

We investigated attitudes toward end-of-life care in five areas: four questions for pain, two questions for hydration/nutrition, three questions for communication, two questions for cancer treatment, and five questions for home care (see Table 5). The questions were identical to those we used in our previous study (11), and they employed a 5-point Likert scale: strongly agree, agree, unsure, disagree, and strongly disagree.

Analyses

Initially, we examined the characteristic differences between respondents and non-respondents in the follow-up questionnaires using the Wilcoxon test or Fisher's exact test, as appropriate. Then we compared the responses to follow-up questionnaires with those to the pre-questionnaires in order to examine the long-term effects of the educational intervention using the Wilcoxon signed-rank test. Regarding the feasibility of home death, we identified the proportion of "possible" responses. In addition, the responses to the post-questionnaire underscored the short-term effect of the educational intervention on these participants. For all analyses, the significance level was set at $p < 0.05$, and the two-sided test was used. All statistical analyses were performed with SAS 9.1 for Windows.

RESULTS

The characteristics of the 424 participants who completed pre- and follow-up questionnaires are shown in Table 1. The mean age \pm SD was 66 ± 10 years, 64 percent were female, 88 percent were living with someone, and 67 percent experienced bereavement within 10 years. There were no significant differences between the 424 respondents and the 171 non-respondents in the follow-up questionnaires, except that the non-response group included more females (77 percent, $p < 0.001$).

Feasibility of Home Death

The feasibility of home death is shown in Table 2. While 41 participants (10 percent) agreed that home death was feasible before the educational

Table 1 / Participant Characteristics (n=424)

	n	(%) ^a
Age		
50 years and under	28	(6.6)
51-60 years	72	(17)
61-70 years	179	(42)
71 years and over	145	(34)
Gender		
male	153	(36)
female	270	(64)
Education		
junior high school	99	(23)
high school	220	(52)
college	55	(13)
university	47	(11)
Health status		
good	177	(42)
moderate	185	(44)
fair	56	(13)
bad	2	(0.5)
Experience of hospital admission		
yes	246	(58)
no	176	(41)
Family members living with participant		
none	50	(12)
one	128	(30)
two or three	128	(30)
four or more	117	(28)
Experience of bereavement within 10 year		
yes	283	(67)
no	136	(32)

^a Percentages were not summed up 100 percent due to missing values.

intervention, significantly more agreed immediately after the intervention ($n=158$, 37 percent, $p < 0.001$); however, no significant difference was seen between the pre- and six-month-follow-up responses ($n=52$, 12 percent, $p=0.117$).

Barriers to End-of-Life Home Care

Barriers to end-of-life home care are shown in Table 3. In the post-questionnaire, 8 of 10 barriers showed significant improvement as a result of the intervention. In contrast, there were no significant differences between the pre- and follow-up responses, except for "absence of 24-hour consultation" (pre, 20 percent; follow-up, 27 percent; $p=0.004$) and "anxiety about worsening physical condition" (62 percent, 57 percent, $p=0.049$).

Table 2 / Feasibility of Home Death

	Pre		Post (vs Pre)			Follow-up (vs Pre)		
	N	(%)	N	(%)	P	N	(%)	P
Possible	41	(10)	158	(37)	<0.001***	52	(12)	0.12
Impossible	240	(57)	107	(25)		226	(53)	
Unsure	132	(31)	141	(33)		144	(34)	
Missing	11	(2.6)	18	(4.0)		2	(0.5)	

$p < 0.001$

Table 3 / Barriers to End-of-Life Home Care

	Pre %	Post %	(vs Pre) P	Follow-up %	(vs Pre) P
Absence of visiting physician	31	27	0.04*	35	0.12
Absence of visiting nurse	23	17	0.009**	25	0.33
Absence of 24-hour consultation	20	21	0.83	27	0.004**
Absence of family caring	19	20	0.81	22	0.18
Burden for family to care	78	68	<0.001***	82	0.09
Anxiety about worsening physical condition	62	52	<0.001***	57	0.05*
Anxiety about immediate admission to hospital when physical condition worsens	43	34	<0.001***	42	0.55
Insufficient living environment	18	14	0.02*	20	0.40
Economic burden	44	24	<0.001***	44	1.00
Suffering not relieved at home	43	19	<0.001***	41	0.45

p<0.05, ** p<0.01, *** p<0.001

Table 4 / Preference for Life-Prolongation Treatment^a

	Pre %	Post %	(vs Pre) P	Follow-up %	(vs Pre) P
Artificial hydration	61	51	0.006**	61	0.69
Artificial nutrition	48	37	0.008**	38	0.06
Vasopressor	37	32	0.26	30	0.21
Mechanical ventilation	21	20	0.87	15	0.02*
CPR	25	21	0.37	16	0.02*

^a Figures are total percentages of "want to receive" and "probably want to receive."
p<0.05, ** p<0.01

Preferences for Life-Prolongation Treatment

Preferences for life-prolongation treatment are shown in Table 4. As a result of the intervention, the preferences for artificial hydration and nutrition were significantly decreased for the short term, while significantly fewer participants preferred mechanical ventilation (pre, 21 percent; follow-up, 15 percent; p=0.015) and CPR (25 percent, 16 percent, p=0.023) for the long term.

Attitudes toward End-of-Life Care

Attitudes toward end-of-life care are shown in Table 5. All of the first four questions regarding pain-related beliefs improved for the short term, and responses to three of the questions remained significantly improved, although to a lesser extent, six months after the intervention: "cancer pain is sufficiently relieved if treatment is adequate" (pre, 67 percent; follow-up, 74 percent; p=0.016), "opioids shorten life" (31 percent, 23 percent, p=0.039), and "opioids cause addiction" (23 percent, 21 percent, p=0.020).

Belief that "artificial hydration and nutrition relieve symptoms" was significantly improved for the short term and remained partially improved after six months (pre, 34 percent; follow-up, 28 percent; p<0.001). In contrast, the change that

occurred for "artificial hydration and nutrition should be continued as the minimum standard until death" was not sustained for the long term (47 percent, 50 percent, p=0.407).

Regarding communication-related beliefs and cancer-treatment-related beliefs, the following significantly improved after the intervention: "physicians are generally poor at communicating bad news," "physicians are uncomfortable discussing death," "it would be intolerable if I were told that I had incurable cancer," and "cancer treatment has only limited effectiveness." But there were no significant differences between responses in the pre- and follow-up questionnaires.

All of the last five questions regarding home-care-related beliefs improved for the short-term, and responses to three of the questions remained significantly improved six months after the intervention: "death at home suggests to relatives that family cannot provide sufficient medical care for patient" (pre, 15 percent; follow-up, 8 percent; p<0.001), "death at home suggests to neighbours that family cannot provide sufficient medical care for patient" (16 percent, 12 percent, p<0.001), and "a large hospital provides better-quality medical treatment than a clinic before death" (53 percent, 40 percent, p<0.001).

