RESEARCH



Effectiveness of a competency-based coordinator of advance care planning competency enhancement program: a mixed method

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Abstract

Background Clinical Ethics Support Services (CESS) improve health-care quality by systematically identifying and resolving ethical issues. CESS providers should be trained to understand patients' difficulties with existential issues and advocate on their behalf. This study evaluates the effectiveness of educational programs to enhance the competencies to solve ethical issues in clinical practice for CESS providers related to life-sustaining-treatment, based on Jonsen et al.'s "the four topics approach."

Methods This is an explanatory sequential mixed-method study conducted in quantitative and qualitative phases. Participants included 52 life-sustaining medical workers at general hospitals. The participants were categorized into 24 experimental and 28 control groups, including nurses, social workers, and legal administrations. The program encompassed bioethics, end-of-life care, critical thinking, decision-making training through clinical ethics cases, role-playing, communication skills, and discussions. In the quantitative phase, a quasi-experimental study design with pre-test, intervention, and post-test was used. The program for experimental group was provided through 8 sessions spread across 4 weeks. The participants' experiences were explored through semi-structured interviews in the qualitative phase.

Results After the education, the experimental and control groups differed significantly in critical thinking disposition, and hospice and palliative care knowledge. Participants acknowledged that critical thinking education improved their ability to analyze and evaluate clinical ethical dilemmas.

Discussion The case-based, role-playing intervention effectively enhanced participants' communication and critical thinking skills concerning life-sustaining treatments. Participants highlighted the importance of ongoing education and professional development to maintain core knowledge and skills, aiming to enhance the quality of care for patients, families, and colleagues.

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Trial registration This study was retrospectively registered as a code (No: KCT0009687) in the Korean Clinical Trial Service on August 9, 2024.URL:https://cris.nih.go.kr/cris/search/detailSearch.do?seq=27805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&seq_group=28805&status=5&se

Keywords Clinical ethics, Competency-based education, Advance care planning, Mixed method

Background

Clinical ethics is a practical field that offers an organized method to assist healthcare providers identify, analyze, and resolve moral dilemmas that may occur during clinical practice [1]. Continuous advancements in medical technology, particularly in the early and late stages of life, may raise awareness about the ethical implications of clinical care [2, 3]. The coordinator of advance care planning (CACP) is an expert who acts as a helper, facilitator, and advocate for leading patients, their families, and medical staff to reach ethical and reasonable moral conclusions regarding the tasks at hand [4]. For example, CACPs can play a critical role in determining the timing of the implementation of decisions, such as appropriate withdrawal of life-sustaining treatment for patients with septic shock owing to urinary tract infection, or permanently unfriended patients who present to the emergency room without family members owing to acute renal failure [5]. This is because CACP possesses the knowledge and skills of clinical ethics that practically help resolve ethical issues in patient care [4]. The CACP, who manages end-of-life issues, should have problem-solving abilities to find more rational solutions among various alternatives to help stakeholders listen to each other and solve moral problems more reasonably.

To improve problem-solving abilities, two areas of education are required: (1) core knowledge and (2) core skills [4], which can be connected through case-based communication skills training that links core knowledge (theory) with core skills (practice). Core knowledge can be explained by the fundamental concepts of bioethics principles suitable for clinical practice and knowledge of the application and practice of moral reasoning. Jonsen et al. proposed "the four topics approach" (hereafter referred to as "the four boxes") to apply the four principles Beauchamp and Childress in clinical practice [6]. "The four boxes" guides how the four principles of Beauchamp and Childress relate to specific clinical situations, and how they guide behavior in these situations. It refers to (1) medical indications (MI), which relate to diagnostic and therapeutic interventions used to evaluate and treat the patient's problem, (2) patient preferences, which relate to the patient's explicit choice of treatment preferences (PP), (3) quality of life (QOL), which relates to the degree of satisfaction, well-being, pain, and dysfunction experienced before and after treatment and affects medical decisions, and (4) situational characteristics (CF) that identify the social, institutional, financial, and legal environments [6]. "The four boxes" considers issues related to various aspects of clinical practice and finding better, more correct, and more reasonable problem solutions among various alternatives [Figure 1].

Core skills refer to the skills that use core knowledge to resolve ethical conflicts in a clinical setting. It is necessary to recognize a conflict through an accurate assessment of the ethical situation, and clarify and analyze it as a moral issue [4, 7]. Critical thinking skills are necessary to clarify clinical ethical situations, in which numerous people's interests are intertwined with moral issues. Critical thinking is generally based on analysis, interpretation, evaluation, and reasoning. When making a difficult decision, one can clearly consider the options and reveal the implications or consequences of each option; based on this, one can make an optimal decision. This includes the ability to decide [8]. Analytical ability is essential for collecting, classifying, and prioritizing the facts and opinions raised in conflicting situations. Judgments made in clinical settings are often based on value; the order of information is determined according to the value, and weight is given to the information analyzed as "the four boxes" based on the value.

