

Development and Effectiveness of an
End-of-Life Care Program for
Faculty in the Critical Care Field
: A Randomized Controlled Trial

（クリティカルケア領域の指導者層を
対象としたエンド・オブ・ライフケア
プログラムの開発と効果：ランダム化
比較試験）

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Development and Effectiveness of an End-of-Life Care Program for Faculty in the Critical Care Field

A Randomized Controlled Trial

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In Japan, end-of-life care education in the critical care field is still insufficient. Therefore, this study developed and verified the effectiveness of an end-of-life care program for faculty in the critical care field in Japan through a randomized controlled trial. The study was implemented from September 2016 to March 2017. Participants were 82 college teaching staff and nurses working in the critical care field. Six months after the program, data of 37 members (84.1%) of the intervention and 39 members (88.6%) of the control group were analyzed. The results demonstrated that the primary end point—"confidence in teaching" 6 months after program completion—differed significantly between the 2 groups (2.5 [0.69] in the intervention group vs 1.8 [0.46] in the control group, $P < .001$). It is suggested that attending this program will give faculty in the field of critical care continued

confidence in their end-of-life care teaching, as well as allow them to implement end-of-life care teaching in their field.

KEY WORDS

critical care, education, ELNEC, end-of-life care

Currently, Japan has the highest rate of population aging in the world, at 29.1%.¹ This situation has led to an increase in comorbid diseases and has made medical care more complex in the country.² The number of intensive care unit (ICU) beds in Japan is also growing each year as the rate of population aging climbs and medical care becomes increasingly complicated.³ In the ICU and other critical care settings, the patient's end-of-life (EOL) may often be extremely short and spent in a state in which the patient cannot make his/her own decisions. The *Guidelines on End-of-Life Care in Emergency & Intensive Care Medicine: Proposals from Three Academic Societies*⁴ was published in 2014 as a way to support medical professionals' decisions on how to handle EOL care in the critical care field (hereafter CC-EOL care), further evidencing the growing importance of this type of care in this field.

Concerning CC-EOL care education outside Japan, in America, the End-of-Life Nursing Education Consortium (ELNEC) developed the ELNEC-Critical Care curriculum in 2006, which is used to provide EOL care education specifically to professionals in the critical care field.^{5,6} Other countries have conducted research on simulation-based education regarding EOL care in the ICU,⁷ as well as included decision-making support as a part of the curriculum⁸ and education on communication skills.⁹ However, none of these other countries seem to have systematic, comprehensive teaching materials for nurses such as ELNEC-Critical Care. In Japan, the Japanese Society of Intensive Care Medicine has been sponsoring the annual

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Lecture on Mental and Emotional Care for Families of End-of-Life Patients in Intensive Care and Lecture on Clinical Ethics since 2011, and CC-EOL care education is slowly becoming more prevalent. Nonetheless, there are still many studies on the dilemmas and difficulties in CC-EOL care,¹⁰ and CC-EOL care education is not yet adequately widespread.

Therefore, CC-EOL care teaching materials intended to promote the dissemination of CC-EOL care education were created, and a program for faculty was developed. Bandura¹¹ stated that the more self-efficacy one holds toward a given behavior, the more likely one is to adopt that behavior. Thus, this study hypothesizes that faculty members will be more likely to teach CC-EOL care if their confidence in EOL care teaching is maintained for 6 months after program completion. This study aimed to evaluate whether faculty members who attended the program maintained their confidence in EOL care teaching compared with those who did not attend, 6 months after program completion.

METHODS

Development of Teaching Materials

Selection and Organization of Members of the Teaching Materials Development Team

A Teaching Materials Development Office at the Kyoto University was established, and a Development Project Team was formed as a subordinate organization. The Development Project Team comprised 30 university teaching staff in the field of critical care and nurses specializing in care for acute and critically ill patients. The team also collaborated with and included advisors from the ELNEC main office and the ELNEC-Japan (ELNEC-J) Core Curriculum Development Team; this served to enable cooperation with the ELNEC office as needed. Teaching materials were developed with approval from the ELNEC main office.

