



Published in final edited form as:

Arch Intern Med. 2012 August 13; 172(15): 1133–1142. doi:10.1001/archinternmed.2012.2364.

Factors Important to Patients' Quality-of-Life at the End-of-Life

Baohui Zhang, MS¹, Matthew E Nilsson, BS¹, and Holly G. Prigerson, PhD^{1,2,3}

¹Center for Psycho-Oncology and Palliative Care Research, Dana-Farber Cancer Institute, Boston, MA 02115, USA

²Department of Medical Oncology, Division of Population Sciences, Dana-Farber Cancer Institute, Boston, MA 02115, USA

³Department of Psychiatry, Brigham and Women's Hospital, Harvard Medical School, Boston, MA 02115, USA

Abstract

Context—When curative treatments are no longer options for dying cancer patients, the focus of care often turns from prolonging life to promoting quality-of-life (QOL). Limited data exist on what predicts better QOL at the end-of-life (EOL) for advanced cancer patients.

Objective—To determine the factors that most influence QOL at the EOL, thereby, identifying promising targets for interventions to promote EOL QOL.

Design, Setting, Participants—Coping with Cancer (CwC1) is a US multi-site, prospective, longitudinal cohort study of advanced cancer patients (n=396 patients) and their informal caregivers, who were enrolled between September 2002 and February 2008. Patients were followed from enrollment to death a median of 4.1 months later.

Main Outcome Measure—Patient QOL in the last week of life was the primary outcome of both CwC1 and the present report.

Results—The following set of 9 factors, preceded by a sign indicating the direction of the effect and presented in rank-order of importance, explained the most variance in patients' EOL QOL: #1=(−) ICU stays in the final week (explained 4.40% of the variance in EOL QOL), #2 = (−) hospital deaths (2.70%), #3 = (−) patient worry at baseline (2.70%), #4 = (+) religious prayer or meditation at baseline (2.50%), #5 = site of cancer care (1.80%), #6 = (−) feeding-tube use in the final week (1.10%), #7 = (+) pastoral care within the hospital/clinic (1.10%), #8 = (−) chemotherapy in the final week (0.90%), and #9 = (+) patient-physician therapeutic alliance (0.70%) at baseline. Most of the variance in EOL QOL, however, remained unexplained (82.3%).

Conclusions—Advanced cancer patients who avoid hospitalizations and intensive care, who are not worried, who pray or meditate, who are visited by a pastor in the hospital/clinic, and who feel a therapeutic alliance with their physicians have the highest QOL at the EOL.

Keywords

cancer; quality-of-life; end-of-life

Corresponding Author: Holly G. Prigerson, PhD, Department of Medical Oncology, Division of Population Sciences, and the Center for Psycho-Oncology and Palliative Care Research, Dana-Farber Cancer Institute, Dana 1134, 450 Brookline Avenue, Boston, MA 02215. Phone: (617) 632-2369, Fax: (617) 632-3161, holly_prigerson@dfci.harvard.edu.

Disclosure: None of the authors have relationships with any entities having financial interest in this topic.

When curative treatments are no longer options for dying cancer patients, the focus of care often turns from prolonging life to promoting quality-of-life (QOL).¹ In 1997 the Institute of Medicine issued a report on improving care at the end-of-life (EOL).² The report stated that in order to ensure better care at the EOL, researchers needed to fill gaps in knowledge about the EOL. One gap has been data on the strongest predictors of higher QOL at the EOL. Data exist on what factors are considered important at the EOL by clinicians, patients and family members³ and the factors that predict the quality of EOL care.⁴ Limited data exist on what predicts better QOL at the EOL for advanced cancer patients.⁵⁻⁹ There has not yet been a comprehensive model of the strongest predictors of QOL at the EOL for cancer patients.

Research has identified factors important to higher quality EOL care, including adequate pain and symptom management, effective patient-physician communication and a strong therapeutic alliance, physicians' responsiveness to patients' treatment preferences, and care that enables patients to attain a sense of life completion.^{3, 10-20} Although these studies note factors that clinicians, patients and caregivers consider important to patient QOL and care, they have not been designed to determine prospectively the most influential set of factors that predict EOL QOL. By establishing empirically the strongest set of predictors of QOL at the EOL for terminally ill advanced cancer patients, we can guide clinicians, patients and family members in focusing on what matters most for ensuring a high QOL for dying cancer patients.

Coping with Cancer (CwC1) is a prospective, multi-institutional study of advanced cancer patients and their caregivers. CwC1 was designed to examine the impact of mental and physical health and health service use, patient-doctor relationships, patient and caregiver coping, social support, spirituality and other relevant psychosocial factors on 2 primary patient outcomes: 1) the care patients receive at the EOL and 2) their EOL QOL. Previous CwC1 reports have examined EOL QOL as it relates to the intensity of care provided and family dynamics. For example, we have shown that higher EOL QOL is associated with longer hospice stays,⁶ and lower QOL at the EOL is associated with more life-prolonging care in the last week of life,⁶ having a dependent child in the home,⁷ and dying in a hospital, particularly in the ICU.⁸ Patients' peaceful awareness of their terminal illness^{21, 22} and pastoral care visits in the hospital²³ have also been shown to relate positively to EOL QOL. Nevertheless, no study has simultaneously examined a wide variety of aspects of the advanced cancer patients' experience, from medical care received to social and spiritual support, to determine the set of predictors that best accounts for EOL QOL.

The aim of this study is to derive parsimonious models of the set of factors that have the greatest influence on EOL QOL. Based on our conceptual model of determinants of EOL outcomes,²⁴ we posit that in addition to the negative effects of intensive life-prolonging care, modifiable psychosocial factors will be of paramount importance. Specifically, we hypothesize that the therapeutic alliance between patients and their physicians, patients' and caregivers' mental health, and support of patients' spiritual needs will be the most significant modifiable contributors to higher EOL QOL.

METHODS

Study Sample

Patients were recruited between September 1st, 2002, and February 28th, 2008, as part of the federally-funded CwC1 study. Participating sites included Yale Cancer Center (New Haven, Connecticut), Veterans Affairs Connecticut Healthcare Systems Comprehensive Cancer Clinics (West Haven, Connecticut), the Parkland Hospital and Simmons Comprehensive Cancer Center (Dallas, Texas), Massachusetts General Hospital and Dana-Farber Cancer Institute (Boston, Massachusetts), and New Hampshire Oncology-Hematology (Hooksett,

New Hampshire). Trained interviewers assessed patients and caregivers at baseline and clinicians and caregivers completed the postmortem evaluations. All study protocol and contact documents were approved by the human subjects committee at each participating institution.

Eligibility criteria included: 1) presence of distant metastases, disease refractory to 1st-line chemotherapy, and oncologist estimate of life expectancy < 6 months; 2) age ≥ 20 years; 3) identified unpaid, informal caregiver; 4) clinic staff and interviewer assessment that the patient had adequate stamina. Patient-caregiver dyads in which either person met criteria for significant cognitive impairment²⁵ or did not speak either English or Spanish were excluded. Potentially eligible patients were identified from medical records and their eligibility confirmed by their clinicians. Trained research staff approached each identified patient to offer participation in the study. Once the patient's written informed consent was obtained, medical records and clinicians were consulted to confirm eligibility.

Of the 1015 patients approached for participation and confirmed eligible, 289 (30%) declined participation. Reasons for non-participation included "not interested" (N=120), "caregiver refuses" (N=37), and "too upset" (N=20). Non-participants reported significantly more distress on a scale where ranged 1="minimal/nonexistent" to 5="distracted" (mean score of 2.72 vs. 2.34, $p<0.0001$) than participants. Latinos were more likely to participate than other ethnic groups (12.5% vs. 5.6%, $p=0.002$). Non-participants did not differ significantly from participants in gender, age, or education. Of the 726 patients who completed the baseline survey, 414 patients died at the time of data analysis and had postmortem assessments. This cohort did not differ significantly ($p<0.05$) by cancer type, psychological distress, or rates of psychiatric disorders to the study participants at large. However, the deceased cohort had worse baseline QOL, symptom burden, and performance status as would be expected in patients closer to death.

