

Validation of the Rotterdam MOVE2PC Questionnaire for Assessment of Nurses' Knowledge and Opinions on Palliative Care

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Abstract: The purpose of this study was the psychometric testing of a questionnaire to assess nurses' opinions, subjective norms, perceived difficulties, and knowledge related to palliative care. The 63-item MOVE2PC Questionnaire was tested among 219 nurses in groups differing in education and experience. The intra-rater agreement was moderate to good ($\kappa > .5\kappa_{\max}$), and internal consistency was good ($\alpha = .77$). Construct validity was demonstrated by between-groups differences in knowledge, opinions, and perceived difficulties. Responsiveness was shown by improved scores after an education program. Time of completion was 20 minutes, and 99% skipped at most five items, demonstrating feasibility. Findings support the usefulness of the instrument for assessing nurses' knowledge and views on palliative care. © 2013 Wiley Periodicals, Inc. Res Nurs Health 36:512–523, 2013

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Nurses increasingly provide palliative and terminal care to patients suffering from cancer or other chronic diseases. The percentage of all deaths in the world due to chronic diseases is expected to increase from 63% in 2010 to 72% in 2020 (World Health Organization, 2010), and patients with chronic diseases are frequently admitted to a hospital during the last 3 months of life (Abarshi et al., 2010). When death is approaching, goals of care need to change, from modifying the disease to optimizing quality of

life by providing palliative and end-of-life care. The increasing number of patients in need of palliative care makes it urgent for nurses to improve their competence in providing this care. The purpose of this study was to develop and test an instrument to assess nurses' knowledge, opinions, subjective norms, perceived difficulties, and educational needs related to palliative care.

Palliative care requires specific knowledge, attitudes, and skills (Simon, Ramsenthaler, Bausewein, Krischke, & Geiss, 2009).

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Providing adequate palliative care is challenging, due to many factors, including the difficulty of communicating with patients at the end of life (Adriaansen, van Achterberg, & Borm, 2008; Johnston & Smith, 2006). Espinosa, Young, and Walsh (2008) identified other barriers nurses experience when providing end-of-life care, including lack of involvement in care planning, disagreement among physicians, unrealistic expectations of the family, and a lack of experience and education.

Nurses' knowledge and competence for providing adequate palliative and end-of-life care have been found insufficient (McDonnell, McGuigan, McElhinney, McTeggart, & McClure, 2009; Raudonis, Kyba, & Kinsey, 2002; Schlairet, 2009; White & Coyne, 2011). Furthermore, nurses themselves have reported a gap in their education in palliative care (Cui, Shen, Ma, & Zhao, 2011; White & Coyne, 2011). Some investigators also have suggested that without specific education, nurses might have negative attitudes toward care for the dying (Smith & Porock, 2009), although others have found more positive attitudes (Schlairet, 2009).

Many education programs have been developed to improve nurses' competence in palliative care, but their effects have rarely been adequately assessed (Adriaansen, van Achterberg, & Borm, 2005). The measurement of competence has been the subject of much debate in the literature, in part due to differences in definitions of competence and differences in opinions about whether competence should be assessed in terms of knowledge, attitudes, or skills, and about the influence of subjective norms (Bradshaw, 1998; Butler et al., 2011; Campbell & Mackay, 2001; McMullan et al., 2003; Watson, Stimpson, Topping, & Porock, 2002). In the last decades, several instruments to assess these different aspects of nurses' competence in palliative care have been developed, such as the Frommelt Attitude toward Care of the Dying Scale (FATCOD) (Frommelt, 1991, 2003; Lange, Thom, & Kline, 2008), the Palliative Care Quiz for Nurses (PCQN) (Carroll, Brisson, Ross, & Labbe, 2005; Ross, McDonald, & McGuinness, 1996), the C-PCQN, an expanded version of the PCQN (Adriaansen & van Achterberg, 2004), the Palliative Care Knowledge Test (PCKT) (Nakazawa et al., 2009), and an assessment instrument for intensive care nurses on experiences, attitudes, and beliefs towards end-of-life care (Latour, Fulbrook, & Albarran, 2009). These instruments

assess either knowledge, or opinions, or attitudes, but not all three, or have been developed for inexperienced nurses and will not capture the shortcomings in competence of nurses experienced in palliative care. Furthermore, they are specific to cancer care, intensive care, or care for the dying rather than the range of patient groups requiring palliative care with which general nurses are confronted.

