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Development and psychometric evaluation of a new short version of the Swedish Frommelt Attitude Toward Care of the Dying Scale (FATCOD)

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Background

Registered nurses in most care settings will have to care for dying patients, which, together with palliative care, is dependent on high quality nursing care focused on the dying patients and their family.¹ To meet the needs of patients and their families, nurses must develop relationships of trust with effective communication skills.²⁻⁴ Education and training is important to develop the skills needed in palliative and end-of-life care.^{5, 6} In order to evaluate the efficacy of education or training in end-of-life-care, there is a need for validated and reliable tools to measure effects. One instrument that has been used for this aim is the Frommelt Attitude toward Care of Dying patients (FATCOD).^{5, 6} This instrument consists of 30 items, measuring a diversity of issues in relation to palliative care needs.

In earlier studies it has been noted that some items need to be revised, therefore, we think that there is a need for a shorter and more concise version, one which is both valid and reliable.

Considering the disadvantages of lengthy questionnaires (i.e., respondents are likely to perceive them as time consuming and tiresome to answer), simple and short questionnaires are required, as health professionals and nursing students often lack time to administer them.

The general goal of developing a scale is to construct a tool of minimal length while maintaining acceptable support for its reliability and validity.⁷ The main reasons for shortening the FATCOD are: 1) to reduce personal burden,⁸ and 2) to increase its usability in clinical and educational practice. Therefore, to be able to use the FATCOD more widely in

nursing education, practice, and research, it is necessary to develop a shorter version and to validate the tool for use in samples of nurses and nursing students in a Swedish context. The development of a short version of the questionnaire may facilitate effective assessment of the attitudes toward caring for dying patients. A brief tool that is easy to complete and interpret could be more readily incorporated into routine care or used in larger population studies. The purpose of this study was to develop a FATCOD-Short Form (FATCOD-SF) and to secure its psychometric properties.

Theoretical framework

Adopting a positive attitude to caring for dying patients is an important element in providing good care. In order to explore the attitudes of those who care for dying patients, a theoretical framework derived from Benner's adapted Model of Skill Acquisition was applied to nursing education by Dunn et al.⁹ The assumption is that clinical knowledge and nurses' attitudes toward death are formed by past, personal, and professional experience, and that it differs from theoretical nursing knowledge.⁹ It has earlier been found that both personal factors, i.e., age, and professional experience, in caring for dying patients influenced nursing students' attitudes toward caring for dying patients at the start of their education program.¹⁰ In the present study, professional experience was conceptualized as the number of years of working in health care. The included personal factors were age and gender. Regarding nursing students, professional and personal factors coincide, as students are generally younger and less experienced than nurses.

Literature review

Several studies in the nursing context have used the Frommelt Attitude Toward Care of the

Dying Scale (FATCOD) scale.^{9, 11-17} Studies in both the US and Sweden show that nursing students developed significantly higher (more positive) attitudes after completing their education program. The FATCOD has proven to be sensitive to changes in knowledge.⁶ The students in the US improved their mean pre-test FATCOD score of 118 to 130 at post-test.⁶ In another study, conducted in the US, Dunn et al.⁹ examined attitudes among 58 nurses working in oncology or medical/surgical units. They found that attitudes toward caring for dying patients and their families became more positive with longer professional experience. Other studies present equivalent results.^{11, 13, 18} The Swedish nursing students improved from mean 126 at the start of their nursing education to mean 132 after three years of education.¹⁹ This indicates that the FATCOD is sensitive to changes in attitudes related to education. In an Italian study among 608 second-year medical students,²⁰ the FATCOD-B,⁶ a slightly modified instrument for students coming from different programs, was used. Leombruni et al.,²⁰ confirmed that the FATCOD-B scale construct is two-dimensional, corroborating previous research,²¹ but found that the loadings on the dimensions and their respective indicators were weak and equal to zero for certain items. Leombruni et al.²⁰ suggest that several of the items need to be revised as they contained ambiguities in wording and the language seemed quite confusing with respect to the subject to which the items related. In a later study by Loera et al.,²² a refined version, with only 18 of the items, was proposed and tested. Here the results showed that the FATCOD-B measures a two-dimensional construct and that only the first dimension is a robust measurement tool for use in medical education to evaluate undergraduates' attitudes toward caring for the dying. Edo-Gual et al.²³ recently included 669 Spanish nursing students in a study and performed a confirmatory factor analysis (CFA). The CFA supported a two-factor model as the best fit to the data obtained in the Spanish context. Li-Ping Wang et al.²⁴ developed and tested the Chinese version of the FATCOD in nurses and nursing students and found it to be reliable and valid. Mastroianni et al.²⁵ established the

