



Mediating Effects of Role Perception of Life-sustaining Treatment in the Relationship between Knowledge of Life-sustaining Treatment Plans and Attitudes toward Withdrawal of Life-sustaining Treatment among Nursing College Students

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Purpose: This study examined the relationship between Knowledge of Life-sustaining Treatment Plans and Attitudes toward Withdrawal of Life-sustaining Treatment among nursing college students, and attempted to identify the mediating effect of Role Perception on Life-sustaining Treatment in that relationship. It is hoped that the findings will ultimately contribute to the development of active nursing strategies. **Methods:** The participants were 142 nursing college students in the third and fourth years of study who had experienced clinical practice at two universities in cities Y and C. Data were collected from November 1 to 30, 2019. For data analysis, SPSS for Windows version 22.0 was used to calculate descriptive statistics, the t-test, Pearson's correlation coefficients, and multiple regression. To analyze the mediating effect, the Baron and Kenny bootstrapping method was used. **Results:** Attitudes toward Withdrawal of Life-sustaining Treatment of nursing college students had a significant positive correlation with Knowledge of Life-sustaining Treatment Plans ($r=0.34$, $P<0.001$) and Role Perception on Life-sustaining Treatment ($r=0.44$, $P<0.001$). Role Perception on Life-sustaining Treatment partially mediated the relationship between Knowledge of Life-sustaining Treatment Plans and Attitudes toward Withdrawal of Life-sustaining Treatment (95% CI, 0.446~1.055). **Conclusion:** Based on the results of this study, improving nursing college students' Role Perception on Life-sustaining Treatment could be used as a coping strategy to establish positive Attitudes toward Withdrawal of Life-sustaining Treatment.

Key Words: Students, Nursing, Nurse's role, Terminal care, Advance care planning, Knowledge, Attitude

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INTRODUCTION

1. Background

The increasing life expectancy due to advances in medical

technology and the rising prevalence of acute/chronic diseases has led to a growing number of patients who rely on drugs to prolong their painful lives without regard for human dignity [1]. Life-sustaining interventions such as cardiopulmonary resuscitation, hemodialysis, and ventilator therapy that do not

address the root causes of irreparable diseases can result in a meaningless extension of life, which has in turn led to changing Perceptions of Life-sustaining Treatment [2].

In the last 23 months since the enforcement of the Act on Hospice and Palliative Care and Decisions on Life-sustaining Treatment for Patients at the End of Life (hereinafter referred to as the Act on Decisions on Life-sustaining Treatment) in February 2018, approximately 80,000 people have discontinued Life-sustaining Treatment, and the number of physician orders for Life-sustaining Treatment (POLST) forms increased by approximately 1.4 times from 15,000 in 2018 to 20,000 in 2020 [2]. According to a study conducted by Park [3], more than 70% of POLST forms were completed in the intensive care unit, and the patients died within 9 days of completion on average. Considering that terminally ill patients are defined as those with a life expectancy of several months or less, this indicates that POLST forms were completed too late. In the same study, some patients reversed their previous decision to forgo Life-sustaining Treatment and agreed to undergo ventilator support, hemodialysis, and chemotherapy [3]. Therefore, it seems that nurses are frequently exposed to unpredictable tension and conflict and ethical dilemmas generated during Life-sustaining Treatment decision-making.

Although there is still considerable controversy regarding the Withdrawal of Life-sustaining Treatment [4], in the current situation where the demand for and social interest in Withdrawal of Life-sustaining Treatment are further increasing after legalization, it is more urgently required for nurses to carry out their role as coordinators, advocates, and counselors who assist in patients' decision-making while protecting their autonomy and rights [5]. Nurses have a moral responsibility to play the role of an active advocate for patients in the process of making decisions related to Life-sustaining Treatment near the end of life and death without losing dignity, and it is necessary for them to strengthen their communication skills with patients undergoing Life-sustaining Treatment and their families [6].

