, you want to stop LST, and then how about donating the organs?" If you ask, they all say no. Those who decide to stop LST are um... they do not seem to want to do anything more complicated or emotionally harder anymore.*

3) They do not want to donate organs after LST is stopped.

*Participant H: Yes, that's right. I think so. They don't want it. They simply want to let the patient go more comfortably. From the moment the consent for suspension of LST is written, the family members have no interest (in organ donation), so the medical staff must follow..*

#### **Theme 4. Not all instances of stopping LST result in brain death, but LST is stopped before brain death.**

Participants stated that not all patients for whom LST is withheld or withdrawn reach brain death. They also noted that not all patients living with LST—post-cardiac arrest survivors or those with devastating brain injury (DBI)—reach brain death. Therefore, they said that a careful approach is needed to deal with the extent to which the LST Decision Act has affected the decrease in brain death OTD. However, they shared that the number of patients who could have reached potential brain death and whose family members decided to withhold or withdraw LST before they reached that stage have increased since the enforcement of the LST Decision Act.

1) Not all patients who stopped LST reached brain death.

*Participant F: On the premise that the medical condition is very irreversible, an explanation and decision to stop the LST is made. However, this does not mean that the patient always becomes brain-dead, so the two are a little different. If you have decided to stop the LST now, there are quite a few cases that do not reach brain death.*

2) However, before brain death, LST is stopped.

*Participant A: When the family asks, "If this person is brain-dead, then when will it be (declared as) brain death?", no one can guarantee that, or the time. Then, the families definitely ask themselves, "Do I have to pay all the hospital bills until brain death?" If this happens, they will not be able to donate organs. It seems that families are deciding more often that they just want to stop at this stage rather than continue to struggle. Thus, there seems to be a trend in which people who might become brain-dead die before they actually reach that stage.*

#### **Theme 5. Since the LST Decision Act, TTM has decreased and so has the number of potential brain death donors, eventually reducing organ donation.**

Participants said that TTM has decreased since the enforcement of the LST Decision Act, and as a result, the number of suspected brain death patients has decreased. However, they said, this decrease could not be attributed to the LST Decision Act. They emphasized that the recent decrease in the survival rate of cardiac arrest patients and contributing factors such as COVID-19 should also be considered.

1) TTM decreased.

*Participant G: Yes, TTM also decreased significantly. I think it was reduced to a third.*

*Participant G: As the law on LST decision itself is first explained in the emergency room, once they have decided not to take LST, they do not try TTM at all.*

2) The number of potential brain death donors and brain death OTD decreased.

*Participant A: (we) did not try to confirm brain death, as I have explained before.*

*Participant A: (I) think the number of potential organ donors has decreased slightly.*

*Participant F: As the medical staff focuses on making decisions about life-sustaining care, it does not seem that they provide an option for organ donation. This seems to have brought about the reduction in the cases.*

## Discussion

This study revealed the experiences and perspectives of emergency physicians on how the enforcement of the LST Decision Act is affecting brain death of patients in the emergency department. To the best of our knowledge, this is the first study to explore emergency physicians' experiences and perspectives on the impact of the newly-implemented LST Decision Act on brain death OTD in Asia.

### **Theme 1. The LST Decision Act is perceived as easing organ donation but does not fit well in an emergency medical setting.**

Participants welcome the LST Decision Act because it offers legal guidelines for physicians to withhold or withdraw the LST in Korea [10]. However, the reason participants think that the Act does not adequately fit the emergency medical field is that sometimes, end-of-life care in emergency settings cannot be clearly distinguished from resuscitation care. Resuscitation measures such as tracheal intubation, use of vasopressors or hemodialysis, are often attempted to save the patient's life and may eventually sustain it [11]. In this process, they seemed to think, making this distinction has been left to individual emergency physicians, which might lead to about other legal problems.

Participants in this study said that they felt that LST was more widely known than brain death OTD and people had become familiar with the concept. A study of Australian physicians' knowledge level of withholding and withdrawing LST found some significant gaps according to specialty. Emergency and respiratory medicine had lower scores than average, while specialists in geriatric and palliative medicine had significantly higher scores [12]. Another study reported that palliative care specialists and geriatricians had more positive attitudes toward LST than emergency physicians [13]. A study in Australia reported that emergency department clinicians lacked information about OTD and had mixed views on their role in the donation process [8]. Another study found that almost half of Australian emergency

clinicians were unfamiliar with the OTD process [14]. A recent study found that intensive care and emergency physicians did not accept organ donation in their current definition of a patient's best interests [7]. This is thought to be due to the different roles and treatment ranges of emergency physicians in Korea and Australia. Emergency physicians in Australia may be primary care physicians in emergency medical centers. However, emergency physicians in Korea are both primary care physicians in emergency medical centers and specialists such as intensivists or toxicologists who directly admit and care for patients from emergency medical centers to intensive care units (ICUs) or wards. Yet, no research has compared the level of knowledge and attitudes between LST and brain death OTD. The findings of this study suggest that participants are familiar with the LST Decision Act as this Act has been enforced recently and there was a lot of publicity.

### **Theme 2. Many family members decide to stop LST first, more quickly and proactively than expected**

This study found that more family members withhold or withdraw LST than emergency physicians in the ED expect. This is consistent with a Moroccan study which found that, despite the absence of guidelines regarding LST decisions and different religious and ethical values, LST was frequently withheld or withdrawn from elderly patients with chronic disease in the ED [15]. A study conducted in France reported similar results; death in the ED was associated with elderly patients with multiple chronic diseases and the decision to withhold and withdraw LST [16]. Emergency medicine has been developed as a medical specialty to care for acutely ill or injured patients who need immediate intervention. Thus, ED might not be the most appropriate place for end-of-life care. However, these findings imply that withholding or withdrawal of LST in EDs is rapidly increasing. Therefore, emergency physicians should be trained not only in resuscitation care but also in end-of-life care.