validity and reliability of an Italian version of the FATCOD-B and concluded that it was a valid and reliable tool, measuring six specific dimensions: fear/malaise, the care of the family, communication, family as caring, relationship, and active care. Although commendable attempts to increase the feasibility of the FATCOD have been made, none of these have reduced the number of items and retained the psychometric properties of the original scale.

METHODS

Participants and procedure

The participants in the present study ($n=1000$) originate from earlier studies. A validation study of the FATCOD²⁶ was performed with baseline samples from two studies; a pilot randomized intervention study (RCT) with a training intervention about existential issues,²⁷ and a main study with similar training intervention.²⁸ Additionally, data from a sample of 100 nursing students at the end of their three-year bachelor program were included. Together, the sample from the first Swedish validation study consisted of 213 participants.²⁶ Another sample of 317 nursing students was included in the present study, which originate from a baseline study of nursing students included at the beginning of their undergraduate nursing education.¹⁰ Another sample was drawn from baseline data from a longitudinal study of nurses who completed a nurse specialist master program (not yet published). The final sample comprises professional in-home care staff, employed in a service supporting people with basic needs in their own homes, of which 68% were enrolled nurses. The earlier studies presented in this study were all approved by the Regional Ethics Committee in Gothenburg

(Dnr 426-08). The samples are presented in Table 1.

Measurements

The Frommelt Attitude Toward Care of the Dying (FATCOD) scale^{5, 26} is a 30-item questionnaire, measuring attitudes toward care of dying patients and their relatives. The items are rated on a five-point Likert scale (1 means disagree, 2 [no category name], 3 means neither/nor, 4 [no category name], 5 means agree). Negatively worded items were reversed and the scale ranges from 30 to 150, where 150 represented a very positive attitude toward caring for dying patients, and 30 a very negative attitude. The Swedish version of FATCOD has been tested for applicability in a Swedish context, and Cronbach's alpha was found to be 0.601.²⁶ The Swedish version of FATCOD also proposes a two-factor scale for the FATCOD; Factor 1: positive attitudes toward caring for dying patients, which includes items 1, 2, 3, 5, 6, 7, 8, 9, 11, 13, 14, 15, 17, 24, 26, 29, and 30; and Factor 2: perceptions of patient and family-centered care, which includes items 4, 12, 16, 18, 19, 20, 21, 22, 23, 25, 27, and 28.

Data analysis

Several steps were taken to reduce item redundancy and produce a short version of the FATCOD (FATCOD-SF). All items were selected based on psychometric considerations, including floor or ceiling effects, factor loading, inter-item correlations, and item-total correlation. For the first step, all items were checked for missing values (items with >10% missing data were considered for removal) and their floor and ceiling effects were calculated (percentage of patients scoring the lowest score possible and percentage of patients scoring the highest scores possible).²⁹ Items were omitted if at least 50% of the participants selected strongly disagree or strongly agree. Skew and kurtosis (agreement with normality) were computed for each item to assess the usefulness of the data provided by the items of the FATCOD. Values outside the range -2.00 to +2.00 were not acceptable for providing normally

distributed data.³⁰

In addition, inter-item correlations and corrected item-total correlations were computed for the FATCOD scale. Items with the lowest corrected item-total correlations ($r_{it} \leq 0.30$) and inter-item correlations <0.2 or >0.8 were omitted from future analyses.³⁰ In the next step, the factor structure of the FATCOD was measured using Principal Components Analysis (PCA) and Confirmatory Factor Analysis (CFA). PCA was carried out using Oblimin rotation with Kaiser normalization. The factorability of the data was measured by Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity. KMO measures sampling adequacy (values above 0.6 are considered to be acceptable), and the Bartlett test of sphericity evaluates whether the correlation matrix is an identity matrix (a significant result is considered acceptable, $p < 0.05$). The number of extracted components were determined using eigenvalues greater than one and scree plot. Items with factor loading less than 0.5 were omitted from the abbreviated scale.