After the Life-Sustaining Treatment Decision Act was implemented in Korea in 2018, a CACP position was created to oversee it. Currently, the National End-of-Life Treatment Management Agency is providing education on the End-of-Life Treatment Decision System to CACPs. The education covers "communication with patients and their families" and "end-of-life care for terminally ill patients." [9]. However, the education has limitations such as insufficient practical training and a lack of real-world application [10, 11]. This education mainly focuses on delivering knowledge through lectures in a short time, which is unsuitable for effectively training communication skills. Additionally, the education provided does not sufficiently include learning based on real cases, essential for training complex and complicated clinical ethical issues [6, 12]. Analysis of actual cases is important because it reflects clinical reality and systematically organizes records and current clues to help solve moral issues. Therefore, case-based education is necessary to overcome these limitations.

This education suits training experts who can solve various medical situations and ethical challenges. Casebased communication skills training can connect core knowledge (theory) with core skills (practice).

THE FOUR BOXES



Fig. 1 The four boxes

This study aims to develop and apply an educational program to improve the competency of CACPs who are in charge of ethical issues related to life-sustaining treatment, analyze its effects, and provide solutions that can be suggested to medical staff, patients, and patients' families who are confused by moral problems.

Methods

Study design

We employed the explanatory sequential mixed method, which is a research method that interprets the overall results by converging and merging qualitative data with data based on quantitative data [13]. The explanatory sequential mixed method, one of the mixed research designs, helps discover phenomena that could not be discovered through quantitative research by helping with general logic and understanding through quantitative research, and adding qualitative research to enable analysis and modification of the statistical results of quantitative research [14, 15]. In this study's initial stage, quantitative data were collected and analyzed first, while qualitative data were collected and analyzed subsequently. For quantitative research, an equivalent control group pre- and post-test design was used to verify the effects of ethical decision-making and end-of-life care education programs on clinical decision-making ability, critical thinking disposition, knowledge of hospice and palliative care, and Global Interpersonal Communication Competence (GICC). For qualitative research, focus group interviews were conducted after the completion of the curriculum.

Sampling and sample size

The participants of this study were life-sustaining medical practitioners who understood the purpose and contents of the study and voluntarily agreed to participate. The inclusion criteria included those who work at general hospitals, general hospitals with an Ethics Committee of the Medical Institution, and meet at least one of the following four conditions: (1) Person in charge of lifesustaining treatment, (2) Person in charge of advance lifesustaining treatment, (3) Person in charge of the public ethics committee, and (4) Member of the medical institution ethics committee. There is no specific qualification guide for life-sustaining medical personnel designated by the state. This study adhered to the Declaration of Helsinki for research involving human participants [16].

The education period lasted 16 h, 4 h each week, from 7 August to 28 August 2021. The number of research participants was analyzed by setting power $1-\beta = 0.80$, significance level $\alpha = 0.05$ (two-tailed test), effect size f = 0.30, number of groups 2, number of repetitions, and withinbetween interaction in Repeated measure ANOVA method using G*Power 3.1.7 program; moreover, the calculated minimum number of samples was 24 in each group.

Sixty two participants were recruited considering the dropout rate of 20%; however, ultimately 10 participants were excluded, and the data were analyzed for 24 in the experimental group and 28 in the control group. After completing the CACPs' competency training program, 10 people who voluntarily agreed to the interview were sampled from the experimental group who participated in the training. The inclusion criteria included those with more than 3 years of experience in life-sustaining medical care at a higher general hospital, and could state, concretely and abundantly, their educational program experience. Samples were selected and research results interpreted carefully to reflect the characteristics of the population properly. The confidentiality and anonymity were explained to the participants; participants could withdraw from the study at any time, and there was no disadvantage. Focus group interviews were conducted after informing the participants that the collected data would be used only for research purposes and asking for consent to the recording.

Program development

We developed an educational program based on the analysis, design, development, implementation, and evaluation (ADDIE) stages of the ADDIE model [17].

First, the analysis step was used to define learning content and identify related factors, the education content, and the education period. Education methods of the CACP were further examined through related literature and previous studies [18–21]. To identify the actual educational needs, we conducted interviews with three nurses who are currently working in tertiary and general hospitals, and have more than 10 years of experience in intensive care units and oncology to discuss the content of education to reinforce clinical ethics capabilities. Through these studies, we confirmed the educational needs for problem-solving skills based on actual clinical cases, critical thinking skills to analyze the ethical positions of various parties, and knowledge of hospice and palliative care for counseling end-of-life patients and their families. Regarding the contents of education based on literature review and interviews, expert advice was received through e-mail from five people who have been in charge of life-sustaining treatment for over three years. These were two members of the medical institution's ethics committee, one with more than 10 years of experience in legal administration, and two nurses with more than 10 years of experience as nurses in the intensive care unit and oncology.