Most nurses have been found to model themselves on their senior colleagues encountered during residency, without receiving systematic education or guidance on how to make decisions and communicate during the decision-making process for Withdrawal of Life-sustaining Treatment, and this gap

may be a cause of ethical conflicts [7]. In addition, it is often the case that nurses who practice based on the knowledge they learned as nursing students appropriately the role of a counselor who supports family members' decision to discontinue Life-sustaining Treatment in clinical settings [7]. Therefore, it is necessary for nursing students to carefully consider the role of nurses in Life-sustaining Treatment in order to develop the ability to help patients and their families make correct judgments with regard to Withdrawal of Life-sustaining Treatment when they become nurses in the future. They also need to have proper values regarding Withdrawal of Life-sustaining Treatment.

A POLST is written by a physician and specifies decisions related to the Withdrawal of Life-sustaining Treatment and hospice care according to the wishes of a terminally ill or dying patient, and knowledge of POLST refers to the recognition of all issues related to POLST stipulated in the Act on Decisions on Life-sustaining Treatment [8]. In a study conducted by Yu [9], higher levels of knowledge of advance directives among nurses were found to be associated with higher Role Perception of Life-sustaining Treatment, and knowledge of advance directives was found to be a major predictor of Role Perception on Life-sustaining Treatment. In a study conducted by Hall and Grant [10], the lack of knowledge and education of nurses on advance directives caused miscommunication with the medical staff and confusion to or negative influence on patients in deciding treatment directions by failing to provide accurate information, which eventually interfered with nurses' Role Perception of Withdrawal of Life-sustaining Treatment. In a previous study involving nursing students, knowledge of Withdrawal of Life-sustaining Treatment was positively correlated with positive Attitudes toward Withdrawal of Life-sustaining Treatment [5].

Although POLST differs from advance directives, it is relevant to note that the level of knowledge of nursing students about advance directives was reported to affect the satisfaction of terminally ill patients' physical, mental, and psychological needs when students became nurses [11]. Therefore, in order to cultivate a positive Attitude toward Life-sustaining Treatment among nurses and widespread use of POLST, it is necessary to assess nursing students' level of knowledge about the content and legal effects of POLST and provide education and

appropriate measures.

Role Perception on Life-sustaining Treatment refers to the level of perception of the role of nurses in Withdrawal of Life-sustaining Treatment, and a previous study showed a positive correlation between nurses' Role Perception on Life-sustaining Treatment and their Attitudes toward Life-sustaining Treatment [12]. It is important for nurses themselves to recognize that they should actively participate in the Life-sustaining Treatment decision-making process as they are in constant contact with patients and can best identify patients' needs and wishes [13]. Moreover, compared to patients and their families, who have insufficient medical knowledge, the medical staff can have a greater influence on the decision to discontinue Life-sustaining Treatment, which underscores the need for nurses to participate in the decision-making process of Withdrawal of Life-sustaining Treatment as information providers, supporters, and advocates [12,14]. However, as such decisions are mostly led by physicians, nurses may not be able to take part in the decision-making process [15]. Furthermore, their Role Perception was also found to be negatively affected by heavy workload, difficulty in communication with patients and caregivers, conflicts due to differences in opinions among the medical staff, and unclear roles and responsibilities [16].

In the clinical field, nurses' Attitudes toward Withdrawal of Life-sustaining Treatment can have a major influence on the decisions and attitudes of patients and families toward Life-sustaining Treatment, and diverse attitudes can be formed depending on personal values, philosophies, and cultural characteristics [17,18]. In addition, nurses need to provide highly skilled, comprehensive nursing to help patients who decide to forego Life-sustaining Treatment maintain their human dignity until the last moment of life; thus, improving the Knowledge of Life-sustaining Treatment alone may produce a limited effect on cultivating proper attitudes toward the Withdrawal of Life-sustaining Treatment. Considering that nurses with higher Role Perceptions on Life-sustaining Treatment are more likely to respect patients' right to make decisions and participate in various roles for patients and their families [6], it is necessary to examine the mediating effect of Role Perception on Life-sustaining Treatment in the relationship between the knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment among prospective nurses.