Our goals were to assess the competence of both experienced and inexperienced general hospital nurses related to palliative care and the effects of a palliative care education program on competence. To this end we developed a new instrument, the Rotterdam MOVE2PC Questionnaire, a Dutch abbreviation of Assessment of Knowledge, and Opinions of Nurses Regarding to Palliative Care. The aim of this study was to validate the Dutch MOVE2PC as an instrument appropriate to meet our goals.

Methods

Sample and Setting

From February 2010 to September 2012, 219 nurses and 4 other health care professionals, $N = 223$ in total, participated in this study. At the start, 21 nurses working at an affiliated cancer center, 3 nurse consultants in palliative care, and 4 other professionals, that is, experts in palliative medicine, palliative care research, and nursing education, contributed to the development and assessments of content and face validity, and intra-rater reliability of the questionnaire. All other tests were performed in two groups of nurses. One group was a sample of 119 hospital nurses, working on 17 inpatient units (nursing students, registered nurses, team coordinators, and nurse specialists), who were randomly selected by computer from the hospital database. The other group consisted of 76 nurses, mostly working in nursing homes, hospices, and home care, who were enrolled in an education program on palliative care. These nurses filled in the questionnaire before and after their education program.

The Education Program

The 25-day education program consists of plenary meetings and working groups, and a study load of 600 hours completed over 12 months. The program aims to improve nurses' knowledge, attitudes, and skills regarding palliative

care, including symptom management, psychosocial and spiritual care, communication skills, consultation skills, evidence based care, and organization of palliative care. In the course of the program, nurses must pass several exams and complete various assignments before receiving a certificate.

Development of the Rotterdam MOVE2PC Questionnaire

Background. A 66-item questionnaire was developed, based on evidence that a variety of factors, such as knowledge, attitudes, values, and skills, contribute to nurses' competence and performance in various situations (Bandura, 1989; Campbell & Mackay, 2001; McMullan et al., 2003). According to Bandura's (1989) social cognitive theory, people's perceived capabilities are predictive of their efforts in practice, and people tend to avoid situations and activities which, they believe, exceed their capabilities. Self-efficacy beliefs affect many human processes, including motivational and affective processes. When people believe they cannot manage a perceived difficult situation, they experience stress and anxiety arousal (Bandura, 1989). To understand perceived difficulty of situations in palliative nursing, we included items on hypothetical clinical situations, and on the imaginary situation of a nurse suffering from a terminal disease and facing imminent death. We described these situations in vignettes, based on evidence that experiential knowledge is an important predictor for practice and decision-making in nursing (Thompson, 2003).

The questions and vignettes were drawn from real patient cases and clinical situations. Previously developed instruments were taken into account when choosing themes and items. One example is a situation that was assessed as potentially difficult (a patient is asking "I will get better, won't I?"), which was based on the item "Nurse, am I dying?" from the FATCOD (Frommelt, 1991). The statement "Palliative care and intensive life prolonging treatment can be combined," which was used in the opinion section, was based on the statement from the PCQN (Ross et al., 1996), "the philosophy of palliative care is compatible with that of aggressive treatment." Knowledge statements were derived from the Dutch national guidelines for palliative care and the Dutch version of the Pain Knowledge Questionnaire (PKQ-DLV) (de Wit, van Dam, Vielvoye-Kerkmeier, Mattern, & Abu-Saad, 1999).

Content. Part 1 of the questionnaire assesses nurses' characteristics, such as gender, age, working environment, actual experience with palliative care, and time spent on education in palliative care (eight items). In part 2, respondents score on a 5-point scale, with the anchors *strongly disagree* and *strongly agree*, the extent to which they agree with 11 statements regarding opinions and 5 statements regarding subjective norms in palliative care, incorporated in a vignette. In part 3, 20 potentially difficult situations are presented in three clinical vignettes describing patients in the last weeks or days of life. Nurses are asked to score the extent to which they perceive these situations to be difficult, using a 5-point Likert-type scale, anchored at *very difficult* and *certainly not difficult* and a category "I have not been exposed to this situation." In part 4, knowledge is assessed using 22 statements regarding symptoms, symptom treatment, and care, using three answer categories: *true*, *false*, and *I don't know*. The self-administered questionnaire is available in Dutch as hard copy and in a computerized version. It was translated into English for the purpose of international publication.

