

Original Article

Nursing practices in palliative sedation across respiratory medicine wards and palliative care units in Japan: A cross-sectional study

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ABSTRACT

Objective: This study aimed to quantitatively assess nursing practices related to palliative sedation (PS) among nurses in respiratory medicine wards (RMWs) and palliative care units (PCUs) and to identify factors influencing these practices.

Methods: A nationwide cross-sectional survey was conducted among nurses in 25 RMWs and 35 PCUs in Japan. A total of 430 nurses (171 from RMWs and 259 from PCUs) completed self-administered questionnaires. Exploratory factor analysis identified key components of PS-related nursing practices, and multiple regression analysis examined influencing factors.

Results: Five key components of PS-related nursing practices were identified: collaboration with experts, assessment and alleviation of suffering, decision-making support, psychological support for families, and evaluation of PS appropriateness and effectiveness. The total PS nursing practice score was significantly lower in RMW nurses (60.6 ± 11.2) than in PCU nurses (68.3 ± 10.6 , $P < 0.0001$). Multiple regression analysis showed that opportunities to discuss bioethics ($\beta = -0.22$, $P < 0.001$), attitudes toward caring for dying patients (FATCOD-B-J, $\beta = 0.22$, $P < 0.05$), collaborative practice with physicians (CPS, $\beta = 0.39$, $P < 0.001$), and opportunities for joint conferences with palliative care teams ($\beta = -0.23$, $P < 0.001$) were significant influencing factors.

Conclusions: To enhance PS-related nursing practices in RMWs, efforts should focus on improving nurses' ethical decision-making abilities, fostering interdisciplinary collaboration, and reducing the psychological burden associated with end-of-life care.

Introduction

Cancer patients experience various types of suffering, and particularly in the terminal stage, their suffering can be so unbearable that treatment is ineffective and causes distress to the patient and their family. In such cases, palliative care sedation (PS) may be chosen as a last resort.¹ The Japanese Society for Palliative Medicine defines PS as "the administration of sedatives with the aim of alleviating treatment-resistant suffering".² As an effective means of alleviating treatment-resistant suffering in terminally ill cancer patients, PS is performed not only on hospice and palliative care wards, but also on general wards and at home.³ However, although PS alleviates patients' suffering, it also reduces their level of consciousness. For this reason, in 2005, the Japanese Society for Palliative Medicine formulated the world's first guidelines to ensure that PS can be safely implemented in any clinical setting. Since then, guidelines have been developed in other countries and the

guidelines in Japan have been revised repeatedly. However, Kremling et al. recently pointed out that the definition, methods, and recognition of PS still differ not only between countries but also among medical professionals.⁴

In recent years, ideas such as continuous deep sedation until death and sedation for existential distress have emerged,⁵ but there is ongoing ethical debate about whether these concepts are right or wrong.⁶

Nurses involved in PS have a variety of roles, including administering sedatives and adjusting medications, assessing the level of suffering, providing care to relieve symptoms, and explaining sedation to patients and their families.⁷ PS is often associated with difficult decisions, such as decision-making for patients and their families⁸ and determining whether a patient has treatment resistance and measuring the effectiveness of sedation.⁹ Additionally, sometimes PS is perceived as accelerating death and is not distinguished from euthanasia, causing confusion among nurses.¹⁰ It has become clear that for a variety of reasons, including a lack

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of knowledge about and skills in administering PS, insufficient discussion with the medical team, and ethical conflicts behind sedation, nurses are confused about providing care.¹¹

PS requires a high level of palliative care expertise, and the Japanese Society for Palliative Medicine recommends that nurses obtain advice from a palliative care specialist.² However, general wards have few palliative care specialists, and issues exist regarding the quality of palliative care and patient and family satisfaction.¹² Hence, questions arise as to whether sedation can be administered safely. On the other hand, especially in diseases such as lung cancer, which progress rapidly, even general ward nurses have many opportunities to be involved in PS, such as alleviating patients' suffering, determining whether suffering is a refractory symptom that cannot be adequately treated otherwise, and confirming the wishes of patients and their families. Thus, to ensure that PS is safely provided in all clinical settings, it is important to improve the quality of care provided by nurses.

Although PS guidelines have been developed, they only contain medical algorithms, and few of them systematically represent actual nursing care. Therefore, we previously conducted an interview survey of nurses to clarify nursing practices regarding PS for terminally ill patients with lung cancer.¹³ However, this survey only included nurses at some cancer specialty hospitals, and to our knowledge, no studies have quantitatively evaluated nursing practices across facilities. We hypothesized that by quantitatively measuring PS nursing practices across Japan, we could systematize PS-related care and identify issues that are specific to the characteristics of each facility.

Factors that influence PS-related nursing practices regarding PS are related to the individual nurse and the organization in which the nurse works, and previous studies have suggested that these factors are related to each other. Factors related to the individual nurse include lack of knowledge about PS,¹⁴ difficulty or feelings of inadequacy in providing care to alleviate patient pain, conflict, or feelings of difficulty in caring for terminally ill patients;¹⁵ and ethical ability.¹⁶ Organizational factors include collaboration with palliative care specialists, such as palliative care teams (PCTs) and doctors.¹⁷ We hypothesized that performing a subgroup analysis to clarify the relationship between these factors would enable us to identify specific strategies that can help to improve PS-related nursing practice in groups with insufficient nursing practice. Therefore, the purpose of this study was to quantitatively measure the structure of PS-related nursing practice among respiratory medicine ward (RMW) nurses, who are most involved in PS on general wards, and palliative care unit (PCU) nurses, who work in specialized palliative care facilities, and to clarify the relationship between nursing practice and individual and organizational factors.