The second step was to establish the purpose and direction of the program. This program aimed to reinforce the practical communication skills of life-sustaining medical personnel, and lectures and group work were chosen as the specific teaching and learning methods.

Third, in the development stage, the program to be applied was developed based on the content determined in the first and second stages. The developed training program was verified, modified, and supplemented following the advice of seven experts, including three CACPs, one nurse in the hospice ward, one Doctor of Philosophy who majored in bioethics, one College of Nursing professor who had vast experience related to bioethics and mixed research, and one doctoral student at the College of Nursing with experiences related to mixed research and bioethics. Expert advice was received via e-mail, and the validity of the program content was calculated using the Content Validity Index (CVI) [22]. The CVI was 0.80 or higher for all items, confirming the content validity (Table 1).

 Table 1
 CACPs' competency enhancement program overview

Session	Contents	Educa-	Time
		tional method	(hrs)
1	Program orientation	Lecture	1
2	Bioethics and Critical Thinking (1) -Critical thinking and the analysis and evaluation of moral arguments	Lecture	3
3	Bioethics and Critical Thinking (2) - Moral Reasoning and Approaches to Bioethics	Lecture	2
4	Care for patients at the end of life (1) - Communication in end-of-life situations	Lecture	2
5	Care for patients at the end of life (2) - Care for patients at the end of life	Lecture	2
6	Training on decision-making and communication skills through clinical ethics cases (1) - Core value exercise - Role of the facilitator	Lecture	2
7	Training on decision-making and communication skills through clinical ethics cases (2) -Value conflicts between patients and their families Example 1. Patients and families blocking discussions on life-sustaining treatment plans and advance care plans Example 2. Discontinuation of life-sustaining treatment for a terminally ill patient with an advance directive for life- sustaining treatment but whose family opposes the decision to discontinue life-sustaining treatment	Practice (Discussion, Role Play)	2
8	Training on decision-making and communication skills through clinical ethics cases (3) - Value conflicts between medical professionals, families, and medical professionals Example 3. A doctor in charge who is not sure of the exact prognosis and is concerned about the judgment of the end-of-life process Example 4. A patient with insufficient decision-making capacity owing to insufficient communication between doc- tors about the end-of-life process	Practice (Discussion, Role Play)	1
9	Program evaluation	Discussion	1

Fourth, in the application process of the educational program, eight sessions of 16 h were conducted using a video conference platform (Zoom). In the first and second sessions, a four-hour lecture on "Critical thinking and the analysis and evaluation of moral arguments" was given to help CACPs promote critical thinking, which is the basis for decision-making ability in moral dilemma in clinical settings. In the third and fourth sessions, a hospice advanced practice nurse was invited to improve the care ability of patients at the end of their lives. In the fifth session, based on the four principles of the bioethics approach and "the four boxes" (5), a concrete case analysis was conducted to communicate moral dilemma situations. In the sixth to eighth sessions, we provided training to discover and apply core values that are important reference points for decision-making and a case scenario for the deliberation of the ethics committee of the medical institution. Then we trained for 40-50 min through group practice and discussion. To facilitate simulation training, the three facilitators were divided into teams to promote team activities.

Lastly, the evaluation stage verified the effectiveness and efficiency of the program. Questionnaires were distributed to participants who participated in the ethical decision-making process and end-of-life care curriculum, and the changes after the program's application were confirmed. Focus group interviews were conducted to identify the effects, satisfaction, and additional curriculum requirements.

Questionnaires

Clinical decision-making ability

Clinical decision-making ability was evaluated using the Clinical Decision-Making in Nursing Scale developed by Jenkins [23] and translated into Korean by Baek [24]. This tool uses a 5-point Likert scale comprising four subdomains with 40 questions. Cronbach's $\alpha = 0.83$ in Jenkins' study, Cronbach's $\alpha = 0.77$ in Baek's study, and Cronbach's $\alpha = 0.82$ in this study.

Critical thinking disposition

The critical thinking disposition tool was evaluated using a measurement tool developed by Yoon [25]. This is a 5-point Likert scale comprising seven subareas with 27 questions. The instrument's reliability at the time of development was Cronbach's $\alpha = 0.84$; in this study, Cronbach's $\alpha = 0.85$.

Knowledge about hospice and palliative care

The Palliative Care Quiz for Nursing (PCQN), developed by Ross et al. [26] and translated into Korean by Kim et al. [27], was used to evaluate the level of knowledge of hospice and palliative care. It comprises 20 questions in three subareas. The response method of the tool consists of "True," "False," and "I do not know." Correct, and wrong and unknown answers were scored 1 and 0 points, respectively, and the minimum and maximum scores were 0 and 20 points, respectively. The KR-20 score at the time of tool development was 0.78, and in this study, KR-20 was 0.62.

Global interpersonal communication competence

The communication ability measurement tool was Global Interpersonal Communication Competence (GICC), developed by Heo [28]. There were 15 questions on a 5-point Likert scale, with higher scores indicating better communication skills. The tool's reliability was Cronbach's $\alpha = 0.72$ in Heo's study and Cronbach's $\alpha = 0.86$ in this study.