Protocol and Measures

Baseline interviews were conducted in English or Spanish and took approximately 45 minutes to complete. Patients and caregivers received \$25 as compensation for completing the interview.

In the baseline interview, both patients and caregivers reported their socio-demographic characteristics, including age, gender, race/ethnicity, family structure, religious faith, education (years schooling), family income ($< \$1,000$ vs $< \$31,000$), and health insurance coverage. Diagnostic information from the patient's medical chart and clinic was recorded. Self-efficacy,²⁶ coping styles,^{27, 28} religious coping,^{29, 30} religiousness/spirituality,³¹ and preferences regarding EOL care³² were assessed in patients and caregivers. Patients were asked if they had completed a do-not-resuscitate order (DNR) and if they discussed their EOL care preferences with their physician. Patients were asked about pastoral care visits in the clinic or hospital²³ and their use of mental health services.³³ Structured Clinical Interview for the DSM-IV (SCID) Axis I Modules³⁴ were administered by trained interviewers to diagnose current Major Depressive Disorder (MDD), Generalized Anxiety Disorder (GAD), Post-Traumatic Stress Disorder (PTSD) and Panic Disorder (PD) among patients and caregivers. The SCID has proven reliability and validity.³⁵ Patients completed validated assessments of doctor-patient relationships.²⁰ Therapeutic alliance was coded equal to 1 when patient reported that the doctor sees him/her as a whole person, being treated with respect, respecting and trusting the doctor and feeling comfortable asking the doctor questions about healthcare.^{6, 20} Caregivers completed established measures of social support.³⁶ Patients' performance status and co-morbid medical conditions were assessed with the Karnofsky scale³⁷ and the Charlson Co-morbidity Index.³⁸ The McGill Quality of Life Index's physical and psychological functioning (e.g., how nervous or worried the

patient felt in the last 2 days where 0=not at all and 10=extremely), symptom burden, and social support subscales were administered to the patient (coded so higher scores reflected better QOL).³⁹ Patients' peacefulness was assessed from an item from the NIA/Fetzer Multidimensional Measure of Religiousness/Spirituality.³¹ Patients were asked to describe their current health status; response options were "relatively healthy," "relatively healthy but terminally ill," "seriously but not terminally ill," and "seriously and terminally ill." Patients who described themselves as "terminally ill" were coded as acknowledging their terminal illness.

Healthcare received in the last week of life was obtained in the postmortem assessment completed by the patient's formal (49.0%) or informal caregiver (51.0%) 2–3 weeks after the death. These retrospective assessments recorded the location of the patient's death, the types of care received in the last week of life, the patient's QOL at the EOL and whether the patient was enrolled in inpatient or outpatient hospice and the length of hospice enrollment. The postmortem assessment contained the following questions regarding QOL at the EOL, "Just prior to the death of the patient (his/her last week, or when you last saw the patient), how would you rate his/her level of psychological distress?" (0–10 with 0 = "none" and 10 = "extremely upset"), "Just prior to the death of the patient (his/her last week, or when you last saw the patient), how would you rate his/her level of physical distress?" (0–10 with 0 = "none" and 10 = "extremely distressed"), "How would you rate the patient's overall quality of life in the last week of life/death?" (0–10 with 0 = "worst possible" and 10 = the "best possible"). The sum of the three questions was our primary outcome measure. At baseline, caregivers completed the McGill QOL measure for the patient; this score was significantly ($p < .0007$) associated with the patient's self-reported McGill QOL scores, suggesting caregivers were capable of evaluating the QOL of the patient for whom they cared.

Statistical Methods

Random effects modeling⁴⁰ was used to examine the univariate and multivariate associations between the potential predictors and EOL QOL, treating recruitment site as a random effect. Univariate analyses determined if patients' QOL in the last week differed significantly by patient and caregiver background characteristics and the hypothesized set of predictors. Variables significant at p -value < 0.2 in the univariate analyses were entered into the multivariate random effects models.

Cross-Validation (CV)⁴¹ provides a way to measure the predictive performance of a statistical model. One way to measure the predictive ability of a model is to test it on a set of data not used in the estimation. The data used to test for the model's predictive ability are called the "test sets" and the data used for model estimation are called the "training sets". The predictive accuracy of a model can be measured by a CV statistic (e.g. mean squared error (MSE)) for the test set. Minimizing the CV statistic is a recommended⁴¹ method of model selection. Based upon the sample size ($N=396$), 9-fold CV model selection was used to determine the best model predicting EOL QOL. The study sample was randomly partitioned into 9 sub-samples, 8 of them used as the "training set" and the other one as the "test set". The process was repeated 9 times and the 9 results were then averaged to produce a single estimate, the average MSE. The advantage of this method is that all observations are used for both training and validation, and each observation is used for validation exactly once.

In each "training set", backward model selection was used to generate the best model fitting the training dataset and then the 9 best models were compared to select the final model with the lowest average MSE of the "test set". SAS 9.2 was the statistical software used for the analyses.

RESULTS

Sample Characteristics

Unadjusted Analyses—Characteristics of the 396 patients who enrolled with no missing site information, died and had their postmortem data collected revealed that patients were predominately white (65.0%), Christian (71.3%), insured (60.8%), almost half were high school educated (52.4%). Their mean age was 58.7 years (SD=12.5). Patients survived a median of 125 days from baseline. Patients closer to death and younger patients had worse EOL QOL. Caregivers' better overall health was associated with patients' better EOL QOL. Informal caregivers (family) rated the QOL of patients marginally significantly worse than did formal (professional/clinical) caregivers (Table 1).

In the analyses of our conceptual model's potential predictors of EOL QOL using random effects models (Table 2), patients with MDD, PTSD, PD and being worried at baseline had significantly worse EOL QOL whereas those with a sense of inner peacefulness at baseline had much better EOL QOL. Caregiver's PD was associated with worse patient's EOL QOL.

Patients who reported having received pastoral care services within the clinic or hospital had better QOL. Those whose religious beliefs or activities help them cope with their illness and who participate in private religious activities before their cancer diagnosis and at baseline had much better EOL QOL. Analyses of doctor-patient relationships revealed a significant positive effect for patients who had therapeutic alliance.

Receipt of any life-prolonging procedure in the last week and an ICU stay predicted significantly worse QOL. Deaths in the ICU and hospital were associated with significantly worse QOL whereas death at home was associated with significantly better QOL at the EOL.

Adjusted Analyses: Comprehensive Models using Cross Validation Model

Selection—Table 3 includes the best models identified in each of the nine training sets and the average MSE values using all of the 9 training sets and the 9 test sets. The 2nd model had the lowest average MSE values for both training sets (average MSE=49.93) and test sets (average MSE=38.36) and, therefore, was selected as the final model.

Table 4a displays the estimation parameters in the best model identified in one training set (N=352). The model included patient's receipt of pastoral care services within the clinic or hospital, therapeutic alliance, ICU stay, hospital death, patient's participation in private religious activities before the cancer diagnosis, patient being worried and chemotherapy and feeding tube in the last week of life. Because of the significant amount of missing data associated with the variables of informal caregiver as the source of the postmortem assessment (N=311) and survival time (N=310), these 2 variables were not included in the adjusted analyses. However, sensitivity analyses were performed to examine the impact of controlling for these 2 variables. When these 2 variables were included, all of the variables remained significant at p-value<0.05 except for therapeutic alliance (p-value=0.11), informal caregiver (p-value=0.32) and survival (p-value=0.26) as shown in Table 4b. Table 4c presented the results applying the final model to the full study sample where receiving pastoral care services and therapeutic alliance were borderline significant while other predictors remained significant at p-value<0.05.