In addition, a group of professionals (health psychologist, psychometrician, nurses, assistant professors and health education specialist) who were all expert in cancer and psychometric, discussed which of the remaining items (after initial EFA) best represented the different aspects of Attitudes Toward the Care of the Dying person that Frommelt intended the instrument to cover. In the session, the two-factor structure of the FATCOD was considered for selection of the items. The group members agreed on eight selected items from each of the two subscales to be included in the next analyses. The same response format from the original scale was used, i.e. a 5-point Likert scale, ranging from strongly disagree (1) to strongly agree (5).

The remaining items were then confirmed through the CFA using diagonally weighted least squares (WLSMV) estimation. Several indices were used to assess model fit: the comparative

fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA) with 90% confidence interval (CI), and standardized root mean square residual (SRMR). The CFI and TLI ranged from 0 to 1.0, where values higher than 0.9 were considered acceptable. For RMSEA and SRMR, values lower than 0.08 were considered to be satisfactory. Average variance extracted (AVE) and composite reliability (CR) were calculated to fit the measurement model. Values >0.5 (AVE) and >0.7 (CR), are indicative of good convergent validity. Reliability was measured using internal consistency (Cronbach's alpha), where Cronbach alpha values higher than 0.7 were considered acceptable.

For the final step, a Rasch analysis, using Rasch partial credit model, was performed to examine unidimensionality, local dependency, item validity, item and person separation reliabilities, and item and person separation indices, as well as differential item functioning (DIF). Rasch models are a component of item response theory that convert the ordinal data or nonlinear raw scores into interval data (the logit or log-odds unit).

Unidimensionality can measure the degree to which all items in a single measure assesses the same single construct. Rasch Principal Component Analysis of Residuals (PCAR) was used to check the unidimensionality of the FATCOD-SF. Unidimensionality is supported if (1) at least 50% of the total variance should be explained by the first component, and (2) any additional factor should explain $<5\%$ of the remaining variance of residuals (with an associated eigenvalue ≤ 1.4). Local independency presumes that a person's response to a given item does not depend on their response to any other items. The local dependency is obtained by computing the residual correlation matrix between the items, where a positive correlation of 0.3 was considered to be indicative of response dependency. The item difficulty was estimated using the mathematical unit of Rasch measurement (logit; with higher values indicate more difficult item). Item validity was measured using two fit indices: information-weighted fit statistic (infit) mean square (MnSq), and outlier-sensitive fit statistic

(outfit) MnSq. Square infit and outfit values of between 0.5 and 1.5 are an acceptable fit to the model and items outside this range should be considered for deletion. The appropriateness of item difficulties was evaluated using item and person separation reliability. Values higher than 0.7 are considered to be acceptable item and person reliability.

A number of differential item functioning (DIF) analyses were also performed to evaluate the measurement invariance of the FATCOD-SF at item level across age, gender, professional experience subgroups and . Values higher than 0.5 for DIF indicate substantial DIF (i.e., the differences difficulty between two subgroups).

Criterion-related validity of the FATCOD-SF was assessed by examining the relationship between FATCOD-SF total score and number of years in profession using multiple linear regression. According to a previous study, older age groups and an earlier care experience were found to be the predictors in shaping positive attitudes toward care of dying patients among Swedish nurse students.¹⁰

in addition, to test the relationships between scales of the FATCOD-SF and the 30-item version of the FATCOD, Pearson's correlation was computed.

All statistical analyses were performed using IBM SPSS 23.0 (IBM Corp., Armonk, NY), MPlus version 8.1,³¹ and WINSTEPS 3.75.0.