Methods

Study design and participants

This study was a cross-sectional questionnaire survey performed in Japan. Participants were nurses who were working at one of 100 randomly selected facilities out of 399 RMWs of designated regional cancer hospitals in Japan or at one of 200 randomly selected facilities out of 387 PCUs that belong to the Japan Hospice and Palliative Care Association. All participants had to have worked with terminally ill patients with lung cancer who received PS.

Sample size estimation

This study will conduct a factor analysis of 19 nursing practice items related to PS. In performing factor analysis, the required number of responses is 5–10 times the number of items; therefore, approximately 200 responses are required. The study will also compare the responses of nurses at 2 different facilities. G*Power software (version 3.1.9.4) was used to calculate the sample size based on an effect size of 0.20, $\alpha = 0.05$, and a power of 0.80, resulting in a sample size of 787 (394 per group). Accordingly, the target number of participants will be 400 in each group.

Procedures

The survey was conducted by mail from January to March 2023. First, we wrote to the target facilities requesting that they cooperate in the research. At the facilities that consented to participate, we asked the nurse managers at each facility whether their facility has a PCT, how often they consult with the PCT about PS, and whether they hold joint conferences with the PCT. Then, we asked the nurse managers to distribute the self-administered questionnaire for this study to target nurses, who returned the completed questionnaire to one of the authors by using a return envelope provided by us. We then performed data entry and analysis.

Questionnaires

We asked about nurses' background characteristics and created a questionnaire and conceptual diagram (Fig. 1) by referring to prior research. In addition, we asked nurses to complete the following questionnaires: Collaborative Practice Scales (CPS) Japanese version, Palliative Care Difficulties Scale, Palliative Care Knowledge Test, and the Frommelt Attitudes Toward Care Of the Dying scale Form B, Japanese shortened version (FATCOD-B-J).

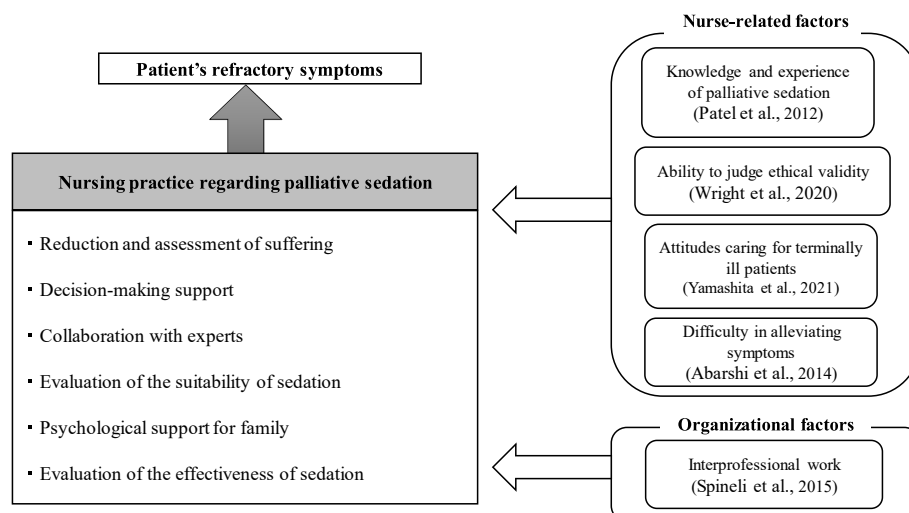


Fig. 1. Conceptual diagram of nursing practice and related factors regarding palliative sedation for relief from suffering.

Nurses' background characteristics

We collected information on demographic characteristics, including sex, years of experience as a nurse, years of working on a ward, education, participation in training sessions on palliative care and PS, and opportunities to discuss bioethics. To understand the PS situations most frequently experienced by nurses, we surveyed the participants about the drugs they usually use for PS, the symptoms of suffering experienced by patients who require PS, and the experiences of nurses who administered the initial dose of sedatives. We also surveyed the nurses' knowledge and use of guidelines on PS and availability of someone to talk to about PS.

Nursing practice related to PS

Prior to this study, in 2017, we conducted an interview survey of nurses on RMWs to clarify nursing practices and perceptions regarding PS for terminally ill patients with lung cancer.¹³ The study revealed that in nursing practice related to PS, it is important to alleviate the physical and mental suffering of patients and their families, support decision-making regarding sedation, manage sedatives and evaluate their effects, and collaborate with other professionals. The content validity of the nursing practice items obtained in the previous study was confirmed by obtaining advice from a Certified Nurse (CN), Certified Nurse Specialist (CNS), nurses working in a PCU, and research experts with experience in questionnaire surveys. The results were organized in line with the guidelines published by the Japanese Society for Palliative Medicine. Ultimately, nursing practice related to PS was divided into six factors: reduction and assessment of suffering, decision-making support, collaboration with experts, evaluation of the suitability of sedation, psychological support for family, and evaluation of the effectiveness of sedation (Fig. 1). Together, these six factors comprised 19 items. This study investigated and confirmed whether these nursing practice items were being implemented by nurses in RMWs and PCUs. Responses to these items were given on a five-point scale ranging from 1 (*not applicable at all*) to 5 (*completely applicable*).

CPS Japanese version

The CPS developed by Weiss and Davis was created to examine collaboration between doctors and nurses and has been used in various studies.¹⁸ The Japanese version of CPS has been developed by Komi et al. for use in Japan, and the reliability of this tool has been confirmed.¹⁹ In this study, a nine-item scale for nurses was used. Responses are given on a six-point scale ranging from 1 (*not practiced at all*) to 6 (*always practiced*).