The MSE for the best overall model was 51.40 with 17.7% of the variance explained by the predictors included in the final model estimated using the full study sample. Figure 1 illustrates the percentage of variance explained by each predictor. The residuals account for the majority of the total variance, followed by an ICU stay, hospital death, worried patients,

random effects of site, pastoral care services reported at baseline, chemotherapy in the last week of life and therapeutic alliance (Table 5).

COMMENT

The aim of this study was to identify the best set of predictors of QOL of patients in their final week of life. By doing so, we advance understanding of important determinants of patients' EOL QOL and, thereby, identify promising targets for healthcare interventions to improve the QOL of dying patients.

The final model showed that providers with this aim should strive to reduce intensive life-prolonging care. Two of the most important determinants of poor patient EOL QOL were dying in a hospital and ICU stays in the last week of life. Therefore, attempts to avoid costly⁹ hospital admissions and encouraging transfer of hospitalized patients to home or hospice might improve patient EOL QOL. Because chemotherapy and feeding tube use also appeared in the final model, results suggest that limiting these types of aggressive EOL care may be an effective strategy to enhance EOL QOL.

The best model also demonstrated that patient worry at baseline was one of the most influential predictors of worse EOL QOL. These results highlight the reduction of patient anxiety as a top priority for care aimed at enhancing EOL QOL. Patients who reported engaging in religious prayer or meditation had better EOL QOL. Pastoral care services within the clinic or hospital were significantly associated with better EOL QOL. These findings are consistent with other studies that have shown significant associations between spirituality and peacefulness and QOL in patients with life threatening diseases.^{42, 43} Evidently, terminally ill patients who participate in religious/spiritual activities both privately and within the medical setting have better QOL near death than those who do not.

The best model in the training set found therapeutic alliance to be among the most important predictors of patient EOL QOL. Therapeutic alliance included measures of patients feeling treated with respect and as a "whole person" by their doctor, trusting and respecting their doctor and feeling comfortable asking their doctor questions about their care. When "survival" and "informal caregiver reporting of EOL QOL" were forced into the final model for conceptual reasons, the sample size dropped, and therapeutic alliance became marginally statistically significant. Although therapeutic alliance may be one of the weaker predictors it, nevertheless, was among the top 9 factors predicting EOL QOL. These results suggest that physicians able to remain engaged and "present" for their dying patients by inviting and answering questions and treating patients in a way that makes them feel that they matter as fellow human beings, have the capacity to improve a dying patient's QOL.

As is always the case, this study is constrained by the data available. Even the best models explained less than 20% of the variance in EOL QOL leaving much to learn about other influences on this outcome. There are, undeniably, many unmeasured factors (e.g., provider and hospital characteristics) that contribute importantly to QOL. Future research with assessments of hospital (e.g., number of ICU beds, number of clinical trials) and provider (e.g., communication and treatment styles) characteristics and more comprehensive, prospective, repeated measures, particularly of therapeutic alliance and QOL, is needed.

Taken together, these results indicate that when medicine is no longer able to cure, physicians may still positively and significantly influence the lives of their patients. By reducing patient worry, encouraging contemplation, integrating pastoral care within medical care, fostering a therapeutic alliance between patient and physician that enables patients to feel dignified,⁴⁴ and by preventing unnecessary hospitalizations and receipt of life-

prolonging care, clinicians can enable their patients to live their last days with the highest possible level of comfort and care.

Acknowledgments

This research was supported in part by the following grants to Dr. Prigerson: MH63892 from the National Institute of Mental Health and CA 106370 and CA 156732 from the National Cancer Institute; and the Center for Psycho-Oncology and Palliative Care Research, Dana-Farber Cancer Institute.

References

1. Peppercorn JM, Smith TJ, Helft PR, et al. Toward individualized care for patients with advanced cancer. *J Clin Oncol*. 2011; 29(6):755–60.
2. Institute of Medicine. *Approaching Death: Improving Care at the End of Life*. Washington DC: National Academy Press; 1997.
3. Steinhauser KE, Christakis NA, Clipp EC, et al. Factors considered important at the end of life by patients, family, physicians, and other care providers. *JAMA*. 2000; 284(19):2476–82.
4. The SUPPORT Principal Investigators. A controlled trial to improve care for seriously ill hospitalized patients. The study to understand prognoses and preferences for outcomes and risks of treatments (SUPPORT). The SUPPORT Principal Investigators. *JAMA*. 1995; 274(20):1591–8.
5. Balboni TA, Vanderwerker LC, Block SD, et al. Religiousness and spiritual support among advanced cancer patients and associations with end-of-life treatment preferences and quality of life. *J Clin Oncol*. 2007; 25(5):555–60. [PubMed: 17290065]
6. Wright AA, Zhang B, Ray A, et al. Associations between end-of-life discussions, patient mental health, medical care near death, and caregiver bereavement adjustment. *JAMA*. 2008; 300(14):1665–73.
7. Nilsson ME, Maciejewski PK, Zhang B, et al. Mental health, treatment preferences, advance care planning, location, and quality of death in advanced cancer patients with dependent children. *Cancer*. 2009; 115(2):399–409.
8. Wright AA, Keating NL, Balboni TA, et al. Place of death: correlations with quality of life of patients with cancer and predictors of bereaved caregivers' mental health. *J Clin Oncol*. 2010; 28(29):4457–64.
9. Zhang B, Wright AA, Huskamp HA, et al. Health care costs in the last week of life: associations with end-of-life conversations. *Arch Intern Med*. 2009; 169(5):480–8.
10. Tulskey JA, Chesney MA, Lo B. How do medical residents discuss resuscitation with patients? *J Gen Intern Med*. 1995; 10(8):436–42. [PubMed: 7472700]
11. Maguire P, Faulkner A, Booth K, et al. Helping cancer patients disclose their concerns. *Eur J Cancer*. 1996; 32A(1):78–81. [PubMed: 8695247]
12. Quill TE. Perspectives on care at the close of life. Initiating end-of-life discussions with seriously ill patients: addressing the “elephant in the room”. *JAMA*. 2000; 284:2502–7. [PubMed: 11074781]
13. Payne SA, Langley-Evans A, Hillier R. Perceptions of a ‘good’ death: a comparative study of the views of hospice staff and patients. *Palliat Med*. 1996; 10(4):307–12. [PubMed: 8931066]
14. Steinhauser KE, Clipp EC, McNeilly M, et al. In search of a good death: observations of patients, families, and providers. *Ann Intern Med*. 2000; 132(10):825–32. [PubMed: 10819707]
15. Curtis JR, Patrick DL, Engelberg RA, et al. A measure of the quality of dying and death. Initial validation using after-death interviews with family members. *J Pain Symptom Manage*. 2002; 24(1):17–31. [PubMed: 12183092]
16. Patrick DL, Curtis JR, Engelberg RA, et al. Measuring and improving the quality of dying and death. *Ann Intern Med*. 2003; 139(5 Pt 2):410–5. [PubMed: 12965967]
17. Pierson CM, Curtis JR, Patrick DL. A good death: a qualitative study of patients with advanced AIDS. *AIDS Care*. 2002; 14(5):587–98. [PubMed: 12419108]
18. Vig EK, Pearlman RA. Good and bad dying from the perspective of terminally ill men. *Arch Intern Med*. 2004; 164(9):977–81. [PubMed: 15136306]

