



# Changes in opinions on palliative sedation of palliative care specialists over 16 years and their effects on clinical practice

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## Abstract

**Purposes** Despite extensive debate on palliative sedation over the last few decades, no studies have explored longitudinal changes in physicians' opinion. Moreover, little is known about how physicians' opinions affect their practice. This study aimed to clarify (1) changes in palliative care specialists' opinions on palliative sedation and (2) the effects of these opinions on clinical practice.

**Methods** In 2000 and 2016, nationwide questionnaire surveys involving Japanese palliative care specialists were performed: measurement was based on agreement with opinions on palliative sedation. In 2016, the physicians reported their practice of continuous deep sedation (CDS) and answered their thoughts on what factors lead to a good death as factors potentially affecting their practice.

**Results** Of the 695 physicians enrolled in the 2016 survey, 469 responded (67%) and 417 were analyzed (60%). Compared with 54 physicians in 2000, the present respondents were more likely to consider palliative sedation is difficult to perform based on appropriate indications (ES = 0.84,  $P < 0.001$ ), is unnecessary if conventional palliative care is performed sufficiently (ES = 0.30,  $P = 0.013$ ), and may result in legal action (ES = 0.35,  $P = 0.003$ ). The physicians' opinions more strongly affected their practice than their characteristics or thoughts on good death components.

**Conclusions** Recently, palliative care specialists in Japan tend to encounter more difficulties determining what conventional palliative care is and what palliative sedation is. They also fear legal ramifications. It is necessary to standardize methods of alleviating patients' suffering, to make CDS criteria clearer, and to create a legal basis that respects patients' rights at their end of life.

**Keywords** Palliative sedation · Continuous deep sedation · Legal framework · Patients' rights · Good death · End of life

## Introduction

Patients nearing death often experience distressing symptoms, and palliative sedation has been recognized as a medical

practice to alleviate unbearable suffering, which is unresponsive to conventional therapies [1–3]. Over the last few decades, evidence-based guidelines or related statements have been published [1–4]. In most of these guidelines, continuous

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deep sedation (CDS), a modality of palliative sedation therapy, is regarded as a last resort to relieve namely refractory symptoms during the last days of life [1–7]. CDS is, however, still debated: it lacks standard procedure [1–3, 7], has potentially life-shortening effects [8, 9], shares certain similarities with medical acts intended to deliberately shorten or end a patient's life [3, 10, 11], and involves inherent ethical problems concerning patients' dignity while they are deeply sedated [12–14].

Physicians have a range of opinions on palliative sedation, but no studies explored longitudinal changes in physicians' opinions in recent decades [3, 15, 16]. Our previous study in 2000 revealed that almost half of Japanese physicians considered that medical indications for palliative sedation were difficult to determine accurately, and that about 40% of them were concerned about the potentially life-shortening effects [17]. In Japan, the national guideline of palliative sedation was established in 2005 [18], and it has been widely recognized by health care providers. Clarifying the changes in physicians' opinions could contribute to a better understanding of the potential effects of recent evidence on physicians' attitudes toward palliative sedation. Moreover, although there have been several studies on determinants of the administration of CDS, little is known about how physicians' opinions affect their daily practice [19]. By assessing the effects of these opinions on their practice, we could understand what is required for further discussion on palliative sedation.

The primary aims of this study were (1) to clarify longitudinal changes in palliative specialists' opinions about palliative sedation and (2) to clarify the effects of these opinions on clinical practice.

## Subjects and methods

This was an analysis of two nationwide questionnaire surveys involving Japanese palliative care specialists. We conducted a nationwide survey of physicians that included 54 palliative care specialists of 695 respondents in 2000 [17], and the same survey with extra questions was sent to 695 palliative care specialists in 2016.

### Procedure

In December 2016, we mailed a questionnaire to Japanese palliative care specialists who were identified from the national registry of the Japanese Society of Palliative Medicine. It was followed by two reminders. Completion and return of the questionnaire was regarded as consent to participation, and physicians who did not want to participate were asked to return the questionnaire with “no reply.” In the 2000 survey, we recruited palliative care physicians and oncologists by using two kinds of nationwide lists: a list of physicians working at

palliative care units and another list of physicians working at designated cancer hospitals [17]. Board certification of palliative medicine started in 2010; the sample of palliative care physicians were regarded as a representative sample of palliative care physician at that time. The Institutional Review Board of Seirei Mikatahara General Hospital approved the ethical and scientific validity of this study.

### Measurement outcomes

The questionnaire was developed by the authors on the basis of a literature review and the previous survey [3, 5, 17, 18, 20–22]. According to the national guidelines<sup>16</sup>, we defined palliative sedation as “the use of sedatives to relieve intolerable and refractory symptoms by the reduction in patient consciousness level,” and CDS as “the continuous use of sedatives to relieve intolerable and refractory symptoms with the total loss of consciousness.”