Table 5 / Attitudes toward End-of-Life Care^a

	Pre %	Post %	(vs Pre) P	Follow-up %	(vs Pre) P
Cancer pain is sufficiently relieved if treatment is adequate	67	82	<0.001**	74	0.02*
Opioids shorten life	31	7	<0.001**	23	0.04*
Opioids cause addiction	23	3	<0.001**	21	0.02*
Consciousness is clear if pain medication is not used	29	29	0.03*	29	0.97
Artificial hydration and nutrition should be continued as the minimum standard until death	47	29	<0.001**	50	0.41
Artificial hydration and nutrition relieve symptoms	34	23	<0.001**	28	<0.001**
Physicians are generally poor at communicating bad news	29	21	<0.001**	31	0.35
Physicians are uncomfortable discussing death	17	9	<0.001**	17	0.51
It would be intolerable if I were told that I had incurable cancer	40	26	<0.001**	32	0.06
Cancer treatment has only limited effectiveness	67	63	0.02*	65	0.84
I want to receive cancer treatment as long as possible	44	47	0.17	45	0.34
Medical systems are insufficient for treatment or care at home	60	30	<0.001**	57	0.33
In my circumstance, it is difficult to be cared for at home	61	30	<0.001**	57	0.10
Death at home suggests to relatives that family cannot provide sufficient medical care for patient	15	8	<0.001**	8	<0.001**
Death at home suggests to neighbours that family cannot provide sufficient medical care for patient	16	11	<0.001**	12	<0.001**
A large hospital provides better-quality medical treatment than a clinic before death	53	11	<0.001**	40	<0.001**

^a Figures are total percentages of "strongly agree" and "agree."

*p<0.05, **p<0.001

DISCUSSION

In our previous study, we delivered one-hour educational lectures on palliative care to a public audience and reported a large number of significant changes in belief immediately after the intervention (27). In this six-month follow-up survey, we learned that many of the changes had reverted to initial beliefs. However, there was improvement in the misconception of opioids, artificial hydration, and home death — although to a lesser extent.

This was the first study to examine the long-term effects of an educational intervention regarding palliative care for the general public. Although lack of knowledge and misconceptions were barriers to appropriate palliative care (1-10), only a few studies have examined the effect of a population-based educational intervention (26). Further-

more, no studies have systematically used pre-, post-, and follow-up questionnaires. Therefore, our findings provide some useful information concerning the development of educational interventions to help the general public overcome the barriers to palliative care.

We propose several possible reasons to organize educational interventions and offer suggestions for how to conduct interventions that will be effective in the long term. First, our intervention was conducted only once for each participant, with the intention of minimizing the burden of participating. Our results, however, suggest the need for repeated education sessions in order to sustain long-term effects. However, it is also necessary to develop other approaches to eliciting participants' internal motivation to learn (28). As didactic lectures may be unmemorable and there-

fore ineffective, experience-based education and small-group discussions should be considered instead. In addition, we should take into account the fact that exposure to palliative care and home death — which may be gained through the media or from the experiences of relatives or friends — may change beliefs, because experience provides a basis for learning (28). Finally, among our participants were many elders, and some were illiterate and hard of hearing; a 60-minute lecture might have exceeded the limits of their ability to concentrate. Different approaches will be necessary for various age groups.

Misconception about opioids is a common barrier to optimal pain management (6-10). In fact, educational intervention produced improvement in pain outcomes and pain-related knowledge among cancer patients (15-18). In a population-based survey, 24 to 33 percent of the Japanese general public said that they believed that opioids shortened life and caused addiction (11). Our one-hour educational lecture dramatically improved the degree of misconception about opioids immediately after the intervention, and the improvement remained significant, although to a lesser extent, at the six-month follow-up.

Beliefs about most barriers to home care were not sustained, and beliefs about the feasibility of home death reverted to initial opinions. It may be difficult to change beliefs about barriers using educational intervention, because some barriers are related to an actual lack of resources, such as a family caregiver or home care; there are significant factors associated with home death (14). However, hospital access is relatively free for end-of-life care in Japan; more than 90 percent of cancer patients have died in hospital over the last decade (29). This accessibility may actually contribute to misconceptions about end-of-life home care. Our educational intervention helped to dispel the negative image of death at home as opposed to end-of-life care at a large hospital, although this improvement was somewhat reduced after six months.

This study had several limitations. First, participants were community residents who volunteered to participate; they therefore represented one geographic community and tended to be health-conscious. Second, our participants were mostly elderly; they therefore did not represent all age groups in the general population. Third, our outcomes were subjective. Further study should be devoted to examining objective factors, such as the number of home deaths. Finally, our educational intervention was not based on adult education theory. By incorporating an appropriate theoretical framework, a more effective and applicable intervention could be developed.

CONCLUSION

This population-based educational intervention was not effective in the long term. Many of the significant changes in belief that occurred immediately after the intervention reverted to initial opinion six months later, although there was some remaining effect on certain misconceptions related to palliative care. Other approaches are needed to achieve more substantial and long-lasting effects: for example, repeated education sessions; experience-based education and small-group discussions; exposure to palliative care and home death; and different strategies for different age groups. Further study is needed to develop and evaluate more effective educational intervention.

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The palliative care knowledge test: reliability and validity of an instrument to measure palliative care knowledge among health professionals

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Abstract

Development of palliative care educational programmes continues in Japan. An instrument to evaluate a wider range of palliative care knowledge among general physicians and nurses is needed. However, such an instrument does not currently exist. The aim of this study was to develop an assessment to measure the efficacy of palliative care educational programmes. The questionnaire survey was validated with a group of 940 nurses at two facilities. The response rate was 85 % ($n = 797$). This study used psychometric methods such as item response theory and intraclass correlation coefficients. Ultimately, 20 items in 5 domains including 'philosophy', 'pain', 'dyspnoea', 'psychiatric problems' and 'gastro-intestinal problems' were selected. For these items, the intraclass correlation was 0.88 overall and 0.61–0.82 in each domain; the Kuder-Richardson formula 20 in internal consistency was 0.81. Validity and reliability of the instrument were established. This tool is designed to evaluate a wider range of palliative care knowledge than currently available assessments and can be used for general physicians and nurses. The evaluation of educational programmes and the clarification of actual knowledge acquired are possible using this instrument.

Keywords

educational measurement, evaluation, knowledge, nurse, palliative care, physician

Introduction

Palliative care is an essential part of cancer care.¹ However, lack of knowledge of palliative care among health professionals is one of the most common barriers to quality palliative care. Therefore, education on palliative care for health professionals is needed.²⁻⁵

Till date, studies of palliative care educational programmes in foreign countries have shown that knowledge and skills can be improved.⁶⁻⁹ The dissemination of palliative care for cancer patients is

promoted as a national policy in Japan.¹⁰ To improve palliative care throughout Japan, a nationwide demonstration project, the Outreach Palliative Care Trial of Integrated Regional Model (OPTIM) study, is ongoing.¹¹ The OPTIM study is an intervention trial targeting four areas across Japan. One of the aims is an improvement of palliative care knowledge and skills among health professionals including general physicians and nurses. Another objective is the development of an educational programme that disseminates

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a standardised tool, which includes information on symptoms such as pain and dyspnoea, through Web-based and interactive workshops. An example is a palliative care manual that describes symptom management.