19. Hales S, Zimmermann C, Rodin G. The quality of dying and death. *Arch Intern Med.* 2008; 168(9):912–8. [PubMed: 18474754]
20. Mack JW, Block SD, Nilsson M, Wright A, Trice E, Friedlander R, Paulk E, Prigerson HG. Measuring therapeutic alliance between oncologists and patients with advanced cancer: the Human Connection Scale. *Cancer.* 2009; 115(14):3302–11. [PubMed: 19484795]
21. Ray A, Block SD, Friedlander RJ, Zhang B, Maciejewski PK, Prigerson HG. Peaceful awareness in patients with advanced cancer. *J Palliat Med.* 2006; 9(6):1359–68. [PubMed: 17187544]
22. Mack JW, Nilsson M, Balboni T, Friedlander RJ, Block SD, Trice E, Prigerson HG. Peace, Equanimity, and Acceptance in the Cancer Experience (PEACE): validation of a scale to assess acceptance and struggle with terminal illness. *Cancer.* 2008; 112(11):2509–17. [PubMed: 18429006]
23. Balboni TA, Paulk ME, Balboni MJ, Phelps AC, Loggers ET, Wright AA, Block SD, Lewis EF, Peteet JR, Prigerson HG. Provision of spiritual care to patients with advanced cancer: associations with medical care and quality of life near death. *J Clin Oncol.* 2010 Jan 20; 28(3):445–52. [PubMed: 20008625]
24. Prigerson HG, Maciejewski PK. Dartmouth Atlas: putting end-of-life care on the map but missing psychosocial detail. *J Support Oncol.* 2012; 10(1):25–8. [PubMed: 22005216]
25. Pfeiffer E. A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *J Am Geriatr Soc.* 1975; 23 (10):433–441. [PubMed: 1159263]
26. Schwarzer, R.; Jerusalem, M. Generalized Self-Efficacy scale. In: Weinman, J.; Wright, S.; Johnston, M., editors. *Measures in health psychology: A user's portfolio. Causal and control beliefs.* Windsor, UK: NFER-NELSON; 1995. p. 35-7.
27. Carver CS. You want to measure coping but your protocol's too long: consider the brief COPE. *Int J Behavioral Medicine.* 1997; 4(1):92–100.
28. Carver CS, Scheier MF, Weintraub JK. Assessing coping strategies: a theoretically based approach. *J Pers Soc Psychology.* 1989; 56(2):267–283.
29. Pargament KI, Koenig HG, Perez LM. The many methods of religious coping: development and initial validation of the RCOPE. *J Clin Psychol.* 2000; 56(4):519–543. [PubMed: 10775045]
30. Phelps AC, Maciejewski PK, Nilsson M, Balboni TA, Wright AA, Paulk ME, Trice E, Schrag D, Peteet JR, Block SD, Prigerson HG. Religious coping and use of intensive life-prolonging care near death in patients with advanced cancer. *JAMA.* 2009; 301(11):1140–7. [PubMed: 19293414]
31. NIA/Fetzer. Multidimensional Measure of Religiousness/Spirituality for Use in Health Research: A Report of the Fetzer/National Institute on Aging Working Group. 1999. http://www.fetzer.org/Resources/TITLE_TOC.pdf
32. Weeks JC, Cook EF, O'Day SJ, et al. Relationship between cancer patients' predictions of prognosis and their treatment preferences. *JAMA.* 1998; 279(21):1709–1714. [PubMed: 9624023]
33. Lichtenthal WG, Nilsson M, Kissane DW, Breitbart W, Kacel E, Jones EC, Prigerson HG. Underutilization of mental health services among bereaved caregivers with prolonged grief disorder. *Psychiatr Serv.* 2011; 62(10):1225–9. [PubMed: 21969652]
34. First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. *Structured Clinical Interview for the DSM-IV Axis I Disorders – Patient Edition (SCID-I/P) version 2.0.* New York: New York State Psychiatric Institute; 1995.
35. Williams JB, Gibbon M, First MB, et al. The Structured Clinical Interview for DSM-III-R (SCID). Multisite test-retest reliability. *Arch Gen Psychiatry.* 1992; 49(8):630–6. [PubMed: 1637253]
36. Cohen S, Hoberman H. Positive events and social supports as buffers of life change stress. *J Applied Social Psychology.* 1983; 13(2):99–125.
37. Karnofsky D, Abelmann W, Craver L, Burchenal J. The use of nitrogen mustard in the palliative treatment of cancer. *Cancer.* 1948; 1(4):634–656.
38. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis.* 1987; 40(5):373–383. [PubMed: 3558716]
39. Cohen SR, Mount BM, Bruera E, Provost M, Rowe J, Tong K. Validity of the McGill Quality of Life Questionnaire in the palliative care setting: a multi-centre Canadian study demonstrating the importance of the existential domain. *Palliat Med.* 1997; 11(1):3–20. [PubMed: 9068681]

40. Laird NM, JH. Random-effects models for longitudinal data. *Biometrics*. 1982; 38(4):963–974. [PubMed: 7168798]
41. Shao J. Linear model selection by cross-validation. *Journal of the American Statistical Association*. 1993; 88(422):486–94.
42. Büsing A, Matthiessen PF, Ostermann T. Engagement of patients in religious and spiritual practices: confirmatory results with the SpREUK-P 1.1 questionnaire as a tool of quality of life research. *Health Qual Life Outcomes*. 2005; 3:53. [PubMed: 16144546]
43. Atef-Vahid MK, Nasr-Esfahani M, Esfeedvajani MS, Naji-Isfahani H. Quality of life, religious attitude and cancer coping in a sample of Iranian patients with cancer. *J Res Med Sci*. 2011; 16(7): 928–37. [PubMed: 22279462]
44. Chochinov HM, Kristjanson LJ, Breitbart W, McClement S, Hack TF, Hassard T, Harlos M. Effect of dignity therapy on distress and end-of-life experience in terminally ill patients: a randomised controlled trial. *Lancet Oncol*. 2011; 12(8):753–62. [PubMed: 21741309]

Table 1
Correlation of Quality of Life with Patient and Caregiver Baseline Characteristics