The Palliative Care Difficulties Scale

The Palliative Care Difficulties Scale was created with the aim of understanding the actual state of difficulty in palliative care for cancer patients and measuring the effectiveness of educational interventions.²⁰ Each item is answered on a five-point scale ranging from 1 (*I don't think so*) to 5 (*very much*).

The Palliative Care Knowledge Test

The Palliative Care Knowledge Test was created to measure basic competencies in palliative care with the aim of understanding the difficulties faced by medical practitioners regarding palliative care for cancer patients and measuring the effectiveness of educational interventions.²⁰ Each item is answered as *true*, *wrong*, or *I don't know*. In this study, we used the scale to examine the criterion-related validity of the PS Nursing Practice questionnaire, which the authors designed for this study, because there is currently no gold standard for evaluating PS nursing practice.

FATCOD-B-J

FATCOD Form B is a scale developed by Frommelt to measure the caring attitude of medical professionals towards dying patients.²¹ This scale is used in research and education involving various medical professionals who work with terminally ill patients. A Japanese version (FATCOD-B-J) has been created to enable use of FATCOD Form B in

Japan, and the reliability of the Japanese version has been confirmed.²² Each item is answered on a five-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), and a total score is calculated for each domain.

Statistical analysis

Comparisons between RMW and PCU nurses and multiple regression analyses of nursing practice related to PS were performed by adjusting for years of experience. Statistical analysis was performed with JMP PRO16. A *P* value < 0.05 was considered statistically significant.

Descriptive statistics

To understand overall trends, we calculated descriptive statistics for background characteristics, nursing practice related to PS, CPS, The Palliative Care Difficulties Scale, The Palliative Care Knowledge Test, and FATCOD-B-J. For each item on the scales, we also evaluated whether differences between RMW and PCU nurses were statistically significant. In addition, we performed a *t* test and one-way analysis of variance to examine the relationship between nursing practice related to PS and background characteristics, CPS, The Palliative Care Difficulties Scale, The Palliative Care Knowledge Test, and FATCOD-B-J; these analyses were adjusted for nurses' years of experience.

Factor analysis of nursing practice related to PS

We performed an exploratory factor analysis (maximum likelihood method, promax rotation) to examine the factor structure of nursing practice related to PS. Ceiling effects, floor effects, inter-item correlations, and item-total correlations were confirmed, and to obtain internal validity, Cronbach's alpha coefficients for each factor were calculated. Criterion-related validity was also examined by calculating Pearson's correlation coefficient with the Palliative Care Knowledge Test score. Last, we examined and determined the final factor structure and items.

Multiple regression analysis of nursing practices related to PS in nurses on RMWs

We performed multiple regression analysis (forced entry method) to examine nursing practices related to PS in RMW nurses. As independent variables, we used variables that were associated with the dependent variable or variables for which we predicted a relationship on the basis of prior research. After entering all independent variables and using the least squares method, we checked the results and deleted the independent variables in descending order of *P* value. Tests were repeated until statistically significant differences were found in all independent variables.

Results

A flow chart showing the recruitment of participants and response rates is shown in Fig. 2. Research cooperation was obtained from 27 facilities with RMWs (return rate, 46.0%; compliance rate, 27.0%) and 38 PCU facilities (return rate, 36.5%; compliance rate, 19.0%). Of these, responses were received from 431 nurses: 171 nurses at 25 facilities with RMWs (response rate, 39.0%) and 260 nurses at 35 PCU facilities (response rate, 53.5%). Responses from one nurse working at a PCU had to be excluded because more than half of the items were missing, so valid responses from a total of 430 nurses were analyzed (valid response rate, 99.8%).

Collaboration with PCTs as reported by nurse managers

Nurse managers on RMWs said that PCTs existed in all facilities and that 46.8% of PCTs conducted ward rounds every day. In the majority of facilities (63.2%), nurse managers said that the nurse performing PS consults the PCT only in difficult cases, and nurse managers in 70.2% of facilities said that they hold joint conferences with the PCT.

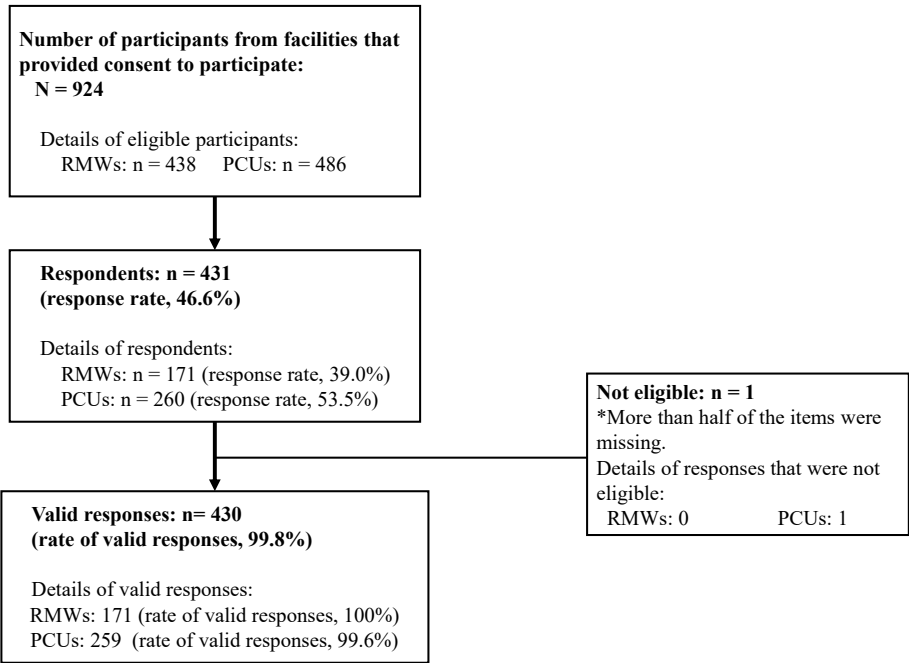


Fig. 2. Participant flow chart.
PCU, palliative care unit; RMW, respiratory medicine ward.