Validation of the Rotterdam MOVE2PC Questionnaire Parts 2–4

We performed six psychometric tests on the second to fourth parts of the questionnaire to validate the MOVE2PC, according to the COSMIN checklist, which was originally developed for health-related patient-reported outcomes (Terwee et al., 2012). The questionnaire was adapted based on test results. All the data were analyzed using SPSS 15 and 19 and VasserStats.

Content and face validity. To assess the degree to which the MOVE2PC adequately assesses knowledge and opinions related to palliative care, palliative care experts screened subsequent versions of the questionnaire on comprehensiveness, and relevance (content validity). Remarks of the first three experts were addressed in a second version, which was reviewed by two new experts. Their comments were addressed in a third version that was again reviewed by two new experts. Subsequently, seven nurses from the cancer center completed the questionnaire to assess whether the MOVE2PC was comprehensive and unambiguous for the target population (face validity). They were explicitly asked to comment

critically on the content and the text of the instrument and to register their time spent on the completion of the questionnaire.

Reliability. The intra-rater reliability, that is, the degree to which the outcome of the questionnaire was based on constant and true scores (real opinions or knowledge) instead of error scores or guesses, was tested with 14 nurses from the cancer center, excluding the 7 previously involved nurses, who completed the questionnaire twice with an interval of 2 weeks. These nurses did not know in advance that they would be asked twice. We used Cohen's kappa to test for agreement between the first and second assessment (Streiner & Norman, 2003). A weighted kappa was calculated because we used nominal scales with three or more categories (Sim & Wright, 2005). Items with 5- and 6-point scales were analyzed using the quadratic weighted kappa, and the linear kappa, was used for items with a 3-point scale. Altman (2000) described guidelines to interpret the kappa values as <0.20 = Poor; $0.21-0.40$ = Fair; $0.41-0.60$ = Moderate; $0.61-0.80$ = Good; and $0.81-1.00$ = Very Good. We set the cut-off point at an observed agreement of at least $\kappa .35$ of the maximum (κ_{\max}) and aimed for 90% of the scores to be at least $\kappa .50\kappa_{\max}$. After the intra-rater reliability test, 5- and 6-point scales were merged to 3-point scales because of inconsistency in responses in the answer category "I have not been exposed to this situation," and imprecise discrimination between several other answer categories. Items still $<.35\kappa_{\max}$ were deleted or changed before the next psychometric test.

The internal consistency of the Rotterdam MOVE2PC was tested using data from the sample of 119 hospital nurses. We used Cronbach's alpha for the whole questionnaire as well as for the parts with enough items to calculate separately, that is, the knowledge statements and the perceived difficulties (Mokkink, Terwee, Patrick et al., 2010).

Construct validity. The ability of the questionnaire to distinguish nurses with different levels of competence was tested by comparing the group of hospital nurses with the group of nurses starting the education program on palliative care. We hypothesized these two groups to be different from each other. Due to the selection criteria and the intensity of this education program, we expected that nurses intending to complete this extensive program would already be more dedicated, more experienced, and more skilled in palliative care in

advance of the program, compared to the general hospital nurses.

Similarities and differences between the groups were tested using ANOVA, Pearson's Chi square test, and Student's *t*-test. Level of significance (two-sided) was set at $p < .05$.

Responsiveness. The questionnaire's sensitivity to change was determined by comparing nurses' scores before and after completion of the education program on palliative care. A positive change after the intensive education program was hypothesized.

Similarities and differences between unpaired measurements before and after the education program were tested using ANOVA, Pearson's Chi square test, and Student's *t*-test. Level of significance (two-sided) was set at $p < .05$.

Feasibility. We tested both a hard copy and a computerized version of the questionnaire; the hard copy was used in the education group and the computerized version in the other group. Because we wanted to develop an instrument that does not take too much time, participants in the education group were given 20 minutes to complete it, based on the time of completion during face validity testing. Missing values in parts 2–4 of the completed questionnaires were counted in the education groups and in the hospital sample.