| Binary Predictors | Full Sample (N=396) | Frequency % (n/N) | Quality of Death Mean±SD (N) | | Unadjusted Analyses | |
|---------------------------------------|---------------------|-------------------|------------------------------|-------------------------|---------------------|---------|
| | | | Predictors=Yes | Predictors=No | F Value | p-value |
| <i>Patient Characteristics</i> | | | | | | |
| Male | 389 (98.2%) | 55.5% (216/389) | 18.52±7.92 (216, 55.5%) | 19.49±7.88 (173, 44.5%) | 1.4341 | 0.2318 |
| Income | 228 (57.6%) | 50.0% (114/228) | 18.07±8.15 (114, 50.0%) | 19.37±7.85 (114, 50.0%) | 1.5156 | 0.2196 |
| Married | 384 (97.0%) | 61.7% (237/384) | 18.59±8.08 (237, 61.7%) | 19.39±7.51 (147, 38.3%) | 0.9465 | 0.3312 |
| Insurance | 380 (96.0%) | 60.8% (231/380) | 18.63±8.15 (231, 60.8%) | 19.38±7.59 (149, 39.2%) | 0.7993 | 0.3719 |
| <i>Race</i> | | | | | | |
| White | 389 (98.2%) | 65.0% (253/389) | 18.63±8.15 (253, 65.0%) | 19.54±7.43 (136, 35.0%) | 1.1833 | 0.2774 |
| Black | 389 (98.2%) | 18.0% (70/389) | 19.66±7.68 (70, 18.0%) | 18.80±7.96 (319, 82.0%) | 0.6839 | 0.4088 |
| Hispanic | 389 (98.2%) | 15.2% (59/389) | 19.64±7.22 (59, 15.2%) | 18.83±8.02 (330, 84.8%) | 0.5365 | 0.4643 |
| Asian | 389 (98.2%) | 1.0% (4/389) | 16.00±8.12 (4, 1.0%) | 18.98±7.91 (385, 99.0%) | 0.5669 | 0.4520 |
| <i>Religion</i> | | | | | | |
| Catholic | 389 (98.2%) | 37.3% (145/389) | 18.17±7.98 (145, 37.3%) | 19.41±7.84 (244, 62.7%) | 2.2625 | 0.1334 |
| Protestant | 389 (98.2%) | 17.0% (66/389) | 19.85±7.77 (66, 17.0%) | 18.77±7.93 (323, 83.0%) | 1.0927 | 0.2965 |
| Jewish | 389 (98.2%) | 4.6% (18/389) | 18.39±9.00 (18, 4.6%) | 18.98±7.86 (371, 95.4%) | 0.0968 | 0.7559 |
| Muslim | 389 (98.2%) | 1.0% (4/389) | 20.75±9.64 (4, 1.0%) | 18.93±7.90 (385, 99.0%) | 0.2093 | 0.6476 |
| No Religion | 389 (98.2%) | 4.9% (19/389) | 17.00±6.95 (19, 4.9%) | 19.05±7.95 (370, 95.1%) | 1.2234 | 0.2694 |
| Pentecostal | 389 (98.2%) | 2.3% (9/389) | 18.78±7.64 (9, 2.3%) | 18.96±7.92 (380, 97.7%) | 0.0057 | 0.9397 |
| Baptist | 389 (98.2%) | 14.7% (57/389) | 19.89±7.75 (57, 14.7%) | 18.79±7.93 (332, 85.3%) | 0.9565 | 0.3287 |
| <i>Recruitment Site</i> | | | | | | |
| Yale Cancer Center | 396 (100.0%) | 20.7% (82/396) | 19.55±8.66 (82, 20.7%) | 18.83±7.70 (314, 79.3%) | 0.5333 | 0.4657 |
| Veterans Affairs CCC | 396 (100.0%) | 4.8% (19/396) | 19.63±7.08 (19, 4.8%) | 18.95±7.95 (377, 95.2%) | 0.1351 | 0.7134 |
| Simmons Center | 396 (100.0%) | 8.6% (34/396) | 17.91±7.71 (34, 8.6%) | 19.08±7.92 (362, 91.4%) | 0.6853 | 0.4083 |
| Parkland Hospital | 396 (100.0%) | 0.0% (0/396) | 19.43±7.62 (156, 39.4%) | 18.69±8.09 (240, 60.6%) | 0.8277 | 0.3635 |
| Dana Farber and Massachusetts General | 396 (100.0%) | 39.4% (156/396) | 20.13±5.51 (8, 2.0%) | 18.96±7.95 (388, 98.0%) | 0.1712 | 0.6793 |
| New Hampshire Oncology | 396 (100.0%) | 2.0% (8/396) | 17.41±7.80 (70, 17.7%) | 19.32±7.90 (326, 82.3%) | 3.384 | 0.0666 |
| <i>Hematology Cancer Type</i> | | | | | | |

| Binary Predictors | Full Sample (N=396) | Frequency % (n/N) | Quality of Death Mean±SD (N) | | Unadjusted Analyses | |
|----------------------------------|---------------------|-------------------|------------------------------|-------------------------|---------------------|---------|
| | | | Predictors=Yes | Predictors=No | F Value | p-value |
| Lung | 382 (96.5%) | 21.7% (83/382) | 18.40±8.80 (83, 21.7%) | 19.08±7.70 (299, 78.3%) | 0.4816 | 0.4881 |
| Pancreatic | 382 (96.5%) | 9.4% (36/382) | 18.81±8.37 (36, 9.4%) | 18.95±7.91 (346, 90.6%) | 0.0101 | 0.9201 |
| Gallbladder | 382 (96.5%) | 2.1% (8/382) | 23.63±4.66 (8, 2.1%) | 18.83±7.97 (374, 97.9%) | 2.8808 | 0.0905 |
| Colon | 382 (96.5%) | 12.8% (49/382) | 19.41±7.33 (49, 12.8%) | 18.86±8.04 (333, 87.2%) | 0.2026 | 0.6529 |
| Brain | 382 (96.5%) | 2.1% (8/382) | 16.63±8.73 (8, 2.1%) | 18.98±7.93 (374, 97.9%) | 0.6922 | 0.4060 |
| Stomach | 382 (96.5%) | 3.4% (13/382) | 19.85±8.81 (13, 3.4%) | 18.90±7.92 (369, 96.6%) | 0.1788 | 0.6727 |
| Esophageal | 382 (96.5%) | 2.6% (10/382) | 21.60±7.93 (10, 2.6%) | 18.86±7.94 (372, 97.4%) | 1.1649 | 0.2811 |
| Informal Caregiver | 351 (88.6%) | 51% (179/351) | 18.13±8.45 (179, 51.0%) | 19.76±7.28 (172, 49.0%) | 3.7429 | 0.0539 |
| Caregiver Characteristics | | | | | | |
| Male | 386 (97.5%) | 24.6% (95/386) | 18.51±8.41 (95, 24.6%) | 19.09±7.77 (291, 75.4%) | 0.3953 | 0.5299 |
| Race | | | | | | |
| White | 384 (97.0%) | 63.3% (243/384) | 18.58±8.07 (243, 63.3%) | 19.61±7.69 (141, 36.7%) | 1.5107 | 0.2198 |
| Black | 384 (97.0%) | 18.5% (71/384) | 19.85±7.61 (71, 18.5%) | 18.76±8.01 (313, 81.5%) | 1.0926 | 0.2966 |
| Asian | 384 (97.0%) | 1.3% (5/384) | 13.80±6.14 (5, 1.3%) | 19.03±7.94 (379, 98.7%) | 2.1562 | 0.1428 |
| Hispanic | 384 (97.0%) | 15.1% (58/384) | 19.81±7.36 (58, 15.1%) | 18.81±8.04 (326, 84.9%) | 0.7905 | 0.3745 |
| Religion | | | | | | |
| Catholic | 386 (97.5%) | 38.3% (148/386) | 18.82±7.57 (148, 38.3%) | 19.03±8.15 (238, 61.7%) | 0.0654 | 0.7983 |
| Protestant | 386 (97.5%) | 16.1% (62/386) | 19.52±8.42 (62, 16.1%) | 18.84±7.83 (324, 83.9%) | 0.3809 | 0.5375 |
| Other Religion | 386 (97.5%) | 15.8% (61/386) | 19.00±7.79 (61, 15.8%) | 18.94±7.96 (325, 84.2%) | 0.0031 | 0.9556 |
| No Religion | 386 (97.5%) | 6.5% (25/386) | 17.80±8.12 (25, 6.5%) | 19.03±7.91 (361, 93.5%) | 0.5637 | 0.4532 |
| Baptist | 386 (97.5%) | 15.5% (60/386) | 19.18±7.92 (60, 15.5%) | 18.90±7.93 (326, 84.5%) | 0.0628 | 0.8023 |
| Spirituality | 350 (88.4%) | 64.0% (224/350) | 18.89±7.76 (224, 64.0%) | 18.58±8.12 (126, 36.0%) | 0.1281 | 0.7206 |