### Opinions on palliative sedation

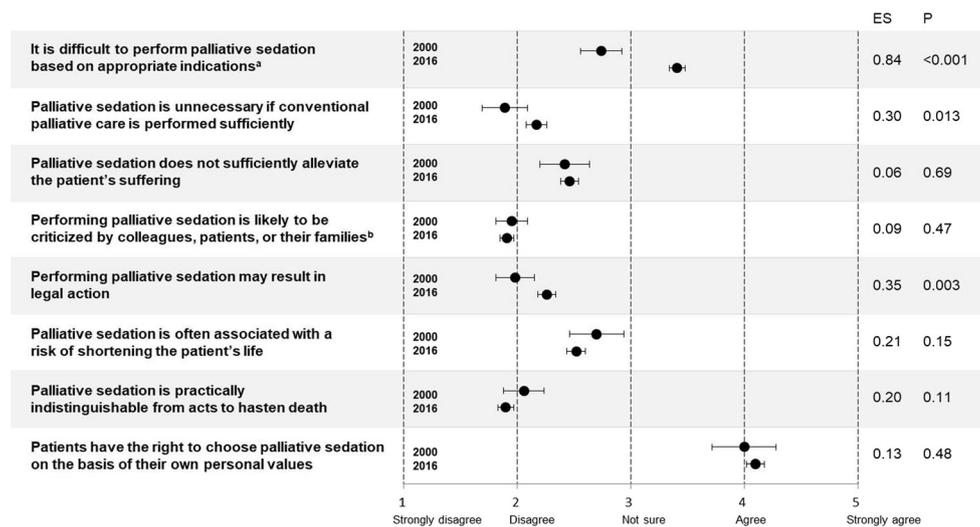
In both of the 2000 and the 2016 surveys, the physicians were asked the extent to which they agree with 11 statements about palliative sedation (Fig. 1) [17]. They answered on a 5-point Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). Additionally, in the 2016 survey, they were asked about their level of agreement with the following two statements on a 6-point Likert-type scale from 1 (strongly disagree) to 6 (strongly agree): “dying while sleeping under CDS is a good death,” and “sleeping under CDS means a social death<sup>12</sup>.”

### Clinical practice of CDS

In the 2016 survey, the physicians reported the number of patients with cancer who received CDS in a year. They were also asked a series of questions about the self-reported practice of CDS in 4 scenarios using a 6-point Likert-type scale from 1 (strongly disagree) to 6 (strongly agree): scenario 1 “it is appropriate to perform CDS to alleviate physical suffering if a patient is expected to die within a few days,” and scenario 2 “it is appropriate to perform CDS to alleviate otherwise refractory and intolerable physical suffering even if a patient is expected to die within a few months.” In scenarios 3 and 4, psychological suffering without physical suffering was assumed and life expectancy was assumed to be a few days and a few months, respectively.

### Potential factors contributing to physicians' practice of CDS

As potential factors contributing to physicians' practice, we asked their thoughts on what factors lead to a good death in the 2016 survey (Table 3) [20–22]. The physicians answered



**Fig. 1** Changes in opinions about palliative sedation. Mean values are presented with 95% confidence intervals. Fifty-four participants in the 2000 survey and 417 participants in the 2016 survey were analyzed. Agreement with each opinion was measured using a five-point Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). A higher score indicates a higher level of agreement. All ES are shown as absolute values, and ES >0.2, >0.5, and >0.8 indicate a small, moderate, and large effect size, respectively. **a** Mean of three items ( $\alpha$  was 0.60); “there is a high risk of palliative sedation therapy being inappropriately

used,” “it is difficult to accurately determine medical indications for palliative sedation therapy,” and “if the use of palliative sedation therapy became wide spread, less effort would be made for necessary palliative care.” **b** Mean of two items ( $\alpha$  was 0.69); “performing palliative sedation is likely to be criticized by colleagues,” and “performing palliative sedation is likely to damage the patient’s and the family’s trust in the physician.” Abbreviation: SD standard deviation, ES effect size

based on a 7-point Likert-type scale from 1 (not important at all) to 7 (vital). Moreover, their background information was obtained from the respondents themselves, including age, sex, clinical experience, work setting, and religion. Religiosity was assessed by three questions [17]: “religion and religious ideas are important in my life,” “religion and religious ideas are of particular interest to me,” and “religion and religious ideas have an influence on my life.” The questionnaire about participants’ background was just same as in the 2000 survey [17].

## Statistical analysis

To investigate changes in physicians’ opinions on palliative sedation between the two periods, we performed the *t* test and calculated the effect size (EF, Cohen’s *D*). For analysis, we collapsed the opinion items into subcategories on the basis of explanatory factor analysis, and internal consistency was acceptable for all subcategories (Cronbach’s  $\alpha$  ranged from 0.60 to 0.69). Regarding the two additional questions about CDS, we calculated descriptive statistics and showed their frequency distribution.