Participation in the ELNEC Critical Care Seminar

The Kyoto University internationalization promotion support program (representative: Kazuko Nin) extended an invitation to 2 American ELNEC-Critical Care instructors, who then held the first ELNEC-Critical Care course in Japan on September 27-28, 2014. Twenty-eight members of the teaching materials development team participated in the seminar. Attending members obtained a copy of the ELNEC-Critical Care teaching materials (in English) and a certificate of course completion.

Creation of the 2015 ELNEC-J Critical Care Curriculum Guide for Faculty

Regarding the creation of the 2015 ELNEC-J Critical Care Curriculum Guide for Faculty (hereafter CC-EOL teaching materials), first, the team proceeded with a comparison and review of the ELNEC-Critical Care teaching materials using the ELNEC-J Core Curriculum Guide for Faculty,

TABLE 1 Modules of the Faculty Training Program Using the Teaching Materials on End-of-Life Care in the Critical Care Field

Module	Name of Module
1	Nursing in End-of-Life Care
2	Pain Management
3	Symptom Management in End-of-Life Care
4	Ethical Issues in End-of-Life Care
5	Consideration of Cultural and Spiritual Dimensions in End-of-Life Care
6	Communication: Supporting Patient and Family Decision-Making
7	Loss, Grief, and Bereavement
8	Final Hours of Life

which had already been developed in Japan. In this step, specific contents pertaining to the field of critical care in Japan were added to create the CC-EOL teaching materials. The 8 modules are outlined in Table 1.

Next, each module of the CC-EOL teaching materials underwent 2 rounds of peer review by the teaching materials development team members to reevaluate whether the content was consistent with the current status of the critical care field in Japan. Qualifications for users of the guide and seminar attendees were also determined.

Last, the CC-EOL teaching materials underwent review by a team of 15 outside experts, comprising developers of the ELNEC-J Core Curriculum Guide for Faculty and doctors and nursing teachers in the field of critical care, to evaluate content validity and consistency from the perspective of Japanese academicians in this field.

Development of a Faculty Training Program Using the CC-EOL Teaching Materials

The development of the faculty training program using the CC-EOL teaching materials (hitherto, the program) was based on Knowles¹² theory of adult education, and the content occasionally included lecture videos to facilitate independent study. Past research on CC-EOL care education⁷⁻⁹ has found that incorporating scenario and group work methods is highly effective; thus, the program also used scenario-based role-play and group work. Moreover, as having a teaching plan improves teaching performance,¹³ the program also included sections on how to create a teaching plan and effective teaching methods. The contents of the program are shown in Table 2.



TABLE 2 Program Contents

Time Required, min	Form	Contents
Day 1		
30	Lecture	Introduction
60	Lecture	Effective Teaching Methods: Adult Education, Flipped Classroom, Participant Analysis, Goal Setting
30	Lecture	Module 1: Nursing in End-of-Life Care
30	Lecture	Teaching Methods Point 1: How to Use PowerPoint? How to Make Effective Presentations? What is a Facilitator?
30	Lecture	Module 2: Pain Management—
30	Lecture	Module 3: Symptom Management in End-of-Life Care—
15	Lecture	Teaching Methods Point 2: Group Work and Case Studies
55	Group work	How to use Case Studies
30	Lecture	Module 4: Ethical Issues in End-of-Life Care
30	Lecture	Module 5: Consideration of Cultural and Spiritual Dimensions in End-of-Life Care
30	Lecture	Module 6: Communication—Supporting Patient and Family Decision-Making
Day 2		
10	Lecture	Teaching Methods Point 3: Role Play
55	Group work	How to Use Role Play
30	Lecture	Module 7: Loss, Grief, and Bereavement
30	Lecture	Module 8: Final Hours of Life—
20	Lecture	How to Create a Teaching Plan
90	Group work	Develop an Instructional Plan Based on Participant Analysis
30	Lecture	How to Organize the ELNEC-J Critical Care Curriculum Nurse Education Program
45	Group work	Set Action Goals for the Year

Abbreviation: ELNEC-J, End-of-Life Nursing Education Consortium-Japan.