| Continuous Predictors | Full Sample (N=396) | Mean±S.D. | Quality of Death Mean±SD | | Unadjusted Analyses | |
|--------------------------------|---------------------|-----------|--------------------------|---------|---------------------|---------|
| | | | F Value | p-value | F Value | p-value |
| Patient Characteristics | | | | | | |
| Age | 389 (98.2%) | 58.7±12.5 | 58.66±12.46 | 5.0788 | 0.0248 | |
| Education | 389 (98.2%) | 12.5±4.1 | 12.53±4.09 | 0.0077 | 0.9299 | |
| Kamofsky Score | 376 (94.9%) | 63.4±18.1 | 63.40±18.14 | 0.1564 | 0.6928 | |
| Zubrod Scale | 384 (97.0%) | 1.7±0.9 | 1.70±0.91 | 0.108 | 0.7427 | |
| Charlson Index | 376 (94.9%) | 8.3±2.7 | 8.34±2.68 | 0.0902 | 0.7641 | |

| Continuous Predictors | Full Sample (N=396) | Mean±S.D. | Quality of Death | Unadjusted Analyses | |
|--|---------------------|--------------|------------------|---------------------|---------|
| | | | | Mean±SD | F Value |
| McGill Subscales | | | | | |
| McGill Physical Subscale | 388 (98.0%) | 5.8±2.6 | 5.76±2.63 | 1.4892 | 0.2231 |
| McGill Symptoms Subscale | 388 (98.0%) | 5.4±2.1 | 5.43±2.15 | 2.8818 | 0.0904 |
| McGill Psychological Subscale | 388 (98.0%) | 7.2±2.5 | 7.21±2.53 | 1.3686 | 0.2428 |
| McGill Support Subscale | 388 (98.0%) | 8.6±1.7 | 8.64±1.67 | 0.2099 | 0.6471 |
| McGill Sum Scale | 388 (98.0%) | 6.8±1.5 | 6.84±1.54 | 3.4817 | 0.0628 |
| Survival Time (Day): median [min, max] | 348 (87.9%) | 125 [1–1020] | 191.2±192.5 | 4.1050 | 0.0435 |
| Caregiver Characteristics | | | | | |
| Age | 386 (97.5%) | 51.6±13.9 | 51.60±13.92 | 0.0016 | 0.9959 |
| MOS Subscales | | | | | |
| Overall Health | 385 (97.2%) | 3.6±1.1 | 3.59±1.12 | 5.0093 | 0.0258 |
| Physical Function Subscale | 384 (97.0%) | 8.8±2.0 | 8.76±2.04 | 1.7447 | 0.1873 |
| Social Function Subscale | 385 (97.2%) | 1.5±0.5 | 1.54±0.55 | 0.1668 | 0.6832 |
| Role Limitation | 383 (96.7%) | 5.5±2.0 | 5.48±2.02 | 0.0004 | 0.9844 |
| Mental Health | 381 (96.2%) | 3.5±1.0 | 3.46±1.04 | 2.4853 | 0.1158 |
| Pain | 385 (97.2%) | 1.6±0.4 | 1.63±0.44 | 0.1207 | 0.7284 |
| Energy | 384 (97.0%) | 2.4±0.9 | 2.36±0.92 | 0.3571 | 0.5505 |
| Health Change from Last Year | 385 (97.2%) | 0.5±0.2 | 0.51±0.18 | 2.3412 | 0.1269 |
| MOS Sum Score | 377 (95.2%) | 27.4±6.3 | 27.36±6.32 | 1.8199 | 0.1781 |

Note: "Predictor=Yes" and "Predictor=No" refers to whether the independent variable was endorsed and the mean and SD for the "Yes" versus the "No" in relation to the QOL dependent variable.

Table 2

Associations between Quality of Life and Potential Predictors

| Binary Predictors | Full Sample (N=396) | Quality of Death Mean±SD (N) | | Unadjusted Analyses | |
|---|---------------------|------------------------------|-------------------------|---------------------|---------|
| | | Predictors=Yes | Predictors=No | F Value | p-value |
| Patient and Caregiver Mental Health | | | | | |
| Patient Lifetime Major Depressive Disorder | 378 (95.5%) | 18.89±8.69 (37, 9.8%) | 19.07±7.78 (341, 90.2%) | 0.0172 | 0.8956 |
| Patient Major Depression Disorder | 379 (95.7%) | 15.92±8.80 (26, 6.9%) | 19.19±7.74 (353, 93.1%) | 4.2605 | 0.0397 |
| Patient Posttraumatic Stress Disorder | 380 (96.0%) | 14.33±8.11 (12, 3.2%) | 19.18±7.81 (368, 96.8%) | 4.4866 | 0.0348 |
| Patient Generalized Anxiety Disorder | 380 (96.0%) | 17.63±6.02 (8, 2.1%) | 19.06±7.89 (372, 97.9%) | 0.2609 | 0.6098 |
| Patient Panic Disorder | 378 (95.5%) | 13.70±8.76 (10, 2.6%) | 19.18±7.75 (368, 97.4%) | 4.8732 | 0.0279 |
| Patient Inner Peacefulness | 358 (90.4%) | 19.63±7.56 (253, 70.7%) | 17.41±8.23 (105, 29.3%) | 6.1225 | 0.0138 |
| Caregiver Lifetime Major Depressive Disorder | 365 (92.2%) | 18.85±8.44 (67, 18.4%) | 18.94±7.84 (298, 81.6%) | 0.0064 | 0.9365 |
| Caregiver Major Depressive Disorder | 365 (92.2%) | 17.00±8.04 (13, 3.6%) | 18.99±7.94 (352, 96.4%) | 0.7929 | 0.3738 |
| Caregiver Generalized Anxiety Disorder | 361 (91.2%) | 16.89±7.76 (18, 5.0%) | 19.02±7.96 (343, 95.0%) | 1.2371 | 0.2668 |
| Caregiver Panic Disorder | 362 (91.4%) | 13.15±8.90 (13, 3.6%) | 19.16±7.85 (349, 96.4%) | 7.3054 | 0.0072 |
| Caregiver Posttraumatic Stress Disorder | 365 (92.2%) | 16.27±8.73 (11, 3.0%) | 19.00±7.91 (354, 97.0%) | 1.2697 | 0.2606 |
| Religious Coping and Spiritual Care | | | | | |
| Mentions religion as a coping method | 349 (87.7%) | 19.88±7.74 (138, 39.5%) | 18.30±7.95 (211, 60.5%) | 3.4132 | 0.0658 |
| Have you received pastoral care services within the clinic or hospital | 343 (86.6%) | 19.98±7.13 (156, 45.5%) | 18.04±8.36 (187, 54.5%) | 5.2463 | 0.0226 |
| Have you been visited by a member of the clergy from outside of the hospital system | 344 (86.9%) | 18.08±7.74 (154, 44.8%) | 19.64±7.92 (190, 55.2%) | 3.3825 | 0.0668 |
| Have you visited a member of the clergy in the last month | 344 (86.9%) | 18.02±8.13 (118, 34.3%) | 19.42±7.70 (226, 65.7%) | 2.4921 | 0.1154 |
| Therapeutic Alliance/Trust/Whole Patient/Care by Doctors | | | | | |
| Terminal illness acknowledgement | 354 (89.4%) | 19.11±7.77 (136, 38.4%) | 19.13±7.79 (218, 61.6%) | 0.0007 | 0.9786 |
| Discussed EOL care wishes | 395 (99.7%) | 18.94±7.59 (168, 42.5%) | 18.98±8.15 (227, 57.5%) | 0.0027 | 0.9584 |
| Doctor sees as a whole person | 358 (90.4%) | 19.21±7.65 (326, 91.1%) | 16.50±8.92 (32, 8.9%) | 3.5764 | 0.0594 |
| Doctors treat you with respect | 359 (90.7%) | 18.94±7.85 (352, 98.1%) | 19.86±7.95 (7, 1.9%) | 0.0941 | 0.7592 |
| Respect your doctor | 360 (90.9%) | 18.97±7.83 (358, 99.4%) | 19.50±12.02 (2, 0.6%) | 0.0092 | 0.9238 |
| Trust your doctors | 360 (90.9%) | 19.00±7.80 (355, 98.6%) | 13.20±9.63 (5, 1.4%) | 2.7238 | 0.0998 |
| Feel very comfortable with your care | 363 (91.7%) | 19.34±7.68 (280, 77.1%) | 17.69±6.91 (13, 3.6%) | 1.3339 | 0.2489 |
| Therapeutic alliance ^a | 363 (91.7%) | 19.59±7.47 (249, 68.6%) | 17.62±8.46 (114, 31.4%) | 5.0327 | 0.0255 |
| Aggressive Care and Location of Death | | | | | |

