

Original Article

Development and Validation of the Palliative Care Attitudes Scale (PCAS-9): A Measure of Patient Attitudes Toward Palliative Care



Laura M. Perry, MS, Michael Hoerger, PhD, MSCR, Sonia Malhotra, MD, MS, FAAP, James I. Gerhart, PhD, Supriya Mohile, MD, MS, and Paul R. Duberstein, PhD

Department of Psychology (L.M.P., M.H.), Tulane University, New Orleans, Louisiana; Department of Medicine (M.H.), Section of Hematology and Medical Oncology, Tulane University, New Orleans, Louisiana; Department of General Internal Medicine & Geriatrics (S.M.), Section of Palliative Medicine, Tulane University, New Orleans, Louisiana; Department of Psychology (J.I.G.), Central Michigan University, Mount Pleasant, Michigan; James P. Wilmot Cancer Center (S.M.), University of Rochester School of Medicine and Dentistry, Rochester, New York; and Department of Health Behavior, Society and Policy (P.R.D.), Rutgers University School of Public Health, Piscataway, New Jersey, USA

Abstract

Context. Palliative Care is underutilized, and research has neglected patient-level factors including attitudes that could contribute to avoidance or acceptance of Palliative Care referrals. This may be due in part to a lack of existing measures for this purpose.

Objectives. The objective of this study was to develop and validate a nine-item scale measuring patient attitudes toward Palliative Care, comprised of three subscales spanning emotional, cognitive, and behavioral factors.

Methods. Data were collected online in three separate waves, targeting individuals with cancer (Sample 1: $N = 633$; Sample 2: $N = 462$) or noncancer serious illnesses (Sample 3: $N = 225$). Participants were recruited using [ResearchMatch.org](https://www.researchmatch.org) and postings on the web sites, social media pages, and listservs of international health organizations.

Results. Internal consistency was acceptable for the total scale ($\alpha = 0.84$) and subscales: emotional ($\alpha = 0.84$), cognitive ($\alpha = 0.70$), and behavioral ($\alpha = 0.90$). The PCAS-9 was significantly associated with a separate measure of Palliative Care attitudes ($p < 0.001$) and a measure of Palliative Care knowledge ($p < 0.004$), supporting its construct validity in samples of cancer and noncancer serious illnesses. The scale's psychometric properties, including internal consistency and factor structure, generalized across patient subgroups based on diagnosis, other health characteristics, and demographics.

Conclusion. Findings support the overall reliability, validity, and generalizability of the PCAS-9 in serious illness samples and have implications for increasing Palliative Care utilization via clinical care and future research efforts. *J Pain Symptom Manage* 2020;59:293–301. © 2019 Published by Elsevier Inc. on behalf of American Academy of Hospice and Palliative Medicine.

Key Words

Palliative Care, palliative medicine, health knowledge, attitudes, practice, psychometrics, patient-reported outcome measures

Serious illness often diminishes patients' quality of life, and research is needed to understand why many patients do not seek care that could relieve their physical and emotional suffering. Four meta-analyses have demonstrated the efficacy of Palliative Care for

improving quality of life and survival outcomes in cancer and noncancer serious illnesses, such as chronic obstructive pulmonary disease (COPD), heart failure, or kidney failure.^{1–4} However, studies in North America and Europe have found that most patients either

Address correspondence to: Laura M. Perry, MS, Tulane University, 3035 Percival Stern Hall, New Orleans, LA 70118, USA. E-mail: lperry5@tulane.edu

Accepted for publication: September 6, 2019.

never receive Palliative Care or only receive it near the end of life.^{5–12} Examining patient-level barriers may help us understand why underutilization still occurs despite recent increases in availability.¹³ For example, qualitative research suggests that patients may avoid referrals due to lack of knowledge or negative attitudes toward Palliative Care, such as misperceiving it as equivalent to hospice or end-of-life care.^{14–20} Quantitative research is needed to evaluate these attitudes in larger samples and to examine whether qualitative findings are generalizable to different patient groups.

However, there is a dearth of measures for assessing patient attitudes toward Palliative Care, hindering research that could increase understanding of patient-level factors underlying Palliative Care utilization. Many existing scales focus on patient attitudes about hospice and end-of-life care, or on health care professionals' attitudes about Palliative Care.^{21–27} Among two scales that focus on patient attitudes toward Palliative Care, one solely measures knowledge²⁸ and another includes a broader spectrum of attitudes using 37 items.²⁹ However, the scales are too long for seriously ill individuals to complete, do not assess attitudes and emotions relevant to health behavior theories,³⁰ and were only validated in cancer samples. A shorter measure of Palliative Care attitudes that includes a validated, theory-informed content domain and has been cross-validated in multiple patient populations is needed.

This study aimed to examine the psychometric properties of a brief measure of Palliative Care attitudes for individuals with cancer and noncancer serious illnesses. Drawing from prior research^{14,19,31} and theory^{30,32,33} emphasizing the cognitive, emotional, and behavioral components of Palliative Care attitudes, we devised the Palliative Care Attitudes Scale (PCAS). The measure is comprised of three subscales that assess patients' fear of Palliative Care (emotional subscale), perceptions of its benefits (cognitive subscale), and willingness to utilize a referral (behavioral subscale). Analyses focused on examining the reliability, factor structure, and construct validity of the PCAS in two samples of cancer patients, and cross-validation in a third sample of individuals with noncancer serious illnesses.

Methods

Participants and Procedures

We collected data from three samples of participants from 2015 to 2018 ($N = 1320$), including individuals with cancer (Samples 1 and 2) and noncancer serious illnesses (Sample 3; COPD, heart failure, or kidney failure). In scale development studies, large sample sizes and heterogeneity in

demographic and illness characteristics are beneficial for drawing strong inferences about the psychometric properties of individual survey questions, subscales, and total scores.^{34,35} Accordingly, we implemented the study via the Internet and recruited through multiple outlets. Participants were recruited mainly using the National Institutes of Health [ResearchMatch.org](https://www.researchmatch.org) patient recruitment database.³⁶ The survey links could also be accessed on web sites and social media pages of relevant health organizations from predominantly English-speaking regions such as the U.S., Canada, Australia, and Europe. Eligibility was determined if participants self-reported that a doctor had told them that they had cancer (Samples 1 and 2) or one of the following diagnoses (Sample 3): COPD, heart failure, or kidney failure. These noncancer populations were selected based on documented Palliative Care need^{1,2} and sufficient availability of participants through the online recruitment strategies. Owing to potential complications with the consent and survey completion process that a cognitive impairment may pose, we did not recruit individuals with dementia or other neurodegenerative disorders. Participants who indicated that they had been diagnosed with heart failure also self-reported symptoms from the Framingham Heart Failure Criteria³⁷ which was used as an additional eligibility criterion. All participants were required to be at least 18 years old and able to read English.

Some of the study procedures were sample specific. In Sample 1, participants completed a 14-item version of the PCAS, which was previously called the Palliative Care Preferences Scale,³⁸ and were randomly assigned to an intervention to learn about Palliative Care or a control condition. In the same online Qualtrics session, they completed a postassessment of the PCAS-14 either immediately after the pretest (control group), or after viewing the Palliative Care information (intervention group); the time between the pre- and post-tests was not recorded. The main findings from that study are reported elsewhere,³⁸ and the present investigation used those data to derive a shorter form of the survey (PCAS-9) and conduct additional psychometric analyses. Samples 2 and 3 completed a single assessment of the PCAS-9 along with other measures for the sake of validation during a one-time REDCap survey session.³⁹ This study was approved by the Tulane University IRB (#14-664306UE, #16-959396UE, and #2017-723), with informed consent inferred by participants' continuation to the survey questions after reading an online consent document.