Human subjects protection. Under Dutch law, no specific ethical approval was required for this study because consent was inferred from participation, and the respondents were informed that their answers would be used for research purposes.

Results

Content and Face Validity

The experts' comments, concerning unclear knowledge statements or unclear formulations of items, for example, were used to optimize preliminary versions of the MOVE2PC. If one or more experts had doubts about an item, it was deleted or changed. After three series of comments, only minor textual changes were proposed. Seven oncology nurses who completed the last version of the questionnaire needed 20 minutes for completion and made 43 remarks on the content concerning formulations, the structure of questions, and the relevance of some items. These remarks were used to further improve comprehensiveness and reduce ambiguity of items.

Reliability

Using Cohen’s kappa, we found 8 of 58 items with $\kappa < .35\kappa_{\max}$ (insufficient). After merging the 5- and 6-point scales to 3-point scales, four items were deleted because a large proportion of participants changed their response from one extreme of the scale to the other, and wording for four items was changed. Of the remaining items, 96% achieved a score of at least $.5\kappa_{\max}$, of which 33% were $>.80\kappa_{\max}$. The final questionnaire had a Cronbach’s α of .77. For perceived difficulties, Cronbach’s α was .79, and for knowledge statements it was .65.

Construct Validity

As expected, hospital nurses’ characteristics differed significantly from those of nurses in the education group (Table 1). Nurses attending the education program had a higher average age, were more experienced as nurses, and had more often attended advanced courses on palliative care. In this group, 59% were working in non-hospital settings, and 82% spent more than 25% of their time providing palliative care, in contrast to 18% of the hospital nurses.

The two groups responded differently to 5 of the 11 opinion statements, but no differences were found in the subjective norms (Table 2).

Table 1. Characteristics of Hospital Nurses and Nurses Entering the Education Program (N = 195)

Characteristics	Hospital (n = 119)		Pre-Education (n = 76)		Difference Hospital/ Pre-Education, p-Value ^a
	n	%	n	%	
Gender					.01
Female	104	87	74	97	
Age					<.01
<30 years	67	56	6	8	
30–49 years	41	34	49	64	
≥50 years	11	9	21	28	
Status					<.01
Student	7	6	—		
Staff nurse	66	56	47	62	
Nurse specialist	24	20	26	34	
Senior staff nurse	4	3	—		
Nurse coordinator/manager	13	11	—		
Nursing experience					<.01
As student	7	6	—		
0–1 years	17	14	—		
2–4 years	31	26	7	9	
5–10 years	29	24	22	29	
≥11 years	35	29	47	62	
Advanced education on palliative care					<.01
<1 day	77	65	7	9	
1–7 days	33	28	28	37	
8–14 days	4	3	11	15	
>14 days	5	4	29	38	
Percentage of work time in palliative care					<.01
0–25%	97	82	14	18	
25–50%	18	15	17	22	
50–75%	4	3	18	24	
>75%	0	0	26	34	
Setting ^b					<.01
University or general hospital	119	100	31	41	
Nursing home	—		9	12	
Home care	—		19	25	
Hospice	—		20	26	
Other	—		1	1	

^aStudent’s t-test or one way ANOVA.
^bRespondents could answer >1 institution.
Significant values are italic.

Table 2. Percentage Agreement of Hospital Nurses and Nurses Before and After Education With Opinions and Subjective Norms on Palliative Care (N = 195)