| Binary Predictors | Quality of Death Mean±SD (N) | | | Unadjusted Analyses | |
|---------------------|------------------------------|-------------------------|-------------------------|---------------------|---------|
| | Full Sample (N=396) | Predictors=Yes | Predictors=No | F Value | p-value |
| Ventilator use | 395 (99.7%) | 14.04±7.53 (27, 6.8%) | 19.35±7.83 (368, 93.2%) | 12.0131 | 0.0006 |
| ICU | 395 (99.7%) | 13.50±7.55 (38, 9.6%) | 19.55±7.73 (357, 90.4%) | 21.2212 | <.0001 |
| Chemotherapy | 396 (100.0%) | 15.76±8.28 (25, 6.3%) | 19.20±7.84 (371, 93.7%) | 4.4973 | 0.0346 |
| Feeding tube | 393 (99.2%) | 15.116±8.33 (32, 8.1%) | 19.34±7.76 (361, 91.9%) | 8.4914 | 0.0038 |
| Any aggressive care | 396 (100.0%) | 14.52±8.00 (52, 13.1%) | 19.66±7.68 (344, 86.9%) | 20.3188 | <.0001 |
| In hospice death | 394 (99.5%) | 20.06±8.37 (62, 15.7%) | 18.84±7.79 (332, 84.3%) | 1.2661 | 0.2612 |
| Out hospice death | 395 (99.7%) | 19.90±7.47 (254, 64.3%) | 17.43±8.37 (141, 35.7%) | 9.8833 | 0.0018 |
| ICU death | 395 (99.7%) | 15.00±7.43 (27, 6.8%) | 19.26±7.88 (368, 93.2%) | 7.7875 | 0.0055 |
| Hospital death | 395 (99.7%) | 16.13±7.85 (84, 21.3%) | 19.74±7.76 (311, 78.7%) | 14.6693 | 0.0001 |
| Home death | 395 (99.7%) | 20.24±7.55 (219, 55.4%) | 17.40±8.09 (176, 44.6%) | 14.4841 | 0.0002 |
| Nursing home death | 395 (99.7%) | 20.12±5.77 (17, 4.3%) | 18.92±8.00 (378, 95.7%) | 0.3738 | 0.5413 |

Unadjusted Analyses

| Continuous Predictors | Quality of Death Mean±SD | | | Unadjusted Analyses | |
|--|--------------------------|------------------|---------|---------------------|---------|
| | Full Sample (N=396) | Quality of Death | Mean±SD | F Value | p-value |
| Patient and Caregiver Mental Health | | | | | |
| Patient feeling depressed | 388 (98.0%) | 2.62±2.94 | 0.8695 | 0.3517 | |
| Patient nervous or worried | 387 (97.7%) | 3.09±3.19 | 4.26 | 0.0397 | |
| Patient terrified | 387 (97.7%) | 2.79±3.09 | 0.9041 | 0.3423 | |
| Patient sad | 388 (98.0%) | 2.66±3.00 | 0.0205 | 0.8863 | |
| Patient sum score of peacefulness | 117 (29.5%) | 101.2±35.23 | 5.7936 | 0.0177 | |
| Therapeutic Alliance/Trust/Whole Patient/Care by Doctors | | | | | |
| To what extent oncologist sees you as a whole person | 129 (32.6%) | 3.16±1.25 | 0.8068 | 0.3708 | |
| How much do you trust your oncologist | 130 (32.8%) | 3.29±1.24 | 1.2029 | 0.2749 | |
| How much do you respect your doctor | 130 (32.8%) | 3.42±1.22 | 2.6043 | 0.1091 | |
| How much do you feel your doctor cares about you | 130 (32.8%) | 3.17±1.23 | 1.1129 | 0.2935 | |
| To what extent do you feel comfortable asking your doctor questions | 129 (32.6%) | 3.31±1.27 | 0.2865 | 0.5934 | |
| How comfortable are you asking your doctor questions about your care | 363 (91.7%) | 4.59±0.93 | 1.3339 | 0.2489 | |
| Religious Coping and Being Spiritually Supported by the Medical Community | | | | | |
| Positive religious coping | 341 (86.1%) | 11.13±6.44 | 2.9147 | 0.0887 | |
| Negative religious coping | 339 (85.6%) | 2.04±3.56 | 0.2828 | 0.5952 | |
| Total religious coping | 337 (85.1%) | 13.20±8.31 | 1.3125 | 0.2528 | |

| Continuous Predictors | Full Sample (N=396) | Quality of Death Mean±SD | Unadjusted Analyses | |
|--|---------------------|--------------------------|---------------------|---------|
| | | | F Value | p-value |
| To what extent do your religious beliefs or activities help you cope with or handle your illness | 344 (86.9%) | 3.61±1.34 | 3.8823 | 0.0496 |
| How often did you attend church or other religious services before your cancer diagnosis | 340 (85.9%) | 3.42±1.73 | 1.4366 | 0.2315 |
| How often do you attend church or other religious services now | 344 (86.9%) | 2.60±1.74 | 1.1132 | 0.2921 |
| How often did you spend time in private religious activities before your cancer diagnosis | 339 (85.6%) | 3.60±1.74 | 9.6851 | 0.0020 |
| How often do you spend time in private religious activities now | 345 (87.1%) | 4.12±1.75 | 4.9224 | 0.0272 |
| How important is religion to you | 345 (87.1%) | 1.44±0.71 | 1.1656 | 0.2811 |
| To what extent are your religious/spiritual needs being supported by your religious community | 344 (86.9%) | 2.94±1.62 | 0.7223 | 0.3960 |
| To what extent are your religious/spiritual needs being supported by the medical system | 344 (86.9%) | 2.33±1.42 | 3.6181 | 0.0580 |
| If you did receive visits from the clergy, how much comfort would you say this provided for you | 230 (58.1%) | 4.32±0.89 | 1.6264 | 0.2035 |

Note: "Predictor=Yes" and "Predictor=No" refers to whether the independent variable was endorsed and the mean and SD for the "Yes" versus the "No" in relation to the QOL dependent variable.

⁴Therapeutic alliance includes being treated as a whole person, being treated with respect, respecting your doctor, trusting your doctor and feeling comfortable asking your doctor questions about your care.