Results

Participant characteristics

Demographic and work-related characteristics of the sample included in the present study are presented in Table 2. The sample comprised mostly women, and the enrolled nurses were the oldest of the group, at mean 47 years, and had the longest experience.

Descriptive statistics

The FATCOD-SF data quality is shown for all 30 items in Table 1, including mean and standard deviation, skew and kurtosis values (compliance with normality), the percentage of cases with missing data, ceiling and floor effects, and corrected item-total correlations.

The data from these 1000 participants suggest that 11 items do not provide normally distributed data and were outside the normality range of -2.00 to +2.00. The missing data were found to be minor and ranged from 0.7% to 1.5% at item level. Floor and ceiling effects were found for 16 of 30 items. Moreover, item–total correlations were found to be lower than the minimum threshold of 0.30 for 12 items (Table 3).

Inter-item correlations ranged from -0.21 to 0.73, indicating the redundancy of some items. The problematic items (20 items) were removed and the construct validity of the modified scale was tested with a PCA. The determinant factor of the matrix showed a value of 0.039, and the anti-image coefficients were low in absolute values, with the exception of item 20. All the items were significant ($p < 0.01$) in the correlation matrix. The KMO was = 0.91, and Bartlett's test was significant beyond the 0.01 level ($\chi^2 = 3127.26$, $df = 45$, $p < 0.001$). There was one factor with an eigenvalue greater than 1 (4.46), and it accounted for 44.6% of the total variance, and the results obtained from the scree test allowed us to identify 1 factor. Table 3 shows the rotated factor solution and communalities values.

The results of Rasch analysis showed that item 20 (Families should maintain as normal an environment as possible for the dying member) showed substantial misfit to the Rasch model (Table 4). The Outfit ZSTD of this item (+1.56) was higher than +1.5. All remaining 9 items in the scale fit the unidimensional Rasch model acceptable and the difficulty values were between -1.73 for item 20 and 0.43 for item 28. The unidimensionality of the FATCOD-SF was confirmed with PCA. The proportion of observed variances explained by the Rasch model for FATCOD-S was 54%. The percentages of residual variance accounted for by the first contrast was 15.3%. The degree of location independence was evaluated by computing

the correlations of the item residuals. The results showed that all residual correlations were under 0.30, indicating local independency of responses. Regarding DIF testing, our results showed that there were no DIF items across male and female participants; and across younger and older participants; across enrolled, registered and nursing students and across low and high experience, as all DIF contrasts were less than 0.5 and nonsignificant.

The final unidimensional 9-item FATCOD-SF was tested in terms of factorial structure using CFA. The results of the CFA showed the single-factor FATCOD-SF measure was an acceptable fit of the hypothesized model: CFI=0.95; TLI= 0.94; RMSEA=0.073; and SRMR=0.035. The loadings for the nine variables on FATCOD-SF ranged from 0.58 to 0.74 and AVE and CR were 0.46 and 0.89, respectively. Internal Consistency and Standard Error of Measurement for the FATCOD-SF were acceptable (Table 5).

The results of criterion-related validity revealed linear, positive and significant relations between the FATCOD-SF total score, age ($B=0.12$, $SE=0.04$, $p=0.006$) and number of years in profession ($B=0.49$, $SE=0.06$, $p<0.001$).

The result of the Pearson correlation between the sort version of the FATCOD and the 30-FATCDO version showed that these measures correlated strongly each other) Pearson's $r=0.914$, $P<0.001$).

DISCUSSION

The purpose of the current study was to reduce the original FATCOD-30 to its essential items using both classical and modern psychometric methods while retaining the theoretical framework of the original tool. A previous study found that several items of the FATCOD-B had poor validity, and the scale construct was considered to be weak.²⁰ A refined version of the FATCOD-B was tested and showed that the scale has a two-dimensional structure but only one was a robust measurement tool to use in medical education.²⁰ Although the large