Focus group interviews

For qualitative results, focus group interviews were conducted to examine CACPs' experiences with the competency-enhancing training curriculum, their satisfaction with education, and the need for future training. Focus group interviews were conducted online, non-face-toface, and via audio recordings. Three groups included 3–4 participants, and the interview lasted 40–60 min. The first transcription was completed within 48 h of the interview, and the two researchers cross-checked the accuracy of the transcription. The semi-structured questions were divided into the following types presented by Krueger [29]: opening, introduction, transition, core, and closing.

- Introduction: "Please tell us about your experience with the competency improvement training program for life-sustaining medical personnel."
- Transition: "What changes have occurred to you after experiencing the education program to improve the capacity of life-sustaining medical personnel?"
- Core: "What were the good and difficult aspects of the life-sustaining medical staff competency improvement training program?"
- Closing: "Please tell us if any future training is needed to improve the capabilities of life-sustaining treatment managers."

Data analysis

Quantitative statistical analysis

The data collected for quantitative analysis were analyzed using IBM SPSS/WIN Ver 25.0, and the analysis method was as follows. First, the participants' general characteristics were analyzed regarding real numbers, percentages, averages, and standard deviations. To verify the preliminary homogeneity of the study variables, analysis was performed using t-test and χ 2-test. Second, as a result of performing the Kolmogorov-Smirnov test to verify the

normality of the subject group, "Clinical decision-making ability," "Knowledge of hospice and palliative care," and "Global interpersonal communication competence" were non-normally distributed. Therefore, the Wilcoxon signed-rank test, a non-parametric statistical method, was used, and "Critical thinking disposition" was typically distributed and verified using a paired t-test.

Qualitative data analysis

For qualitative data analysis, focus group interviews were transcribed and analyzed using Microsoft Excel 2007 (Microsoft). Thematic analysis of Braun and Clarke [30] was used to identify and derive the relationship between the central theme and concept. Following the thematic analysis process described by Braun and Clarke, the participants first familiarized with the data by reading them several times and taking notes. Second, the data were organized into tentative codes. Subsequently, the codes were further organized into themes, which were finally defined and named. The data were examined by a nursing professor with extensive experience in qualitative research, a doctoral student, and a Doctor of Philosophy majoring in bioethics.

Ethical considerations

This study was conducted after obtaining approval (No. GIRB-A21-Y-0031) from the Institutional Bioethics Committee (IRB) of G University, J City. The purpose and significance of the study were explained to the participants and informed consent was obtained. During the investigation, the participants could terminate and withdraw from the consultation anytime. Moreover, their personal information was completely confidential. The inquiry data was only used for this study and not open for other purposes.

Rigor

To ensure the rigor of qualitative research, it was evaluated according to the standards presented by Guba and Lincoln [31]. To ensure credibility, the researchers selected participants with sufficient work experience in life-sustaining treatment, repeatedly checked the same questions in different forms during the interviews, and attempted to describe the participants' statements as they were. To increase applicability, the researchers continued to collect and analyze data cyclically until the participants' statements reached a theoretical saturation point at which new content was no longer produced [32]. To increase the consistency of the study, three researchers with extensive experience in qualitative research repeatedly discussed the data analysis and interpretation of results to ensure agreement. Lastly, neutrality was maintained during the data collection and analysis process by excluding the researcher's subjectivity and prejudice, and dividing the researcher's words through bracketing.

The interviews in this study were newly conducted for qualitative data in mixed research, and have not been published elsewhere outside of this study.

Results

General characteristics of the participant and verification of group homogeneity according to research variables

The average age of the study participants included in the experimental and control groups was 39.0 years old (48 women and 4 men), and the total work experience was 14 years; most of them were nurses (94.0%), two social workers, and one legal administrative worker. More than 90.0% of the participants belonged to general or upperlevel general hospitals. All variables of general characteristics such as gender, age, occupation, total work experience, and hospital size differed statistically insignificantly between the experimental and control groups before the competency enhancement training for CACPs; therefore, the two groups were verified as homogeneous. The homogeneity test using the pre-survey scores of the experimental and control groups showed no statistically significant differences in any study variable, indicating that the two groups were homogeneous (Table 2).

Effect of CACPs' competency enhancement program

This study assesses the results of quantitative research on the effectiveness of competency-building education for CACPs using the explanatory sequential mixed approach, followed by focus group interviews with participants to acquire qualitative data.

To confirm the effects of the program, the difference between the pre- and post-test scores of the experimental and control groups was analyzed (Table 3).

In "Clinical decision-making ability," the experimental group decreased from 3.63 ± 0.24 points to 3.61 ± 0.04 points out of 5 points, and there was no statistically significant difference (Z=-0.53, *p*=.594). The control group's score decreased from 3.51 ± 0.27 beforehand to 3.47 ± 0.04 afterwards, showing no statistically significant difference (Z=-0.76, *p*=.442).