To deliver quality educational programmes, it is necessary to conduct evaluations to determine whether an educational programme is effective. Such evaluations can assess individual achievement, clarify the effectiveness of the programme and provide information on whether the programme should be continued. Therefore, a valid instrument to evaluate educational programmes is needed. We considered the linkages among knowledge, skills and practice of palliative care, and we determined that a knowledge test with a wider assessment of symptomatology was necessary. Existing studies have generally focused on knowledge about pain management; broader areas of palliative care, however, have rarely been investigated.¹²⁻¹⁵ Furthermore, we found little information on the psychometric properties of the measures used. The most frequent measurement of palliative care knowledge is the Palliative Care Quiz for Nursing (PCQN) that was developed in 1996 to evaluate nurses' knowledge of palliative care.¹⁶ The validity and reliability of this instrument have been confirmed. However, there were some limitations in assessment of the PCQN, and we felt that the development of a new instrument would be useful for the following reasons: (1) many studies have shown that terminal patients experience a variety of symptoms.¹⁷⁻¹⁹ We wanted to evaluate a wider range of knowledge, including psychiatric problems such as delirium and gastrointestinal problems such as nutrition, that often arise in end-stage cancer patients. (2) We wanted to evaluate not only general nurses but also general physicians who were subjects of the educational programme. (3) We wanted to develop an instrument that is not limited to terminal care and is more in accord with the recent definition by WHO that palliative care is applicable early in the course of illness.¹ (4) Finally, the PCQN included medication that was not available in Japan, and we wanted to develop a tool suitable for Japanese culture.

The aims of this study are two-fold: (1) to develop and validate the Palliative Care Knowledge Test (PCKT) for general physicians and nurses and (2) to identify the factors associated with palliative care knowledge.

In this study, we defined 'patients with terminal cancer' as follows: 'Patients with cancer who are not likely to respond to treatment and whose life expectancy is less than 6 months'. We also defined 'mentor' as follows: 'A person (physician, nurse, family member or friend) with whom a health professional can talk about palliative care personally'.

Methods

Design

The questionnaire survey was designed as a cross-sectional, anonymous, self-administered questionnaire survey. To examine the test-retest reliability of items and domains, the questionnaire was re-issued 2 weeks after the first survey was completed.

Sample

The survey was carried out in August 2007 in two hospitals. The subjects were 940 nurses from a university hospital (661 beds) and a general hospital (634 beds) located in Yokohama city in Japan. Both the facilities had inpatient palliative care units (PCUs). The inclusion criterion for the subjects was that they were registered nurses. The retest was conducted on the subjects who had consented to participate during the first assessment ($n = 204$).

The questionnaire and cover letter were distributed to nurses in each ward. The cover letter explained that this survey was confidential and anonymous. Consent to participate was indicated by the completion and return of the questionnaire. The questionnaire for retests was distributed in each ward as well. Completed questionnaires were collected in a box that we put in the ward. The ethical and scientific validity of this study was approved by the Institutional Review Board in one hospital. Because there was no Institutional Review Board in the other hospital, the study was approved by the director of the hospital.

Procedure

Development of test

We developed an instrument to quantify health care professionals' general palliative care knowledge. Item generation was based on the literature reviews and discussion among nine experts.^{13,16,20-22} Content areas included philosophy, pain, dyspnoea, psychiatric problems, gastrointestinal problems and communication regarding palliative care. A pool of 148 items was generated. To achieve face validity, an expert panel (three palliative physicians, four oncology clinical nurse specialists and two home care nurses) rated the appropriateness of each item. First, experts evaluated the appropriateness of each item according to four grades. Next, the mean, minimum and maximum values were calculated, and the items with less than a mean of two and a minimum of zero were deleted. Then, the argument for the item selection was repeated including an evaluation of the way the concept was

expressed. As a result, a preliminary list of 40 items (Appendix 1) was selected from the original 148 items.

Questionnaire

- (1) The PCKT: preliminary 40 items
- (2) Total number of terminal cancer patients whom you have cared for and the number in the past year
- (3) Experience of working in hospice or PCU
- (4) Hours of palliative care education
- (5) The existence of a mentor regarding end-of-life issues
- (6) Demographic factors (gender, age, education, clinical area and years of clinical experience)

We included factors 2 through 5 as potentially related to palliative care knowledge among nurses. The original questionnaire was in Japanese.

Statistical analyses

Item selection: Participants who responded to 90% or more of the 40 items were included as subjects of the analysis. Responses were determined to be right or wrong for the 40 questions. 'Unsure' responses were regarded as incorrect.

First, item analysis was conducted. We considered the percentage of missing data to enhance feasibility (cut-offs: missing more than 1% of data) and ceiling effect to enhance sensitivity (cut-offs: correct answers are more than 90% or 10% or less). Second, to examine the test-retest reliability of each item, the kappa coefficients were calculated. We considered the reliability of each item (cut-offs: kappa coefficients 0.3 or less). Third, the difficulty and discrimination based on the 2-parameter logistic Item Response Theory (IRT) model were estimated. IRT models are used as a basis for statistical estimation of parameters that represent the magnitude of the latent trait attributable to the items. An advantage of IRT is that it potentially provides information that enables a researcher to improve the precision and reliability of an assessment.²³ We then determined the precision (cut-offs: discrimination 0.5 or less).

Then, to achieve content validity, we repeated the discussion with the experts. We chose particular items based on the analysis results and the following points: (1) items in which sensitivity seemed to be higher and (2) items that could be viewed as providing lessons in themselves. Eventually, 20 items were selected to comprise the PCKT.

Reliability and validity: The sample of the subjects who were surveyed with the 40-item questionnaire was analysed using the 20-selected items. The Kuder-Richardson formula 20 (KR-20) was used to assess the

internal consistency of the 20 items. The test-retest reliability was explored by calculating intraclass correlation coefficients with 2-week interval administrations.

To explore known-group validity, the unpaired *t*-test was used to determine differences between the group of nurses working in PCUs and the group of other nurses. The total overall score of the 20 items and of each domain were examined with the unpaired *t*-test.

Related factors: To identify the factors associated with palliative care knowledge among nurses, first, univariate analyses were conducted using the unpaired *t*-test, ANOVA and Pearson product-moment correlation coefficients, where appropriate. Thereafter, the associations of each hypothesised factor with the total overall score of the 20 items and of each domain were determined using multivariate linear regression. Standardised partial regression coefficients were calculated with models including all explanatory variables other than age. Dummy variables were created for clinical areas. Statistical analysis was performed using SAS version 9.1 (SAS Institute, Inc., Cary, NC, USA). The significance level was set at <0.05 (2-tailed).

Results

The response rates are shown in Figure 1. Finally, 773 responses (82%) in the first and 148 responses (73%) in the second round were used for analysis.

The characteristics of the respondents (first round) are summarised in Table 1. The characteristics of the respondents in the second round were as follows: approximately 97% were women. Job locations were the surgical ward for 38% of the nurses, internal medicine ward for 18% and PCU for 14%. The duration of clinical experience was less than 4 years for 35% of the nurses and from 5 to 9 years for 34%. The number of terminal cancer patients who have been cared for was as follows: 66% were less than 50 people, 17% were 50–99 and the remainders were more than 100 people. Approximately 70% had a mentor.

Validation study

The results of the item analysis and IRT are shown in Table 2.

Feasibility

Missing values were less than 1% in all items.