	Hospital (n = 119)		Pre-Education (n = 76)		Post-Education (n = 63)		Difference Hospital/ Pre-Education, p-Value ^a	Difference Pre/ Post-Education, p-Value ^a
	n	%	n	%	n	%		
Opinions on palliative care								
1. The aim of palliative care is treatment of pain only	1	1	0		1	2	.27	.27
2. Palliative care starts in the last weeks of life	25	21	0		1	2	<.01	.50
3. Palliative care and intensive life prolonging treatment can be combined	50	42	45	59	45	71	<.01	.30
4. Palliative care includes spiritual care	100	84	74	97	62	99	.01	.44
5. Palliative care includes care for patients' family/relatives	116	98	76	100	63	100	.38	n.m.
6. The acute care hospital is an appropriate place to die	17	14	9	12	9	14	.76	.56
7. To arrange any kind of hospice or terminal care deprives patients of all hope	7	6	4	5	0	0	.64	.17
8. Visits of a relative should be permitted all day	102	86	66	87	54	86	.35	.98
9. Patients should be clearly informed about imminent death	97	82	48	63	38	60	.01	.79
10. A patient having a prognosis of only a few days to live should not be transported to home or hospice	4	3	5	7	1	2	.42	.09
11. Usually life prolonging treatment in the hospital is continued too long	61	51	31	41	36	57	.02	.04
Subjective norms (response to vignette: "When I am terminally ill and am about to die...")								
1. I wish the nurse would not start a discussion of approaching death with me, but respond only when I initiate it	16	13	7	9	3	5	.61	.58
2. I do not wish to foresee my death	10	8	1 ^b	2	1	2	.10	.90
3. I prefer that a nurse refers me to a spiritual advisor (e.g., chaplain, vicar, humanistic counselor, imam) or a social worker	112	94	73	96	62	98	.83	.43
4. I wish to prepare myself and my family and friends	116	98	74	97	62	98	.39	.65
5. I wish I could die at home	97	82	49 ^b	78	46	73	.82	.82

n.m., not measurable.

Significant values are italic.

^aPearson Chi-Square test, 2 degrees of freedom.

^bn = 63; item added after pre education measurement of one group of 13 nurses.

When compared to nurses in the education program, the hospital nurses more often perceived 5 of 18 situations as difficult (Table 3), and nurses in the education program more often gave correct answers to six knowledge items (Table 4). In the summed score for potential difficulties, no difference between the groups was found, but of the 20 knowledge statements, nurses in the education program answered 12.0 (*SD* 2.4) items correctly, versus 10.3 (*SD* 3.0) in the hospital group ($p < .01$) (Table 5).

Responsiveness

Sixty-three nurses completed the questionnaires before and after the education program. Nurses changed their opinions on one item: after the education, more nurses thought that life-prolonging treatment is usually continued for too long in the hospital (Table 2). After the education program, six potentially difficult situations were significantly less often perceived as difficult, whereas one situation was more often perceived as difficult (Table 3). The summed score of situations perceived as difficult decreased significantly from 7.8 (*SD* 2.6) to 6.3 (*SD* 2.5; $p < .01$; Table 5). Four knowledge statements were more often answered correctly after the education program (Table 4). The summed score of correct answers increased significantly, from 12.0 (*SD* 2.4) to 13.7 (*SD* 2.2; $p < .01$; Table 5).

Feasibility

Nurses in the education group filled in the paper version twice (before and after the program); at both times they finished it within 20 minutes ($n = 139$). Seventy percent fully completed all parts, 23% missed one or two items, and 1% missed more than five items. Of the 119 hospital nurses, 90% fully completed all parts, 8% missed one or two items, and 1% had more than five missing items.

Discussion

To minimize the risk of measurement error of this self-administered questionnaire, six measurement properties were evaluated, using a sample of 223 professionals that included experts on palliative care, experts on education, and nurses of the target population. We tested all items for relevance, and the content validity, face validity, consistency, and construct validity

of the instrument (Mokkink, Terwee, Knol et al., 2010; Streiner, 2003). The Rotterdam MOVE2PC questionnaire proved to be a valid instrument for assessing nurses' knowledge, opinions, subjective norms, and perceived difficulties related to palliative care, and for measuring the effects of an education program on palliative care.

Criteria for sample size were met according to the COSMIN checklist, which is at this moment the best available checklist to evaluate the methodological quality of studies on measurement properties in a standardized way. This checklist, based on expert opinions and extensive validation, considers a sample size of >50 as good and >100 as excellent. A factor analysis could not be performed because this would have required a sample size of five to seven times the number of items (Terwee et al., 2012).