In "Critical thinking disposition," the experimental group's score increased from 3.74 ± 0.24 points out of 5 beforehand to 3.95 ± 0.26 after, showing a statistically significant difference (t=-4.17, *p*<.001). The control group's score increased from 3.75 ± 0.29 to 3.83 ± 0.26 , but there was no statistically significant difference (t=-0.90, *p*=.371).

In "Knowledge of hospice and palliative care," the experimental group's score increased from 11.92 ± 2.43 points to 15.84 ± 3.28 points out of 20 points, showing a statistically significant difference (Z=-3.57, *p*<.001). The control group increased from 10.82 ± 1.76 points to

Table 2 Homogeneity test of general characteristics and study variables between groups at baseline (N = 52)

Variables	Characteristics	Exp. (n = 24)	Cont. (n = 28)	X ² or t	Р
	or range	n(%) or Mean±SD	n(%) or Mean	±SD	
Gender	Male Female	1(4.0%) 23(96.0%)	3(10.7%) 25(89.3%)	0.85	0.356
Age	-	40.40 ± 6.67	37.64 ± 5.54	1.64	0.107
Total Career	-	15.44±7.81	12.88±5.56	1.37	0.176
dol	Nurse Social worker Legal administration	21(88.0%) 2(8.0%) 1(4.0%)	28(100%) 0 0	3.56	0.169
Hospital Size	Advanced general hospital General hospital Nursing hospital	13(54.0%) 10(42.0%) 0 1(4.0%)	13(46.4%) 11(39.3%) 1(3.6%) 3(10.7%)	6.69	0.461
Clinical decision-making ability	1–5	3.63 ± 0.24	3.51 ± 0.27	1.71	0.092
Critical thinking disposition	1–5	3.74 ± 0.24	3.75 ± 0.29	-0.23	0.813
Knowledge of hospice and palliative care	0–20	11.92 ± 2.43	10.82 ± 1.76	1.89	0.064
Global interpersonal communication competence	1–5	3.79±0.39	3.82±0.39	-0.24	0.807
Even - overarimental group: Cont - control group					

Exp.=experimental group; Cont.=control group

Variables	Group	Pretest	Posttest	t or Z	p
		Mean ± SD	$Mean \pm SD$		
Clinical decision-making ability ^a	Exp. (n = 24)	3.63±0.24	3.61±0.04	-0.53	0.594
	Cont. (n = 28)	3.51 ± 0.27	3.47 ± 0.04	-0.76	0.442
Critical thinking disposition ^b	Exp. (n = 24)	3.74 ± 0.24	3.95 ± 0.26	-4.17	< 0.001
	Cont. (n = 28)	3.75 ± 0.29	3.83 ± 0.26	-0.90	0.371
Knowledge of hospice and palliative care ^a	Exp. (n = 24)	11.92 ± 2.43	15.84 ± 3.28	-3.57	< 0.001
	Cont. (<i>n</i> = 28)	10.82 ± 1.76	10.96 ± 1.99	-0.31	0.753
Global interpersonal communication competence ^a	Exp. (n = 24)	3.79 ± 0.39	3.86 ± 0.41	-0.45	0.647
	Cont. (<i>n</i> = 28)	3.82 ± 0.39	3.90 ± 0.36	-1.03	0.299

SD = Standard deviation, Exp.=experimental group; Cont.=control group, ^a Wilcoxon signed rank test, ^b Paired t-test

 10.96 ± 1.99 points, showing no statistically significant difference (Z=-0.31, *p*=.753).

In "Global interpersonal communication competence," the experimental group slightly increased from 3.79 ± 0.39 before to 3.86 ± 0.41 after, but there was no statistically significant difference (Z=-0.45, *p*=.647). The control group increased from 3.82 ± 0.39 to 3.90 ± 0.36 , but there was no statistically significant difference (Z=-1.03, *p*=.299).

Qualitative research results

The qualitative research results (Focus group interview) on the program's effectiveness are as follows. Ten clinical ethics counselors participated in the focus group interview, and the interview, conducted using a semistructured interview guide, lasted approximately 60 min. The average age of the participants was 40.0 years (range: 36–44 years), and the average duration of work experience related to life-sustaining treatment was 3.5 years.

The following five themes emerged from the focus group interview data: "Improvement of critical thinking

and ethical analysis training through education," "Feeling a lack of competence as a CACP," "Need for a facilitator for effective role-play discussion," "Preference for in-person education for better feedback and discussion," and "Demand for continuing education combining theoretical and practice ethical training."