Measures

Participant Characteristics. Participants supplied demographic information and completed a measure of financial strain.⁴⁰ They also completed a health history

checklist,⁴¹ indicated time since diagnosis and treatment types, and reported on the cancer site and presence/absence of known distant metastases (cancer samples only). All participants reported on their physical symptom burden using the FACT-G physical symptom subscale (Samples 1 and 2),⁴² FACIT-Dyspnea Short Form (Sample 3 COPD subgroup),⁴³ Kansas City Cardiomyopathy Questionnaire (KCCQ) (Sample 3 heart failure subgroup),⁴⁴ or the Kidney Disease Quality of Life Short Form Symptom Scale (KDQOL-SF) (Sample 3 kidney failure subgroup).⁴⁵

Palliative Care Attitudes Scale. In Sample 1, participants completed a 14-item version of the PCAS, which spanned three subscales: emotional (five items), cognitive (three items), and behavioral (six items). The scale includes a short definition of Palliative Care in its instructions (see [Appendix I](#)), which allowed all participants in Samples 1–3 to have a basic understanding of Palliative Care before responding to the items. After evaluating the psychometric properties of the PCAS-14, reported in detail later, we winnowed the measure down to nine items, with three in each subscale, and the PCAS-9 was used in Samples 2 and 3 ([Appendix I](#) displays the PCAS-14 and PCAS-9 items). Items retained in the nine-item version were selected based on a combination of face validity and a preliminary evaluation of corrected item-total correlations and item means. Because items on the emotion subscale are reverse-worded, they were reverse-scored so that all were in the same direction. Through simple addition, the items are summed to yield a total score for each subscale and the overall scale, with higher scores indicating more positive Palliative Care attitudes.

Single-Item Palliative Care Attitudes Rating (VOICE-PC1). Samples 2 and 3 responded to a single-item measure of Palliative Care attitudes (VOICE-PC1) developed in the VOICE Study.^{46–48} The measure asks participants to rate from 1 (definitely no) to 5 (definitely yes) how much they would want “Palliative Care (e.g., comfort care, focused on quality of life but not a cure)” if their doctor informed them that further treatment was unlikely to be helpful. Participants were categorized as “high” on the VOICE-PC1 item if they responded a 4 or 5, and “low” if they responded ≤ 3 .

Palliative Care Knowledge Scale (PaCKS-2). Samples 2 and 3 also reported their knowledge of Palliative Care using two true-false items from the PaCKS^{28,49}: “Palliative Care can help people manage the side effects of their medical treatments” and “When people receive Palliative Care, they must give up their other doctors.” Because the PCAS includes a summary of

Palliative Care in its instructions, participants responded to these two items before the PCAS and were asked not to change their answer to these two items after reading the PCAS instructions. Participants were classified as “high” on the PaCKS-2 if they answered both questions correctly, or “low” if they answered 0–1 correctly.

Analyses

Descriptive statistics on participant characteristics were examined for each sample. To address missing data, cases that were missing values on ≥ 5 variables were removed from the data set ($N = 5$), whereas cases with one to four missing values ($N = 62$) received imputations based on the participant’s mean from all other items belonging to the same scale (multi-item scale), the sample mean (single-item continuous variable), the sample median (ordinal variable), or the sample mode (categorical variable). First, descriptive and reliability analyses were performed on both the PCAS-14 (Sample 1 only) and the PCAS-9 (Samples 1 to 3). These included examining item-level statistics in Sample 1 (means, SDs, endorsement rates, and corrected item-total correlations) and examining scale-level statistics for each subscale and the total scale in Samples 1–3 (means, SDs, Cronbach’s alpha, and bivariate correlations). Test-retest reliability was evaluated using the control group’s data from Sample 1 ($N = 289$).

Second, factorial and construct validity were examined. In Samples 1–3, we performed a confirmatory factor analysis (CFA) of the PCAS-9 to examine whether the underlying three-factor model was supported by our data, as evidenced by the following statistics: Comparative Fit Index (CFI) ≥ 0.95 , Non-Normed Fit Index (NNFI) ≥ 0.90 , Standardized Root Mean Square Residual (SRMR), and Root Mean Squared Error of Approximation (RMSEA) ≤ 0.10 .⁵⁰ Construct validity was examined in Samples 2 and 3 using independent-samples t-tests to evaluate the association between the PCAS-9 (continuous variable) and two similar measures: the VOICE-PC1 Palliative Care attitudes item and Palliative Care knowledge (dichotomous variables).³⁸

Third, we examined whether the properties of the PCAS-9 generalized across key diagnostic, health, and demographic subgroups. We began by conducting a multigroup CFA to compare participants with cancer in Samples 1 and 2 ($N = 1095$) against those with non-cancer serious illnesses in Sample 3 ($N = 225$). We evaluated measurement invariance sequentially to examine cross-sample generalizability in the number of factors and items (so-called configural invariance), factor loadings (weak invariance), item means (strong invariance), and error variances (strict invariance).^{35,51} Measurement invariance in a scale ensures

Table 1
Participant Characteristics

Variable	Sample 1 (Cancer) N = 633	Sample 2 (Cancer) N = 462	Sample 3 (Noncancer) N = 225	Total N = 1,320 ^a
Age, yrs	62.00 (10.71)	58.23 (12.08)	61.21 (12.53)	60.54 (11.64)
Gender, female	271 (42.8%)	348 (75.1%)	141 (62.7%)	760 (57.6%)
Race, white/non-Latino	592 (93.5%)	426 (92.2%)	202 (89.8%)	1220 (92.4%)
Education, bachelor's degree	444 (70.1%)	309 (66.9%)	94 (41.8%)	847 (64.2%)
Marital status, married	461 (72.8%)	304 (65.8%)	106 (47.1%)	871 (66.0%)
Financial strain, present	157 (24.8%)	201 (43.5%)	140 (62.2%)	498 (37.7%)
Location				
Northeastern U.S.	83 (13.1%)	89 (19.3%)	41 (18.2%)	213 (16.1%)
Midwestern U.S.	123 (19.4%)	102 (22.1%)	59 (26.2%)	284 (21.5%)
Western U.S.	135 (21.3%)	90 (19.5%)	35 (15.6%)	260 (19.7%)
Southern U.S.	211 (33.3%)	147 (31.8%)	79 (35.1%)	437 (33.1%)
International	81 (12.8%)	34 (7.4%)	11 (4.9%)	126 (9.5%)
Cancer diagnosis ^b				
Prostate cancer	320 (50.6%)	53 (11.5%)		373 (34.1%)
Breast cancer	120 (19.5%)	135 (29.2%)		255 (23.3%)
Skin cancer	78 (12.3%)	90 (19.5%)		168 (15.3%)
Lung cancer	73 (11.5%)	75 (16.2%)		148 (13.5%)
Colon/rectal cancer	63 (10.0%)	129 (27.9%)		192 (17.5%)
Other cancer	88 (13.9%)	104 (22.5%)		192 (17.5%)
Metastases, present	131 (20.7%)	108 (23.4%)		239 (21.8%)
Primary noncancer diagnosis				
COPD			137 (60.9%)	
Heart failure			48 (21.3%)	
Kidney failure			40 (17.8%)	
Time since diagnosis, yrs	4.50 (3.53)	6.31 (6.65)	6.19 (4.09)	5.67 (4.76)

COPD = chronic obstructive pulmonary disease.

Values indicate N (%) for categorical variables or M (SD) for continuous variables.

^aN = 1095 (cancer-only subgroup) for the cancer diagnosis and presence of metastases variables.