Tests of reproducibility and internal consistency of the questionnaire demonstrated its reliability. An important assumption when using kappa to test for reproducibility is that errors in rating occur independently (Sim & Wright, 2005). To maximize independence, we used an interval of 2–4 weeks, to avoid nurses' recall of their previous answers, based on the recommendations of Streiner and Norman (2003). Because kappa will be reduced by chance agreement, for example, due to high or low prevalence of certain answers, the interpretation of the magnitude of kappa was reported as the Kappa κ_{\max} , reflecting the maximum extent of the ability to agree (Sim & Wright, 2005). Almost all items showed moderate to very good agreement in the test-retest analysis (Altman, 2000; Landis & Koch, 1977).

For internal consistency, Cronbach's alpha coefficient was acceptable, with values between .70 and .90 (Streiner & Norman, 2003). The internal consistency of the total questionnaire as well as of the separate parts was good and comparable with other instruments, such as the C-PCQN (.71) and the PCKT (.81) (Adriaansen et al., 2005; Nakazawa et al., 2009). The magnitude of the Cronbach's alpha coefficient is not solely influenced by homogeneity of the items, but also by the number of items and their multidimensionality (Streiner & Norman, 2003). The MOVE2PC contains multiple dimensions (e.g., knowledge and opinions) that together form a construct, and therefore, as expected, the alpha remained adequate when individual items were deleted (Mokkink, Terwee, Knol et al., 2010; Streiner, 2003).

Table 3. Percentage of Hospital Nurses and Nurses Pre- and Post-Education Program Perceiving Palliative Care Situations as Difficult (*N* = 195)

Based on Vignettes, Do You Think the Following Situations Are Difficult or Not Difficult?	Hospital (<i>n</i> = 119)		Pre-Education (<i>n</i> = 76)		Post-Education (<i>n</i> = 63)		Difference Hospital/ Pre-Education, <i>p</i> -Value ^a	Difference Pre/ Post-Education, <i>p</i> -Value ^a
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Vignette 1 : Bad News								
After several diagnostics it has become clear that there are no opportunities for recovery or prolonging life for a patient on your ward. The staff expects the patient's prognosis to be a few weeks only. In the presence of a colleague nurse the physician has discussed this poor prognosis with the patient.								
1. You arrive at patient's room and find him very upset, due to the meeting with the physician	37	31	12	16	5	8	<.01	.33
2. After 2 days the patient asks you: "I will get better, won't I?"	71	60	39	51	20	32	.36	.07
3. The patient feels very sad because he has to say goodbye to his young children soon	87	73	64	84	40	64	.06	.01
4. Relatives of the patient are angry at everyone and no one can do well in their opinion	61	51	38	50	29	46	.38	.82
5. The patient and his spouse want to talk with you about the end of patient's life	25	21	8	11	1	2	.02	.05
Vignette 2: Treatment yes or no?								
A patient on your ward is expected to live no longer than 2–3 weeks.								
6. The patient no longer wants any kind of treatment, even when his symptoms can be treated well	37	31	19	25	13	21	.56	.10
7. The family definitely does not want the bad prognosis to be discussed with the patient	106	89	69	91	48	76	.23	.02
8. The antibiotics prescribed for the patient no longer have any results. You have to stop the medication and remove the syringe driver	7	6	6	8	1	2	.86	.19
9. The patient has a cardiac arrest and you have to resuscitate him, because there is no decision on DNR policy	93	78	70	92	59	94	.08	.70
10. The patient suffers from severe breathlessness. The attending junior physician does not know how to relieve this suffering, but refuses to consult a senior staff member	89	75	57	75	40	64	.96	.39
11. The patient feels very anxious about what will happen and asks you for support	23	19	12	16	4	6	.75	.01
12. The physician made the decision to start tube feeding	45	38	40	53	45	71	.10	.04
13. The patient becomes delirious and may suddenly become aggressive	32	27	32	42	11	18	.08	.01
14. The physician gave directives for several diagnostic procedures	84	71	58	76	47	75	.63	.72
Vignette 3: Terminal care								
A patient on your ward is in terminal condition and his prognosis is only about 24–48 hours.								
15. You are assigned to care for this patient and know that he may die at the moment you enter his room	29	24	1	1	1	2	<.01	.96
16. The physician has decided to withdraw the patient's tube feeding. You have to remove the tube	4	3	0	0	1	2	.05	.09
17. The family does not agree with the decision to stop the tube feeding	77	65	44	58	27	43	.62	.14
18. You have to say goodbye to the patient because palliative sedation has started	53	45	21	28	6	10	.01	.02

^aPearson Chi-square test, 2 degrees of freedom.
Significant values are italic.