To explore factors significantly contributing to physicians’ practice, we calculated the frequency of CDS (%) per total number of patients who died in a year. We excluded the respondents who had no patient that died in a year from further analysis. For comparisons, we divided respondents into two groups according to the frequency of

CDS: physicians who performed CDS for 25% or more vs. less than 25%. On sensitivity analyses, we performed the same analyses using different cut-off points (15, 20, 25, 30, and 35%); as we had essentially the same results, we decided to report the data using 25%. The respondents were also divided into two groups according to their answers regarding their level of agreement with self-reported practice of CDS: physicians who strongly agreed in scenario 1 vs. others, and physicians who agreed or strongly agreed in scenario 2 vs. others. These cutoff points were determined on the basis of the distribution of the actual data to enable division of the entire sample into appropriately sized groups for comparisons. As for scenarios 3 and 4, the comparisons were considered statistically underpowered, i.e., the majority of the respondents disagreed with performing CDS; we decided not to perform analyses.

We first performed univariate analyses using logistic regression analysis, and then multiple logistic regression analyses were performed in a forward elimination fashion. All potential predictors that reached  $p < 0.10$  in univariate analysis were entered into the equation as independent variables. Results of regression analyses are presented as point estimate odds ratios (ORs) with two-sided 95% confidence intervals (CIs).  $P < 0.05$  was considered significant in all analyses due to the exploratory nature of the study. All statistical analyses were done with SPSS Advanced Statistics software (ver.24.0; IBM Japan, Tokyo, Japan).

## Results

### Characteristics of participants

Of the 695 palliative care specialists mailed in the 2016 survey, 469 returned the questionnaire (response rate: 67%). Among them, 29 refused to participate, and 23 were excluded because of missing data; thus, the remaining 417 were analyzed (60%). As for the study in 2000<sup>17</sup>, overall response rate was 49.6% (697 of 1404). Fifty-four of the 697 respondents were identified as palliative care specialists, and they were analyzed in this study. The characteristics of the participants are summarized in Table 1. The mean length of clinical experience was  $16.8 \pm 6.8$  years in 2000 and  $26.8 \pm 8.3$  years in 2016. In 2000, 59.3% of the physicians attended over 50 deaths in a year, and none of them attended less than five deaths. In 2016, 48.0% of the physicians attended over 50 deaths in a year, while 7.9% of them attended less than five deaths. Of the participants, 12.5% worked at home hospices in 2016, whereas only the physicians working at palliative care units or at designated cancer hospitals were recruited in 2000.

### Opinions on palliative sedation

Figure 1 shows the changes in palliative care specialists' opinions on palliative sedation. Compared with the study in 2000, the present respondents were significantly more likely to agree with the following three statements: "it is difficult to perform palliative sedation based on appropriate indications" ( $ES = 0.84$ ,  $P < 0.001$ ), "palliative sedation is unnecessary if conventional palliative care is performed sufficiently" ( $ES = 0.30$ ,  $P = 0.013$ ), and "performing palliative sedation may result in legal action" ( $ES = 0.35$ ,  $P = 0.003$ ). In contrast, the present respondents were less likely to agree with the following statements: "palliative sedation is often associated with a risk of shortening the patient's life" ( $ES = 0.21$ ,  $P = 0.15$ ) and "palliative sedation is practically indistinguishable from acts to hasten death" ( $ES = 0.20$ ,  $P = 0.11$ ), although the difference did not reach significance.

As for the two questions which used only in the 2016 survey, a total of 41.5% of the physicians strongly agreed, agreed, or somewhat agreed with the opinion "dying while sleeping under CDS is a good death," while the remaining 58.5% somewhat disagreed, disagreed, or strongly disagreed with it (Fig. 2a). In contrast, a total of 94.2% of the physicians somewhat disagreed, disagreed, or strongly disagreed with "sleeping under CDS means a social death (Fig. 2b)."