Ceiling effect

The percentage of correct answers was from 12 to 97%. The item with the highest percentage of correct answers

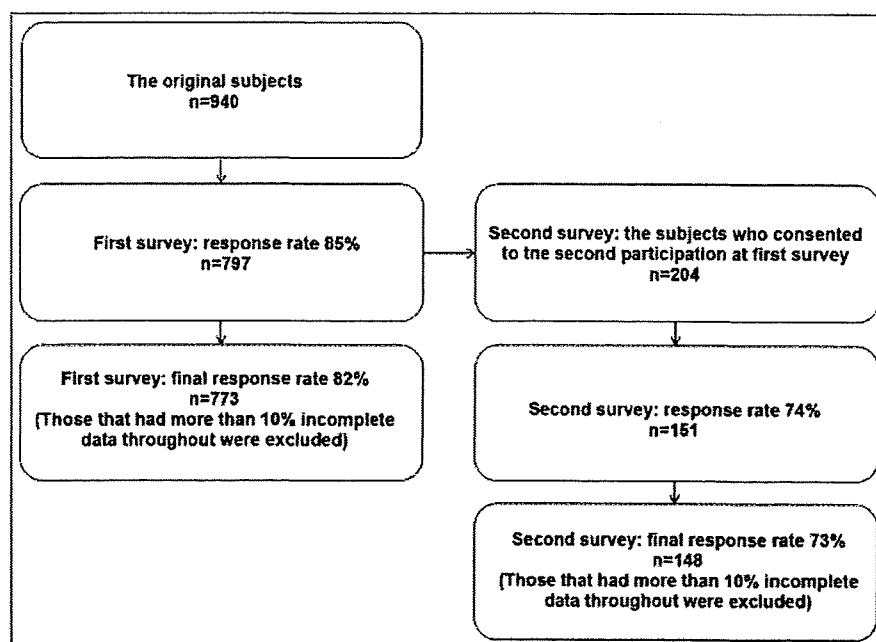


Figure 1. Response rate of the first and the second survey.

(97%) was, 'What is important for quality of life varies among individuals'. This was the only item that had $\geq 90\%$ correct response rate. There were no items that had a 10% or less correct response rate.

Reliability of each item

The kappa coefficient in the test-retest reliability of each item was from 0.26 to 0.74. The kappa coefficient for the item, 'One of the goals of pain management is getting a good night's sleep' (Q3) was low. However, we gave priority to content validity over psychometric properties as a result of a discussion among experts, so it was included in the PCKT.

Item Response Theory

The difficulty in all items ranged from -2.9 to 3.09 . The discrimination was from 0.33 to 2.25 . The item with the highest difficulty and the lowest discrimination was, 'Uncertain information should not be given to patient or family because it may cause additional anxiety'. The item with the highest discrimination was, 'Steroids should improve appetite among patients with advanced cancer' (Q19). We determined that a subject who correctly answered an item with high discrimination would also have a high total score, whereas for an item with poor discrimination, the percentage of correct answers for that item would not relate to the total score.

Reliability and validity

On the basis of the results of the item analysis, IRT and expert discussions, we determined that the PCKT would include 20 items in five domains: 1) philosophy, 2) pain, 3) dyspnoea, 4) psychiatric problems and 5) gastrointestinal problems. Table 3 summarises the internal consistency and test-retest reliability of the PCKT. The KR-20 index of internal consistency of the PCKT was 0.81. The intraclass correlation in the test-retest examination was 0.88 overall and from 0.61 to 0.82 in each domain.

Also, to examine the known-group validity, nurses working in the PCU were compared with other nurses on the mean scores for each domain (Figure 2). There was a significant difference in the score for each domain (philosophy, $P < 0.01$; pain, $P < 0.001$; dyspnoea, $P < 0.001$; psychiatric problems, $P < 0.001$; gastrointestinal problems, $P < 0.001$) as well as for the overall score ($P < 0.001$) between the two groups.

Related factors

Univariate analyses: The relationship among the demographic factors and the factors potentially related to palliative care knowledge was examined with univariate analysis where appropriate, and the results are shown in Table 4. Many variables were identified with a significant difference in the score of each domain. Particularly, all variables other than sex and education

Table 1. Characteristics of participants ($n = 773$)

	<i>n</i>	(%)
Sex		
Male	30	4
Female	740	96
Age, years		
≤ 29	465	60
30–39	229	30
40–49	60	8
50–59	15	2
≥ 60	1	0
Clinical area		
Surgical	185	24
Internal medicine	143	19
Palliative care unit	42	5
Others	394	51
Status		
Manager	23	3
Sub-manager	21	3
Staff	722	93
Duration of clinical experience, years		
≤ 4	295	38
5–9	260	34
10–14	128	17
15–19	44	6
≥ 20	43	6
Duration of experience in hospice or palliative care unit, years		
None	705	91
1–4	55	7
5–9	1	0
10–14	0	0
≥ 15	0	0
Number of terminal cancer patients who have been cared for		
None	132	17
1–9	223	29
10–49	250	32
50–99	90	12
≥ 100	71	9
Number of terminal cancer patients cared for in the past year		
None	278	36
1–9	299	39
10–49	134	17
50–99	31	4
≥ 100	19	2
Education		
Nursing school	482	62
Junior college	180	23
University or higher	102	13
Other	6	1
Palliative care education as an undergraduate, h		
None	190	25
≤ 1	64	8
2–5	270	35
> 5	225	29
Palliative care education as a postgraduate, h		
None	357	46
≤ 1	114	15
2–5	170	22
> 5	121	16
Participation frequency in palliative care seminars		
None	564	73
1	78	10
2–5	94	12
> 5	32	4
Presence of a mentor for palliative care issues		
Present	454	59
Absent	311	40

The percentages do not add up 100% due to missing values.

but including the number of terminal care patients the nurse had ever cared for ($r = 0.52$, $P < 0.001$), scored significantly higher in 'pain', 'psychiatric problems' and total score.

Multivariate linear regression analyses: The results of multivariate linear regression analyses are shown in Table 5. Multivariate linear regression identified a significant difference in many variables, as well. The number of terminal care patients the nurse had ever cared for was associated with a higher total score ($\beta = 0.16$, $P < 0.001$), as were the scores for the four domains including 'dyspnoea' ($\beta = 0.17$, $P < 0.001$). Greater participation in seminars was associated with a higher total score ($\beta = 0.16$, $P < 0.001$) and the three domain scores including 'philosophy' ($\beta = 0.16$, $P < 0.01$). Furthermore, the existence of a mentor for palliative care issues was associated with a higher total score ($\beta = 0.07$, $P < 0.05$) and scores for 'pain' ($\beta = 0.1$, $P < 0.001$) and 'dyspnoea' ($\beta = 0.08$, $P < 0.01$).

Discussion

This study validated an instrument to test the palliative care knowledge of general physicians and nurses. The instrument has good internal consistency, test-retest reliability, face validity and known-group validity. Also, the strength of this instrument is the higher precision compared to existing tools because the items were chosen based on IRT.

The strong points of this instrument are as follows: it is the first instrument concerned with palliative care that can be used for health professionals such as general physicians and nurses because it was developed and tested for content validity using a panel of nine experts in a variety of professions (palliative care physicians, oncology clinical nurse specialists and home care nurses). In addition, it is the first instrument that assesses a wide range of palliative care knowledge that includes 'philosophy', 'pain', 'dyspnoea', 'psychiatric problems' and 'gastrointestinal problems'. Also, the instrument consists of only 20 items with three responses of 'correct', 'incorrect' and 'unsure'.