Because PCUs are facilities with a high level of palliative care expertise and ward members are often PCT members, we decided to omit the results related to PCT.

Characteristics of RMW and PCU nurses

The mean work experience of nurses was 17.4 ± 9.6 years (RMW nurses, 14.7 ± 10.1; PCU nurses, 19.2 ± 8.9). Overall, 86.4% (RMW nurses, 83.6%; PCU nurses, 86.5%) answered that they had started administration of sedatives. Midazolam was the most commonly used drug for PS, and dyspnea was the most frequently affected symptom (Table 1).

Significantly fewer RMW than PCU nurses were familiar with and used the PS guideline (P < 0.005). Also, although there was no

statistically significant difference, fewer RMW nurses answered that they had opportunities to discuss bioethics (RMW nurses, n = 118 [69.0%]; PCU nurses, n = 186 [71.8%]). Significantly more RMW than PCU nurses answered that they could consult with experts (PCT, CNs, CNSs) about PS (P < 0.0001).

RMW nurses had significantly lower scores for both the Palliative Care Difficulties Scale (P < 0.05) and FATCOD-B-J (P < 0.0001).

Exploratory factor analysis of nursing practice regarding PS

We calculated the mean value of the 19 items related to PS nursing practice. After checking for ceiling and floor effects, we excluded “Q12: The appropriateness of starting sedation is discussed with doctors, PCTs, and other professionals” because we found a ceiling effect of 4.04 ± 0.97

Table 1
Participant background characteristics.

	All (N = 430)	RMW (n = 171)	PCU (n = 259)	P
	Mean ± SD or n (%)	Mean ± SD or n (%)	Mean ± SD or n (%)	
Factors related to the individual nurse				
Nursing experience	17.4 ± 9.6	14.7 ± 10.1	19.2 ± 8.9	< 0.0001
Experience in administering the initial dose of sedatives: Yes	367 (85.3)	143 (83.6)	224 (86.5)	
Medications: Midazolam	376 (87.4)	149 (87.1)	227 (87.6)	
Symptom: Dyspnea	390 (90.7)	158 (92.4)	232 (89.6)	
Frequency of use of the guidelines: Not used	394 (91.6)	169 (98.8)	225 (86.9)	0.0026
Use often	31 (7.2)	1 (0.6)	30 (11.6)	
Discussion of bioethics: Available	304 (70.7)	118 (69.0)	186 (71.8)	
Someone to discuss PS with: Experts (PCT, CNS, CN)	340 (79.1)	156 (91.2)	184 (71.0)	< 0.0001
The palliative care difficulties scale: Alleviation of symptoms	3.0 ± 0.9	3.3 ± 0.9	2.8 ± 0.9	< 0.0001
The palliative care knowledge test	14.9 ± 3.6	12.7 ± 3.5	16.3 ± 2.8	
FATCOD-B-J	10.7 ± 2.1	10.0 ± 1.8	11.3 ± 2.1	< 0.0001
Organizational factors				
CPS	25.6 ± 9.1	24.6 ± 8.3	26.4 ± 9.6	
PCT available	—	171 (100.0)	—	
PCT rounds: Every day	—	80 (46.8)	—	
Frequency of PS consultation with PCT: Every time	—	48 (28.1)	—	
Conference with PCT: Available	—	120 (70.2)	—	

CN, Certified Nurse; CNS, Certified Nurse Specialist; CPS, Collaborative Practice Scale; FATCOD-B-J, Frommelt Attitudes Toward Care Of the Dying scale Form B, Japanese shortened version; PCT, palliative care team; PCU, palliative care unit; RMW, respiratory medicine ward. Some items do not add up to 100% due to missing values.

(no floor effect was observed). We checked the inter-item correlation and item–total correlation analysis, but no items needed to be excluded.

Factor analysis (maximum likelihood method, promax rotation) was performed with 18 items. We reexamined the content of the questions and excluded “Q18: The effects of sedation are continuously evaluated with doctors, PCTs, and other professionals” because it overlapped with other items. Subsequently, we repeated the factor analysis (maximum likelihood method, promax rotation) with the 17 items and extracted five factors. Nursing practice related to PS consisted of five factors and 17 items, which was close to the structure envisioned when creating the questionnaire. Factor loadings were over 0.3 for all items (Table 2).

The Cronbach's alpha coefficient for each factor was 0.826–0.926, confirming internal consistency. In addition, the correlation coefficient between the 17 nursing practice items regarding PS and the Palliative Care Knowledge Test score was 0.31, confirming criterion-related validity.

Comparison of PS nursing practice between RMW and PCU nurses

The mean total score of PS nursing practice was significantly lower in the RMW than in the PCU nurses (Table 3). Furthermore, the nursing practice scores of RMW nurses were significantly lower than those of PCU nurses for all factors except factor I (collaboration with experts; Table 3).

Table 2

Exploratory factor analysis of nursing practice regarding palliative sedation.