### **Theme 3. Stopping LST is about comforting patients without distressing them further; thus, decision makers are no longer willing to try any other option.**

This study did not directly explore family members' perspectives on the LST Decision Act. However, from the perspective of emergency physicians, we could identify family members' behaviors in LST decisions. Participants mentioned that, for family members, perceived attempts for OTD after stopping LST as tormenting patients through the extraction of necessary organs. This discovery appears to have originated from Korea's cultural background, which resists the mutilation of bodies even after death; for instance, there are few autopsy cases in Korea, except for suspected crimes [17]. These sociocultural factors have been reported in several studies. According to Kim et al. [18], such attitudes originated from Confucianism. The most basic and decisive concept of Confucianism is filial piety or duty toward parents, which includes maintaining the same body received from parents, even if they are deceased [18]. Koreans' tendency to preserve their bodies has been confirmed in other studies. In a study by Lee et al. [19], which investigated the attitudes of patients' families toward brain death OTD, 75% of the participants showed a positive attitude toward organ donation; however, 60.9% showed a positive attitude toward donating their own organs, and 38.1% of them agreed to donate their own family organs. In addition, 20.6% wanted their or their family members' dead bodies preserved [19]. For the patient's family,

if stopping LST is a decision to preserve the body, organ donation is a decision to damage the body. This perspective of Koreans seems to lead to a decrease in brain death OTD, as it meets with the LST Decision Act. To promote donations, changes in this perception must be targeted first.

**Theme 4. Not all instances of stopping LST result in brain death, but LST is stopped before brain death.**

Not all patients end up brain-dead and not all life-sustaining care can lead to organ donation. Nevertheless, evidence of loss of potential organ donors in the ED or non-ICU can be found in many studies. A study in the Netherlands to analyze the number of unrecognized potential organ donors admitted to the ED with DBI found 11–34% under-recognition of the total pool of organ donors [20]. According to a study in Spain following patients dying from DBI (possible donor), half of them received active treatment in an ICU and 27% of them reached brain death [21]. In a retrospective review of clinical charts of patients with DBI whose families discussed organ donation, 80% developed brain death [22]. In Korea, donations after cardiac death (DCD) are limited, and most donations are brain death OTD [23]. With the implementation of the LST Decision Act, patients suspected of brain death now have the option of dying from withholding and withdrawing LST before brain death. However, the number of patients who could reach brain death in Korea has not yet been investigated. Therefore, further research is required.

**Theme 5. Since the LST Decision Act, TTM and the number of potential brain death donors decreased, eventually reducing organ donation.**

According to a study in the United States, successful donations were more likely when potential donors were referred from the ED [24]. However, another study identified that potential solid organ donation was missing within the ED; therefore, attention should be paid to donations from the ED [25]. The ED is becoming a place where life ends by withholding or withdrawing LST, and simultaneously, where another life begins through OTD. However, when we summarize our research findings, it seems that the newly-enforced LST Decision Act does not happily coexist with brain death OTD. Participants perceived that because of the Act, TTM has decreased, and subsequently, the number of potential brain death donors, leading to reduction in brain death OTD.

**Strengths and Limitations**

This study adds a new perspective to how the newly-implemented LST Decision Act has influenced family members' decisions regarding brain death OTD and emergency physicians' practices. However, it should be considered that these findings were revealed from the perspective of emergency physicians. This is because acute patients who visit the ED have distinct characteristics, different from those who are admitted to the ward for chronic or terminal illness. In addition, this study was conducted with emergency physicians who had extensive experience with brain death OTD. They may be more positive toward and active in organ donation than inexperienced emergency physicians. Further, the findings of this study consider the phenomenon only 2 years after the implementation of the LST Decision Act, highlighting the importance of a long-term study.

# Conclusions

Since the enforcement of the LST Decision Act, emergency physicians in the field welcomed it as a legal method to stop futile LST, while recognizing that it was not sufficient and suitable to the emergency medical setting. Patient family members have been proactive in stopping LST, as expected by emergency physicians. The family seemed to perceive that stopping LST would make the patient comfortable from futile LST and no longer distressed. As a result, patients who could have been potential brain death donors died without donating due to the suspension of LST. Unless the family members change their perceptions and a supplementary policy that can lead to easier brain death OTD is created, the decline in brain death OTD as referred to by emergency physicians will continue in Korea.

# Abbreviations

LST, life-sustaining treatment; OTD, organ tissue donation; KODA, Korean organ donation agency; ED, emergency department; EM, emergency medicine; TTM, targeted temperature management; EMS, emergency medical service; DBI, devastating brain injury; ICU, intensive care unit; DCD, donation after cardiac death.

# Declarations

## *Ethics approval and consent to participate*

This study was approved by the Ethics Committee of Yonsei University Wonju College of Medicine (IRB No. CR320150). Participants gave their consent after they were informed of the study aim, method, voluntary participation, and recording of interviews.

## *Consent for publication*

This manuscript contains individual persons' interview data, which are anonymous. Before the interview, we informed the participants that the interview could be part of an original article and published, and their consent was obtained.

## *Availability of data and materials*

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

## *Competing interests*

All authors declare that there are no competing interests.

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## ***Authors' contributions***

SYP and KHP designed the study. HK managed and supervised the entire research team. KHP, SMP, DEL, YHJ, and WJJ participated in the literature review and refined the research questions. SYP and KHP analyzed and interpreted the interview data and were major contributors in writing the manuscript. All authors have read and approved the final manuscript.

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