"Improvement of critical thinking and ethical analysis training through education"

Participants considered the advantage of this program to be the ability to analyze ethical situations through critical thinking and argument analysis methods that were not covered in the existing curriculum provided by the government, but were needed by life-sustaining treatment managers. Participants learned how to solve numerous ethical issues encountered in clinical practice through simulation training and role play. The participants could recognize other aspects of the problem that they did not know well through the simulation training process, and learned how to approach the problem by understanding others and thinking logically through discussion. "To communicate effectively with patients and their families as a CACP, I needed training in critical thinking (for analysis of issues and ethical decisionmaking). Critical thinking skills through 'the four boxes' learned through moral argument training. This has improved, so I plan actually to apply this in practice next time." (Participant 1 in Group A).

"Through this training, I learned that each CACP may make different clinical decisions while resolving ethical issues during the life-sustaining treatment decision-making process. Through others, I could see different sides of an issue and learn decision-making skills along with logical thinking." (Participant 2 in Group B).

"Feeling a lack of competence as a CACP"

Regarding the reason the knowledge score on hospice and palliative care was low, one participant said that not all people in charge of life-sustaining care have high knowledge of hospice and end-of-life care, and that it is difficult to know precisely unless it is a specialty in which the person worked in the past. Therefore, continuous education is required.

Participants found that case education through simulation training was effective in improving their poor communication skills, and wanted to receive not only knowledge-free but also specific feedback from experts at any time during the process of communicating with group members.

"Not all CACPs have high hospice knowledge. Although I worked in the intensive care unit for a long time in the past, I did not deal with cancer patients, so I did not have basic knowledge about drugs used for terminal cancer patients, such as morphine. Therefore, continuous knowledge education is necessary." (Participant 2 in Group C).

"I think that to improve the communication skills of those in charge of life-sustaining treatment in clinical settings, simulation training education based on actual counseling cases should be developed and continued. Even during the training process, I would like to ask experts in detail about any questions I have." (Participant 3 in Group B).

"Need for a facilitator for effective role-play discussion"

Participants felt a leader needed to lead an effective discussion during the simulation training process through role-play. This is because if a discussion is held without a moderator, it may deviate from the topic or the discussion may stop. "During the mock training communication process, it was helpful for the management to intervene in the middle of the training and provide feedback, but since there was no leader who led the entire group and played a central role, there were concerns that 'were we missing an important part of the training" (Participant 1 in Group A).

"Preference for in-person education for better feedback and discussion"

Regarding the part of this training that was conducted non-face-to-face owing to the COVID-19 pandemic, the participants hoped that future training would be conducted face-to-face so that they could freely receive feedback from experts and have more active discussions during this series of training courses.

"In order to make the simulation training course discussion more active, it seems important to freely receive feedback from experts during the discussion. This training was a non-face-to-face, so those aspects were disappointing, but I think it will be more effective if it is a face-to-face training next time." (Participant 2 in Group C).

"Demand for continuing education combining theoretical and practice ethical training"

Participants wanted to continue education that included not only knowledge education related to the end of life and theoretical education to develop logical thinking, but also practical training that can improve ethical decisionmaking. This type of education provides better psychological and physical care to patients, and helps in the counseling process with patients and their families.

Additionally, one participant said that systematic education on quality management should continue to increase the practical capabilities of those in charge of life-sustaining treatment.

"For CACPs to communicate effectively with patients and their families in practice, it seems important that education that combines end-of-life knowledge and logical thinking education with practical casebased simulation training, like this one, continues." (Participant 1 in Group C).

"If clinical ethics meetings such as EGR are held regularly using actual cases of various clinical problem situations, it will not only provide education to improve the ethical decision-making ability of medical staff but also serve as a channel for hospital officials to become interested in life-sustaining treatment systems. Could it be possible?" (Participant 3 in Group A).

Table 4 Synthesis of quantitative and qualitative research results

Domain	Quantitative result	Qualitative quotes	Inference
Critical thinking disposition	Critical thinking disposition increased statistically significantly (t=-4.17, p <.001)	"To communicate effectively with patients and their families as a CACP, I needed training in critical thinking (for analysis of issues and ethical decision-making). Critical think- ing skills through "the four boxes" learned through moral argument training. This has improved, so I plan actually to apply this in practice next time." (Participant 1 in Group A) "For CACPs to communicate effectively with patients and their families in practice, it seems important that education that combines end-of-life knowledge and logical think- ing education with practical case-based simulation training, like this one, continues." (Participant 1 in Group C)	The four boxes approach is useful for improving the critical thinking skills of CACPs for ethical decision-making.
Knowledge of hospice and pal- liative care	Knowledge of hospice and palliative care increased statistically significantly (Z=-3.57, p <.001)	"Not all CACPs have high hospice knowledge. Although I worked in the intensive care unit for a long time in the past, I did not deal with cancer patients, so I did not have basic knowledge about drugs used for terminal cancer patients, such as morphine. Therefore, continuous knowledge education is necessary." (Participant 2 in Group C)	CACPs recognized the need for ongo- ing education in the knowledge of hospice and palliative care to enable them to provide psycho- logical and physical support to patients and their families.
Clinical decision- making ability	Clinical decision- making ability is not statistically significant (Z=-0.53, p=.594)	"Through this training, I learned that each CACP may make different clinical decisions while resolving ethical issues during the life-sustaining treatment decision-making pro- cess. Through others, I could see different sides of an issue and learn decision-making skills along with logical thinking." (Participant 2 in Group B) "If clinical ethics meetings such as EGR are held regularly using actual cases of various clinical problem situations, it will not only provide education to improve the ethical decision-making ability of medical staff but also serve as a channel for hospital officials to become interested in life-sustaining treatment systems. Could it be possible? "(Partici- pant 3 in Group A)	CACPs were trained in how to resolve eth- ical issues that arise in clinical practice through role-playing simulation training.
Global interpersonal communication competence	Global interpersonal computication competence e is not statisti- cally significant (Z=-0.45, p=.299)	"During the mock training communication process, it was helpful for the management to intervene in the middle of the training and provide feedback, but since there was no leader who led the entire group and played a central role, there were concerns that were we missing an important part of the training" (Participant 1 in Group A) "I think that to improve the communication skills of those in charge of life-sustaining treatment in clinical settings, simulation training education based on actual counseling cases should be developed and continued. Even during the training process, I would like to ask experts in detail about any questions I have." (Participant 3 in Group B)	Education is sought so that CACPs can act as facilitators who lis- ten to and empathize with the stories of patients, families, and medical staff in the process of making decisions about end- of-life treatment