^bSums exceed 100% due to overlap in cancer diagnoses.

that the items measure the same underlying construct (e.g., Palliative Care attitudes) in both groups and therefore provides a psychometric justification for using the measure for similar purposes and comparing scores across groups. Configural invariance was determined using previously described guidelines (CFI \geq 0.95 and RMSEA \leq 0.10), while the other three types of invariance (weak, strong, strict) were determined if the CFI decreased by \leq 0.01 and the RMSEA increased by \leq 0.015 from the previously tested model.^{52,53} If these analyses supported invariance across the cancer and noncancer subgroups, we would then combine all data from Samples 1–3 into a single data set and examine measurement invariance across demographic and health subgroups. All analyses were performed in IBM SPSS version 25, with the exception of CFAs and multigroup CFAs which were performed in the Lavaan⁵⁴ and semTools packages available for R statistical software (developed by the R Core Team in 1995; R Foundation for Statistical Computing, Vienna, Austria) version 3.4.4, respectively.

Results

Sample Characteristics

Participants were 1320 individuals diagnosed with cancer ($N = 1095$), COPD ($N = 137$), heart failure

($N = 48$), or kidney failure ($N = 40$) who ranged in age from 23 to 93 years ($M = 60.54$, $SD = 11.64$; see Table 1). The total sample was 57.6% female and participants were distributed across U.S. regions (South: 33.1%; Midwest: 21.5%; West: 19.7%; North: 16.1%) and internationally (9.5%, including $n = 42$ in Canada, $n = 41$ in the United Kingdom, and $n = 85$ elsewhere). Most of the sample was white (92.4%), married (66.0%), and college-educated (64.2%), and about a third (37.7%) experienced financial strain. On average, patients received their primary diagnosis (cancer, COPD, heart failure, kidney failure) 5.67 years before they participated in the study. Among participants with cancer, 21.8% had metastases and they scored an average of 5.07 (Sample 1; $SD = 5.68$) and 6.37 (Sample 2; $SD = 6.15$) on the FACT-G physical symptom subscale. Among participants with noncancer diagnoses, those with COPD scored an average of 14.41 ($SD = 8.32$) on the FACIT-dyspnea measure, those with heart failure scored an average of 9.29 ($SD = 2.96$) on the Kansas City Cardiomyopathy Questionnaire, and those with kidney failure scored an average of 14.03 ($SD = 4.79$) on the KDQOL-SF.

PCAS Descriptives, Reliability, and Validity

Using Sample 1 data, Table 2 shows item-level statistics (means, SDs, corrected item-total correlations, factor loadings) for each item comprising the PCAS-14

Table 2
Item-Level Statistics in Sample 1 ($N = 633$)

Item	PCAS-14			PCAS-9	
	M	SD	Item-Total r	Item-Total r	Factor Loading
Emotional: If, at your doctor's suggestion, you went to a Palliative Care Consultation ...					
1. How stressful would you find it to be overall?	2.92	1.29	0.73	0.70	0.80
2. How stressful would you find discussing severe physical symptoms or side effects (e.g., painful bone tumor; severe nausea, problems swallowing food)?	2.55	1.31	0.73	0.75	0.87
3. How stressful would you find discussing emotions, like feeling sad, scared, or angry?	2.69	1.27	0.69	0.67	0.74
4. How stressful would you find discussing difficult decisions, like whether to stop cancer treatments that are no longer working?	3.27	1.38	0.79		
5. How stressful would you find discussing issues related to death and dying?	3.24	1.48	0.74		
Cognitive: If your doctor suggested you go to a Palliative Care Consultation ...					
6. Do you think a Palliative Care Consultation would help with physical quality of life?	5.41	1.23	0.61	0.61	0.86
7. Do you think a Palliative Care Consultation would help with feelings of sadness and depression?	5.00	1.35	0.65	0.65	0.79
8. Do you think a Palliative Care Consultation would help prolong life?	3.85	1.49	0.44	0.44	0.46
Behavioral: If you were diagnosed with a life-threatening illness or had symptoms or side effects that were difficult to manage ...					
9. Would you be willing to attend the Consultation?	5.98	1.18	0.85	0.77	0.92
10. Would you try to schedule it as soon as possible?	5.65	1.37	0.83	0.75	0.92
11. Would you be willing to attend even if the time was inconvenient?	5.26	1.48	0.77		
12. Do you believe the Consultation could be helpful?	5.55	1.27	0.83		
13. Would you be willing to attend on a monthly basis for several months if requested?	5.27	1.39	0.81	0.74	0.78
14. Do you believe the Consultation would be informative?	5.65	1.18	0.75		

Item-total r = corrected item-total correlation for each item and its subscale; PCAS-14 = 14-item version of the Palliative Care Attitudes Scale; PCAS-9 = nine-item version of the Palliative Care Attitudes Scale.

Factor loadings for the PCAS-9 were derived from a three-factor confirmatory factor analysis where each item loaded on its respective subscale factor, performed in R statistical package version 3.4.4 using maximum likelihood estimation.

and PCAS-9 (see [Appendix Tables 1 to 6](#) for response option endorsement rates). Overall, items were strong indicators of their respective subscales for both the PCAS-14 (corrected item-total r s ≥ 0.44) and the PCAS-9 (corrected item-total r s ≥ 0.44 , factor loading r s ≥ 0.46).

Reliability analyses included test-retest reliability and internal consistency. Among participants in Sample 1 randomized to the control group, scores on the PCAS-9 exhibited good test-retest reliability across the subscales and the total scale (r s from 0.87 to 0.93). The PCAS-9 demonstrated acceptable internal consistency on the emotional ($\alpha = 0.84$), cognitive ($\alpha = 0.70$), behavioral ($\alpha = 0.90$), and total ($\alpha = 0.84$) scales in the combined sample ($N = 1320$; see [Table 3](#) for sample-specific alphas). [Appendix Table 7](#) displays internal consistency for the PCAS-9 total scale across key subgroups (age, gender, education, financial strain, location, diagnosis, metastases, comorbidity, multimorbidity, and perceived health).

Analyses supported the scale's factorial and construct validity. CFAs indicated acceptable model fit for the hypothesized three-factor solution

underlying the PCAS-9 in all three samples ($CFI \geq 0.97$, $NNFI \geq 0.96$, $RMSEA \leq 0.07$, $SRMR \leq 0.04$). As hypothesized, the PCAS-9 was significantly associated with the VOICE-PCI item and with Palliative Care knowledge in Samples 2 and 3 (d s from 0.38 to 0.75, p s ≤ 0.004 ; see [Table 4](#)).

Measurement Invariance

We examined whether the factor structure of the PCAS-9 was generalizable across a subgroup of individuals with cancer (Samples 1–2) and a second subgroup of individuals with noncancer serious illnesses (Sample 3). A multigroup CFA testing this hypothesis showed that the PCAS-9 scores achieved strict measurement invariance across groups ($\Delta CFI = 0.005$, $\Delta RMSEA = 0.000$; see [Table 5](#) for each step's fit statistics). Therefore, the factor structure of the PCAS-9 showed evidence of generalizability across different patient subgroups. Based on these results, we combined the data from Samples 1–3 into a single data set ($N = 1320$) and assessed measurement invariance across additional subgroups. [Appendix Table 8](#) displays these results, which indicate that the PCAS-9 scores also achieved strict invariance based on age,

Table 3
Scale-Level Statistics for Each Subscale in Studies 1 to 3:
Means, SDs, Alphas, and Correlations

Scale	M	SD	1	2	3	4
Sample 1						
(PCAS-14)						
1. Emotional ^a	20.32	5.62	(0.89)			
2. Cognitive	14.27	3.30	0.13	(0.74)		
3. Behavioral	33.36	6.83	0.11	0.60	(0.93)	
4. Total	67.95	11.39	0.60	0.70	0.84	(0.87)
Sample 2						
(PCAS-9)						
1. Emotional ^a	12.84	3.37	(0.84)			
2. Cognitive	14.27	3.30	0.14	(0.74)		
3. Behavioral	16.50	3.61	0.15	0.56	(0.87)	
4. Total	43.61	7.44	0.59	0.78	0.80	(0.81)
Sample 3						
(PCAS-9)						
1. Emotional ^a	12.92	3.42	(0.83)			
2. Cognitive	14.91	3.02	0.11	(0.60)		
3. Behavioral	17.82	3.10	0.24	0.42	(0.89)	
4. Total	45.67	6.71	0.67	0.69	0.77	(0.76)
Total sample						
(PCAS-9)						
1. Emotional ^a	12.98	3.43	(0.84)			
2. Cognitive	14.47	3.28	0.12	(0.70)		
3. Behavioral	17.09	3.57	0.21	0.55	(0.90)	
4. Total	44.54	7.46	0.61	0.76	0.81	(0.84)

PCAS-14 = 14-item version of the Palliative Care Attitudes Scale; PCAS-9 = nine-item version of the Palliative Care Attitudes Scale.