The PCKT can be used not only to evaluate educational programmes but also to identify the knowledge level of the health care provider. In addition, it can be used to evaluate educational needs and priorities by identifying low-scoring domains and items. Results from the test can help develop strategies for improving the quality of palliative care. Alternatively, this test can be used for individuals to determine an objective measure of personal knowledge and methods for improvement.

Table 2. Item analysis and item response theory of the palliative care knowledge test ($n = 773$)

Questions			Correct answer (%)	κ -coefficient ($n = 148$)	IRT	
					Difficulty	Discrimination
Philosophy						
1	Palliative care should only be provided for patients who have no curative treatments available.	F	73	0.39	-1.83	0.55
2	Palliative care should not be provided along with anti-cancer treatments.	F	64	0.66	-1.29	0.47
Pain						
3	One of the goals of pain management is to get a good night's sleep.	T	62	0.26	-0.53	1.07
4	When cancer pain is mild, pentazocine should be used more often than an opioid.	F	42	0.49	0.30	1.40
5	When opioids are taken on a regular basis, non-steroidal anti-inflammatory drugs should not be used.	F	40	0.68	0.29	2.64
6	The effect of opioids should decrease when pentazocine or buprenorphine hydrochloride is used together after opioids are used.	T	34	0.74	0.59	1.59
7	Long-term use of opioids can often induce addiction.	F	34	0.73	0.50	2.03
8	Use of opioids does not influence survival time.	T	25	0.73	0.98	1.51
Dyspnoea						
9	Morphine should be used to relieve dyspnoea in cancer patients.	T	44	0.73	0.23	1.66
10	When opioids are taken on a regular basis, respiratory depression will be common.	F	12	0.62	1.47	2.01
11	Oxygen saturation levels are correlated with dyspnoea.	F	74	0.43	-1.01	1.20
12	Anticholinergic drugs or scopolamine hydrobromide are effective for alleviating bronchial secretions of dying patients.	T	17	0.7	1.19	1.92
Psychiatric problems						
13	During the last days of life, drowsiness associated with electrolyte imbalance should decrease patient discomfort.	T	19	0.55	1.29	1.42
14	Benzodiazepines should be effective for controlling delirium.	T	25	0.42	1.16	1.15
15	Some dying patients will require continuous sedation to alleviate suffering.	T	38	0.5	0.59	0.97
16	Morphine is often a cause of delirium in terminally ill cancer patients.	F	40	0.41	0.32	2.05
Gastrointestinal problems						
17	At terminal stages of cancer, higher calorie intake is needed compared to early stages.	F	38	0.53	0.47	1.49
18	There is no route except central venous for patients unable to maintain a peripheral intravenous route.	F	55	0.49	-0.22	0.98
19	Steroids should improve appetite among patients with advanced cancer.	T	35	0.72	0.42	2.59
20	Intravenous infusion will not be effective for alleviating dry mouth in dying patients.	T	40	0.39	0.57	0.81

IRT, item response theory (the numbers are analysis results for 20 items.); T, correct answer is 'right'; F, correct answer is 'wrong'. The analysis was based on participants who responded to 90% or more of the 40 items.

Table 3. Reliability of the palliative care knowledge test ($n = 773$)

Domains (range)	Mean	SD	ICC ($n = 148$)	KR-20
Philosophy (0–2)	1.4	0.8	0.61	
Pain (0–6)	2.4	1.7	0.82	
Dyspnoea (0–4)	1.5	1	0.79	
Psychiatric problems (0–4)	1.2	1.1	0.62	
Gastrointestinal problems (0–4)	1.7	1.2	0.75	
Total (0–20)	8.2	4.3	0.88	0.81

ICC, intraclass correlation coefficients; KR-20, Kuder-Richardson formula-20; Mean, the mean of total scores in each domain.

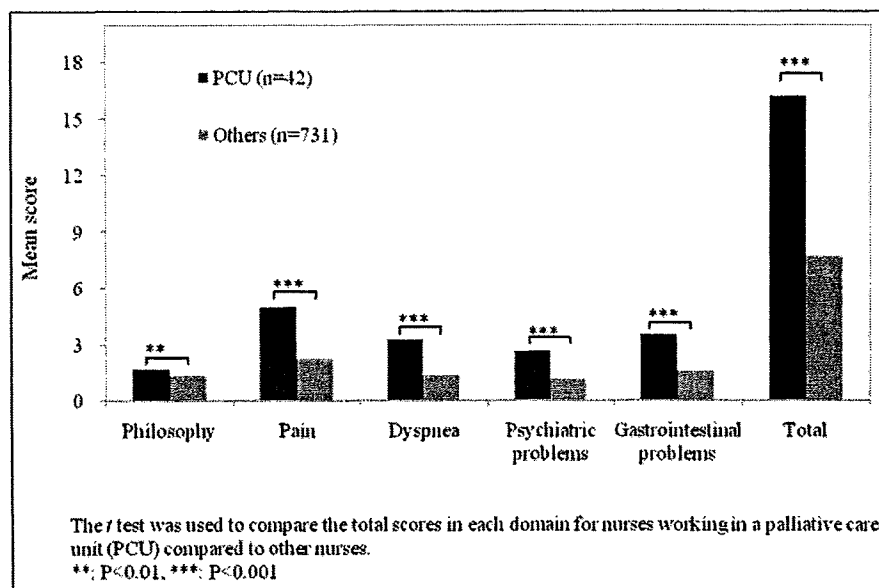


Figure 2. Known-group validity of the palliative care knowledge test. The *t*-test was used to compare the total scores in each domain for nurses working in a palliative care unit (PCU) compared to other nurses. ** $P < 0.01$; *** $P < 0.001$.

This study explored the factors related to palliative care knowledge of nurses. One of the important findings was that the number of terminal care patients the nurse had ever cared for and working in a PCU were associated with a higher total score and scores in four domains including pain, dyspnoea, psychiatric problems and gastrointestinal problems. Earlier research has reported that there is a relationship between pain management knowledge and years of nursing experience.²⁴ However, no significant relationship was found between the knowledge score and the length of nursing experience. These results suggest that education is necessary for nurses with less experience caring for terminal cancer patients even if the total nursing experience was long.

As for another associated factor, greater participation in seminars was only associated with scores for

'philosophy', 'pain' and 'dyspnoea'. In Japan, the contents of the curriculum for palliative care tend to focus on pain control; for example, there is certification for nurses who specialise in cancer pain management.²⁵ In the future, the curriculum should expand to include other areas such as psychiatric and gastrointestinal problems.