Prior studies on Attitudes toward Withdrawal of Life-sustaining Treatment in Korea mainly involved nurses. Few studies have investigated knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment among nursing students [19], and no studies have yet investigated the mediating effect of Role Perception on Life-sustaining Treatment. As nurses are responsible for providing patients or caregivers with sufficient information on Life-sustaining Treatment and they should establish the proper values to play the role of advocates and coordinators for patients [5], it is necessary to investigate this issue among nursing students who are in the process of developing and acquiring relevant qualifications.

Therefore, this study aimed to provide basic data for the development of nursing education strategies for establishing proper Attitudes toward Withdrawal of Life-sustaining Treatment by examining the mediating effect of Role Perception on Life-sustaining Treatment in the relationship between the knowledge of POLST and Attitude toward Withdrawal of Life-sustaining Treatment in nursing students.

2. Purpose

The purpose of this study was to investigate the mediating effect of Role Perception on Life-sustaining Treatment in the relationship between the knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment among nursing students. The specific objectives were as follows:

- 1) To quantify participants' Attitudes toward Withdrawal of Life-sustaining Treatment.
- 2) To confirm correlations between participants' knowledge of POLST, Role Perception on Life-sustaining Treatment, and Attitudes toward Withdrawal of Life-sustaining Treatment.
- 3) To investigate the mediating effect of Role Perception on Life-sustaining Treatment in the relationship between participants' knowledge of POLST and their Attitudes toward Withdrawal of Life-sustaining Treatment.

METHODS

1. Study design

This descriptive survey-based study aimed to confirm the relationship between the knowledge of POLST and Attitudes to-

ward Withdrawal of Life-sustaining Treatment among nursing college students and to investigate the mediating effect of Role Perception on Life-sustaining Treatment in the relationship between knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment.

2. Study participants

Based on a previous study reporting that the presence or absence of clinical practice experience may affect nursing college students' Attitudes toward Withdrawal of Life-sustaining Treatment [4], we primarily enrolled fourth-year senior nursing college students with clinical practice experience at the departments of nursing in one university in Y city and one university in C city, and then additionally included third-year junior nursing college students who volunteered to participate in the study. Those who took leaves of absence, had not experienced clinical practice, or did not wish to participate in the study were excluded.

The number of participants required was calculated using G*Power version 3.1.9.2 based on Cohen's power analysis. In multiple regression analysis with a significance level of 0.05, an effect size (medium) of 0.15, and six subcategories of the independent variable that could affect the dependent variable, the number of samples required to keep the power of the test at 0.90 was 123. A total of 148 questionnaires were distributed in consideration of a dropout rate of 20%, of which 142 replies were used for the final analysis, excluding six questionnaires with insufficient responses.

3. Research tool

In this study, we used a structured questionnaire consisting of a total of 57 questions, including 17 items on knowledge of POLST, 13 items on Role Perception on Life-sustaining Treatment, 14 items on Attitudes toward Withdrawal of Life-sustaining Treatment, and 9 items on general characteristics.

1) Knowledge of POLST

The level of knowledge of POLST was assessed using a tool proposed by Jung [19], who modified and supplemented a previous assessment tool for knowledge of POLST revised by Kim [20] to reflect the Act on Decisions on Life-sustaining Treatment, which has been in force since 2017. Before the en-

actment of the Act, knowledge related to POLST was referred to as Knowledge of Withdrawal of Life-sustaining Treatment in most studies; however, knowledge of POLST has been used since Jung [19] assessed the level of knowledge based on the content of POLST.