Items	Factor loading				
	F1	F2	F3	F4	F5
I: Collaboration with experts					
8. Consult with PCT or experts when it becomes difficult to alleviate the suffering	0.81	0.09	−0.06	0.06	−0.03
9. Share information necessary for relief from suffering with PCT and experts	0.97	−0.02	0.07	−0.03	−0.01
10. Advice from palliative care teams and other palliative care experts is shared with staff	0.84	−0.03	0.00	0.00	0.12
II: Reduction and assessment of suffering					
1. Assess the degree and cause of the patient's suffering	0.03	0.87	−0.06	0.01	0.03
2. Care for patients' painful symptoms and their causes (physical, mental, social, and environmental)	0.00	0.85	0.10	−0.06	0.02
3. Assess whether the patient's suffering is a refractory symptom	0.05	0.49	0.29	0.16	−0.13
III: Decision-making support					
4. Confirm with patients and families about their wishes regarding end-of-life treatment (including PS) before the patient's suffering becomes unbearable	0.00	−0.05	0.85	−0.03	0.01
5. Provide support to help patients and their families understand PS	0.00	0.16	0.59	0.13	0.07
6. Help patients and their families reach decisions that are satisfactory to both parties, when a conflict of opinion occurs	0.05	0.23	0.51	0.10	0.06
7. Evaluate whether the decision to commence sedation was the patient's true will	0.01	0.12	0.40	0.11	0.25
IV: Psychological support for family					
14. Understand the anxiety, emotional turmoil, and distress that families may experience when deciding on PS	−0.01	0.18	0.05	0.51	0.20
15. Listen carefully to the regrets and conflicts of family members who have become surrogate decision-makers when the patient is unable to make a decision	0.06	−0.07	0.04	0.99	−0.07
16. Help with the loneliness of families during PS and inform them of the patient's condition and what the family can do	−0.05	0.13	0.07	0.61	0.18
V: Evaluation of the suitability and effectiveness of PS					
11. Consider whether it is appropriate to administer sedation based on the patient's wishes and degree of suffering	0.12	0.15	0.04	0.16	0.47
13. During PS, continuously discuss the appropriateness of PS with doctors, PCT, and other professionals from various professions	0.13	−0.07	0.15	0.00	0.69
17. During PS, evaluate the effectiveness of PS based on the patient's behavior, facial expressions, level of consciousness, etc.	0.07	0.27	−0.10	0.18	0.50
19. After PS, reassess whether PS was effective for the patient and family (e.g., assistance with analgesia, support for sedation decision-making, post-sedation care, etc.)	−0.02	−0.08	0.21	0.25	0.37
Cronbach's α (all: 0.95)	0.93	0.85	0.87	0.89	0.83
Pearson's product moment correlation coefficient (with the palliative care knowledge test) (all: 0.31**)	0.18*	0.32**	0.22**	0.32**	0.30**

* $P < 0.05$, ** $P < 0.001$.

PCT, palliative care team; PS, palliative sedation.

Table 3

Comparison of palliative sedation nursing practice between respiratory medicine unit nurses and palliative care unit nurses.

Factor	Nursing practice score regarding palliative sedation			P
	All (N = 430) Mean \pm SD	RMW (n = 171) Mean \pm SD	PCU (n = 259) Mean \pm SD	
I	12.0 \pm 2.7	11.7 \pm 2.4	12.2 \pm 2.9	0.1506
II	11.4 \pm 2.3	10.7 \pm 2.3	11.9 \pm 2.2	< 0.0001
III	14.4 \pm 3.3	13.2 \pm 3.2	15.2 \pm 3.1	< 0.0001
IV	11.9 \pm 2.4	10.8 \pm 2.4	12.6 \pm 2.1	< 0.0001
V	15.6 \pm 3.0	14.4 \pm 3.0	16.4 \pm 2.7	< 0.0001
Total	65.3 \pm 11.4	60.6 \pm 11.2	68.3 \pm 10.6	< 0.0001

Factors were as follows: I, collaboration with experts; II, reduction and assessment of suffering; III, decision-making support; IV, psychological support for family; V, evaluation of the suitability and effectiveness of palliative sedation. PCU, palliative care unit; RMW, respiratory medicine ward.

*Adjusted for years of nursing experience.

Factors influencing nursing practice of RMW nurses regarding PS

PS nursing practice scores were lower in RMW than in PCU nurses. RMW nurses also had more difficulty alleviating symptoms than PCU nurses. Therefore, multiple regression analysis (forced entry method)

Table 4
Multiple regression analysis of nursing practice related to palliative sedation among respiratory medicine unit nurses.

	Factor I score			Factor II score			Factor III score			Factor IV score			Factor V score			Total score		
	95% CI	β		95% CI	β		95% CI	β		95% CI	β		95% CI	β		95% CI	β	
		Lower limit	Upper limit		Lower limit	Upper limit		Lower limit	Upper limit		Lower limit	Upper limit		Lower limit	Upper limit		Lower limit	Upper limit
Discussion of bioethics: not available	-0.95	-0.28	-0.24**	-0.69	-0.03	-0.15 ^a	-1.11	-0.19	-0.19 ^a	-	-	-	-1.16	-0.31	-0.23**	-4.11	-1.07	-0.22**
FATCOD-B-J	0.16	0.50	0.26**	0.12	0.46	0.24**	-	-	0.25**	0.15	0.52	0.25**	-	-	-	0.52	2.08	0.22 ^a
CPS	0.002	0.08	0.15 ^a	0.06	0.14	0.38**	0.11	0.22	0.44**	0.07	0.15	0.37**	0.08	0.19	0.38**	0.34	0.69	0.39**
Conference with PCT: not available	-1.3	-0.6	-0.35**	-0.75	-0.06	-0.15 ^a	-1.12	-0.14	-0.18 ^a	-	-	-	-1.38	-0.48	-0.28**	-4.57	-1.39	-0.23**
Knowledge of PS guidelines	-	-	-	-	-	-	-	-	-	-	-	-	0.03	0.87	0.15 ^a	-	-	-
Frequency of use of PS guidelines	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Palliative care difficulties scale: Alleviation of symptoms	-	-	-	-	-	-	-	-	-	-	-	-	-0.98	-0.07	-0.16 ^a	-	-	-