Sample 1: *N* = 633 (cancer sample). Sample 2: *N* = 462 (cancer sample). Sample 3: *N* = 225 (noncancer serious illness sample). Total sample: *N* = 1320 (Sample 1–3 combined). Alphas are indicated in parentheses. Correlations are reported on the off-diagonals.

^aItems were reverse-coded so that higher scores indicated higher Palliative Care attitudes.

gender, education, financial strain, location, diagnosis, metastases, comorbidity, multimorbidity, and perceived health.

Table 4
Construct Validity in Studies 2 and 3: Associations
Between the PCAS-9 and Related Measures

Measure	Study 2 (Cancer) <i>N</i> = 462		Study 3 (Noncancer) <i>N</i> = 225	
	<i>d</i>	<i>P</i>	<i>d</i>	<i>P</i>
VOICE-PC1 preference item	0.55	<0.001	0.75	<0.001
Palliative care knowledge	0.49	<0.001	0.38	0.004

PCAS = Palliative Care Attitudes Scale; VOICE-PC1 = single-item measure of Palliative Care attitudes developed by the study team for the VOICE study.^{42–44}

Palliative care knowledge was assessed by two items from the Palliative Care Knowledge Scale (PaCKS).^{28,45} Both measures were dichotomized to represent high versus low scoring participants. *d* = Cohen's *d* obtained from an independent-samples *t*-test predicting the PCAS-9 (continuous dependent variable) from each dichotomous independent variable.

Table 5
Measurement Invariance Comparing the PCAS-9 Model
Fit Between Participants With Cancer (Samples 1 and 2)
and Participants With Noncancer Serious Illnesses
(Sample 3) (*N* = 1320)

Model	Reference Model	CFI	RMSEA	ΔCFI	ΔRMSEA
1. Configural	—	0.978 ^a	0.065 ^a	—	—
2. Weak	1	0.976 ^a	0.063 ^a	0.002 ^a	0.001 ^a
3. Strong	2	0.970 ^a	0.066 ^a	0.005 ^a	0.003 ^a
4. Strict	3	0.966 ^a	0.067 ^a	0.005 ^a	0.000 ^a

PCAS = Palliative Care Attitudes Scale; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; ΔCFI = change in CFI between the present model and its reference model; ΔRMSEA = change in RMSEA between the present model and its reference model; Configural = a configural invariance model where the factor structure (number of factors and items, and which factor each item loads on) is fixed to be equivalent across groups; Weak = a weak invariance model where each corresponding factor loading is fixed to be equivalent across groups; Strong = a strong invariance model where each corresponding item mean is fixed to be equivalent across groups; Strict = a strict invariance model where each corresponding error variance is fixed to be equivalent across groups.

^aAcceptable model fit using existing guidelines.^{46,48,49}

Discussion

This study examined the psychometric properties of the nine-item Palliative Care Attitudes Scale (PCAS-9). Scores demonstrated strong reliability, validity, and generalizability across three separate international samples, including adults with cancer and other noncancer serious illnesses. The PCAS-9 has the potential to advance clinical and research efforts aiming to understand and reduce barriers to Palliative Care utilization.

Main Findings

Overall, participants' scores on the PCAS-9 demonstrated strong reliability, factor structure, and construct validity. They met criteria for acceptable internal consistency and model fit in CFAs, including for key demographic and health subgroups. In Sample 1, the PCAS-9 scores also demonstrated good test-retest reliability in the control group. Finally, in Samples 2 and 3, the PCAS-9 was associated with related constructs, including a separate single-item measure of Palliative Care attitudes and Palliative Care knowledge. This builds on prior research showing that patient knowledge of health-related information influences patient attitudes, decision-making, and resource utilization in health care contexts, including Palliative Care.^{38,55–57}

This investigation also provided evidence for the generalizability of the PCAS-9 across multiple groups of patients. Specifically, a multigroup CFA found that the PCAS-9 scores demonstrated strict measurement invariance across a subgroup of individuals with cancer and a second subgroup of individuals with noncancer serious illnesses. The scale's three-factor theoretical model was equally well supported across these groups (configural invariance), and each item

measured the construct of Palliative Care attitudes comparably with regard to factor loadings, item means, and error variances (weak, strong, and strict invariance). That is, across diagnostic subgroups, the survey items were approximately equal indicators of the overarching construct, had similar means, and had a similar range of values. Follow-up multigroup CFAs found invariance across sociodemographic and health groups (see [Appendix Table 8](#)). Measurement invariance in the PCAS-9 means that any observed difference in scores between groups will be due to actual differences in the construct of interest (Palliative Care attitudes), and not due to measurement differences (e.g., one item is more heavily weighted in one group than another).^{35,51} Therefore, this finding provides validity for future studies comparing Palliative Care attitudes across patient and sociodemographic groups using the PCAS-9.

Strengths and Limitations

This study had both strengths and limitations. This is the first known investigation to develop a measure of patient-reported Palliative Care attitudes with a validated content domain that is short enough to be used with seriously ill patients for whom Palliative Care may be appropriate. Key psychometric analyses were replicated across two (construct validity) or three (internal consistency, CFA) independent samples and across demographic and health subgroups. However, these strengths were qualified by three limitations. First, the surveys did not include items from the PPCI,²⁹ the only other published measure of Palliative Care attitudes. Second, we were unable to assess the predictive validity of the PCAS-9, nor long-term test-retest reliability, though such characteristics are rarely evaluated in new scale development studies. Follow-up research using longitudinal designs should report on the extent to which the PCAS-9 predicts important clinical outcomes such as utilization of Palliative Care services or receipt of aggressive end-of-life treatments. Third, this study focused solely on patient attitudes from a predominantly non-Latino white sample, and the Internet sampling methodology may have biased our sample toward having more positive attitudes or higher literacy levels than the average seriously ill patient. Future research could examine whether the scale's psychometric properties generalize to other populations including diverse sociodemographic patient groups (with respect to race, ethnicity, education, etc.), those with other serious illnesses such as dementia or neurodegenerative disorders, family/caregivers, clinicians, or the general public.

Implications

This study could advance future research and clinical efforts examining patient barriers to health care

utilization. Previously, scale development projects have helped to stimulate more research in understudied clinical fields, such as patient-physician communication,⁵⁸ patient dignity,⁵⁹ and caregiver needs at the end of life.⁶⁰ Similarly, the PCAS-9 may help to facilitate research aiming to understand why Palliative Care is underutilized despite its benefits, as well as research focused on developing interventions to address this issue.^{1,2,5,6,8,11,12,61} For example, the tool may be especially helpful for identifying differing attitudes about Palliative Care in men and women or across racial groups or other demographic groups (e.g., defined in terms of education or income), which could contribute to efforts focused on reducing the demographic disparities in Palliative Care access and utilization.^{20,62,63} In addition, the items comprising the PCAS-9 could be used to develop similar scales examining patient barriers to utilizing other interventions known to improve quality of life, such as social work, supportive care, or behavioral health care. In clinical contexts, routine use of the PCAS-9 could help to initiate patient-clinician communication and shared decision-making surrounding Palliative Care options, conversations that both clinicians and patients tend to avoid on their own.^{15,61,63-65} The scale could also be used as a screening measure to identify individuals with negative attitudes toward Palliative Care. For example, patients who fall in the "Opposed" or "Skeptical" range based on their PCAS scores (see [Appendix Table 9](#) for score interpretations) may benefit from formal interventions that have been developed to increase knowledge and utilization of Palliative Care.^{38,66}

To conclude, this study found that a brief measure called the PCAS-9 demonstrated reliability and validity across two samples of individuals with cancer and one sample of individuals with noncancer serious illnesses. Findings provide a reasonable justification for use of this measure in future research and have implications for increasing Palliative Care utilization worldwide.