This tool used in this study consists of a total of 17 questions, each of which can be answered with "yes," "no," or "I don't know." "I don't know" is treated as an incorrect answer and the individual average score is calculated using a 100-point scale. Higher scores indicate higher knowledge of POLST. The overall reliability of the tool was shown by a Cronbach's α value of 0.75 in the study of Kim [20], 0.60 in the study of Jung [19], and 0.63 in the current study.

2) Role Perception on Life-sustaining Treatment

Role Perception on Life-sustaining Treatment was assessed using a tool developed by Byun et al. [21], with a total of 13 questions on Role Perception on Life-sustaining Treatment; one item is a negative question, and is reverse-scored. Each question is scored using a 5-point Likert scale, with 1 point for "not at all" and 5 points for "very." Higher scores indicate higher Role Perception of Withdrawal of Life-sustaining Treatment. In the study of Byun et al. [21], the overall reliability of the tool was shown by a Cronbach's α value of 0.88, and Cronbach's α was 0.92 in the current study.

3) Attitudes toward Withdrawal of Life-sustaining Treatment

Attitudes toward Withdrawal of Life-sustaining Treatment were assessed using the tool proposed by Jung [19], who modified and supplemented the tool developed by Byun et al. [21] to reflect the Act on Decisions on Life-sustaining Treatment enacted in 2017. The tool used in this study is composed of a total of 14 questions, and each question is scored on the basis of a 5-point Likert scale, ranging from 1 point for "not at all" to 5 points for "very positive." Higher scores indicate more positive Attitudes toward Withdrawal of Life-sustaining Treatment. The overall reliability of the tool was shown by a Cronbach's α value of 0.60 in the study of Jung [19] and 0.79 in the current study.

4. Data collection

This study was approved by the Institutional Review Board of K University (KU IRB 2019–0072) located in B metropolitan city before data collection was initiated. The data collection period was from November 1, 2019, to November 30, 2019. For data collection, the researchers requested permission to conduct research from the head of the department at the university, obtained consent, and distributed questionnaires through the department. The purpose of the study, study participation period, personal information protection, and study process were explained, and voluntary participation was ensured in light of ethical considerations regarding the participants. Gifts were provided to participants of the survey. The collected data were to be stored in a personal safe with a lock in the laboratory for 3 years, used only for the purpose of the study, and destroyed by the research manager after completion of the study.

5. Data analysis

The collected data were analyzed using SPSS for Windows version 22.0 (IBM Corp., Armonk, NY, USA) as follows:

1) General characteristics and disease-related characteristics were analyzed as numbers and percentages, and participants' knowledge of POLST, Role Perception on Life-sustaining Treatment, and Attitudes toward Withdrawal of Life-sustaining Treatment as means and standard deviations.

2) Correlations between participants' knowledge of POLST,

Role Perception on Life-sustaining Treatment, and Attitudes toward Withdrawal of Life-sustaining Treatment were analyzed using Pearson correlation coefficients.

3) The significance of the mediating effect of Role Perception on Life-sustaining Treatment (mediating variable) in the relationship between participants' knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment was verified using the SPSS Macro program, PROCESS.

RESULTS

1. General characteristics of participants

Table 1 shows the general characteristics of the study participants. Those aged 23 years or younger made up 69.7% (n=99), the average age of the participants was 24.30 ± 3.49 years, 83.1% (n=118) were women, and 96.5% (n=137) were unmarried. Most of the participants participating in the study were fourth-year seniors (98.6%, n=139), and 1.4% were third-year juniors (n=2). The participants had received education on Life-sustaining Treatment was 13.4% (n=19) and 70.4% (n=100) had experienced the death of an acquaintance.

2. Participants' level of knowledge of POLST, Role Perception on Life-sustaining Treatment, and Attitudes toward Withdrawal of Life-sustaining Treatment

The score for the level of knowledge of POLST among nursing college students was 58.94 ± 16.16 out of 100 points, and the score for Role Perception on Life-sustaining Treatment was 3.99 ± 0.43 out of 5 points. The score for Attitudes toward Withdrawal of Life-sustaining Treatment was 3.46 ± 0.51 out of 5 points (Table 2).