### Clinical practice of CDS

In the 2016 survey, 400 of 417 physicians attended at least one death in a year; we analyzed their clinical practice of CDS, i.e., frequency of CDS and self-reported practice of CDS. The

**Table 1** Characteristics of participants

	2000		2016	
	<i>n</i> = 54		<i>n</i> = 417	
	%	No.	%	No.
Age, years				
Mean	42.8		52.9	
SD	7.4		8.2	
Sex				
Male	90.7	49	79.4	331
Female	9.3	5	18.7	78
Clinical experience, years				
Mean	16.8		26.8	
SD	6.8		8.3	
Palliative care experience, years				
Mean	N/A		13.0	
SD			6.2	
No. of patients who die of cancer in a year				
< 5	0.0	0	7.9	33
5–25	9.3	5	23.3	99
26–50	31.5	17	20.9	87
> 50	59.3	32	48.0	203
Clinical setting				
Palliative care unit	N/A		35.0	146
Palliative care team	N/A		48.0	200
Home hospice	N/A		12.5	52
Religion				
None	48.1	26	46.5	194
Buddhism	14.8	8	18.2	91
Christianity	35.2	19	10.8	45
Others	1.9	1	21.8	76
Religiosity <sup>a</sup>				
Mean	3.7		3.6	
SD	0.9		1.0	

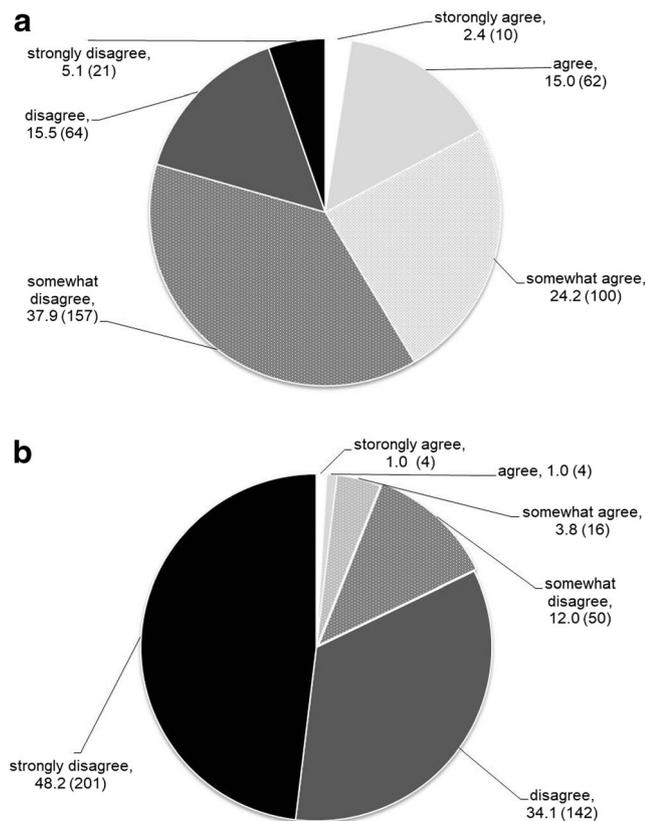
Some data do not add up to 100% as a result of missing values

SD standard deviation

<sup>a</sup> On a five-point Likert-type scale from 1 to 5. The score is the mean of 3 item scores ( $\alpha$  was 0.84). A higher score indicates a higher religiosity

frequency of CDS per total number of patients who died in a year markedly varied (mean 13.1, SD 15.2, median 8.3, range 0–100%). The physicians who performed CDS for less than 10,  $\geq 10$  and  $< 25$ , and 25% or more of their patients accounted for 50.5 ( $n = 202$ ), 30.8 ( $n = 123$ ), and 18.8% ( $n = 75$ ), respectively.

A total of 20.3% of the physicians strongly agreed with performing CDS to alleviate physical suffering in the last days (Table 2). In contrast, 5.8 and 14.8% of them strongly agreed and agreed with performing CDS to alleviate physical



**Fig. 2** Opinions about CDS until death. **(a)** “Dying while sleeping under CDS is a good death”. **(b)** “Sleeping under CDS means a social death”. All values are presented as percentage (numbers). Participants (417) in the 2016 surveys were analyzed

suffering in the last months, respectively. Only 7.8% of the physicians strongly agreed with performing CDS to alleviate psychological suffering in the last days, and 3.3 and 6.5% of them strongly agreed and agreed with performing CDS to alleviate psychological suffering in the last months, respectively.

### Determinants of physicians’ practice of CDS

In univariate analysis, all the opinions on palliative sedation showed a significant correlation with at least one of the

physicians’ practice of CDS, i.e., actual frequency or self-reported practice (data shown in s Table 1). The results of multivariate analysis are summarized in Table 3. In multivariate analysis, the physicians who less agreed with “palliative sedation is unnecessary if conventional palliative care is performed sufficiently” performed more frequent CDS (OR[95%CI] 0.70 [0.50–0.97],  $P = 0.030$ ). The physicians who less agreed with “performing palliative sedation is likely to be criticized by colleagues, patients, or their families” and who more agreed with “patients have the right to choose palliative sedation on the basis of their own personal values” were more favorable for CDS to alleviate physical suffering in the last days (OR[95%CI] 0.37 [0.20–0.69],  $P = 0.002$ , and 1.55 [1.02–2.36],  $P = 0.039$ , respectively). The physicians who less agreed with the statement “palliative sedation does not sufficiently alleviate the patient’s suffering” were more favorable for CDS to alleviate physical suffering in the last months (OR[95%CI] 0.68 [0.48–0.96],  $P = 0.030$ ).