Furthermore, the existence of a mentor for palliative care issues was associated with scores for pain and dyspnoea. Earlier research has shown that the existence of a mentor decreased the difficulty that the nurses experienced.²⁶ Moreover, the palliative care team provides support for health care professionals and has been reported to positively affect patient symptoms, discharge planning and staff support.^{27,28} Therefore, the presence of a specialist and facilitator for consultation about palliative care is

Table 4. Factors related to nurses' knowledge according to univariate analyses (n=773)

	Domains of the palliative care knowledge test					
	Philosophy	Pain	Dyspnoea	Psychiatric problems	Gastrointestinal problems	Total
Sex						
Male	1.1	2.2	1.2	1.4	1.6	7.4
Female	1.4	2.4	1.5	1.2	1.7	8.1
Age, year						
≤29	1.4	2***	1.4	1.1*	1.5***	7.4***
30–39	1.4	2.9	1.6	1.4	1.9	9.1
40–49	1.4	2.9	1.6	1.5	2	9.4
50–59	1.5	3	1.3	1.2	2.1	9.2
>60	1	2	0	1	0	4
	r=0.01	r=0.22	r=0.07	r=0.09	r=0.14	r=0.17
Clinical area						
Surgical	1.3*	2.2***	1.2***	1.2***	1.5***	7.5***
Internal medicine	1.4	2.9	1.9	1.4	1.9	9.4
Palliative care unit	1.7	5	3.3	2.7	3.5	16.2
Others	1.4	2	1.2	1	1.5	7.1
Status						
Manager	1.5	3.5***	1.9	2***	2.4**	11.3***
Sub-manager	1.3	3.5	1.5	1.8	2.3	10.3
Staff	1.4	2.3	1.4	1.2	1.6	7.9
Duration of clinical experience, year						
≤4	1.4	1.8***	1.2***	0.9***	1.3***	6.5***
5–9	1.4	2.6	1.6	1.4	1.9	8.8
10–14	1.3	2.8	1.6	1.4	1.9	9
15–19	1.3	3.5	1.7	1.6	2.1	10.1
≥20	1.5	2.9	1.5	1.4	2.1	9.4
	r=0.01	r=0.26	r=0.14	r=0.18	r=0.22	r=0.24
Experience of working in hospice or palliative care unit, year						
None	1.4***	2.2***	1.3***	1.1***	1.6***	7.5***
≤4	1.7	4.8	3	2.5	3.3	15.3
5–9	2	6	4	4	3	19
	r=0.1	r=0.39	r=0.44	r=0.33	r=0.37	r=0.47
Number of terminal cancer patients who have been cared for						
None	1.4	1.2***	0.8***	0.6***	1***	4.9***
1–9	1.3	1.7	1.2	1	1.3	6.5
10–49	1.4	2.7	1.6	1.3	1.9	8.9
50–99	1.4	3.3	1.9	1.5	2.1	10.2
≥100	1.6	4.2	2.4	2.3	2.9	13.3
	r=0.07	r=0.52	r=0.46	r=0.4	r=0.45	r=0.55
Number of terminal cancer patients who were cared for in the past year						
None	1.3*	1.6***	1***	0.9***	1.3***	6.1***
1–9	1.4	2.3	1.5	1.2	1.6	8
10–49	1.3	3.3	2	1.6	2.2	10.4
50–99	1.5	4.4	2.6	2.2	2.6	13.4
≥100	1.9	5.2	2.9	2.5	3.5	15.4
	r=0.09	r=0.48	r=0.46	r=0.34	r=0.39	r=0.51

(continued)

Table 4. Continued

	Domains of the palliative care knowledge test					
	Philosophy	Pain	Dyspnoea	Psychiatric problems	Gastrointestinal problems	Total
Education						
Nursing school	1.3	2.4	1.5	1.3	1.7*	8.2
Junior college	1.4	2.4	1.6	1.3	1.7	8.4
University or higher	1.5	2	1.3	1	1.3	7.1
Other	1.2	2.2	1.2	1	1.8	7.3
Palliative care education as undergraduate, h						
None	1.4	2.8***	1.7***	1.4***	1.9***	9.2***
≤1	1.1	2.7	1.6	1.5	1.8	8.6
2–5	1.4	2.2	1.5	1.2	1.7	8
>5	1.4	2.1	1.2	1.1	1.5	7.2
	$r=0.05$	$r=-0.18$	$r=-0.17$	$r=-0.12$	$r=-0.14$	$r=-0.17$
Palliative care education as postgraduate, h						
None	1.3***	1.7***	1.1***	0.9***	1.3***	6.1***
≤1	1.3	2.1	1.3	1.2	1.4	7.4
2–5	1.4	2.8	1.8	1.5	2.1	9.5
>5	1.7	4.1	2.2	2	2.6	12.4
	$r=0.14$	$r=0.49$	$r=0.38$	$r=0.37$	$r=0.42$	$r=0.52$
Participation in palliative care seminars						
None	1.3***	1.9***	1.2***	1***	1.4***	6.8***
1	1.5	2.9	1.9	1.7	2.1	10
2–5	1.6	3.7	2.1	1.8	2.5	11.8
>5	1.7	4.7	2.8	2.3	3	14.4
	$r=0.17$	$r=0.45$	$r=0.41$	$r=0.34$	$r=0.38$	$r=0.5$
Existence of a mentor for palliative care issues						
Present	1.4	2.8***	1.7***	1.4***	1.9***	9.1***
Absent	1.3	1.7	1.2	1	1.4	6.6

Numbers in the table represent means or correlation coefficients.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

necessary for nurses who care for terminally ill cancer patients.

This study has several limitations. The tool developed by this research aimed at evaluating not only nurses but also physicians. Although physicians were included in the design of the questionnaire, the subjects of this survey were only nurses. To provide a more generalised test, this instrument needs to be evaluated psychometrically with other types of health care providers, including physicians, and in other cultures. Furthermore, we aimed to develop a PCKT with a wider range, but we had a specific focus within palliative care and were not able to cover other areas such as communication, care during the dying phase and family care and bereavement because we wanted to limit the length of the questionnaire. In other words, we sacrificed breadth for usability. Also, subjects were only recruited from two facilities in Japan. Therefore, this

sample is not sufficiently representative for relevant factors to be generalised.

Conclusion

This study used psychometric methods to validate an instrument for evaluating palliative care knowledge, and reliability and validity were determined. This instrument was constructed from five domains including 'philosophy', 'pain', 'dyspnoea', 'psychiatric problems' and 'gastrointestinal problems'. Therefore, research on palliative care knowledge of general physicians and nurses and the evaluation of educational programmes can be assessed using this test.

The number of terminal care patients the nurse had ever cared for was associated with the highest score. It is important to educate nurses who have had only limited experience with terminal cancer patients.

Table 5. Factors related to nurses' knowledge according to multiple regression analysis ($n = 715$)

	Domains of the palliative care knowledge test					
	Philosophy	Pain	Dyspnoea	Psychiatric problems	Gastrointestinal problems	Total
Sex (one, male; two, female)	0.06	-0.03	0	-0.07***	-0.01	-0.02
Clinical area						
Surgical ^a						
Internal medicine	-0.01	0.11***	0.18***	0.06	0.07*	0.12***
Palliative care unit	0.05	0.1*	0.21***	0.13*	0.15**	0.17***
Other	-0.04	0.03	-0.01	0.02	0.05	0.02
Status	0.03	0	-0.02	0.07	0.02	0.02
Years of clinical experience	-0.01	0.07	-0.06	-0.02	0.01	0.01
Experience of working in hospice or palliative care unit	0.01	0.07	0.11*	0.08	0.09	0.1*
Number of terminal care patients ever cared for	-0.07	0.12*	0.17***	0.16**	0.16**	0.16***
Number of terminal cancer patients cared for in the past year	0.01	0.15**	0.06	0.02	0.06	0.1*
Education	0.04	0	0.01	0.02	0.01	0.02
Hours of palliative care education as undergraduate	0.07	-0.04	-0.08*	-0.04	-0.03	-0.04
Hours of palliative care education as postgraduate	0.08	0.18***	0.06	0.14**	0.16***	0.18***
Participation frequency in palliative care seminars	0.16**	0.13***	0.14***	0.08	0.08	0.16***
Existence of a mentor for palliative care issues	0	0.1***	0.08**	0.04	0.01	0.07*
R^2	0.05	0.42	0.39	0.24	0.3	0.5
Adjusted R^2	0.04	0.41	0.38	0.23	0.29	0.49

R^2 , coefficient of determination.