Evaluation of the Effectiveness of the Program for Faculty

Study Design

An open randomized controlled trial between September 2016 and March 2017 (UMIN 000021348) was conducted.

Setting and Participant Recruitment

Participants were 82 college teaching staff and nurses working in the critical care field. In this study, the field of critical care refers to the care for sudden, life-threatening conditions arising in individuals in all stages and care settings, and undergoing all types of illness and medical treatments.

Specifically, nurses working in the field of critical care are those working in intensive care units, critical care units, and emergency and surgery wards. The participants were not compensated for their participation in the study.

Inclusion and Exclusion Criteria

Individuals in a leadership position in the field of critical care were those who met the following inclusion criteria: for nurses, (1) those with at least 5 years of clinical experience in a field such as critical care and in at least a low-level leadership position in their department, and (2) those who intend to teach EOL or critical care nursing at their institution/community and who could obtain approval/

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recommendation from the institution's director/head of nursing; for university teaching staff, (1) those involved in teaching EOL or critical care in an educational institution such as a nursing vocational school or college and (2) those who intended to teach EOL or critical nursing care at their institution/community and who could obtain approval/recommendation from the institution's director/faculty (department) head.

Those who had already taken the ELNEC-J Core Curriculum when it was under development in Japan were excluded.

Participant Enrollment

Research participants were recruited from a mailing list of nurses specializing in care for acute and critically ill patients with permission from the Japanese Nursing Association and the Nin laboratory of Graduate school at Kyoto University website.¹⁴ All 82 participants provided written consent after receiving a written explanation of the study in an informed consent form that had been approved by the ethics review board. After submitting the consent forms by mail, participants were asked to complete a pre-intervention self-administered questionnaire and were enrolled in the study.

Randomization

After participant enrollment, stratified randomization was performed. Strata were defined by presence or absence of experience in EOL care teaching. The procedures were as follows: a researcher recorded the basic data collected from the participant and assigned it a research ID. Then, files noting whether the participant had experienced EOL care teaching and their research ID were sent to an assignment supervisor affiliated with a third-party institution independent of the research organization; this supervisor assigned participants using a computer-generated random number table. The results of allocation were concealed from all instructors and participants until one month before the program.

Intervention and Data Collection

Participants were divided into an intervention group that attended the program and a control group that did not attend it. The educational content is shown in Table 2. Participants in the intervention group were asked to complete a self-administered questionnaire immediately after the program. The same questionnaire was sent by mail 3 and 6 months later. The same questionnaire was also sent 3 times to participants in the control group, at the same time points as the intervention group (ie, immediately after, 3 months after, and 6 months after the program). Reminders were sent by mail, and only those who responded within a week were included in the analysis.

End-of-Life Nursing Education Questionnaire

The questionnaire included the 20-item End-of-Life Nursing Education Questionnaire,¹⁵ which is divided into 5 subscales related to EOL teaching for faculty: "confidence in teaching" (4 items), "motivation for teaching" (4 items), "preparation to provide teaching" (4 items), "preparation to lead initiatives in EOL care" (4 items), and "expected influences on participants" (4 items). Responses are provided on a 5-point scale ranging from 1 to 5 (lowest rating to highest rating), and its reliability and validity have been verified (Cronbach's α ranged from 0.84 to 0.97, and interclass correlation coefficients for test-retest reliability were 0.63-0.76).¹⁵

Outcome Measures

Data were collected on age, sex, current workplace, address of current workplace, educational attainment, years of clinical experience in critical or EOL nursing care, job position, qualification, and education experience.