As for the characteristics, the clinical setting showed a significant correlation with the use of CDS in the last months; the physicians working in palliative care teams were more likely to agree with the use of CDS to alleviate physical suffering in the last months (OR[95%CI] to those in palliative care unit 1.99[1.10–3.61],  $P = 0.024$ ), but there was no significant difference between the physicians working in palliative care units and in home hospices. The number of patients who died in a year had a controversial effect on physicians’ practice. Regarding physicians’ thoughts on what factors lead to a good death, no item showed a significant correlation with their practice of CDS in multivariate analysis.

### Discussion

This is, to our knowledge, the first to assess the longitudinal changes in palliative care specialists’ opinions on palliative sedation and clarify their impact on clinical practice. We revealed that the physicians’ opinions more strongly affected their practice than their characteristics or thoughts on what factors lead to a good death.

**Table 2** Self-reported practice of CDS

	Strongly agree	Agree	Somewhat agree	Somewhat disagree	Disagree	Strongly disagree
To alleviate physical suffering in the last days	20.3 (81)	43.5 (174)	21.5 (86)	8.8 (35)	3.4 (14)	2.5 (10)
To alleviate physical suffering in the last months	5.8 (23)	14.8 (59)	24.8 (99)	24.3 (97)	18.8 (75)	11.8 (47)
To alleviate psychological suffering in the last days	7.8 (31)	24.3 (97)	29.3 (117)	18.5 (74)	11.8 (47)	8.3 (33)
To alleviate psychological suffering in the last months	3.3 (13)	6.5 (13)	14.5 (58)	26.1 (104)	24.3 (97)	25.3 (101)

All values are presented as percentages (numbers). Four hundred respondents in the 2016 survey who attended at least one death in a year were analyzed

**Table 3** Determinants of tendency to perform CDS in multivariate analysis

	More frequent CDS <sup>a</sup> <i>n</i> = 75 (18.8%)	More favorable to CDS for physical suffering in the last days <sup>b</sup> <i>n</i> = 81 (20.3%)	More favorable to CDS for physical suffering in the last months <sup>c</sup> <i>n</i> = 82 (20.5%)	
	OR (95%CI)	P	OR (95%CI)	P
<b>Demographic data</b>				
Age, years				
Clinical experience, years				
Palliative care experience, years			0.97 (0.92–1.01)	0.14
No. of patients who die of cancer in a year	0.99 (0.99–1.00)	0.002	1.00 (1.00–1.01)	0.30
Religiosity				
Sex				
Male				
Female				
Clinical setting				
Palliative care unit				
Palliative care team			1.99 (1.10–3.61)	0.024
Home hospice			1.44 (0.58–3.46)	0.44
Religion				
None				
Buddhism	0.56 (0.23–1.32)	0.18		
Christianity	1.97 (0.85–4.61)	0.12		
Others	0.69 (0.32–1.52)	0.36		
<b>Opinion on palliative sedation<sup>d</sup></b>				
It is difficult to perform palliative sedation based on appropriate indications	0.96 (0.67–1.39)	0.84	0.93 (0.61–1.42)	0.73
Palliative sedation is unnecessary if conventional palliative care is performed sufficiently	0.70 (0.50–0.97)	0.030	0.73 (0.50–1.06)	0.098
Palliative sedation does not sufficiently alleviate the patient's suffering	0.67 (0.44–1.02)	0.059	0.68 (0.48–0.96)	0.030
Performing palliative sedation is likely to be criticized by colleagues, patients, or their families	0.62 (0.38–1.02)	0.058	0.37 (0.20–0.69)	0.002
Performing palliative sedation may result in legal action	1.07 (0.70–1.64)	0.75		
Palliative sedation is often associated with a risk of shortening the patient's life	0.77 (0.56–1.06)	0.11	1.11 (0.78–1.59)	0.56
Palliative sedation is practically indistinguishable from acts to hasten death	0.69 (0.44–1.08)	0.11	0.69 (0.44–1.08)	0.11
Patients have the right to choose palliative sedation on the basis of their own personal values	1.46 (0.98–2.18)	0.066	1.55 (1.02–2.36)	0.039
<b>Opinion on good death components<sup>e</sup></b>				
Physical comfort			1.06 (0.73–1.54)	0.75
Being cognitively intact			0.81 (0.63–1.05)	0.11
Autonomy				