number of items in the FATCOD might facilitate detailed assessment, it takes more time and concentration to complete. The present study showed that, by deleting 21 problematic and ambiguous items, the FATCOD-SF showed high validity and reliability. All 9 items (out of the originally proposed 30) on the one-factor structure scale reported fit statistics describing two areas within the nurse's relation/attitudes toward the dying patient (item 8, 11, 13, 14, 25, 26) and nurse's relation/attitudes toward the family members (item 9, 20, 28,29). These items explore the nurses' emotions and clinical experiences when caring for patients/persons in palliative care and when they encounter family members, which affect the care experience and quality of care. This in turn may affect how nursing students respond, as they cannot base their estimations on clinical experiences; rather, they may base their responses on intuition and imagination. In a previous study, the nurses who had more contact with dying patients reported having a more positive attitude toward caring for these patients compared to nurses who had less contact.⁹

Previous studies reported various factor structures (unidimensional, two-factor, four- and seven-factor structures)^{20, 21, 23, 24, 26} for the FATCOD across cultures. In addition, item redundancy has been reported in previous studies, suggesting that a short version could be developed. The present study showed that the FATCOD-SF in its shortened version of 9 items achieved excellent internal consistency and unidimensional factor structure, suggesting that the new tool is a reliable and valid measure of the attitudes of professionals and trainees toward caring for the dying patient and their family members.

There are two methods of psychometric assessments; classical test theory (CTT), and item response theory (IRT)/Rasch measurement theory (RMT). In CTT, items can be summed (without weighting or standardization) to obtain a total score (e.g., means and standard deviations). In IRT, the locations of persons and items on a latent continuum are measured. RMT is a special case of IRT that assesses the score orders, local dependency, and differential

item functioning (DIF). To the best of our knowledge, there is only one study that has appraised the psychometric properties of the FATCOD within the framework of Rasch analysis.²² Using Rasch models has several advantages over CTT; in Rasch models, item statistics are not sample-dependent, weights responses are not equal in Rasch models, and reliability and standard error of measurement are not constant.³² Therefore, a Rasch model was applied to the FATCOD to better understand the relationship between a person's ability and an item's difficulty. In the Rasch model of the Italian version of the FATCOD-B, there were several items with poor fit statistics. Moreover, the authors found that a two-dimensional structure of the FATCOD was not conclusive because several items correlated weakly with each other.²² FATCOD items with poor factor loadings in the factor analyses were also found in the Japanese²¹ and Swedish versions.²⁶

In this study, we conducted DIF to identify items that behave differently among gender, age and years of experience subgroups. Female caregivers have shown to have a more positive attitude and behavior toward caring for a dying patient.³³ Conversely, older nurses (especially those 50 years and older) and those with a higher number of years of experience, were found to be the strongest indicators of exhibiting a positive attitude toward caring for dying patients.^{13, 23, 33, 34} Therefore, in order to ensure that sociodemographic comparisons (i.e., age, gender and years of experience comparisons) are valid and accurate, the items of the FATCOD-SF must have equivalent meaning across these subgroups.^{35, 36} To our knowledge, no previous studies have investigated the influence of gender, age and experience on the FATCOD items. Our results indicate that nurses in this study had a similar interpretation of the items on the FATCOD-SF, regardless of age, gender and years of experience. Future studies should investigate the functionality of the unidimensional short version of the FATCOD in different samples of health professionals and/or students.

The implications for nursing education and practice

The older population continues to increase, and by the year 2050, the older population will be larger than that of the middle-aged population. This demands that nurses have sufficient education in palliative and end-of-life care to improve their attitudes toward caring for dying patients. Attitudes to death and care for the dying requires specific competences, i.e., in the philosophy of palliative care, which not only relate to the patient but also to the family members. When reforming curricula in nursing education or implementing new procedures in nursing practice, it is important to have a valid instrument to evaluate the results of the change. Such instruments should not be too lengthy or complicated, in order to facilitate evaluation. The FATCOD-SF is a brief and valid instrument that can be easily used together with other instruments to evaluate relationships that are more complicated.