"In order to manage the quality of life-sustaining medical services, systematic education, such as statistics and information management education, theoretical knowledge education related to law and ethics, and case studies, must be continued for those in charge of life-sustaining treatment." (Participant 2 in Group B).

Discussion

This study investigates the effects of ethical decisionmaking and end-of-life care education programs on the clinical decision-making ability, knowledge of hospice and palliative care, critical thinking disposition, and Global interpersonal communication competence of CACPs. To reinforce the explanatory power and importance of the study by supplementing the quantitative research results with qualitative research results, the explanatory sequential mixed method was applied. Table 4 shows the basis for supplementing the quantitative results with qualitative results.

This study found that the critical thinking disposition of life-sustaining medical personnel was significantly higher in the experimental group than in the control group. In the focus group.

interview, the participants were satisfied with the training because they did not have the opportunity to receive such education, because they needed education to improve critical and logical thinking for ethical decision-making to work as life-sustaining medical practitioners. The ability to think critically improved with "the four boxes" learned through moral argument education. In previous studies, case-based discussion learning was applied to an online ethics education module to improve the ethical decision-making ability and capacity of occupational therapists, clinicians, and educators [19]. The critical thinking ability of medical and nursing students was improved through case studies and group

discussions applying a problem-based learning curriculum between clinical ethics professionals [20]. CACPs are required to have the ability to make decisions on complex ethical issues that arise in end-of-life care situations. In this situation, medical practitioners' thinking processes become more complicated, and it is important to use critical thinking accordingly [33]. Critical thinking promotes ethical problem-solving and ensures patientcentered decision-making in the clinical ethics counseling of CACPs; however, current education lacks a focus on critical thinking for ethical decision-making; therefore, it should be included in education. "The four boxes" is among the approaches used to make decisions about ethical issues arising from life-sustaining medical decisions and reservations. This is a rational decision-making approach that links the principles of respect for autonomy, prohibition of evil and good deeds, and justice presented in clinical ethics with specific medical facts and details [34]. In other words, if life-sustaining practitioners use "the four boxes," they can develop ethical reasoning skills because the quadrants contain ethical reasoning that allows them to make more rational decisions based on a wide range of medical facts and details. "The four boxes" are tools for understanding how abstract moral principles relate to concrete problem situations, and how these principles guide decision-making in specific clinical ethical situations.

The pre-post knowledge of hospice and palliative care scores of the experimental group were significantly improved compared with the control group, through the CACP competency enhancement program applied in this study. This mirrored the result of the statistically significant improvement in the degree of knowledge after the education in a previous study [35] that applied a hospice and palliative care education program. In the focus group interview, the participants said that they needed to know about hospice care to discuss what kind of psychological and physical help they could provide to patients and their families. Hospice and palliative care knowledge are affected by the relevant departments, experience with terminal care, and the presence or absence of education. The life-sustaining medical personnel who participated in this education have various specialized fields, and all basic knowledge about hospice care is different; therefore, it is necessary to educate them by dividing the basic process and deepening the process related to the end of life