Disclosures and Acknowledgments

The authors have no conflicts of interest to disclose. This work was supported by the Research Competitiveness Subprogram (RCS) of the Louisiana Board of Regents (LA BOR), the Robert E. Flowerree Summer Research Fellowship from the Tulane University Psychology Department, U54GM104940, from the National Institute of General Medical Sciences, and R01CA168387 from the National Cancer Institute.

References

1. Gaertner J, Siemens W, Meerpohl JJ, et al. Effect of specialist palliative care services on quality of life in adults

- with advanced incurable illness in hospital, hospice, or community settings: systematic review and meta-analysis. *BMJ* 2017;357:j2925.
2. Kavalieratos D, Corbelli J, Zhang D, et al. Association between Palliative Care and patient and caregiver outcomes: a systematic review and meta-analysis. *JAMA* 2016;316:2104–2114.
 3. Hoerger M, Wayser GR, Schwing G, et al. Impact of interdisciplinary outpatient specialty Palliative Care on survival and quality of life in adults with advanced cancer: a meta-analysis of randomized controlled trials. *Ann Behav Med* 2018;53:674–685.
 4. Fulton JJ, LeBlanc TW, Cutson TM, et al. Integrated outpatient Palliative Care for patients with advanced cancer: a systematic review and meta-analysis. *Palliat Med* 2018;33:123–134.
 5. Beernaert K, Cohen J, Deliens L, et al. Referral to Palliative Care in COPD and other chronic diseases: a population-based study. *Respir Med* 2013;107:1731–1739.
 6. Carpenter JG, McDarby M, Smith D, et al. Associations between timing of Palliative Care consults and family evaluation of care for veterans who die in a hospice/Palliative Care unit. *J Palliat Med* 2017;20:745–751.
 7. Hui D, Elsayem A, De La Cruz M, et al. Availability and integration of Palliative Care at US cancer centers. *JAMA* 2010;303:1054–1061.
 8. Hui D, Kim SH, Roquemoire J, et al. Impact of timing and setting of Palliative Care referral on quality of end-of-life care in cancer patients. *Cancer* 2014;120:1743–1749.
 9. Kumar P, Casarett D, Corcoran A, et al. Utilization of supportive and Palliative Care services among oncology outpatients at one academic cancer center: determinants of use and barriers to access. *J Palliat Med* 2012;15:923–930.
 10. Osta BE, Palmer JL, Paraskevopoulos T, et al. Interval between first Palliative Care consult and death in patients diagnosed with advanced cancer at a comprehensive cancer center. *J Palliat Med* 2008;11:51–57.
 11. Scibetta C, Kerr K, McGuire J, et al. The costs of waiting: implications of the timing of Palliative Care consultation among a cohort of decedents at a comprehensive cancer center. *J Palliat Med* 2016;19:69–75.
 12. Szekendi MK, Vaughn J, Lal A, et al. The prevalence of inpatients at 33 US hospitals appropriate for and receiving referral to Palliative Care. *J Palliat Med* 2016;19:360–372.
 13. Morrison RS, Meier D, Dumanovsky T, et al. America's care of serious illness 2015 state-by-state report card on access to Palliative Care in our nation's hospitals. New York: Center to Advance Palliative Care, 2015.
 14. Collins A, McLachlan S-A, Philip J. Initial perceptions of Palliative Care: an exploratory qualitative study of patients with advanced cancer and their family caregivers. *Palliat Med* 2017;31:825–832.
 15. Collins A, McLachlan S-A, Philip J. Communication about Palliative Care: a phenomenological study exploring patient views and responses to its discussion. *Palliat Med* 2018;32:133–142.
 16. Institute of Medicine (IOM). Dying in america: Improving quality and honoring individual preferences near the end of life. Washington, DC 2014.
 17. Meirick PC. Motivated misperception? Party, education, partisan news, and belief in “death panels”. *Journalism Mass Commun Q* 2013;90:39–57.
 18. Shalev A, Phongtankuel V, Kozlov E, et al. Awareness and misperceptions of hospice and Palliative Care: a population-based survey study. *Am J Hosp Palliat Medicine* 2018;35:431–439.
 19. Zimmermann C, Swami N, Krzyzanowska M, et al. Perceptions of Palliative Care among patients with advanced cancer and their caregivers. *Can Med Assoc J* 2016;188:E217–E227.
 20. Boyd K, Moine S, Murray SA, et al. Should Palliative Care be rebranded? Changing perceptions is more important than changing names. *BMJ* 2019;364:l881.
 21. Brock KE, Cohen HJ, Popat RA, et al. Reliability and validity of the pediatric Palliative Care questionnaire for measuring self-efficacy, knowledge, and adequacy of prior medical education among pediatric fellows. *J Palliat Med* 2015;18:842–848.
 22. Cagle JG, van Dussen DJ, Culler KL, et al. Knowledge about hospice: exploring misconceptions, attitudes, and preferences for care. *Am J Hosp Palliat Care* 2016;33:27–33.
 23. Catt S, Blanchard M, Addington-Hall J, et al. The development of a questionnaire to assess the attitudes of older people to end-of-life issues (AEOLI). *Palliat Med* 2005;19:397–401.
 24. Dobbs DJ, Hanson L, Zimmerman S, et al. Hospice attitudes among assisted living and nursing home administrators, and the long-term care hospice attitudes scale. *J Palliat Med* 2006;9:1388–1400.
 25. Phillips J, Salamonson Y, Davidson PM. An instrument to assess nurses' and care assistants' self-efficacy to provide a palliative approach to older people in residential aged care: a validation study. *Int J Nurs Stud* 2011;48:1096–1100.
 26. Ross MM, McDonald B, McGuinness J. The Palliative Care quiz for nursing (PCQN): the development of an instrument to measure nurses' knowledge of Palliative Care. *J Adv Nurs* 1996;23:126–137.
 27. Yamamoto R, Kizawa Y, Nakazawa Y, et al. The Palliative Care knowledge questionnaire for PEACE: reliability and validity of an instrument to measure Palliative Care knowledge among physicians. *J Palliat Med* 2013;16:1423–1428.
 28. Kozlov E, Carpenter BD, Rodebaugh TL. Development and validation of the Palliative Care knowledge scale (PaCKS). *Palliat Support Care* 2017;15:524–534.
 29. Milne D, Aranda S, Jefford M, et al. Development and validation of a measurement tool to assess perceptions of Palliative Care. *Psycho-Oncology* 2013;22:940–946.
 30. Glanz K, Rimer BK, Viswanath K. Health behavior and health education: Theory, research, and practice. John Wiley & Sons, 2015.
 31. Milne D, Jefford M, Schofield P, et al. Appropriate, timely referral to Palliative Care services: a name change will not help. *J Clin Oncol* 2013;31:2055.
 32. Breckler SJ. Empirical validation of affect, behavior, and cognition as distinct components of attitude. *J Personal And Social Psychol* 1984;47:1191–1205.
 33. Ajzen I. From intentions to actions: A theory of planned behavior. Action control. Springer, 1985:11–39.