Numbers in the table represent standardised partial regression coefficients.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

^aReference category.

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Appendix I. Potential 40 items of the PCKT and psychometric properties of each item ($n = 773$)

		Correct answer (%)	κ -coefficient ($n = 148$)	IRT	
				Difficulty	Discrimination
Philosophy					
Palliative care should only be provided for patients who have no curative treatments available ^a .	F	73	0.39	-1.95	0.53
Palliative care should not be provided along with anti-cancer treatments ^a .	F	64	0.67	-1.33	0.48
What is important for quality of life varies among individuals.	T	97	— ^b	-2.91	1.49
The patient provided palliative care must accept death.	F	65	0.55	-1.18	0.59
Pain					
When a patient with cancer has pain, opioids should be started first.	F	78	0.37	-1.36	1.11
One of the goals of pain management is to get a good night's sleep ^a .	T	62	0.26	-0.63	0.98
When cancer pain is mild, pentazocine should be used more often than an opioid ^a .	F	42	0.49	0.29	1.24
When opioids are taken on a regular basis, non-steroidal anti-inflammatory drugs should not be used ^a .	F	40	0.68	0.28	2.24
Regular use of an analgesic drug is effective for management of cancer pain.	T	68	0.32	-0.61	1.90
The effect of opioids should decrease when pentazocine or buprenorphine hydrochloride is used together after opioids are used ^a .	T	34	0.74	0.59	1.45
Some antidepressant and anticonvulsant medications help relieve cancer pain.	T	45	0.64	0.12	1.93
Even if breakthrough pain occurs when opioids are taken on a regular basis, the next dose should not be given earlier than scheduled.	F	76	0.39	-0.90	2.05
Long-term use of opioids can often induce addiction ^a .	F	34	0.70	0.51	1.79
Use of laxatives is effective for preventing opioid-induced constipation.	T	82	0.33	-1.16	2.02
Increase in opioid dosage should be limited because respiratory depression can occur as a side effect.	F	65	0.47	-0.50	1.86
Use of opioids does not influence survival time.	T	25	0.72	1.01	1.40
Dyspnea					
Morphine should be used to relieve dyspnea in cancer patients ^a .	T	44	0.70	0.22	1.42
When opioids are taken on a regular basis, respiratory depression will be common ^a .	F	12	0.58	1.66	1.63
Oxygen saturation levels are correlated with dyspnea ^a .	F	74	0.43	-1.10	1.19
Evaluation of dyspnea should be based on subjective report of patients.	T	33	0.56	0.73	1.17
Anti-cholinergic drugs or scopolamine hydrobromide are effective for alleviating bronchial secretions of dying patients ^a .	T	17	0.67	1.23	1.79
The only effective way to alleviate bronchial secretions in dying patients is by suctioning.	F	61	0.46	-0.54	1.06

(continued)

Appendix I. Continued

		Correct answer (%)	κ -coefficient (n = 148)	IRT	
				Difficulty	Discrimination
Psychiatric problems					
During the last days of life, drowsiness associated with electrolyte imbalance should decrease patient discomfort ^a .	T	19	0.55	1.44	1.18
Benzodiazepines should be effective for controlling delirium ^a .	T	25	0.42	1.23	1.03
Some dying patients will require continuous sedation to alleviate suffering ^a .	T	38	0.50	0.57	0.92
Morphine is often a cause of delirium in terminally ill cancer patients ^a .	F	40	0.41	0.29	1.98
Delirium occurs frequently in patients who are prone to mental symptoms.	F	72	0.29	-1.19	0.94
Gastrointestinal problems					
A gastric tube must be inserted to relieve symptoms caused by digestive tract obstruction.	F	48	0.44	0.04	1.24
At terminal stages of cancer, higher caloric intake is needed compared to early stages ^a .	F	38	0.53	0.45	1.35
A decrease in oral intake associated with cancer can only be treated with infusion.	F	64	0.28	-0.63	1.17
Even if oral intake is not possible because of digestive tract obstruction, total parenteral nutrition often improves quality of life if performance status is good.	T	54	0.37	-0.26	0.82
There is no route except central venous for patients unable to maintain a peripheral intravenous route ^a .	F	55	0.49	-0.26	0.97
When patients receive an infusion of 1000 mL or more per day, pleural effusion and ascites tend to worsen.	T	46	0.52	0.17	0.89
Steroids should improve appetite among patients with advanced cancer ^a .	T	35	0.72	0.41	2.34
When patients with ileus use metoclopramide, stomach ache and vomiting may worsen.	T	29	0.43	1.02	1.02
Intravenous infusion will not be effective for alleviating dry mouth in dying patients ^a .	T	40	0.39	0.55	0.77
Communication					
More than 90% of Japanese want full disclosure of bad news including estimated prognosis.	F	41	0.42	0.63	0.59
Communication skill can be learned.	T	65	0.31	-0.97	0.72
Information that patients and families request and the degree to which patients and families take part in decision making may change according to the course of the illness and the condition.	T	84	0.39	-1.72	1.17
Uncertain information should not be given to patient or family because it may cause additional anxiety.	F	27	0.33	3.15	0.32

IRT, item response theory; T, correct answer is 'right'; F, correct answer is 'wrong'.

The analysis was based on participants who responded to 90% or more of the 40 items.

^aThe 20 items that were chosen as PCKT.

^bKappa coefficient was impossible to calculate because the first test sample had all correct answers.

The Efficacy of Mindfulness-Based Meditation Therapy on Anxiety, Depression, and Spirituality in Japanese Patients with Cancer

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Abstract

Objective: The primary goal of the study was to assess the efficacy of mindfulness-based meditation therapy on anxiety, depression, and spiritual well-being of Japanese patients undergoing anticancer treatment. A secondary goal was to assess the relationships among anxiety, depression, spiritual well-being, growth, appreciation, pain, and symptoms.

Methods: The subjects were 28 patients who were receiving anticancer treatment. The subjects participated in two sessions of mindfulness-based meditation therapy, including breathing, yoga movement and meditation. Each patient was taught the program in the first session, then exercised at home with a CD, and subsequently met the interviewer in a second session after 2 weeks. Primary physicians recruited the patients and interviews were conducted individually by nurses or psychologists with training in the program. Patients completed preintervention and postintervention questionnaires on anxiety and depression (Hospital Anxiety and Depression Scale [HADS]), spiritual well-being (Functional Assessment of Chronic Illness Therapy-Spiritual [FACIT-Sp]), and appreciation, growth, pain, and symptoms.