The primary end point was confidence in teaching CC-EOL care 6 months after attending the program. The secondary end points were motivation for teaching, preparation to provide teaching, preparation to lead initiatives in EOL care, and expected influence on participants concerning teaching CC-EOL care immediately after, 3 months after, and 6 months after attending the program.

Sample Size Calculation

In a study by Takenouchi et al,¹⁵ the mean confidence in teaching EOL care after a training program was 2.5 (0.8) and that before attending the program was 1.9 (0.6). On the basis of these previous data, the necessary sample size for this study was 29 participants per group when considering a standard deviation of 0.8, a significance level (α) of 5% (2-tailed), and a power ($1 - \beta$) of 80%. Then, assuming a dropout rate of 30%, the sample size was set to 82 participants for both groups.

Statistical Methods

All analyses were performed on an intention-to-treat basis, although participants who did not attend the program or evaluation were excluded from the analyses. No masking of evaluators or subjects was done (open trial). Data were summarized as numbers and percentages for categorical variables and means (SDs) for numerical variables. Comparison of the 2 groups at baseline was conducted using a 2-sample *t* test because of the normal distribution for age, years of experience as a nurse, and years of experience as a nursing teacher, and χ^2 test for sex, education experience, current workplace, qualification, difficulty of EOL care, necessity of the program, and existence of the program. Differences in mean values immediately after, 3 months after, and 6 months after attending the program were evaluated using a 2-sample *t* test. Effectiveness immediately after, 3 months after, and 6 months after

attending the program was evaluated using age, sex, educational experience, and baseline data as covariates. The 2-tailed significance level was set to less than 5%. Statistical analyses were performed using SPSS version 25.0 (IBM Corp, Armonk, New York).

Ethical Considerations

The study was conducted in accordance with the “Personal Information Protection Law” and the “Ethical Guidelines for Medical Research Involving Human Subjects.” All procedures were conducted in accordance with the Declaration of Helsinki. The study was conducted after providing participants with an explanation of its purpose, objective, and method, and obtaining their written informed consent. This study was approved by the medical ethics committee of the Kyoto University Graduate School of Medicine (registration number C1336). Note that the control group was offered the opportunity to attend the program as soon as the 6-month postintervention questionnaire was completed.

RESULTS

Baseline Participant Characteristics

In total, 90 participants were enrolled in the study, with 44 assigned to the intervention group and 46 assigned to the control group. Of those assigned to the intervention group, 37 attended the program. Six months after the program, data of 37 members (84.1%) of the intervention group and 39 members (88.6%) of the control group were analyzed (Figure 1). Table 3 shows the baseline characteristics of participants who were included in the analysis. There were no significant differences between the 2 groups.

Comparison of Mean Score for the ELNEC of the Intervention and Control Groups in Each Period and Over Time

Figure 2 shows participants' mean scores for ELNEC immediately after, 3 months after, and 6 months after attending the program. The mean confidence in teaching 6 months