34. Hoerger M, Quirk SW, Weed NC. Development and validation of the delaying gratification inventory. *Psychol Assess* 2011;23:725–738.
35. Kline RB. *Principles and Practice of Structural Equation Modeling*. Guilford Publications, 2015.
36. Harris PA, Scott KW, Lebo L, et al. ResearchMatch: a national registry to recruit volunteers for clinical research. *Acad Med* 2012;87:66–73.
37. Mahmood SS, Levy D, Vasan RS, et al. The Framingham Heart Study and the epidemiology of cardiovascular disease: a historical perspective. *Lancet* 2014;383:999–1008.
38. Hoerger M, Perry LM, Gramling R, et al. Does educating patients about the Early Palliative Care Study increase preferences for outpatient Palliative cancer care? *Health Psychol* 2017;36:538–548.
39. Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform* 2009;42:377–381.
40. Friedman B, Conwell Y, Delavan RL. Correlates of late-life major depression: a comparison of urban and rural primary care patients. *Am J Geriatr Psychiatry* 2007;15:28–41.
41. Chapman BP, Khan A, Harper M, et al. Gender, race/ethnicity, personality, and interleukin-6 in urban primary care patients. *Brain Behav Immun* 2009;23:636–642.
42. Cella DF, Tulsky DS, Gray G, et al. The Functional Assessment of Cancer Therapy scale: development and validation of the general measure. *J Clin Oncol* 1993;11:570–579.
43. Yount SE, Choi SW, Victorson D, et al. Brief, valid measures of dyspnea and related functional limitations in chronic obstructive pulmonary disease (COPD). *Value in Health* 2011;14:307–315.
44. Green CP, Porter CB, Bresnahan DR, Spertus JA. Development and evaluation of the Kansas City Cardiomyopathy Questionnaire: a new health status measure for heart failure. *J Am Coll Cardiol* 2000;35:1245–1255.
45. Hays RD, Kallich JD, Mapes DL, et al. *Kidney Disease Quality of Life Short Form (KDQOL-SF)*, Version 1.3: a manual for use and scoring. Santa Monica, CA: Rand, 1997:39.
46. Epstein RM, Duberstein PR, Fenton JJ, et al. Effect of a patient-centered communication intervention on oncologist-patient communication, quality of life, and health care utilization in advanced cancer: the VOICE randomized clinical trial. *JAMA Oncol* 2017;3:92–100.
47. Saeed F, Hoerger M, Norton SA, et al. Preference for Palliative Care in cancer patients: are men and women alike? *J Pain Symptom Manage* 2018;56:1–6.
48. Hoerger M, Epstein RM, Winters PC, et al. Values and options in cancer care (VOICE): study design and rationale for a patient-centered communication and decision-making intervention for physicians, patients with advanced cancer, and their caregivers. *BMC Cancer* 2013;13:188.
49. Kozlov E, McDarby M, Reid MC, et al. Knowledge of Palliative Care among community-dwelling adults. *Am J Hosp Palliat Care* 2018;35:647–651.
50. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *Methods Psychol Res Online* 2003;8:23–74.
51. Vandenberg RJ, Lance CE. A review and synthesis of the measurement invariance literature: suggestions, practices, and recommendations for organizational research. *Organizational Res Methods* 2000;3:4–70.
52. Chen FF. Sensitivity of goodness of fit indexes to lack of measurement invariance. *Struct Equation Model* 2007;14:464–504.
53. Cheung GW, Rensvold RB. Evaluating goodness-of-fit indexes for testing measurement invariance. *Struct Equation Model* 2002;9:233–255.
54. Rosseel Y. *Lavaan: an R package for structural equation modeling and more*. Version 0.5–12 (BETA). *J Stat Softw* 2012;48:1–36.
55. Grossman M. Education and nonmarket outcomes. *Handbook Econ Education* 2006;1:577–633.
56. Kenkel DS. Health behavior, health knowledge, and schooling. *J Polit Economy* 1991;99:287–305.
57. Oldenmenger WH, Smitt PAS, van Dooren S, et al. A systematic review on barriers hindering adequate cancer pain management and interventions to reduce them: a critical appraisal. *Eur J Cancer* 2009;45:1370–1380.
58. Mack JW, Block SD, Nilsson M, et al. Measuring therapeutic alliance between oncologists and patients with advanced cancer: the Human Connection Scale. *Cancer* 2009;115:3302–3311.
59. Chochinov HM, Hassard T, McClement S, et al. The patient dignity inventory: a novel way of measuring dignity-related distress in Palliative Care. *J Pain Symptom Manage* 2008;36:559–571.
60. Ewing G, Brundle C, Payne S, et al. The Carer Support Needs Assessment Tool (CSNAT) for use in palliative and end-of-life care at home: a validation study. *J Pain Symptom Manage* 2013;46:395–405.
61. Wright AA, Keating NL, Ayanian JZ, et al. Family perspectives on aggressive cancer care near the end of life. *JAMA* 2016;315:284–292.
62. Saeed F, Hoerger M, Norton, et al. Preference for Palliative Care in cancer patients: are men and women alike? *J Pain Symptom Manage* 2018;56:1–6.e1.
63. Cain CL, Surbone A, Elk R, et al. Culture and Palliative Care: preferences, communication, meaning, and mutual decision making. *J Pain Symptom Manage* 2018;55:1408–1419.
64. Mack JW, Weeks JC, Wright AA, et al. End-of-life discussions, goal attainment, and distress at the end of life: Predictors and outcomes of receipt of care consistent with preferences. *J Clin Oncol* 2010;28:1203–1208.
65. Bernacki RE, Block SD. Communication about serious illness care goals: a review and synthesis of best practices. *JAMA Intern Med* 2014;174:1994–2003.
66. Kozlov E, Reid MC, Carpenter BD. Improving patient knowledge of Palliative Care: a randomized controlled intervention study. *Patient Education Couns* 2017;100:1007–1011.

Appendix. Palliative Care Attitudes Scale—14-Item Version

This section asks you some questions about your beliefs about aspects of health and health care, particularly something called a “Palliative Care Consultation.” Palliative Care Consultations are for patients who have life-threatening illnesses or have symptoms or side effects that are difficult to manage. The consultation usually involves the patient (and family, if desired) meeting with a team of providers (e.g., doctor, nurse, psychologist, nutritionist, social worker). Usually, the conversations focus on discussing ways to address a) physical symptoms and side effects, b) emotional concerns, c) difficult decisions, or d) end-of-life issues.

Emotion Subscale

If, at your doctor’s suggestion, you went to a Palliative Care Consultation ...

1	2	3	4	5	6
Not at all stressful	A little stressful	Somewhat stressful	Very stressful	Extremely stressful	Extremely, extremely stressful

1. How stressful would you find it to be overall? (item was retained in nine-item version)
2. How stressful would you find discussing severe physical symptoms or side effects (e.g., painful bone tumor, severe nausea, problems swallowing food)? (item was retained in nine-item version)
3. How stressful would you find discussing emotions, like feeling sad, scared, or angry? (item was retained in nine-item version)
4. How stressful would you find discussing difficult decisions, like whether to stop cancer treatments that are no longer working?
5. How stressful would you find discussing issues related to death and dying?

Cognitive Subscale

If your doctor suggested you go to a Palliative Care Consultation ...

1	2	3	4	5	6	7
Definitely no	Probably no	Possibly no	Unsure	Possibly yes	Probably yes	Definitely yes

1. Do you think a Palliative Care Consultation would help with physical quality of life? (item was retained in nine-item version)
2. Do you think a Palliative Care Consultation would help with feelings of sadness and depression? (item was retained in nine-item version)
3. Do you think a Palliative Care Consultation would help prolong life? (item was retained in nine-item version)

Behavioral Subscale

If you were diagnosed with a life-threatening illness or had symptoms or side effects that were difficult to manage ...