Limitations

The large sample sizes and the utilizing of both classical and modern psychometric methods are a strength of this study. However, there are limitations to this study that should be considered when interpreting our results. First, it may not be possible to generalize the results of this study to all Swedish nurses or nursing students. Second, we did not assess test-retest reliability due to the nature of the study design. Therefore, future studies should evaluate the stability of the FATCOD-SF over time. Finally, we did not assess convergent and discriminant validity. Future studies should therefore use parallel measures to assess nurses' attitudes toward the care of dying patients.

Conclusion

The 9-item FATCOD-SF demonstrates evidence of acceptable validity and reliability to quickly identify nurses' attitudes toward caring for dying persons because of its brevity and comprehensive content. We provide further evidence that the FATCOD-SF is unidimensional

and has acceptable local independence. Future studies should be performed to evaluate the sensitivity analysis of the FATCOD-SF after a given intervention and over time. We also suggest that further studies should assess the measurement invariance of the FATCOD-SF across cultures/languages.

Legends for Tables:

Table 1. Samples included in the present study ($n=1000$)

Table 2. Demographics for the professions and total sample

Table 3. Descriptive statistics and item-total correlation of the FATCOD from 1000 participants

Table 4. Psychometric properties of the Frommelt Attitude Toward Care of the Dying (FATCOD) at the item level

Table 5. Psychometric properties of the the Frommelt Attitude Toward Care of the Dying (FATCOD) at the scale level

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Table 1. Samples included in the present study ($n=1000$)

From study	No formal education	Enrolled nurses	Undergraduate students	Registered nurses	Specialist nursing students
RCT, pilot study ²⁷		13		14	
RCT, main study ²⁸		29		57	
Nursing students, undergraduate ¹⁰			377		
Specialist nursing students					287
Nursing students at end of education ²⁶			100		
Home care service professionals	39	83			
Total	39 (3.9%)	125 (12.5%)	477 (47.7%)	359 (35.9%)	

Table 2. Demographics for the professions and total sample

	No formal education (<i>n</i> =39)	Enrolled nurses (<i>n</i> =125)	Undergraduate students (<i>n</i> =477)	Registered nurses (<i>n</i> =71)	Specialist nursing students (<i>n</i> =287)	Total sample (<i>n</i> =1000)
Age, mean (SD)	31.6 (13.1)	47.21 (10.96)	24.98 (6.52)	42.89 (11.10)	35.56 (7.8)	32.4 (11.53)
Gender, <i>n</i> (%)						
Men	3 (7.7%)	2 (1.6%)	76 (16.0%)	0	31 (10.8%)	112 (11.2%)
Women	36 (92.3)	123 (98.4%)	398 (84.0%)	71 (100%)	256 (89.2%)	885 (88.8%)
Place of work <i>n</i> (%)	39 (100%)	83 (66.4%)	-			
Home service		21 (16.8%)		25 (34.7%)		
Hospice		8 (6.4%)		16 (22.2%)		
Oncology		13 (10.4%)		14 (19.4%)		
Surgery				17 (23.6%)		
Home healthcare						
Years in profession, mean (SD)	7.37 (9.48)	21.3 (10.46)	-	14.85 (11.21)		
Years in profession, grouped, <i>n</i> (%)						
1–5 years						144 (50.2%)
6–10 years						74 (25.8%)
>10 years						69 (24.0%)

Table 3. Descriptive statistics and item-total correlation of the FATCOD for 1000 participants

Item number	Mean (SD)	Corrected item– total correlation	Skewness	Kurtosis	Missing data (%)	Floor effect (%)	Ceiling effect (%)	item being excluded or retained
Item-1 Giving care to the dying patient is a worthwhile experience	4.70 (0.60)	-0.06	-2.45	8.05	1.0	0.4	74.5	Excluded
Item-2 Death is not the worst thing that can happen to a person	3.86 (1.14)	0.01	-0.86	-1.16	1.2	4.6	35.9	Excluded
Item-3 I would be uncomfortable talking about death with a dying patient	2.64 (1.31)	0.50	0.29	-1.16	0.9	23.5	9.0	Excluded
Item-4 Caring for the patient's family should continue throughout the period of grief and bereavement	4.60 (0.78)	0.16	-2.26	6.55	1.1	1.3	70.7	Excluded
Item-5 I would not want to care for a dying patient	2.07 (1.39)	0.74	1.03	-0.31	0.8	52.8	11.2	Excluded
Item -6 The nurse should not be the one to talk about death with a dying patient	1.89 (1.21)	0.67	1.30	0.65	0.8	53.9	6.5	Excluded
Item-7 The length of time required giving care to a dying patient would	2.04 (1.35)	0.71	1.04	-0.19	1.2	53.0	9.9	Excluded