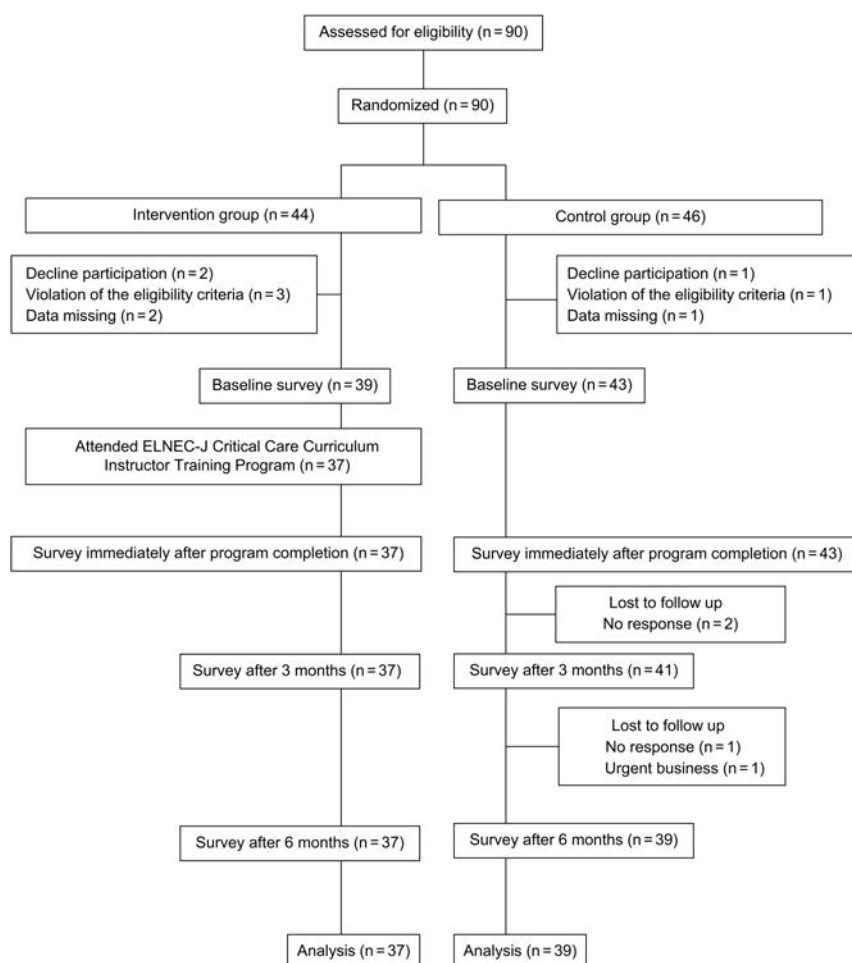


FIGURE 1. Participant flowchart.

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TABLE 3 Baseline Characteristics of Analyzed Subjects (N = 76)

	Intervention Group (n = 37)	Control Group (n = 39)	P value
Age, mean (SD), y	39.3 (6.4)	39.1 (6.7)	.925
Sex (female), n (%)	32 (86.4)	30 (76.9)	.378
Years of experience as a nurse, mean (SD)	15.8 (6.7)	16.3 (7.0)	.767
Years of experience as a nursing faculty, mean (SD)	7.6 (4.9)	7.6 (4.4)	.960
End-of-life care education experience (yes), n (%)	9 (24.3)	13 (33.3)	.453
Work experience, n (%) ^a			
Intensive care unit	26 (70.3)	28 (71.8)	1.000
Emergency unit	16 (43.2)	20 (51.3)	.501
Surgery department	20 (54.1)	23 (59.0)	.817
Other	10 (27.0)	11 (28.2)	1.000
Qualification and job position, n (%) ^a			
Critical care nursing CNS	3 (8.1)	10 (25.6)	.066
Gerontological nursing CNS	0 (0.0)	1 (2.6)	1.000
Emergency nursing CN	3 (8.1)	5 (12.8)	.712
Intensive care CN	6 (16.2)	1 (2.6)	.053
Cancer pain management nursing CN	1 (2.7)	0 (0.0)	.487
Other CN	3 (8.1)	1 (2.6)	.352
Chief nurse	5 (13.5)	3 (7.7)	.475
Sub chief nurse	10 (27.0)	13 (33.3)	.622
Nurse	15 (40.5)	15 (38.5)	1.000
Assistant professor	2 (5.4)	1 (2.6)	.610
Assistant	1 (2.7)	1 (2.6)	1.000
Difficulty of end-of-life care (yes), n (%)	33 (89.2)	34 (87.2)	1.000
Necessity of the program (yes), n (%)	37 (100.0)	38 (97.4)	1.000
Existence of the program (yes), n (%)	6 (16.2)	5 (12.8)	.752

Abbreviations: CN, certified nurse; CNS, certified nurse specialist.
^aMultiple choice was allowed.

after program completion—the primary end point—was found to differ significantly between the 2 groups (2.5 [0.69] in the intervention group vs 1.8 [0.46] in the control group, $P < .001$). The secondary end points of preparation to provide teaching, preparation to lead initiatives in EOL care, and expected influences on participants all showed significantly higher mean scores in the intervention than in the control groups immediately after, 3 months after,

and 6 months after attending the program. However, motivation for teaching did not differ significantly between the 2 groups in any period.