Table 3

Summary of 9-Fold Cross Validation Analyses

| Fold No. | Significant Predictors in the Best Model in Each Training Dataset | Average MSE in the Nine Training Datasets | Average MSE in the Nine Test Datasets |
|----------|--|---|---------------------------------------|
| 1 | Patient gallbladder cancer ^b Patient age ^b Caregiver MOS subscale mental health ^b Patient Panic Disorder ^b ICU stay ^c Hospital death How often did you spend time in private religious activities before your cancer diagnosis ^b | 50.57 | 40.90 |
| 2 | Have you received pastoral care services within the clinic or hospital ^b Therapeutic alliance ^b ICU stay ^c Hospital death How often did you spend time in private religious activities before your cancer diagnosis ^b Patient nervous or worried ^b Chemotherapy ^c Feeding tube ^c | 49.93 | 38.36 |
| 3 | Patient age ^b Caregiver MOS subscale health change from last year ^b Patient Panic Disorder ^b Have you received pastoral care services within the clinic or hospital ^b ICU stay ^c Chemotherapy ^c Hospital death | 51.83 | 40.44 |
| 4 | Doctor sees as a whole person ^b ICU stay ^c Hospital death Patient nervous or worried ^b How often did you spend time in private religious activities before your cancer diagnosis ^b | 51.82 | 41.97 |
| 5 | Caregiver MOS subscale overall health ^b Patient Panic Disorder Have you received pastoral care services within the clinic or hospital ^b ICU stay ^c Hospital death | 51.82 | 46.66 |
| 6 | Caregiver MOS subscale health change from last year ^b ICU death Feeding tube ^c Hospital death Patient nervous or worried ^b How often did you spend time in private religious activities before your cancer diagnosis ^b | 53.19 | 42.23 |
| 7 | Have you received pastoral care services within the clinic or hospital ^b ICU death Chemotherapy ^c Hospital death Patient nervous or worried ^b How often did you spend time in private religious activities before your cancer diagnosis ^b | 51.07 | 41.06 |
| 8 | Patient Major Depression Disorder ^b Therapeutic alliance ^b ICU death Chemotherapy ^c | 51.99 | 39.57 |

| Fold No. | Significant Predictors in the Best Model in Each Training Dataset | Average MSE in the Nine Training Datasets | Average MSE in the Nine Test Datasets |
|----------|---|---|---------------------------------------|
| | Feeding tube ^c Outpatient hospice death How often did you spend time in private religious activities before your cancer diagnosis ^b | | |
| 9 | ICU death Chemotherapy ^c Feeding tube ^c Hospital death How often did you spend time in private religious activities before your cancer diagnosis ^b | 51.07 | 43.38 |

Notes:

^a Actual sample size varied depending on missing information of the analyzed variables, only 293 observations were used.

^b Assessed at baseline

^c Assessed in the final week of the patient's life

Table 4a
 Best Model of Predictors of Quality-of-Life at the End-of-Life in the Training Set (N=352^a)

| Predictor | Quality-of-Life (Mean±SD) | | | | |
|--|---------------------------|----------------|-----|---------|---------|
| | Parameter Estimate | Standard Error | df | t-value | p-value |
| Have you received pastoral care services within the clinic or hospital ^b | 2.01 | 0.89 | 279 | 2.26 | 0.0246 |
| Therapeutic alliance ^b | 2.02 | 0.93 | 279 | 2.17 | 0.0310 |
| ICU stay ^c | -5.75 | 1.42 | 279 | -4.05 | <.0001 |
| Hospital death ^c | -2.74 | 1.10 | 279 | -2.49 | 0.0133 |
| How often did you spend time in private religious activities before your cancer diagnosis ^b | 0.70 | 0.25 | 279 | 2.84 | 0.0048 |
| Patient nervous or worried ^b | -0.41 | 0.13 | 279 | -3.18 | 0.0016 |
| Chemotherapy ^c | -4.09 | 1.77 | 279 | -2.31 | 0.0216 |
| Feeding tube ^c | -3.39 | 1.66 | 279 | -2.04 | 0.0423 |

Notes: "Predictor=Yes" and "Predictor=No" refers to whether the independent variable was endorsed and the mean and SD for the "Yes" versus the "No" in relation to the QOL dependent variable.

^a Actual sample size varied depending on missing information of the analyzed variables, only 293 observations were used.

^b Assessed at baseline

^c Assessed in the final week of the patient's life

Table 4b
Sensitivity Analyses of the Best Model of Predictors of Quality-of-Life at the End-of-Life in the Training Set (N=352^a)

| Predictor | Quality-of-Life (Mean±SD) | | | | |
|--|---------------------------|----------------|-----|---------|---------|
| | Parameter Estimate | Standard Error | df | t-value | p-value |
| Have you received pastoral care services within the clinic or hospital ^b | 2.12 | 0.94 | 245 | 2.24 | 0.0257 |
| Therapeutic alliance ^b | 1.54 | 0.97 | 245 | 1.59 | 0.1137 |
| ICU stay ^c | -5.40 | 1.48 | 245 | -3.65 | 0.0003 |
| Hospital death ^c | -2.39 | 1.19 | 245 | -2.00 | 0.0463 |
| How often did you spend time in private religious activities before your cancer diagnosis ^b | 0.71 | 0.26 | 245 | 2.76 | 0.0063 |
| Patient nervous or worried ^b | -0.40 | 0.13 | 245 | -2.94 | 0.0036 |
| Chemotherapy ^c | -4.00 | 1.81 | 245 | -2.21 | 0.0279 |
| Feeding tube ^c | -3.51 | 1.74 | 245 | -2.01 | 0.0451 |
| Survival time | 0.00 | 0.00 | 245 | 1.13 | 0.2580 |
| Informal caregiver ^d | -0.99 | 0.99 | 245 | -0.99 | 0.3212 |

Notes: "Predictor=Yes" and "Predictor=No" refers to whether the independent variable was endorsed and the mean and SD for the "Yes" versus the "No" in relation to the QOL dependent variable.

^a Actual sample size varied depending on missing information of the analyzed variables, only 261 observations were used.

^b Assessed at baseline

^c Assessed in the final week of the patient's life

^d Informal (vs formal) caregiver conducted the postmortem assessment

Table 4c

Best Model of Predictors of Quality-of-Life at the End-of-Life in the Full Study Sample (N=396^a)

| Predictor | Quality-of-Life (Mean±SD) | | | | |
|--|---------------------------|----------------|-----|---------|---------|
| | Parameter Estimate | Standard Error | df | t-value | p-value |
| Have you received pastoral care services within the clinic or hospital ^b | 1.60 | 0.82 | 316 | 1.95 | 0.0520 |
| Therapeutic alliance ^b | 1.45 | 0.86 | 316 | 1.69 | 0.0912 |
| ICU stay ^c | -5.61 | 1.34 | 316 | -4.18 | <.0001 |
| Hospital death ^c | -3.03 | 1.00 | 316 | -3.03 | 0.0027 |
| How often did you spend time in private religious activities before your cancer diagnosis ^b | 0.66 | 0.23 | 316 | 2.86 | 0.0045 |
| Patient nervous or worried ^b | -0.39 | 0.12 | 316 | -3.21 | 0.0015 |
| Chemotherapy ^c | -3.46 | 1.65 | 316 | -2.09 | 0.0375 |
| Feeding tube ^c | -3.54 | 1.60 | 316 | -2.22 | 0.0271 |

Notes:

^a Actual sample size varied depending on missing information of the analyzed variables, only 330 observations were used.^b Assessed at baseline^c Assessed in the final week of the patient's life

Table 5

Percentage of Variance Explained in Patients' Quality of Life at the End-of-Life

| Independent Variable | % Variance Explained in QOL at the EOL |
|--|--|
| 1. Unexplained variance | 82.30% |
| 2. ICU stays ^b | 4.40% |
| 3. Hospital deaths ^b | 2.70% |
| 4. Worried patient ^a | 2.70% |
| 5. Religious activities ^a | 2.50% |
| 6. Random Effects of Site ^a | 1.80% |
| 7. Feeding tubes ^b | 1.10% |
| 8. Pastoral care ^a | 1.10% |
| 9. Chemotherapy ^b | 0.90% |
| 10. Therapeutic alliance ^a | 0.70% |

Notes:

^a Assessed at baseline;^b Care in patient's final week