1	2	3	4	5	6	7
Definitely no	Probably no	Possibly no	Unsure	Possibly yes	Probably yes	Definitely yes

1. Would you be willing to attend the Consultation? (item was retained in nine-item version)
2. Would you try to schedule it as soon as possible? (item was retained in nine-item version)
3. Would you be willing to attend even if the time was inconvenient?
4. Do you believe the Consultation could be helpful?
5. Would you be willing to attend on a monthly basis for several months if requested? (item was retained in nine-item version)
6. Do you believe the Consultation would be informative?

Appendix Table 1
Response Endorsement Rates for PCAS-14 Emotional Subscale in Sample 1 (N = 633)

Item	Not at All Stressful	A Little Stressful	Somewhat Stressful	Very Stressful	Extremely Stressful	Extremely, Extremely Stressful
Emotional						
1. How stressful would you find it to be overall?	13.1%	26.7%	31.8%	15.6%	8.8%	3.9%
2. How stressful would you find discussing severe physical symptoms or side effects (e.g., painful bone tumor, severe nausea, problems swallowing food)?	23.2%	30.5%	25.0%	13.1%	6.0%	2.2%
3. How stressful would you find discussing emotions, like feeling sad, scared, or angry?	20.2%	28.3%	27.2%	13.6%	7.7%	3.0%
4. How stressful would you find discussing difficult decisions, like whether to stop cancer treatments that are no longer working?	11.7%	18.6%	25.3%	24.4%	13.0%	6.0%
5. How stressful would you find discussing issues related to death and dying?	14.4%	18.0%	26.5%	20.4%	11.2%	9.5%

PCAS = Palliative Care Attitudes Scale.

Appendix Table 2
Response Endorsement Rates for PCAS-14 Cognitive and Behavioral Subscales in Sample 1 (N = 633)

Item	Definitely No	Probably No	Possibly No	Unsure	Possibly Yes	Probably Yes	Definitely Yes
Cognitive							
1. Do you think a Palliative Care Consultation would help with physical quality of life?	0.9%	2.2%	1.4%	17.4%	25.0%	34.0%	19.1%
2. Do you think a Palliative Care Consultation would help with feelings of sadness and depression?	1.4%	6.0%	3.0%	20.5%	29.7%	28.6%	10.7%
3. Do you think a Palliative Care Consultation would help prolong life?	4.3%	20.9%	8.4%	36.0%	16.7%	9.5%	4.3%
Behavioral							
1. Would you be willing to attend the Consultation?	0.8%	1.7%	1.3%	7.3%	12.3%	36.8%	39.5%
2. Would you try to schedule it as soon as possible?	1.1%	3.5%	3.0%	11.2%	13.7%	37.4%	30.0%
3. Would you be willing to attend even if the time was inconvenient?	1.7%	4.9%	6.5%	13.4%	19.4%	34.1%	19.9%
4. Do you believe the Consultation could be helpful?	0.8%	2.8%	0.8%	15.0%	22.4%	32.5%	74.4%
5. Would you be willing to attend on a monthly basis for several months if requested?	1.7%	4.7%	2.5%	15.3%	24.6%	33.6%	17.4%
6. Do you believe the Consultation would be informative?	0.9%	1.7%	0.5%	12.3%	21.5%	38.5%	24.5%

PCAS = Palliative Care Attitudes Scale.

Appendix Table 3
Response Endorsement Rates for PCAS-9 Emotional Subscale in Sample 2 (N = 462)

Item	Not at All Stressful	A Little Stressful	Somewhat Stressful	Very Stressful	Extremely Stressful	Extremely, Extremely Stressful
Emotional						
1. How stressful would you find it to be overall?	16.5%	24.5%	28.4%	17.1%	8.4%	5.2%
2. How stressful would you find discussing severe physical symptoms or side effects (e.g., painful bone tumor, severe nausea, problems swallowing food)?	27.1%	28.6%	23.4%	13.0%	6.0%	1.9%
3. How stressful would you find discussing emotions, like feeling sad, scared, or angry?	21.2%	26.0%	28.8%	13.4%	7.1%	3.5%

PCAS = Palliative Care Attitudes Scale.

Appendix Table 4
Response Endorsement Rates for PCAS-9 Cognitive and Behavioral Subscales in Sample 2 (N = 462)

Item	Definitely No	Probably No	Possibly No	Unsure	Possibly Yes	Probably Yes	Definitely Yes
Cognitive							
1. Do you think a Palliative Care Consultation would help with physical quality of life?	0.4%	1.1%	0.9%	11.0%	22.5%	35.7%	28.4%
2. Do you think a Palliative Care Consultation would help with feelings of sadness and depression?	1.3%	2.6%	1.9%	18.6%	27.5%	30.1%	18.0%
3. Do you think a Palliative Care Consultation would help prolong life?	7.1%	19.0%	9.3%	30.5%	0.2%	18.4%	9.5%
Behavioral							
1. Would you be willing to attend the Consultation?	0.4%	0.4%	0.9%	3.0%	14.9%	32.9%	47.4%
2. Would you try to schedule it as soon as possible?	1.3%	0.9%	1.7%	10.4%	15.2%	34.6%	35.9%
3. Would you be willing to attend on a monthly basis for several months if requested?	1.1%	1.3%	1.3%	8.9%	21.2%	35.1%	31.2%

PCAS = Palliative Care Attitudes Scale.

Appendix Table 5
Response Endorsement Rates for PCAS-9 Emotional Subscale in Sample 3 (N = 225)

Item	Not at All Stressful	A Little Stressful	Somewhat Stressful	Very Stressful	Extremely Stressful	Extremely, Extremely Stressful
Emotional						
1. How stressful would you find it to be overall?	18.5%	23.4%	30.6%	12.1%	9.7%	5.6%
2. How stressful would you find discussing severe physical symptoms or side effects (e.g., painful bone tumor, severe nausea, problems swallowing food)?	44.0%	23.4%	19.8%	8.5%	2.0%	2.4%
3. How stressful would you find discussing emotions, like feeling sad, scared, or angry?	27.4%	31.9%	18.1%	10.5%	7.7%	4.4%

PCAS = Palliative Care Attitudes Scale.

Appendix Table 6
Response Endorsement Rates for PCAS-9 Cognitive and Behavioral Subscales in Sample 3 (N = 225)

Item	Definitely No	Probably No	Possibly No	Unsure	Possibly Yes	Probably Yes	Definitely Yes
Cognitive							
1. Do you think a Palliative Care Consultation would help with physical quality of life?	2.0%	2.4%	1.2%	21.4%	28.2%	28.6%	16.1%
2. Do you think a Palliative Care Consultation would help with feelings of sadness and depression?	3.2%	5.8%	4.8%	22.6%	27.8%	22.2%	13.7%
3. Do you think a Palliative Care Consultation would help prolong life?	8.1%	12.5%	8.9%	36.7%	16.5%	12.1%	5.2%
Behavioral							
1. Would you be willing to attend the Consultation?	2.8%	1.2%	1.6%	6.9%	27.4%	24.6%	35.5%
2. Would you try to schedule it as soon as possible?	4.0%	3.2%	5.6%	15.7%	19.8%	29.0%	22.6%
3. Would you be willing to attend on a monthly basis for several months if requested?	4.0%	3.6%	2.8%	17.3%	24.2%	30.2%	17.7%

PCAS = Palliative Care Attitudes Scale.