Program Effectiveness in Each Period

Confidence in teaching, preparation to provide teaching, preparation to lead initiatives in EOL care, and expected influences on participants were found to differ significantly

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between the 2 groups immediately after, 3 months after, and 6 months after attending the program even when age, sex, previous experience with EOL education, and baseline data were entered as covariates. Variation was particularly high for preparation to provide teaching. Meanwhile, variation was low for motivation for teaching, and a significant difference was not found (Table 4).

DISCUSSION

This study evaluated the effects of the program for faculty in the critical care field through a randomized controlled trial. The results demonstrated that the program could sustain confidence in teaching over a 6-month period after intervention. Takenouchi et al¹⁵ also studied a program that

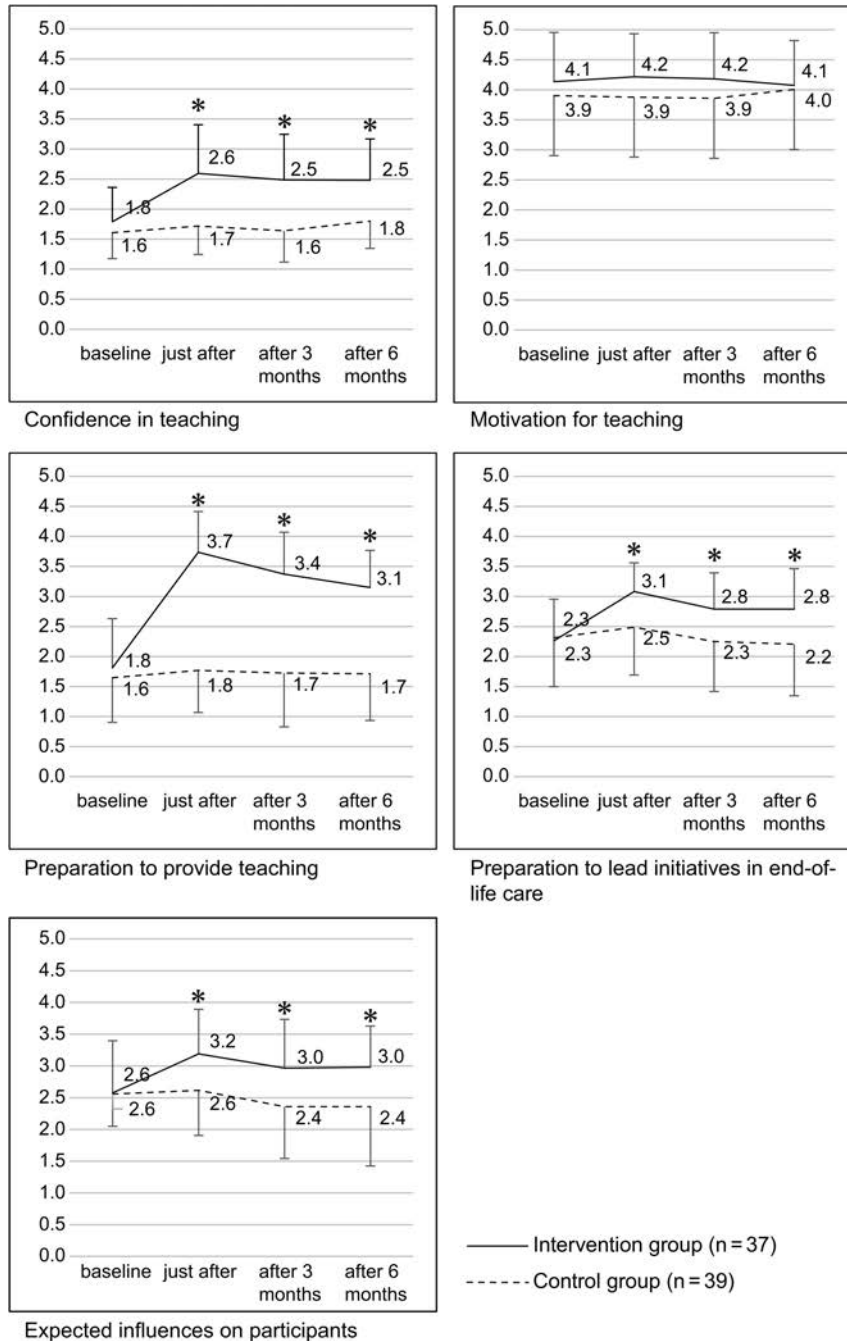


FIGURE 2. Comparison of the mean scores for the End-of-Life Nursing Education Questionnaire by group, period, and subscales. Results are based on t tests. *P < .05.

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TABLE 4 Effectiveness of the Program in Each Period by Each Interest Variable (N = 76)

Domain		Variation (Intervention Group–Control Group)	95% CI	P value ^a
Confidence in teaching	Just after	0.796	0.511-1.081	<.001
	After 3 mo	0.760	0.475-1.046	<.001
	After 6 mo	0.612	0.362-0.862	<.001
Motivation for teaching	Just after	0.219	0.046-0.484	.104
	After 3 mo	0.213	-0.107 to 0.532	.189
	After 6 mo	0.015	-0.303 to 0.273	.103
Preparation to provide teaching	Just after	1.876	1.596-2.156	<.001
	After 3 mo	1.527	1.194-1.860	<.001
	After 6 mo	1.371	1.078-1.664	<.001
Preparation to lead initiatives in end-of-life care	Just after	0.636	0.415-0.858	<.001
	After 3 mo	0.603	0.36-0.845	<.001
	After 6 mo	0.643	0.358-0.927	<.001
Expected influences on participants	Just after	0.564	0.279-0.849	<.001
	After 3 mo	0.609	0.278-0.941	<.001
	After 6 mo	0.657	0.306-1.009	<.001

Abbreviation: CI, confidence interval.
^aAnalysis of covariance; covariates: age, sex, end-of-life care educational experience, baseline data.

increases confidence in teaching, but their study only demonstrated effectiveness preintervention and postintervention. Meanwhile, the current study had a 6-month follow-up, period and used a randomized controlled trial design to offer strong evidence of the program's effects on teaching CC-EOL care.