**Table 3** (continued)

	More frequent CDS <sup>a</sup>		More favorable to CDS for physical suffering in the last days <sup>b</sup>		More favorable to CDS for physical suffering in the last months <sup>c</sup>	
	<i>n</i> = 75 (18.8%)	<i>P</i>	<i>n</i> = 81 (20.3%)	<i>P</i>	<i>n</i> = 82 (20.5%)	<i>P</i>
	OR (95%CI)		OR (95%CI)		OR (95%CI)	
Saying goodbye to important people					1.27 (0.93–1.72)	0.13
Being free from tubes and machines						

Four hundred respondents in the 2016 study who attended at least one death in a year were analyzed. The variables that reached  $p < 0.10$  in univariate analysis were included to the multivariate analysis CI confidence interval, OR odds ratio

<sup>a</sup>The respondents who perform CDS for 25% or more of their patients. R2 in the multivariate analysis was 0.12

<sup>b</sup>The respondents who answered 'strongly agree.' R2 in the multivariate analysis was 0.28

<sup>c</sup>The respondents who answered 'strongly agree' or 'agree.' R2 in the multivariate analysis was 0.12

<sup>d</sup>On a five-point Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). A higher score indicates a stronger agreement

<sup>e</sup>On a seven-point Likert-type scale from 1 (not important at all) to 7 (necessary). A higher score indicates a higher physician-perceived importance of the components

In the present survey, the palliative care specialists, compared with those in 2000 [17], tended to consider palliative sedation as difficult to perform based on appropriate indications. This suggests that physicians have more difficulty in determining medical indication for palliative sedation, and that they are more concerned about misusing palliative sedation without providing sufficient alternative treatment as well. The palliative care specialists in the 2016 survey, however, also more agreed that palliative sedation is unnecessary if conventional palliative care is provided sufficiently; that is, more physicians consider they can control distressing symptoms without the need to use palliative sedation as an option of last resort. This phenomenon suggests that the distinction between conventional palliative care and palliative sedation at the end of life is becoming unclear [3, 6, 23]. Addressing this issue is important, since these opinions significantly affected their practice. Consistent with recent reports, these findings indicate that it is necessary to standardize therapies to alleviate patients' suffering, and consequently make criteria for CDS clearer [3, 6, 23].

Additionally, physicians' practice was affected by their concern that palliative sedation may not relieve patients suffering efficiently. Recently, it was pointed out the possibility that patients who are deeply sedated might be aware or still experience suffering [24, 25]; the current assessments of suffering and awareness may not be accurate enough. It is therefore necessary to establish objective methods to evaluate patients' suffering when they are unable to communicate [25]. Further biological investigations to clarify whether patients deeply sedated still suffer might provide us a clue.

The palliative care specialists, compared with those in 2000 [17], were more likely to fear being prosecuted by performing palliative sedation; such fear also affected their practice. These findings remind us that legal factors in addition to biological, cultural, and social factors have an impact on physicians' practice of CDS [26, 27]. The increasing fear of being prosecuted despite developing guidelines is notable. In recent decades, physicians in Japan have become more sensitive to legal issues surrounding patients' end of life, probably influenced by criminal cases [28]. In one case, the Supreme Court found a physician guilty of homicide; she removed a patient's intra-tracheal tube and administered muscle relaxants with sedatives on the family's request without explicit patient consent [29]. Moreover, the present study revealed that the physicians tended to be in favor of CDS when they consider that patients have the right to choose palliative sedation. Notably, in 2016, the French government enacted a law that establishes patients' rights to receive CDS [30]. The issue is becoming more complicated due to recent reports from countries where euthanasia has been legalized; they revealed the existence of a gray area surrounding CDS and euthanasia [31, 32]. As there are no written laws about the right of patients to relief from

suffering including palliative sedation in Japan, we may need to devise a legislative framework.

Of note was that the palliative care specialists, compared with those in 2000 [17], tended to be less concerned about the life-shortening effect of palliative sedation, although such an opinion affected their practice. One conceivable cause of this change may be recent empirical investigations demonstrating that CDS, when appropriately administered, does not invariably hasten death [8, 9]. To confirm the investigation, further research is needed using more confirmatory methods [33].

Finally, in the present study, more than 90% of the physicians did not consider that sleeping under CDS means “social death,” though CDS has often been criticized for inducing social death [12]. In contrast, there were pros and cons regarding the opinion “dying while sleeping under CDS is a good death.” This result differed from the previous report whereby more than 90% of the Japanese public consider “dying as one sleeps” as a good death [21], although they mentioned that, in Japan, dying as one sleeps suggests an overall good death beyond the literal meaning. Further cross-cultural studies might promote understanding of how CDS is viewed among countries with different cultures.