There was no significant difference between the experimental and control groups in clinical decision-making ability evaluated through quantitative research after education. In the focus group interview with educated people, each person in charge of case education through simulation training could make different situation analyses and ethical decision-making, and learn these through others. They stated that continuous simulation training is needed to cultivate ethical decision-making abilities. Case-based simulation training is needed to compensate for the lack of current education, and ethical grand rounds (EGRs) or moral case deliberations (MCDs) can be alternatives. EGR and MCD [36] are programs that raise structured moral questions through specific clinical practices and train various conversational ways to resolve these questions [7]. In foreign countries, EGR [37] and MCD [38] are widely applied by medical students and clinicians as educational strategies to reinforce the ethical decision-making abilities of medical personnel. A discussion-based curriculum on clinical medical ethics topics improved the clinical decision-making skills of clinicians, medical students, social workers, and pastors [39]. Various methods such as theoretical lectures, literature reading, case studies, problem-based learning, roleplay, simulation activities, narrative, storytelling, and small group discussions are used as learning strategies to enhance the ethical competence of prospective medical professionals and medical professionals [40]. To improve the quality of clinical ethics counseling by improving the ethical decision-making ability of CACPs, it is necessary to train life-sustaining medical practitioners using various learning strategies, such as adding EGR and MCD programs to existing theoretical education or applying case-based scenario learning.

There was no statistically significant difference in the Global interpersonal communication competence of the CACPs between the experimental and control groups. As a result of the qualitative research, the participants expressed the need for a leader who led the whole group and played a central role in the simulation training that was attempted in this training program, and an education program that can improve the communication ability of life-sustaining medical personnel should be continued. Life-sustaining medical practitioners should function as clinical ethics counselors and facilitators. A facilitator listens to and sympathizes with patients, patient families, and medical staff confused by ethical problems arising from the life-sustaining medical decision-making process, and helps them make appropriate and ethically correct decisions. To perform this role effectively, this educational program facilitates life-sustaining medical staff. It manages the basic concept of the facilitator, the function of facilitation, the principle of facilitation, and finding common core values based on the design-thinking technique as a facilitator practice. However, there is a lack of facilitator training in existing life-sustaining medical personnel training [21]; therefore, it is necessary to reinforce capacity-increase training as a facilitator in future life-sustaining medical personnel training.

In previous studies, simulation-based palliative care communication skills workshops improved hospice

communication skills among internal medicine residents, professional fellows, nursing college students, and community-based nurses [41]. For CACPs to effectively lead conversations with patients and their families at the end of their lives, various types of education, such as roleplaying and knowledge education are recommended; the SPIKES protocol developed by Baile et al. [42] can be an alternative. This is a common communication tool designed and used to provide healthcare providers access to systematically inform them of bad news. The use of SPIKES protocols for complex communication tasks such as poor prognosis delivery has been shown to improve the self-confidence and competence of healthcare professionals, reduce anxiety, prevent miscommunication, and increase patient participation in decision-making [43, 44]. Additionally, as confirmed in the qualitative study, educators should be prepared to intervene directly in the training process and provide guidance on team dynamics when planning for education.

Limitations

In this study, most participants in the control group were nurses. This is consistent with research suggesting that nurses account for the largest proportion of personnel responsible for life-sustaining treatment [45]. Repeated research is needed to expand the number of institutions participating in future research and increase the possibility of generalizing the research results by securing the number of participants in multiple occupations. Additionally, in this study, it was difficult to perform face-to-face activities owing to the COVID-19 pandemic. Therefore, all education was conducted as non-face-toface activities, which may have affected group activities. Although the effect of education on knowledge transfer does not deteriorate even if it is conducted through online education, it is more efficient to conduct a case analysis process that requires group activities offline; therefore, we propose a blended learning education method in future [46]. Blended learning is an educational method that enables educators to deliver content in class more deeply and efficiently by conveying learning initiatives to learners [47].

The educational program developed in this study positively affected improving critical thinking ability and knowledge of hospice and palliative care in CACPs, but the effect was not confirmed in clinical decision-making ability and communication ability; therefore, further research on these two variables is needed.

Conclusion

The significance of this study is the development of an educational program to improve the problem-solving ability of domestic CACPs in life-sustaining medical decision-making system tasks, and to confirm the effect of applying a mixed research method. The case-based, role-playing intervention was successful in improving participants' skills in communication and critical thinking ability related to life-sustaining treatment. Sustainability of core knowledge and skills is desired, as demonstrated by participants' emphasis on continuous education and commitment to professional growth, with the aim of improving the care provided to patients, families, and colleagues.

Abbreviations

ADDIE	Analysis, Design, Development, Implementation, and Evaluation
CACP	Coordinator of Advanced Care Planning
EGR	Ethical grand rounds
GICC	Global Interpersonal Communication Competence

- MCD Moral case deliberation
- MCD Moral case deliberation
- SPIKES Setup, Perception, Invitation, Knowledge, Emotions with Empathy, Strategy or Summary

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions

All authors made substantial contributions to the conception and design of the study. Data was collected by SMJ, PJR. Data analysis and interpretation were done by SMJ, RJH and PJR. SMJ, RJH, and PJR conducted the intervention. SMJ, RJH and PJR participated in drafting the manuscript. All authors revised the manuscript critically for important intellectual content and final approval of the manuscript.

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Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Institutional of Review Board at Gyeongsang National University (No. GIRB-A21-Y-0031). Informed consent was obtained from the participants who agreed to participate in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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