Table 2. Levels of Knowledge of Life-sustaining Treatment Plans, Role Perception of Life-sustaining Treatment, and Attitudes toward Withdrawal of Life-sustaining Treatment among Nursing College Students (N=142).

Variables	Mean \pm SD (range)
Knowledge of Life-sustaining Treatment Plans	58.94 ± 16.16 (0~100)
Role Perception of Life-sustaining Treatment	3.99 ± 0.43
Attitudes toward Withdrawal of Life-sustaining Treatment	3.46 ± 0.51

Table 1. General Characteristics of Participants (N=142).

Variables	Categories	n	%	Mean \pm SD
Age (yr)	≤ 23	99	69.7	24.30 ± 3.49
	24~30	38	26.8	
	≥ 31	5	3.5	
Sex	Female	118	83.1	
	Male	24	16.9	
Marital status	Single	137	96.5	
	Married	5	3.5	
Year in program	3	2	1.4	
	4	139	98.6	
Experiences with education on Life-sustaining Treatment	Yes	19	13.4	
	No	123	86.6	
Experience of someone's death	Yes	100	70.4	
	No	42	29.6	

3. Correlations between participants' knowledge of POLST, Role Perception on Life-sustaining Treatment, and Attitudes toward Withdrawal of Life-sustaining Treatment

Nursing college students' Attitudes toward Withdrawal of Life-sustaining Treatment showed significant positive correlations with knowledge of POLST ($r=0.34$, $P<0.001$) and Role Perception on Life-sustaining Treatment ($r=0.44$, $P<0.001$) (Table 3).

4. The mediating effect of Role Perception on Life-sustaining Treatment in the relationship between participants' knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment

Table 4 shows the mediating effect of Role Perception on Life-sustaining Treatment in the relationship between knowl-

edge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment among nursing college students.

The mediating effect of Role Perception on Life-sustaining Treatment was verified with multiple regression analysis. Before verifying the mediating effect, it was checked whether the assumptions for regression analysis were satisfied. The Durbin-Watson index for autocorrelation was 1.983~2.029 (both above 0.1 and close to 2), indicating independence, and the variance inflation factor was 1.011~1.129 (less than 10), indicating an absence of multicollinearity between independent variables (Table 4).

In this study, we used the three-step analysis suggested by Baron and Kenny [22] in order to verify the influence of knowledge of POLST on Attitudes toward Withdrawal of Life-sustaining Treatment through the mediating variable,

Table 3. Correlations among Knowledge of Life-sustaining Treatment Plans, Role Perception of Life-sustaining Treatment, and Attitudes toward Withdrawal of Life-sustaining Treatment among Nursing College Students (N=142).

	Knowledge of Life-sustaining Treatment Plans	Role perception of Life-sustaining Treatment
	r (P)	r (P)
Role Perception of Life-sustaining Treatment	0.34 (<0.001)	
Attitudes toward Withdrawal of Life-sustaining Treatment	0.34 (<0.001)	0.44 (<0.001)

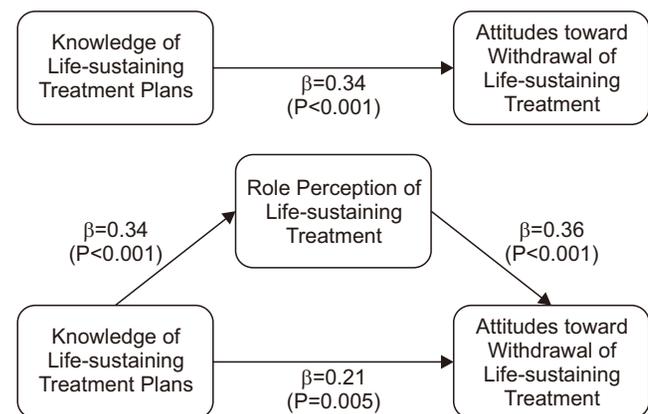


Figure 1. Mediating effects of Role Perception of Life-sustaining Treatment in the relationship between Knowledge of Life-sustaining Treatment Plans and Attitudes toward Withdrawal of Life-sustaining Treatment of nursing college students.