* $P < 0.05$, ** $P < 0.001$.
 R^2 : .42, Adjusted R^2 : 0.39.
CI, confidence interval; CPS, Collaborative Practice Scale; FATCOD-B-J, Frommelt Attitudes Toward Care Of the Dying scale Form B, Japanese shortened version; PCT, palliative care team; PS, palliative sedation; RMW, respiratory medicine ward.
^a Adjusted for years of nursing experience.

was performed on the data from the RMW group, with the total PS nursing practice of RMW nurses as the dependent variable. The independent variables were *knowledge of PS guidelines*, *frequency of use of PS guidelines*, *FATCOD-B-J*, and *Palliative Care Difficulties Scale: alleviation of symptoms*; these variables were correlated with the dependent variable. In addition, we also analyzed *CPS*, *opportunity to discuss bioethics*, and *opportunity for joint conferences with a PCT* as independent variables because although they were not significantly different, prior research indicated that they were related.

The items that were removed, in order of largest P value, were as follows: *frequency of use of PS guidelines* ($P = 0.945$), *knowledge of PS guidelines* ($P = 0.088$), and *Palliative Care Difficulties Scale: alleviation of symptoms* ($P = 0.134$). The final model was calculated in the fourth analysis (Table 4). The multiple regression analysis showed that *opportunity to discuss bioethics*, *FATCOD-B-J*, *CPS*, and *opportunity for joint conferences with a PCT* were associated with nursing practice of RMW nurses regarding PS (all $P < 0.005$).

To examine in more detail the factors that influence the PS nursing practice of RMW nurses, we performed multiple regression analysis on the scores of each factor and the above-mentioned independent variables. The results showed that *opportunity to discuss bioethics*, *FATCOD-B-J*, *CPS*, and *opportunity for joint conferences with a PCT* generally had a similar effect on each factor. However, these results suggested that *knowledge of PS guidelines* and the *Palliative Care Difficulties Scale: alleviation of symptoms* may have had a different effect on the fifth factor (*evaluation of the suitability and effectiveness of PS*) than on the other factors.

Discussion

This study identified specific factors that play a role in nursing practice for PS by quantitatively measuring and analyzing individual and organizational factors relevant for PS-related nursing practice among RMW and PCU nurses. The results are discussed in detail below.

Factor structure of nursing practice regarding PS

Factor analysis showed that nursing practice regarding PS comprised five factors: *collaboration with experts*, *reduction and assessment of suffering*, *decision-making support*, *psychological support for family*, and *evaluation of the suitability and effectiveness of PS*.

The purpose of PS is to alleviate a patient's suffering. Research has shown that when nurses are involved in PS, they emphasize alleviating the suffering of the patient and their family and are also involved in decision-making situations. However, studies have shown difficulties in controlling symptoms and confirming the patient's wishes²³ and in providing psychological care for family members.²⁴ Consequently, nurses must work in consultation and cooperation with a variety of professions, including doctors and PCTs. The factor structure obtained in this study captures these characteristics of PS and also the characteristics of nursing practice identified in prior studies. Cronbach's α was 0.8 or higher for all factors, and we found correlations with existing scales used in palliative care research. Consequently, we believe that the reliability and validity of the practical items are ensured.

The factor analysis of nurses' PS care practices resulted in a five-factor structure, not the expected six-factor structure, because we combined the first model's "Factor 3: Evaluation of the appropriateness of sedation" and "Factor 6: Evaluation of the effects" into one factor, which ultimately became "Evaluation of the suitability and effectiveness of PS." PS is started with the aim of relieving the patient's refractory symptoms. Therefore, before PS is started, health care providers must evaluate its appropriateness, i.e., whether the patient is suffering because of refractory symptoms, whether the patient has expressed their will, and whether the family or medical staff have provided consent. Furthermore, although PS relieves the patient's suffering, it also reduces the level of consciousness. Therefore, even after starting PS, medical staff need to

regularly consider whether the patient and family really need to continue PS. Based on the above, we designated the evaluation of the appropriateness of PS as “assessment of the appropriateness of sedation” and the evaluation of the effects on consciousness as “evaluation of its effectiveness.” Ideally, these two factors should be considered as independent, but in this study, we extracted them as a single factor; one of the reasons for this approach was that the nurses surveyed were not very aware of the guidelines, did not use them, and consequently, could not understand the difference between the two factors in the survey questions. However, our findings reflect the current state of PS nursing practice among nurses in Japan, and in our study, we were able to evaluate the validity of highly specialized PS and identify issues faced by nurses regarding the evaluation of its effectiveness.

PS nursing practice of RMW and PCU nurses

RMW nurses' mean scores for nursing practice were lower than those of PCU nurses. The RMWs involved in this study play a role in providing advanced cancer treatment, i.e., they provide aggressive treatment and recuperation, including chemotherapy. In contrast, the PCUs specialize in palliative care, where patients and their families spend their final days after completing treatment. Because the roles and nurses' specialties at each type of facility are different, the superiority or inferiority of PS nursing practice cannot be evaluated by simply comparing scores. Nevertheless, the results of this study showed that RMW nurses found it more difficult than PCU nurses to alleviate the symptoms of terminally ill lung cancer patients. PS is performed not only in specialized facilities but also on general wards, and previous studies have shown that RMW nurses find it difficult to engage in PS. RMWs do not have palliative care specialists such as PCTs on-site, and the work is complicated, making it difficult for RMW nurses to receive prompt consultation and guidance from specialists.²⁵ Other issues identified by studies include the lack of proper control of terminal symptoms.²⁶ Therefore, we determined that RMW nurses need more support in PS nursing practice, and we investigated factors related to further improving nursing practice.