frustrate me								
Item-8 I would be upset if the dying patient I was caring for gave up hope of getting better	2.21 (1.37)	0.69	0.80	-0.66	1.1	45.1	10.2	Retained
Item-9 It is difficult to form a close relationship with the family of a dying patient	2.21 (1.17)	0.62	0.71	-0.29	1.2	35.1	5.5	Retained
Item-10 There are times when death is welcomed by the dying patient	4.68 (0.69)	-0.05	-2.36	7.50	1.0	0.6	76.3	Excluded
Item-11 When a patient asks if he/she is dying, I change the subject to something cheerful	2.25 (1.23)	0.56	0.71	-0.51	1.1	35.8	6.6	Retained
Item-12 The family should be involved in the physical care of the dying person	3.54 (1.07)	0.09	-0.28	-0.39	1.1	3.4	22.4	Excluded
Item-13 I would hope the patient I'm caring for dies when I am not present	2.29 (1.30)	0.66	0.63	-0.73	0.6	39.4	8.5	Retained
Item-14 I am afraid to become friends with a dying patient	2.12 (1.38)	0.71	0.91	-0.53	0.9	49.9	9.9	Retained
Item-15 I would feel like running away when the	1.96 (1.36)	0.80	1.21	0.10	1.4	55.3	10.2	Excluded

patient actually died								
Item-16 Families need emotional support to accept the behavior changes in the dying patient	4.59 (0.68)	0.10	-2.18	6.98	0.8	0.2	66.4	Excluded
Item-17 As a patient nears death, the nurse should withdraw from his/her involvement with the patient	1.59 (1.32)	0.77	2.00	2.29	0.9	79.6	11.4	Excluded
Item-18 Families should be concerned about helping their dying family member make the best of his/her remaining life	4.48 (0.81)	0.19	-1.58	2.26	1.0	0.3	64.4	Excluded
Item-19 The dying patient should not be allowed to make decisions about his/her physical care	1.71 (1.25)	0.73	1.72	1.68	1.0	66.9	8.4	Excluded
Item-20 Families should maintain as normal an environment as possible for the dying family member	4.10 (0.98)	0.36	-0.87	0.22	0.8	0.9	44.5	Retained
Item-21 It is	4.51	0.22	-1.57	2.49	0.8	0.2	63.9	Excluded

beneficial for the dying patient to verbalize his/her feelings	(0.76)							
Item-22 Care should extend to the family of the dying person	4.65 (0.67)	-0.01	-2.36	7.31	0.8	0.4	72.0	Excluded
Item-23 Nurses should permit dying patients to have flexible visiting schedules	4.67 (0.71)	0.01	-2.62	8.11	1.0	0.8	76.5	Excluded
Item-24 The dying patient and his/her family should be the in-charge decision-makers	3.63 (1.19)	0.26	-0.72	-0.14	1.5	6.7	26.3	Excluded
Item-25 Addiction to pain relieving medication is a problem when dealing with a dying patient	2.17 (1.40)	0.59	0.85	-0.57	1.3	48.8	11.6	Retained
Item-26 I would be uncomfortable if the patient is crying	2.31 (1.39)	0.68	0.66	-0.96	0.7	39.4	9.3	Retained
Item-27 Dying patients should be given honest answers about their condition	4.64 (0.70)	0.04	-2.55	8.14	0.7	0.7	72.8	Excluded
Item-28 Educating families about death and dying is not a nursing	1.99 (1.25)	0.57	1.11	0.12	0.8	49.1	7.0	Retained

responsibility								
Item-29 Family members who stay close to a dying patient interfere with the professional's job with the patient	2.13 (1.19)	0.66	0.86	-0.08	1.1	39.1	6.2	Retained
Item-30 It is possible for the nurse to help patients to prepare for death	4.35 (0.91)	0.03	-1.71	3.34	1.4	2.1	55.0	Excluded