Table 4. Mediating Effects of Role Perception of Life-sustaining Treatment in the Relationship between Knowledge of Life-sustaining Treatment Plans and Attitudes toward Withdrawal of Life-sustaining Treatment among Nursing College Students (N=142).

Causal steps			B	β	Adj R ²	F (t)	P
Step 1	Knowledge of Life-sustaining Treatment Plans	→ Role Perception of Life-sustaining Treatment	0.90	0.34	0.11	20.01	<0.001
Step 2	Knowledge of Life-sustaining Treatment Plans	→ Attitudes toward Withdrawal of Life-sustaining Treatment	1.06	0.34	0.11	19.56	<0.001
Step 3	Knowledge of Life-sustaining Treatment Plans & Role Perception of Life-sustaining Treatment	→ Attitudes toward Withdrawal of Life-sustaining Treatment			0.22	22.83	<0.001
	1) Knowledge of Life-sustaining Treatment Plans	→ Attitudes toward Withdrawal of Life-sustaining Treatment	0.67	0.21			0.005
	2) Role Perception of Life-sustaining Treatment	→ Attitudes toward Withdrawal of Life-sustaining Treatment	0.43	0.36			<0.001

Role Perception on Life-sustaining Treatment.

The mediating effect of Role Perception on Life-sustaining Treatment was confirmed to be present in the relationship of knowledge of POLST with Attitudes toward Withdrawal of Life-sustaining Treatment (Figure 1, Table 4). In step 1, knowledge of POLST (independent variable) was found to have a significant influence on Role Perception on Life-sustaining Treatment (mediating variable) ($\beta=0.34$, $P<0.001$), with an explanatory power of 10.9%.

In step 2, knowledge of POLST (independent variable) was found to have a significant influence on Attitudes toward Withdrawal of Life-sustaining Treatment (dependent variable) ($\beta=0.34$, $P<0.001$), and the explanatory power was 10.6%. In step 3, knowledge of POLST and Role Perception on Life-sustaining Treatment (mediating variable) were both treated as independent variables and Attitudes toward Withdrawal of Life-sustaining Treatment was treated as a dependent variable. In this step, it was found that knowledge of POLST ($\beta=0.21$, $P<0.001$) and Role Perception on Life-sustaining Treatment ($\beta=0.36$, $P<0.001$) had a significant impact on Attitudes toward Withdrawal of Life-sustaining Treatment. In other words, when Role Perception on Life-sustaining Treatment was treated as a mediating variable in step 3, knowledge of POLST was found to have a significant influence on Attitudes toward Withdrawal of Life-sustaining Treatment, but as the regression coefficient (β) decreased from 0.34 in step 2 to 0.21 in step 3, Role Perception on Life-sustaining Treatment appeared to show partial mediation. The degree to which these variables explained Attitudes toward Withdrawal of Life-sustaining Treatment was 21.9%. To verify the statistical significance of the indirect effect, bootstrapping was performed; as the 95% confidence interval was 0.446~1.055 without including 0, statistical significance was confirmed (Table 4).

DISCUSSION

This study was conducted to assess the level and relationships of Attitudes toward Withdrawal of Life-sustaining Treatment with other variables among nursing college students and to verify the mediating effect of Role Perception on Life-sustaining Treatment in the relationship between knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining

Treatment.