Preparation to provide teaching, preparation to lead initiatives in EOL care, and expected influences on participants were found to differ significantly between the 2 groups, whereas only motivation for teaching did not. This may owe to sample characteristics, as roughly 40% of the participants were nurses holding certified nurse specialist or Japanese Nursing Association certification, and “intention to teach” was a requirement for participation. Certified nurse specialist– or Japanese Nursing Association–certified nurses have a duty to “fulfill an educational role for nursing professionals to improve care quality.”¹⁴ Takenouchi et al's¹⁵ study with faculty also found no change in score for motivation for teaching from preintervention to postintervention, and it may be that the participants already had a high motivation for teaching from the start; this may also explain the similar results in this study.

The scores for the secondary end points of preparation to provide teaching and expected influences on participants were also found to be significantly higher in the intervention group than in the control group. This is likely because the program included sections on effective teaching methods and how to create a teaching plan. As it is considered that content learned in a class using lecture alone is largely forgotten 2 weeks later,¹⁶⁻¹⁹ the section on effective teaching methods of the program developed in this study offers instruction on various active learning teaching techniques; these techniques can be found in previous research²⁰⁻²² and include buzz sessions, think-pair-share, case studies, role-play, and flipped classrooms. These teaching methods have been shown to be effective through various studies.²³⁻³⁵ Meanwhile, the section on how to create a teaching plan of the program offers instruction on participant analysis methods and class structure (goal setting, introduction, unpacking, summary). The program also provides teaching materials that can be put to use immediately after program completion (eg, PowerPoint documents, role-play cases, case study cases), even including a faculty outline that can help encourage teachers. Accordingly,

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instructors attending the program are requested to prepare a lesson plan and teaching materials for implementing CC-EOL care education.