Appendix Table 7

**Internal Consistency of the PCAS-9 Total Scale Across
Key Demographic and Health Subgroups in Samples 1 to
3**

Variable	Sample 1, N = 633	Sample 2, N = 462	Sample 3, N = 225
Age			
≥65	0.81	0.76	0.78
<65	0.81	0.77	0.87
Gender			
Female	0.83	0.76	0.85
Male	0.78	0.77	0.82
Education			
≥Bachelor's degree	0.79	0.78	0.82
<Bachelor's degree	0.85	0.73	0.85
Financial strain ^a			
Present	0.84	0.77	0.84
Absent	0.79	0.76	0.83
Location, region			
Northeast	0.93	0.87	0.86
Midwest	0.93	0.89	0.88
South	0.89	0.90	0.80
West	0.87	0.92	0.84
International	0.75	0.59	0.81
Location, palliative care grade ^b			
A/B	0.82	0.76	0.85
C/D	0.79	0.81	0.81
Cancer diagnosis			
Prostate	0.78	0.77	—
Breast	0.82	0.78	—
Skin	0.83	0.73	—
Lung	0.84	0.81	—
Colon/rectal	0.85	0.78	—
Other	0.74	0.75	—
Metastases			
Present	0.72	0.80	—
Absent	0.82	0.75	—
Primary noncancer diagnosis			
COPD			0.77
Heart failure			0.88
Kidney failure			0.89
Comorbidity			
Present	0.84	0.78	0.84
Absent	0.79	0.75	0.72
Multimorbidity			
Present	0.82	0.75	0.84
Absent	0.80	0.78	0.83
Perceived health			
Poor/fair	0.85	0.76	0.85
Good/very good/excellent	0.79	0.77	0.79

PCAS = Palliative Care Attitudes Scale; COPD = chronic obstructive pulmonary disease.

Values indicate Cronbach's alphas for each subgroup in each study.

^aFinancial strain was assessed using the Financial Strain Index.¹

^bStates were categorized according to their Palliative Care grades as indicated by the most recent state-by-state report card on access to Palliative Care released by the Center to Advance Palliative Care.² In A/B states, >60% of hospitals in the state had a Palliative Care program, whereas its C/D states Palliative Care programs were present in only 21%–60% of hospitals.

Appendix Table 8

PCAS-9 Measurement Invariance by Key Demographic and Health Characteristics Across Samples 1 to 3 ($N = 1320$)

Model	Reference Model	CFI	RMSEA	Δ CFI	Δ RMSEA
Age (≥ 65 vs. < 65)					
1. Configural	—	0.976 ^a	0.067 ^a	—	—
2. Weak	1	0.975 ^a	0.064 ^a	0.000 ^a	0.003 ^a
3. Strong	2	0.972 ^a	0.065 ^a	0.003 ^a	0.001 ^a
4. Strict	3	0.969 ^a	0.063 ^a	0.003 ^a	0.002 ^a
Gender (female vs. male)					
1. Configural	—	0.977 ^a	0.065 ^a	—	—
2. Weak	1	0.977 ^a	0.061 ^a	0.000 ^a	0.004 ^a
3. Strong	2	0.976 ^a	0.060 ^a	0.001 ^a	0.001 ^a
4. Strict	3	0.971 ^a	0.060 ^a	0.004 ^a	0.001 ^a
Bachelor's education (present vs. absent)					
1. Configural	—	0.978 ^a	0.064 ^a	—	—
2. Weak	1	0.978 ^a	0.060 ^a	0.000 ^a	0.003 ^a
3. Strong	2	0.974 ^a	0.062 ^a	0.004 ^a	0.002 ^a
4. Strict	3	0.964 ^a	0.058 ^a	0.000 ^a	0.004 ^a
Financial strain (present vs. absent)					
1. Configural	—	0.975 ^a	0.068 ^a	—	—
2. Weak	1	0.975 ^a	0.065 ^a	0.001 ^a	0.003 ^a
3. Strong	2	0.972 ^a	0.065 ^a	0.003 ^a	0.000 ^a
4. Strict	3	0.964 ^a	0.068 ^a	0.008 ^a	0.003 ^a
Perceived health (poor/fair vs. good/very good/excellent)					
1. Configural	—	0.976 ^a	0.067 ^a	—	—
2. Weak	1	0.973 ^a	0.067 ^a	0.002 ^a	0.001 ^a
3. Strong	2	0.971 ^a	0.066 ^a	0.002 ^a	0.001 ^a
4. Strict	3	0.967 ^a	0.066 ^a	0.004 ^a	0.000 ^a
Comorbidity (present vs. absent)					
1. Configural	—	0.972 ^a	0.072 ^a	—	—
2. Weak	1	0.972 ^a	0.069 ^a	0.001 ^a	0.003 ^a
3. Strong	2	0.972 ^a	0.065 ^a	0.000 ^a	0.004 ^a
4. Strict	3	0.971 ^a	0.061 ^a	0.001 ^a	0.004 ^a
Multimorbidity (present vs. absent)					
1. Configural	—	0.969 ^a	0.076 ^a	—	—
2. Weak	1	0.969 ^a	0.072 ^a	0.000 ^a	0.004 ^a
3. Strong	2	0.968 ^a	0.069 ^a	0.001 ^a	0.003 ^a
4. Strict	3	0.968 ^a	0.065 ^a	0.001 ^a	0.004 ^a
Metastases (present vs. absent) ^b					
1. Configural	—	0.968 ^a	0.076 ^a	—	—
2. Weak	1	0.967 ^a	0.074 ^a	0.002 ^a	0.002 ^a
3. Strong	2	0.966 ^a	0.071 ^a	0.000 ^a	0.003 ^a
4. Strict	3	0.965 ^a	0.067 ^a	0.001 ^a	0.004 ^a
State Palliative Care grade (A/B vs. C/D)					
1. Configural	—	0.975 ^a	0.068 ^a	—	—
2. Weak	1	0.976 ^a	0.063 ^a	0.001 ^a	0.005 ^a
3. Strong	2	0.975 ^a	0.061 ^a	0.001 ^a	0.002 ^a
4. Strict	3	0.974 ^a	0.058 ^a	0.001 ^a	0.003 ^a

PCAS = Palliative Care Attitudes Scale; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; Δ CFI = change in CFI between the present model and its reference model; Δ RMSEA = change in RMSEA between the present model and its reference model; Configural = a configural invariance model where the factor structure (number of factors and items, and which factor each item loads on) is fixed to be equivalent across groups; Weak = a weak invariance model where each corresponding factor loading is fixed to be equivalent across groups; Strong = a strong invariance model where each corresponding item mean is fixed to be equivalent across groups; Strict = a strict invariance model where each corresponding error variance is fixed to be equivalent across groups.

^aAcceptable model fit using existing guidelines.^{3–5}

^bSamples 1 and 2 only, $N = 1095$.

Appendix Table 9
Interpretations of PCAS Scores

Description	Total		Emotional		Cognitive		Behavioral	
	Score	%	Score	%	Score	%	Score	%
Opposed	9–29	3.7	3–9	16.9	3–9	6.1	3–9	4.4
Skeptical	30–43	36.6	10–13	33.4	10–14	35.8	10–14	23.8
Optimistic	44–52	44.0	14–16	34.6	15–17	33.4	15–18	42.9
Favoring	53–60	16.1	17–18	15.2	18–21	18.1	19–21	38.2

PCAS = Palliative Care Attitudes Scale.

References

1. Friedman B, Conwell Y, Delavan RL. Correlates of late-life major depression: a comparison of urban and rural primary care patients. *Am J Geriatr Psychiatry* 2007;15:28–41.
2. Morrison RS, Meier D, Dumanovsky T, et al. America's Care of Serious Illness 2015 State-by-State Report Card on Access to Palliative Care in Our Nation's Hospitals. New York: Center to Advance Palliative Care, 2015.
3. Chen FF. Sensitivity of goodness of fit indexes to lack of measurement invariance. *Struct Equation Model* 2007;14: 464–504.
4. Cheung GW, Rensvold RB. Evaluating goodness-of-fit indexes for testing measurement invariance. *Struct Equation Model* 2002;9:233–255.
5. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *Methods Psychol Res Online* 2003;8:23–74.