Table 4. Percentage of Correct Answers on Knowledge of Symptom Management and Palliative Care of Hospital Nurses and Nurses Pre- and Post-Education Program (N = 195)

Palliative Care Knowledge Statements	True or False, T/F	Hospital (n = 119)		Pre-Education (n = 76)		Post-Education (n = 63)		Difference Hospital/ Pre-Education, p-Value ^a	Difference Pre/Post- Education, p-Value ^a
		n	%	n	%	n	%		
1. The prevalence of constipation in cancer patients in the palliative phase is higher than in patients in the final stage of chronic heart failure	F	15	13	17	22	17	27	.02	.65
2. When constipation, caused by opioids (e.g., morphine) has been relieved, laxatives can be stopped	F	115	97	76	100	63	100	.27	n.m.
3. When artificial hydration is withheld, the patient is likely to have more symptoms in the dying phase	F	53	45	72	95	61	97	<.01	.80
4. The prescription of fortifying drinks is almost always worthwhile for patients with a prognosis of 2-3 weeks when they no longer have enough intake of nutrients	F	69	58	58	76	56	89	.01	.09
5. Pain in the legs in patients with chronic heart failure is best treated by opioids like morphine, when paracetamol is no longer sufficient	T	30	25	16	21	24	38	.11	.06
6. The prevalence of depression in patients with advanced chronic heart failure is about 60%	T	39	33	24	32	36	60	.76	<.01
7. Anxiety and restlessness are more prevalent in the terminal phase of cancer than of other chronic terminal diseases	F	43	36	35	46	32	51	.35	.20
8. One of the characteristics of a delirium is that it develops in a short time	T	104	87	59	77	56	89	.20	.07
9. When palliative sedation is started, the treatment of pain can be withdrawn	F	97	82	69	91	38	92	.21	.42
10. Oxygen is the most appropriate treatment to start with in case of shortness of breath in the terminal phase	F	39	33	39	51	43	68	.01	.21
11. Treatment of depression in the terminal phase is not worthwhile	F	105	88	74	98	63	100	.08	.43
12. The most appropriate treatment for death rattle is suction of secretion	F	83	70	75	99	63	100	<.01	.36
13. Problems of a dry mouth due to reduced saliva production in the palliative phase can be solved by sugar free chewing gum as well as by artificial saliva	T	24	20	23	30	36	57	.24	<.01
14. When nausea is a problem in the palliative phase it is appropriate to do an extensive history and monitor daily	T	61	51	53	70	46	73	.04	.17
15. The prevalence of pain in advanced chronic heart failure is comparable to that in advanced cancer	T	22	19	8	11	10	16	.06	.01
16. The adherence to prescribed pain medication of patients in pain is quite good	F	73	61	43	57	38	60	.97	.40
17. Patients mostly are prescribed too little pain medication	T	48	40	33	43	34	54	.34	.41
It is important to wait as long as possible to start strong pain medication, to save this for worsening pain	F	99	83	65	86	60	95	.16	.35
19. Vivid dreams might be a signal of a delirium	T	84	71	53	70	56	89	.90	<.01
20. A patient in the last phase of life always has the right to receive 24 hours per day homecare	F	21	18	20	26	11	18	.27	.15

^aPearson Chi-Square test, 2 degrees of freedom.
Significant values are italic.

Table 5. Comparison of Summed Scores on Perceived Difficulties and Knowledge Statements (N = 195)

	Hospital (n = 119), <i>M (SD)</i>	Pre-Education (n = 76), <i>M (SD)</i>	Post-Education (n = 63), <i>M (SD)</i>	Hospital/ Pre-Education, <i>p-Value^a</i>	Difference Pre/ Post-Education, <i>p-Value^a</i>
Answer of "difficult" for 18 situations in palliative care ^b	8.1 (3.0)	7.8 (2.6)	6.3 (2.5)	.47	<.01
Correct answers on 20 knowledge statements on palliative care ^b	10.3 (3.0)	12.0 (2.4)	13.7 (2.2)	<.01	<.01

^aStudent's *t*-test.^bAll items given the same weight. The 18 items on perceived difficulties were combined by ranking the answer "difficult" as 1 and others as 0. The 20 knowledge statements were combined by ranking the correct answer as 1 and others as 0.