The results showed that the intervention group scored significantly higher than the control group on readiness to lead efforts in EOL care. This may be due to the fact that the program allowed time to “set and share behavioral goals with participants,” and previous research has also stated that “goal setting” improves motivation.³⁶⁻⁴⁰ Therefore, setting behavioral goals may increase motivation for CC-EOL care education, and sharing goals with participants can empower them to engage in CC-EOL care education after they return to their respective institutions.

This study is limited by the selection of the target population. The study's target population was instructors, who are already highly motivated to educate. As a result, significant differences were found in all results except for “motivation to educate.” However, the effectiveness of this program for those who are leaders but have low “motivation for education” is unclear. Therefore, it will be necessary in the future to develop a program that makes it possible to provide education even to those with low “motivation for education.”

CONCLUSION

The results of the evaluation of the effectiveness of a comprehensive EOL care program for faculty in the critical care field demonstrated that their “confidence” in CC-EOL care teaching remained high 6 months after program completion. Implementation of CC-EOL care education in related institutions by faculty in the critical care field can reduce the dilemmas and difficulties faced by nurses involved in this type of care and contribute to improving its quality.

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論文の訂正について

出版後に、掲載論文に、以下の表に示した箇所に誤りがあることがわかり、出版社に訂正を依頼しました。訂正文は、**Journal of hospice and palliative nursing** 25 巻 6 号に掲載される予定です。大変恐縮ですが、以下をご訂正の上、論文をお読み頂けますと幸いです。

Before correction	After modification	Page
<p>Abstract</p> <p>Participants were 82 college teaching staff and nurses working in the critical care field. Six months after the program, data of 37 members (84.1%) of the intervention and 39 members (88.6%) of the control group were analyzed.</p>	<p>Abstract</p> <p>Participants were 90 college teaching staff and nurses working in the critical care field. Six months after the program, data of 37 members (84.1%) of the intervention and 39 members (84.8%) of the control group were analyzed.</p>	178
<p>Setting and Participant Recruitment</p> <p>Participants were 82 college teaching staff and nurses working in the critical care field.</p>	<p>Setting and Participant Recruitment</p> <p>Participants were 90 college teaching staff and nurses working in the critical care field.</p>	180
<p>Participant Enrollment</p> <p>All 82 participants provided written consent after receiving a written explanation of the study in an informed consent form that had been approved by the ethics review board.</p>	<p>Participant Enrollment</p> <p>All 90 participants provided written consent after receiving a written explanation of the study in an informed consent form that had been approved by the ethics review board.</p>	181
<p>Baseline Participant Characteristics</p> <p>Six months after the program, data of 37 members (84.1%) of the intervention group and 39 members (88.6%) of the control group were analyzed (Figure 1).</p>	<p>Baseline Participant Characteristics</p> <p>Six months after the program, data of 37 members (84.1%) of the intervention group and 39 members (84.8%) of the control group were analyzed (Figure 1).</p>	182
<p>Comparison of Mean Score for the ELNEC of the Intervention and Control Groups in Each Period and Over Time</p> <p>Figure 2 shows participants' mean scores for ELNEC immediately after, 3 months after, and 6 months after attending the program.</p>	<p>Comparison of Mean Score for the ELNEQ of the Intervention and Control Groups in Each Period and Over Time</p> <p>Figure 2 shows participants' mean scores for ELNEQ immediately after, 3 months after, and 6 months after attending the program.</p>	182