Some limitations exist in this study. First, we used different methods to recruit palliative care specialists in the two surveys, since board certification for palliative care specialist was established in 2010: physicians who worked in palliative care units in 2000 and physicians who were registered as palliative care specialists in 2016. Besides, participants in the two surveys were not matched. The supposed reason of these differences is current changes in the situation surrounding palliative care in Japan; palliative care has become more accepted and more physicians now specialize in it [34]. We believe, however, that the participants were representative Japanese palliative care specialists in each study periods. Second, we assessed limited items about physicians’ characteristics. Though, in multivariate analysis, we found no significant correlation between physicians’ characteristics except for care settings and their CDS practice pattern, other characteristics, e.g., physicians’ background specialty or work place, might have influence on their practice. Third, the study subjects participated on a voluntary basis; therefore, there might be a selection bias, even though the response rate was acceptable. Fourth, because of the self-reporting method, there might be a gap between the physician-reported practice analyzed here and their actual practice. Finally, since we used rough scenarios, a proportion of physicians might answer differently if given detailed information. However, we do not believe they caused a significant discrepancy in the context of assessing thoughts on CDS.

In conclusion, recently, palliative care specialists in Japan tend to have more difficulties determining what is conventional palliative care and what is palliative sedation, and they fear being prosecuted by performing palliative sedation. These

findings suggest the necessity of standardizing methods to alleviate patients’ suffering and of making criteria for CDS clearer; in addition, we may need to create a legal basis that respects patients’ rights at their end of life.

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## Compliance with ethical standards

The Institutional Review Board of Seirei Mikatahara General Hospital approved the ethical and scientific validity of this study.

**Conflict of interest** The authors declare that they have no conflict of interest.

## References

- Beller EM, van Driel ML, McGregor L, Truong S, Mitchell G (2015) Palliative pharmacological sedation for terminally ill adults. *Cochrane Database Syst Rev* 1:CD010206
- Claessens P, Menten J, Schotsmans P, Broeckaert B (2008) Palliative sedation: a review of the research literature. *J Pain Symptom Manag* 36:310–333
- Papavasiliou EE, Payne S, Brearley S, EUROIMPACT (2014) Current debates on end-of-life sedation: an international expert elicitation study. *Support Care Cancer* 22:2141–2149
- Gurschick L, Mayer DK, Hanson LC (2015) Palliative sedation: an analysis of international guidelines and position statements. *Am J Hosp Palliat Care* 32:660–671
- Papavasiliou ES, Brearley SG, Seymour JE, Brown J, Payne SA, EUROIMPACT (2013) From sedation to continuous sedation until death: how has the conceptual basis of sedation in end-of-life care changed over time? *J Pain Symptom Manag* 46:691–706
- Quill TE, Lo B, Brock DW, Meisel A (2009) Last-resort options for palliative sedation. *Ann Intern Med* 151:421–424
- Schildmann EK, Schildmann J, Kiesewetter I (2015) Medication and monitoring in palliative sedation therapy: a systematic review and quality assessment of published guidelines. *J Pain Symptom Manag* 49:734–746
- Maeda I, Morita T, Yamaguchi T, Inoue S, Ikenaga M, Matsumoto Y, Sekine R, Yamaguchi T, Hirohashi T, Tajima T, Tatara R, Watanabe H, Otani H, Takigawa C, Matsuda Y, Nagaoka H, Mori M, Tei Y, Kikuchi A, Baba M, Kinoshita H (2016) Effect of continuous deep sedation on survival in patients with advanced cancer (J-Proval): a propensity score-weighted analysis of a prospective cohort study. *Lancet Oncol* 17:115–122
- Maltoni M, Pittureri C, Scarpi E, Piccinini L, Martini F, Turci P, Montanari L, Nanni O, Amadori D (2009) Palliative sedation therapy does not hasten death: results from a prospective multicenter study. *Ann Oncol* 20:1163–1169
- Rys S, Deschepper R, Mortier F, Deliens L, Atkinson D, Bilsen J (2012) The moral difference or equivalence between continuous sedation until death and physician-assisted death: word games or war games? A qualitative content analysis of opinion pieces in the indexed medical and nursing literature. *J Bioeth Inq* 9:171–183
- Radbruch L, Leget C, Bahr P, Müller-Busch C, Ellershaw J, de Conno F, vanden Berghe P, on behalf of the board members of