First, on the basis of the results of this study, we would like to discuss the level of Attitudes toward Withdrawal of Life-sustaining Treatment among nursing college students. The score for the dependent variable, Attitudes toward Withdrawal of Life-sustaining Treatment among nursing college students, was an average of 3.46 out of 5 points, which is higher than the median score and thus indicates positive attitudes of the participants. This value is similar to that of 3.38 points obtained using the same tool among 238 nursing students in the study of Jung [19]. By comparison, the score for Attitudes toward Withdrawal of Life-sustaining Treatment among nurses was 3.20 out of 5 points among 218 general hospital nurses in the study of Kim and Kim [23] and 3.33 out of 5 points among 202 intensive care unit nurses in a study of Lee and Kim [12]. Therefore, nursing students were found to have more positive Attitudes toward Withdrawal of Life-sustaining Treatment than nurses.

The difference may be because while nurses in the clinical field encounter various ethical issues related to Life-sustaining Treatment and have more interest in and awareness of Withdrawal of Life-sustaining Treatment, they also experience ethical dilemmas between protecting the patient's life, which is a basic obligation of medical professionals who closely take care of patients, and respecting the patient's right to self-determination. In addition, while nurses in the clinical field often experience confusion due to complex and subtle side effects that result from interventions using modern medical technology for life extension, nursing students have not yet been involved in the decision-making process to discontinue Life-sustaining Treatment or directly providing care for dying patients. This may also explain the more positive attitude observed among nursing students in this study [24]. However, as there may have been differences in multiple variables between nurses and nursing students, a direct comparative analysis on Attitudes toward Withdrawal of Life-sustaining Treatment between these groups should be based on an in-depth investigation.

Second, the results of this study have meaningful implications for the relationships among knowledge of POLST, Role Perception on Life-sustaining Treatment, and Attitudes toward Withdrawal of Life-sustaining Treatment. In this study, it was found that higher levels of knowledge of POLST were

associated with more positive Attitudes toward Withdrawal of Life-sustaining Treatment among nursing students. In a study conducted by Kim et al. [5], among 213 nursing college students, a similar finding was reported: there was a moderately positive correlation between knowledge of and Attitudes toward Withdrawal of Life-sustaining Treatment. Although a direct comparison is not feasible due to the scarcity of studies on knowledge of and attitudes toward POLST, the finding reported by Lee [25] can be understood in a similar vein: there was a positive correlation between knowledge of and attitudes toward advance directives in nursing students.

In the absence of education on legally and socially acceptable boundaries or grounds related to the suspension of Life-sustaining Treatment in schools or clinics, if nurses encounter an unexpected difficulty without having established a philosophy on Life-sustaining Treatment or death, they may show a negative and passive Attitude toward Withdrawal of Life-sustaining Treatment [26]. Therefore, in order to compensate for these problems, specific education should be provided such as writing POLST based on guidelines for Withdrawal of Life-sustaining Treatment, application targets and timing, and roles reflecting job characteristics [27]. We believe that if proper values are established through such education during the college years, when nursing students explore academic knowledge and form values regarding numerous issues, they will suffer less from confusion and difficulties associated with Life-sustaining Treatment even after becoming nurses.

Furthermore, in this study, it was found that higher scores for Role Perception on Life-sustaining Treatment were associated with more positive Attitudes toward Withdrawal of Life-sustaining Treatment among nursing students. Similarly, Yu [9] reported a positive correlation between intensive care unit nurses' perception of their Role in Life-sustaining Treatment and Attitudes toward Withdrawal of Life-sustaining Treatment, and Shim [28] reported that higher perceptions of nurses' Role in Withdrawal of Life-sustaining Treatment were associated with more positive Attitudes toward Withdrawal of Life-sustaining Treatment. In addition, Lee and Kim [12] observed among intensive care unit nurses higher scores for Role Perception on Life-sustaining Treatment were associated with more negative Attitudes toward Life-sustaining Treatment, as we noted in our participants.