Factors influencing nursing practice of RMW nurses regarding PS

The results of the multiple regression analysis of the PS nursing practice total score of RMW nurses suggested that *opportunity to discuss bioethics*, *FATCOD-B-J*, *CPS*, and *opportunity for joint conferences with a PCT* influenced the nursing practice of RMW nurses regarding PS. Similarly, the results of the multiple regression analysis of the relationship between the scores of each factor and each independent variable showed that most factors were influenced by the *opportunity to discuss bioethics* and *opportunity for joint conferences with a PCT*, *FATCOD-B-J*, and *CPS*. These four factors are thought to reflect the characteristics of PS as a final measure to alleviate a patient's unbearable suffering, although, at the same time, the factors are prone to ethical conflicts.

Nurses who did not have the opportunity to discuss bioethics had significantly lower overall nursing practice scores than those who did. PS requires a clear indication of the patient's intention to start PS, but depending on the patient's condition, it may not be possible to confirm their intention.²⁷ After starting PS, the patient's level of consciousness decreases, hindering conversation with family and participation in daily life. In addition, many patients die without any treatment. Therefore, before starting PS, health care providers must confirm the patient's clear wishes, obtain the consent of the family and medical staff, and determine whether PS is really necessary based on the degree of the patient's suffering. The decision must be made according to the principle of proportionality between the benefit of alleviating the patient's suffering and the harm of a decrease in consciousness, and it requires ethical judgment.² In addition, previous studies have reported cases in which nurses have ethical conflicts, such as when the patient does not clearly express their wishes, when the patient and family do not agree, and when the family resents PS and requests that it be stopped.^{28,29} This conflict puts a

psychological burden on the nurse. When a nurse faces an ethical problem, having the opportunity to consult with someone and discuss the situation improves the nurse's basic ethical ability and is also assumed to reduce the psychological burden on nurses.

Nurses with a high total CPS score had a significantly higher total nursing practice score regarding PS. Additionally, nurses who did not have an *opportunity for joint conferences with a PCT* had a lower total nursing practice score than those who had this opportunity. Previous studies have indicated that RMW nurses have doubts about the attending doctor's treatment policy and symptom management regarding PS and are dissatisfied when their opinions are not reflected. Furthermore, compared with PCUs, on RMWs, it is difficult for nurses to receive support from palliative care specialists.³⁰ Providing an opportunity for nurses to easily discuss their opinions on PS with doctors and PCTs is thought to help resolve nurses' worries and anxieties about PS and how to improve the situation of patients and their families. Research has also indicated that some nurses feel mentally burdened by being involved in PS.¹¹ Our results indicate that engaging in PS while consulting with people from many different professions and sometimes receiving guidance will help nurses feel less responsible and alone and will support them.

PS is a highly specialized palliative care procedure that involves ethical issues, as mentioned above, so the decision-making and coordination process requires repeated discussions with a multidisciplinary medical team. Among all medical team members, nurses spend the most time with patients and their families before PS begins and therefore may notice the patient's increasing suffering or the patient's or family's wishes before doctors or PCTs do.⁷ Even after PS begins, nurses manage medications and monitor symptoms and are also responsible for providing psychological care to the patient's family;³¹ consequently, they should have the opportunity to actively voice their opinions during the PS process. In some countries, studies have found that nurses are actively involved in confirming and deciding on PS wishes,³¹ but in Japan, decisions are still led by doctors and it is unclear to what extent nurses' wishes are reflected. Poor communication within the medical team prevents a common understanding of the needs and goals of patients and their families in palliative care.³² Multifaceted discussions are essential, especially in procedures such as PS that are likely to create ethical issues, and nurses need to acquire the ability to express their opinions in such settings.

The total score of *FATCOD-B-J* showed that the nurses who were more aware of the rewarding aspects of caring for terminally ill patients and the need to do so had higher values for nursing practice related to PS. This result is thought to be related to the fact that patients undergoing PS are in the final stages of life and that PS is a last resort for relief from suffering. RMWs provide treatment and recovery, and many RMW nurses feel confused and limited in their ability to care for terminally ill patients. On the basis of our results, we believe that this confusion is affecting nursing practice regarding PS. To reduce the confusion and difficulties faced by RMW nurses, they need to be given training and support, such as training sessions on how to deal with terminally ill patients and their families and how to care for them.³³

The fifth factor, *evaluation of the suitability and effectiveness of PS*, appeared to be influenced by *knowledge of PS guidelines* and the *Palliative Care Difficulties Scale*: alleviation of symptoms, neither of which influenced the other factors. The assessment of the appropriateness of PS at its initiation and the evaluation of its effectiveness after implementation require skills in alleviating the distressing symptoms that necessitate PS and in objectively assessing the suffering of patients who cannot express themselves after PS initiation. Therefore, knowledge of guidelines, which introduce scales for objectively evaluating the effectiveness of sedation, and confidence in symptom relief, are believed to have influenced these assessments.