- the EAPC; Board Members of EAPC (2016) Euthanasia and physician-assisted suicide: a white paper from the European Association for Palliative Care. *Palliat Med* 30:104–116
12. Mastersvedt LJ, Bosshard G (2009) Deep and continuous palliative sedation (terminal sedation): clinical-ethical and philosophical aspects. *Lancet Oncol* 10:622–627
  13. ten Have H, Welie JV (2014) Palliative sedation versus euthanasia: an ethical assessment. *J Pain Symptom Manag* 47:123–136
  14. Schildmann J, Schildmann E (2013) Clinical and ethical challenges of palliative sedation therapy. The need for clear guidance and professional competencies. *Int J Clin Pract* 67:1086–1088
  15. Seymour J, Rietjens J, Bruinsma S, Deliens L, Sterckx S, Mortier F, Brown J, Mathers N, van der Heide A, on behalf of the UNBIASED consortium, Addington-Hall J, Anquetin L, Brown J, Bruinsma S, Deliens L, Mathers N, Mortier F, Payne S, Raus K, Rietjens J, Seale C, Seymour J, Smithson WH, Sterckx S, Janssens R, van der Heide A (2015) UNBIASED consortium. Using continuous sedation until death for cancer patients: a qualitative interview study of physicians' and nurses' practice in three European countries. *Palliat Med* 29:48–59
  16. Raus K, Brown J, Seale C, Rietjens JA, Janssens R, Bruinsma S et al (2014) Continuous sedation until death: the everyday moral reasoning of physicians, nurses and family caregivers in the UK, the Netherlands and Belgium. *BMC Med Ethics* 15:14
  17. Morita T, Akechi T, Sugawara Y, Chihara S, Uchitomi Y (2002) Practices and attitudes of Japanese oncologists and palliative care physicians concerning terminal sedation: a nationwide survey. *J Clin Oncol* 20:758–764
  18. Morita T, Bito S, Kurihara Y, Uchitomi Y (2005) Development of a clinical guideline for palliative sedation therapy using the Delphi method. *J Palliat Med* 8:716–729
  19. van Deijck RH, Hasselaar JG, Verhagen SC, Vissers KC, Koopmans RT (2013) Determinants of the administration of continuous palliative sedation: a systematic review. *J Palliat Med* 16:1624–1632
  20. Morita T, Oyama Y, Cheng SY, Suh SY, Koh SJ, Kim HS, Chiu TY, Hwang SJ, Shirado A, Tsuneto S (2015) Palliative care physicians' attitudes toward patient autonomy and a good death in east Asian countries. *J Pain Symptom Manag* 50:190–199
  21. Miyashita M, Sanjo M, Morita T, Hirai K, Uchitomi Y (2007) Good death in cancer care: a nationwide quantitative study. *Ann Oncol* 18:1090–1097
  22. Steinhauser KE, Christakis NA, Clipp EC, McNeilly M, McIntyre L, Tulsky JA (2000) Factors considered important at the end of life by patients, family, physicians, and other care providers. *JAMA* 284:2476–2482
  23. Bruera E (2012) Palliative sedation: when and how? *J Clin Oncol* 30:1258–1259
  24. Davis MP (2009) Does palliative sedation always relieve symptoms? *J Palliat Med* 12:875–877
  25. Deschepper R, Laureys S, Hachimi-Idrissi S, Poelaert J, Distelmans W, Bilsen J (2013) Palliative sedation: why we should be more concerned about the risks that patients experience an uncomfortable death. *Pain* 154:1505–1508
  26. Anquetin L, Rietjens JA, Seale C, Seymour J, Deliens L, van der Heide A (2012) The practice of continuous deep sedation until death in Flanders (Belgium), the Netherlands, and the U.K.: a comparative study. *J Pain Symptom Manag* 44:33–43
  27. Rousseau PC (2006) Palliative sedation and the fear of legal ramifications. *J Palliat Med* 9:246–247
  28. Bito S, Asai A (2007) Attitudes and behaviors of Japanese physicians concerning withholding and withdrawal of life-sustaining treatment for end-of-life patients: results from an Internet survey. *BMC Med Ethics* 8:7
  29. Kai K (2006) Euthanasia and death with dignity in Japanese law. *Waseda Bull Comp Law* 27:1–14
  30. Boulanger A, Chabal T, Fichaux M, Destandau M, La Piana JM, Auquier P et al (2017) Opinions about the new law on end-of-life issues in a sample of french patients receiving palliative care. *BMC Palliat Care* 16:7
  31. Onwuteaka-Philipsen BD, Brinkman-Stoppelenburg A, Penning C, de Jong-Krul GJ, van Delden JJ, van der Heide A (2012) Trends in end-of-life practices before and after the enactment of the euthanasia law in the Netherlands from 1990 to 2010: a repeated cross-sectional survey. *Lancet* 380:908–915
  32. Anquetin L, Rietjens JAC, Van den Block L, Bossuyt N, Deliens L (2011) General practitioners' report of continuous deep sedation until death for patients dying at home: a descriptive study from Belgium. *Eur J Gen Pract* 17:5–13
  33. Morita T, Imai K, Yokomichi N, Mori M, Kizawa Y, Tsuneto S (2017) Continuous deep sedation: a proposal for performing more rigorous empirical research. *J Pain Symptom Manag* 53:146–152
  34. Mori M, Morita T (2016) Advances in hospice and palliative care in Japan: a review paper. *Korean J Hosp Palliat Care* 19:283–291