Table 4. Psychometric properties of the Frommelt Attitude Toward Care of the Dying (FATCOD) at the item level

Item number	Factor loading*	h^2	Infit MnSq	Outfit MnSq	Difficulty	DIF contrast across gender ^{cd}	DIF contrast across age ^{ce}	DIF contrast across years of experience ^{cf}	DIF contrast across nursing position ^{cj}	DIF contrast across age groups ^{ch}
Item-8 I would be upset if the dying patient I was caring for gave up hope of getting better	0.74	0.55	0.96	0.91	0.17	-0.03	0.01	-0.19	0.03	-0.22
Item-9 It is difficult to form a close relationship with the family of a dying patient	0.69	0.48	0.84	0.86	0.16	-0.16	-0.11	0.05	-0.03	-0.39
Item-11 When a patient asks if he/she is dying, I change the subject to something cheerful	0.65	0.42	0.98	1.04	0.12	-0.04	0.01	-0.26	0.28	-0.14
Item-13 I would hope the patient I'm caring for dies when I am not present	0.72	0.53	0.90	0.94	0.07	-0.04	0.01	-0.08	0.08	0.01
Item-14 I am afraid to become friends with a dying patient	0.73	0.54	1.05	1.08	0.26	-0.05	-0.03	0.11	-0.23	0.18
Item-20 Families should maintain as normal an environment as possible for the dying family member	0.26	0.07	1.23	1.56	-1.73	0.41	0.50	0.38	-0.30	0.12

Item-25 Addiction to pain relieving medication is a problem when dealing with a dying patient	0.64	0.41	1.29	1.28	0.21	0.20	0.24	0.16	0.17	0.33
Item-26 I would be uncomfortable if the patient is crying	0.74	0.56	0.93	0.87	0.05	0.03	0.06	-0.46	0.20	0.37
Item-28 Educating families about death and dying is not a nursing responsibility	0.63	0.40	1.16	1.14	0.43	0.20	0.24	0.40	-0.02	-0.21
Item-29 Family members who stay close to a dying person interfere with the professional's job with the patient	0.74	0.55	0.79	0.84	0.25	-0.36	-0.33	-0.05	0.02	-0.13

*Extraction method: Oblimin rotation with Kaiser normalization. h2 = communalities

^c DIF contrast > 0.5 indicates substantial DIF.

^d DIF contrast across gender=Difficulty for males-Difficulty for females.

^e DIF contrast across age groups=Difficulty for younger (i.e. ≤29)-Difficulty for older (i.e. >29) patients.

^f DIF contrast across years of experience=Difficulty for low experience (i.e. ≤5)-Difficulty for high experience (i.e. >5).

MnSq=mean square error; DIF=differential item functioning.

^j DIF contrast across nursing position=Difficulty for enrolled and registered Nurses-Difficulty for nursing students.

MnSq=mean square error; DIF=differential item functioning.

^h DIF contrast across age groups=Difficulty for older (i.e. >32.4 years) -Difficulty for younger nurses (i.e. ≤32.4 years).

MnSq=mean square error; DIF=differential item functioning.

Table 5. Psychometric properties of the Frommelt Attitude Toward Care of the Dying (FATCOD) at the scale level

Psychometric testing		Suggested cutoff
Composite Reliability	0.89	>0.7
Average Variance Extracted	0.46	>0.5
Internal consistency (Cronbach's α)	0.87	>0.7
Confirmatory factor analysis		
χ^2 (<i>df</i>)	170.84 (27)	Nonsignificant
Comparative fit index	0.95	>0.9
Tucker-Lewis index	0.94	>0.9
Root-mean square error of approximation	0.073	<0.08
Standardized root mean square residual	0.035	<0.08
Person separation reliability	0.79	>0.7
Item separation reliability	1.0	>0.7
Standard error of measurement	2.96	The smaller the better