Third, we would like to discuss the mediating effect of Role Perception on Life-sustaining Treatment in the relationship between the knowledge of POLST and Attitude toward Withdrawal of Life-sustaining Treatment. In this study, it was confirmed that nursing students' Role Perception on Life-sustaining Treatment had a statistically significant partial mediating effect in the relationship between knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment. In other words, knowledge of POLST appeared to affect Attitudes toward Withdrawal of Life-sustaining Treatment according to nursing students' level of awareness of their Role in Life-sustaining Treatment, which suggests that due to the partial mediating effect of Role Perception on Life-sustaining Treatment in the relationship between the knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment, Attitudes toward Withdrawal of Life-sustaining Treatment may be different among those with a similar level of knowledge of POLST.

Role Perception on Life-sustaining Treatment is an important variable, as nursing students are supposed to play a pivotal role in the treatment and management of patients by directly and indirectly intervening as the caregivers closest to patients when they become nurses, and it demonstrated its significance in this study by producing a partial mediating effect between knowledge of POLST and Attitude toward Withdrawal of Life-sustaining Treatment among nursing students. Therefore, proper perceptions of nurses' role should be cultivated among nursing students so that these prospective nurses can effectively perform their roles when they become professional nurses. Furthermore, it is necessary to help them improve their capacity to overcome unforeseen difficulties and ethical dilemmas in clinical practice and to empathically help patients and caregivers through various strategies related to Withdrawal of Life-sustaining Treatment. Through this, they need to positively change their Role Perception in order to actively participate in Life-sustaining Treatment decisions instead of regarding involvement in such decisions as burdensome even after becoming nurses.

However, few prior studies have examined the mediating effect of nursing students' perceptions of their Role in Life-sustaining Treatment, and most such studies mainly involved nurses, restricting a direct comparative analysis. Therefore,

further repeated research is warranted.

With the Act on Decisions on Life-sustaining Treatment fully in force, on the basis of sufficient discussion with those working in the field, patients or families, and medical professionals, efforts should be made to instill proper Attitudes toward Withdrawal of Life-sustaining Treatment by providing specific guidelines on Life-sustaining Treatment and systematic education programs for nursing college students who are prospective nurses. In addition, as cultivation of positive perceptions among nurses about their active participation in Life-sustaining Treatment decisions and establishment of values are difficult to achieve in a short time, repeatedly exposing nursing students through education can be considered a useful coping strategy to provide terminally ill patients with high-quality nursing and to establish positive Attitudes toward Withdrawal of Life-sustaining Treatment.

However, one of the limitations of this study is that the tools we used to assess the knowledge of POLST, Role Perception on Life-sustaining Treatment, and Attitudes toward Withdrawal of Life-sustaining Treatment had originally been developed for use among nurses who take care of terminally ill patients in the actual clinical field; there were limitations in ensuring reliability when we applied the tools to nursing students who had experienced nursing terminally ill patients only during training or had no experience at all. Therefore, in order to establish positive Attitudes toward Withdrawal of Life-sustaining Treatment in nursing college students as prospective nurses, it is necessary to develop highly reliable tools designed for application in nursing college students and to explore relationships with Attitudes toward Withdrawal of Life-sustaining Treatment that may be unique to nursing college students. In

addition, as the participants of this study were drawn from nursing students with experience in clinical training at one university in Y city and one university in C city through convenience sampling, there is a limitation in generalizing the results and further research is required. Furthermore, we suggest that additional research should be conducted to identify other possible mediating variables between the knowledge of POLST and Attitudes toward Withdrawal of Life-sustaining Treatment.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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AUTHOR'S CONTRIBUTIONS

Conceptualization or design of the work: YP, KN. Data collection: JB. Data interpretation: KN, JB. Manuscript writing: YP, KN. Critical revision of the article: KN.

SUPPLEMENTARY MATERIALS

Supplementary materials can be found via <https://doi.org/10.14475/jhpc.2021.24.1.36>.

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