From the above, we assume that to improve the quality of PS nursing, nurses must be able to face terminally ill patients and have the skills to relieve patients' suffering, the ethical judgment to evaluate the

appropriateness of PS, and the ability to discuss PS on an equal footing with multiple professions. To acquire these skills, nurses themselves must first acquire correct knowledge about PS. To achieve this, we believe that public awareness and use of the PS guidelines need to be promoted, such as by providing learning opportunities about the guidelines, improving educational materials for nurses, and providing simulation-based education. In particular, in facilities that are not specialized in palliative care, such as RMWs, we suggest that nurses must be given the opportunity to consult with palliative care specialists such as PCTs and that an environment must be created in which nurses can receive guidance from specialists.

Strengths and limitations

A strength of the study is that it is one of only a few studies to date to quantitatively examine nursing practice regarding PS on a nationwide scale in Japan. Furthermore, to our knowledge, no studies have previously quantitatively evaluated nursing practices across different types of care facilities. Our study provides important information on the situation of nursing practice for PS on RMWs by identifying relevant factors and allows us to make suggestions on how to improve the quality of PS-related nursing care.

The study also has some limitations. First, the survey response rate for this study was low. This may have been because at the time of the survey, the surveyed institutions were forced to respond to emergency situations resulting from the COVID-19 pandemic. Furthermore, RMWs may have been handling seriously ill patients with COVID-19; some PCU facilities responded that at the time of the survey, their wards were closed because of the pandemic. These factors may have made it more difficult than usual to obtain sufficient responses. Because of the low response rate, the results may not have accurately reflected the actual situation; however, the response rate was comparable to that of similar surveys targeting nurses, so we decided to analyze the responses. In the future, to increase response rates, study protocols may need to consider the nurses' working situations, including time constraints due to their ward work. Second, the number of responses was below the planned sample size. However, the factor analysis had 19 items and the multiple regression analysis had 7 items, so the sample size for each analysis was 100–200, and we believe the obtained sample size was sufficient for both analyses. Nevertheless, the smaller sample size may have affected the statistical power of the study. For the two-group comparison, the number of samples was smaller than expected, which also may have reduced the statistical power. We will need to continue to study the topic of nursing practice related to PS by obtaining a sufficient number of samples in the future. Third, the study did not limit the type of PS, such as continuous sedation or controlled sedation. In the future, it will be necessary to extract nursing practices that are characteristic of each type of sedation. Fourth, we investigated the actual state of PS care practice through nurses' self-evaluation. Because this was not an observational study by a third party, some nurses may have rated their PS care practice higher or lower than their actual practice, and the results may differ from the actual situation. However, currently no method is available to objectively evaluate PS nursing practice. To measure nurses' PS care practice more accurately, future research needs to explore ways to evaluate care practice more objectively, such as having a third party observe nurses' PS care. Fifth, the components of nursing practice related to PS used in this study were items extracted from a qualitative study on PS for terminally ill patients with lung cancer that targeted RMW nurses at designated regional cancer centers and hospitals. Therefore, the items may not be sufficient to measure the nursing practices of PCU nurses, who also care for patients with other types of cancer and who provide more advanced PS. A more detailed investigation into the actual state of nursing practice by PCU nurses is needed with the aim to enrich the nursing practice items. Sixth, the nurses who participated in this study had low awareness and use of PS guidelines.

Therefore, results may be different if we studied a group with more PS knowledge and advanced care practices, such as specialist nurses or those who have worked in the PCU for a long time. Seventh, there are limitations as to how well the results can be generalized. This study was conducted in Japan, and PS was performed according to the guidelines of the Japanese Society for Palliative Medicine. Although PS is generally understood to be defined in the same way around the world, no common method exists for assessing its methods or effectiveness. As a result, the PS situation identified in this study may differ from that in other countries with different guidelines. In addition, because the study targeted nurses involved in PS in Japan, the results reflect the current situation of nurses in the country, such as a lack of knowledge about PS. Also, the nurses targeted in this study had many years of experience and were considered to have higher cancer nursing abilities than other nurses. Therefore, it may be difficult to apply the results of this study to all nurses working on RMWs.

Conclusions

The aims of this study were to quantitatively examine the structure of nursing practice regarding PS in terminally ill patients with lung cancer and to clarify the factors that influence nursing practice. The study has four main conclusions: i) Five factors are relevant for nursing practice regarding PS, i.e., *collaboration with experts, reduction and assessment of suffering, decision-making support, psychological support for family, and evaluation of the suitability and effectiveness of PS*; ii) RMW nurses had lower PS nursing practice scores than PCU nurses and felt that it was difficult to alleviate symptoms; iii) nursing practice of RMW nurses related to PS is influenced by the *opportunity to discuss bioethics, caring attitudes towards dying patients, collaboration with doctors, and opportunity for joint conferences with a PCT*; and iv) to improve nursing practice of RMW nurses regarding PS, it is necessary to create a situation where they can discuss bioethics, increase opportunities to collaborate with doctors and PCTs, and establish support to reduce the burden and difficulty felt by nurses in caring for terminally ill patients.

CRediT authorship contribution statement

Chihiro Yamashita: Conceptualization, Methodology, Funding Acquisition, Data Collection, Formal Analysis, Writing - Original Draft. **Shoko Ando:** Methodology, Supervision, Writing - Review & Editing. **Ayumi Sugimura:** Conceptualization, Funding Acquisition, Supervision, Validation, and Writing - Review & Editing. All authors had full access to all the data in the study, and the corresponding author had final responsibility for the decision to submit for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Ethics statement

This study was approved by the Bioethics Review Committee of Nagoya University Graduate School (Approval No. 22-102-2) and was conducted in accordance with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. All participants provided written informed consent.

Data availability statement

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

Declaration of generative AI and AI-assisted technologies in the writing process

No AI tools/services were used during the preparation of this work.

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Declaration of competing interest

The authors declare no conflict of interest.

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