Results: HADS scores significantly decreased from 12 ± 5.3 to 8.6 ± 6.3 ($p = 0.004$) after the intervention, and FACIT-Sp increased from 32 ± 6.5 to 33 ± 6.9 ($p = 0.69$), but the change was not significant. There were significant associations between FACIT-Sp and HADS ($r = -0.78$, $p = 0.000$), FACIT-Sp and growth ($r = -0.35$, $p = 0.04$), FACIT-Sp and pain ($r = -0.41$, $p = 0.02$), and growth and appreciation ($r = 0.45$, $p = 0.009$).

Conclusions: Mindfulness-based meditation therapy may be effective for anxiety and depression in Japanese cancer patients, and spiritual well-being is related to anxiety and depression, growth, and pain. The negative correlation of spirituality with growth differs from the results of previous studies and the mechanism of this effect needs to be investigated further.

Introduction

PATIENTS WITH CANCER experience physical problems such as pain, fatigue and nausea, and psychological problems such as anxiety, depression, distress,¹⁻³ and spiritual pain. Spiritual well-being includes dimensions such as meaning, faith, purpose, and connection with others and with a higher power,⁴ and is thought to be one of the most important factors

in quality of life. Some patients with cancer experience and suffer from these problems, but many also find positive aspects in the experience. For example, after diagnosis patients may begin an internal search for awareness and a sense of meaning and purpose in life; that is, they experience a transition referred to as posttraumatic growth, stress-related growth, benefit finding, or positive change. For example, patients with breast cancer scored significantly higher for

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growth on the Post-Traumatic Growth (PTG) Inventory compared to a group of age- and education-matched controls, specifically in the area of relationships with others, spirituality and appreciation, and patients with high scores had increased skills, felt a sense of purpose, had closer relationships, better coping ability, increased spirituality, and an overall deeper appreciation of life.⁵

A mindfulness approach is an effective intervention from a psychological perspective. The Mindfulness-Based Stress Reduction (MBSR) program was modeled on the work of Kabat-Zinn and colleagues⁶ at the Center for Mindfulness-Massachusetts Medical Center. The program is based on the principal of mindfulness, defined as moment-to-moment, present-centered, purposive nonjudgmental awareness. The goal of the MBSR program is to guide participants to achieve greater awareness of themselves, their thoughts, and their bodies through class discussion, meditation, and yoga exercises. For patients with cancer, Speca et al.⁷ showed effects of the MBSR on mood disturbance using the Profile of Mood Scale (POMS) and stress symptoms using the Symptoms of Stress Intervention (SOSI), and Carson et al.⁸ showed an effect on quality of life based on the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) and the immune profile. Monti et al.⁹ showed that Mindfulness-Based Art-Therapy (MBAT), which includes mindfulness and art therapy, also produces a significant decrease in symptoms of distress and improvements in key aspects of health-related quality of life using the Short-Form Health Survey (SF-36). Garland et al.¹⁰ examined the effects on spirituality, stress symptoms, and mood of a Healing Art (HA) program compared with MBSR PTG. Improved growth, a relationship of PTG in MBSR with spirituality, and increases in spirituality with related decreases in stress and mood disturbance were found in participants in both groups.

Many studies from Western countries have shown the efficacy of MBSR on mood or symptoms, but few have been performed for Japanese patients. Therefore, it is unclear if MBSR is effective for moods such as anxiety or depression in Japanese cancer patients. Moreover, very few studies have investigated the effects of a mindfulness program on growth or spirituality. Thus, we investigated the efficacy of mindfulness on anxiety, depression, and spirituality in Japanese patients with cancer, and determined the associations among anxiety, depression, spiritual well-being, growth, and appreciation, in addition to physical symptoms.

Patients and Methods

Participants

The participants were outpatients who were receiving anticancer chemotherapy, radiation, or medication at a general hospital in Western Japan. The additional inclusion criteria were no cognitive impairment and age greater than 20 years old. Patients were excluded if they were experiencing severe pain or physical symptoms. These were rated using a numeric rating scale (0–10 points), and those with a score of above 8 were excluded from the study. A total of 28 patients (4 males, 24 females) with a mean age of 60.0 ± 9.2 years old participated in the study. The primary tumor sites were the breast ($n=21$), colon ($n=2$), stomach ($n=2$), and bladder ($n=2$). The performance status ranged from 0 to 2 and all patients were able to visit the hospital.

Outcome measures

The Japanese version of the Hospital Anxiety and Depression Scale (HADS)^{11,12} was used to measure levels of anxiety and depression. The HADS score ranges from 0 to 42. Following the model of our group, we chose the sense of meaning measured by the FACIT-Sp scale¹³ as the primary end point. The validity and reliability of the Japanese version of the FACIT-Sp is well established.¹⁴ The FACIT-Sp consists of two domains, meaning of life and religious issues, but we only used the meaning of life domain, which includes 8 items and is scored on a 4-point scale (range, 0–4). The total range of the FACIT-Sp is 0 to 32 and high scores indicate an elevated sense of meaning of life or a peaceful state of mind.

To measure psychological appreciation, we used several items from the Caregiving Consequence Inventory.¹⁵ This is a 12-item questionnaire with 4 core domains, of which we used "appreciation" only. Appreciation is determined from 2 items: "Having this disease made me more grateful for my family" and "Having this disease made me more grateful for other people." To measure psychological growth, we used 3 items from the Benefit Finding Scale¹⁶: "Having had cancer has made me more sensitive to family issues," "Having had cancer made me a more responsible person," and "Having had cancer has helped me to budget my time better," using a 7-point numeric rating scale. The α reliability coefficient of the 3 items was 0.71 in this sample. A high score indicates an elevated sense of life completion (range, 1–7). We also monitored the intensity of pain and physical symptoms such as constipation, nausea, fatigue, and sleep disturbance on a 10-point numeric rating scale (0–11).

Interventions and procedure

We used a modified version of the MBSR program,^{6,17} in which we refer to cyclic meditation as that including both breathing and meditation. During meditation, patients move

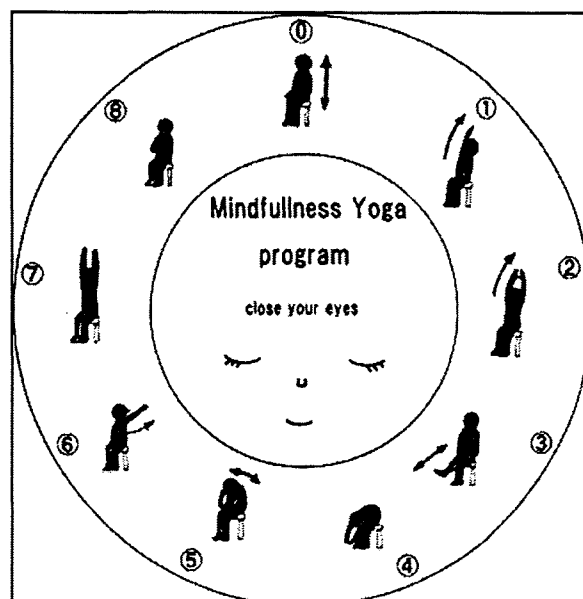


FIG. 1. The cyclic meditation program.