Significant values are italic.

The MOVE2PC showed good construct validity and responsiveness. The scores for the questionnaire varied in the anticipated direction between hospital nurses and nurses attending an education program, as expected due to more experience and previously derived knowledge in the education group.

Within the group of hospital nurses, the summed scores of correctly answered knowledge statements and perceived difficult situations showed more variation compared to the education group (*SD* 3.0 vs. 2.4 and 3.0 vs. 2.6, respectively). This might be explained by the larger variation in age, experience, and involvement in palliative care of the hospital nurses, but the impact of these determinants should be investigated in a larger sample. The MOVE2PC nevertheless detected a 2-point difference in correctly answered knowledge statements between the hospital group and the pre-education group.

After the education program, nurses had an increased level of knowledge and perceived fewer situations as difficult. This shows that the questionnaire is sufficiently sensitive to detect change. With a standard deviation of 2.2 in the sum score of correctly answered knowledge statements, the results show decreased variation between nurses after the education program, while the instrument still distinguished high and very high levels of knowledge. Unfortunately, there is no gold standard against which to compare these findings, thus whether this is an adequate level of knowledge can not be determined until norms are developed.

We detected only one change in opinions and no change in subjective norms after the education. This might be due to common and strong norms related to end-of-life care among nurses, norms that are not easily changed. These

opinions and norms might predict practice and decision-making in nursing, for example, with regard to referring patients to a spiritual advisor or social worker, and communication with patients and relatives. To confirm this hypothesis, further research is needed.

Finally the questionnaire was shown to be feasible, even though it contains 63 items. Participants managed to complete the paper version in 20 minutes, and only 1% of the respondents skipped more than five items.

Though the MOVE2PC was developed for use in the Netherlands, the items have relevance for nurses throughout the world. According to the WHO guidelines, palliative care requires an integrative approach of prevention; early identification of physical, psychosocial, and spiritual problems; and care of both the patient and his or her relatives in all health care settings (WHO, 2002, 2007). Nurses everywhere are confronted with the complexity of palliative care, for example, with severe suffering, ethical problems, and difficulties in communication with patients, relatives, and other health care professionals (Adriaansen et al., 2008; Cui et al., 2011; Espinosa et al., 2008; Frommelt, 1991, 2003; Johnston & Smith, 2006; Lange et al., 2008; Ross et al., 1996). The MOVE2PC assessment of perceived difficulties is therefore expected to be applicable in many other countries. In addition, opinions and knowledge statements in the MOVE2PC are based on Dutch guidelines for palliative care, which are in turn based on the WHO guidelines (WHO, 2004). Specific items, such as the item on organization of palliative care, might need a country-specific answer, and if the MOVE2PC is translated into other languages and used in other countries, validation would be needed.

Limitations

For this validation study, some methodological considerations should be taken into account. We did not use a validated inter-rater agreement index, such as the content validity index (CVI), to structure the evaluation by the experts of the content of the first version of the questionnaire (Polit, Beck, & Owen, 2007). Instead, we used a strong but slightly less transparent method of improvement by first using the verbal comments of three experts. Thereafter, twice, two new experts in succession assessed improved versions of the questionnaire. We tested the hard copy in one group and the computerized version in the other group, which might have influenced the results. This might also explain the differences in levels of completion between groups (70% in hard copy vs. 90% in the computerized version). Finally, although the questionnaire was sensitive to change over time, this was tested in only 76 nurses. Further testing in larger samples is needed to confirm results.

Conclusion

The Rotterdam MOVE2PC questionnaire assesses nurses' knowledge, opinions, subjective norms, and perceived difficulties related to providing palliative care. This questionnaire is specifically designed for studying the competence and educational needs of general nurses providing palliative care to a variety of patients, and for evaluating education programs aimed at improving nurses' knowledge and competence in palliative end-of-life care. It proved to be an instrument with good feasibility, validity, reliability, and responsiveness, and with appropriate translation is expected to be relevant for nurses throughout the world.

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