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The Relationships between Mood Disturbances and Pain, Hope, and Quality of Life in Hospitalized Cancer Patients with Pain on Regularly Scheduled Opioid Analgesic

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Abstract

Objective: The study purposes were to describe the percentage of patients in one of four mood groups (i.e., neither anxiety nor depression [NEITHER], only anxiety [ANX], only depression [DEP], both anxiety and depression [BOTH]) and to evaluate how differences in mood states are related to pain, hope, and quality of life (QOL).
Methods: Oncology inpatients ($n = 225$) completed Brief Pain Inventory, Herth Hope Index (HHI), and the European Organization for Research and Treatment of Cancer Core QOL Questionnaire-C30. Research nurses completed Symptom Severity Checklist, Karnofsky Performance Status score, and medical record reviews. Data were analyzed using χ^2, Kruskal-Wallis, one-way analyses of variance (ANOVAs), and analyses of covariance (ANCOVA).
Results: Thirty-two percent of patients were categorized in the NEITHER group, 12% in the ANX group, 12% in the DEP group, and 44% in the BOTH group. Younger patients and women were more likely to be in the BOTH group. While only minimal differences were found among the mood groups on pain intensity scores, patients in the NEITHER group in general, reported lower pain interference scores than those in the other three groups. Significant differences were found in HHI scores between the patients in the NEITHER group and the BOTH group. In addition, patients with both mood disorders reported significantly poorer QOL scores.
Conclusions: Because 44% of the patients had both anxiety and depression, clinicians need to evaluate patients for the co-occurrence of these two symptoms, evaluate its impact on pain management, hope, and QOL, and develop appropriate interventions to manage these symptoms.

Introduction

Anxiety and depression are common reactions to cancer.[1] Occurrence rates in patients with advanced cancer for anxiety range from 13% to 79% and for depression from 3% to 77%.[2–6] While most studies have evaluated these two mood disturbances separately,[2,4] some evidence exists that depression and anxiety co-occurs in the general population,[7,8] and in oncology patients.[4,9,10] In addition, in the general Norwegian population, co-occurrence of anxiety and depression was more strongly associated with somatic health problems than either anxiety or depression.[11]

In a comprehensive review that examined the relationships between chronic cancer pain and psychological distress,[12] the authors concluded that a significant positive correlation exists between pain and psychological distress. However, most of these studies examined only the independent associations between anxiety and pain, or depression and pain.

Patients with more depression and anxiety have reported less hope.[13,14] For example, in a study of 80 hospitalized Italian patients with cancer, significant negative correlations were found between hope and anxiety ($r = -0.50$) and depression ($r = -0.58$). This finding was confirmed in a recent review[15] that found oncology patients' level of hope was related to physical and psychological factors.

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Finally, depression and anxiety have been associated with lower levels of quality of life (QOL) in patients with advanced cancer.[2,3,5] Patients with both anxiety and depression reported a higher frequency and intensity of symptoms when compared with patients without anxiety or depression.[2]

The University of California, San Francisco's Symptom Management Theory (SMT)[16] served as the conceptual framework for this study. The SMT consists of three essential concepts (i.e., symptom experience, symptom management strategies, and symptom status outcomes). For the purposes of this study, mood disturbance was the symptom experience of interest. Hope was conceptualized to be a coping strategy within the strategy domain. Finally, QOL was the outcome of interest. Because cancer pain is associated with mood disturbance in patients with advanced cancer[17] and the SMT suggests that multiple symptoms can be evaluated, the relationship between mood disturbance and pain was included as part of the conceptual model in this study. While findings from a limited number of studies suggest that depression and anxiety appear to be significant problems in patients with advanced cancer with pain[17] and that anxiety and depression are associated with patient's level of hope and QOL,[2,3,5,13–15] no studies were found that evaluated how depression or anxiety or the co-occurrence of these two symptoms are related to pain, hope, and QOL in the same sample of patients. Therefore, the purposes of this study in a sample of hospitalized patients with cancer pain were to describe the percentage of patients in one of four mood groups (i.e., neither depression nor anxiety, only anxiety, only depression, or both) and to evaluate how differences in mood status were related to pain, hope, and QOL.

Methods

Sample and methods of data collection

This study is part of a large multicenter study, the European Pharmacogenetic Opioid Study.[18] From a potential sample of 1571 patients with cancer hospitalized at the Norwegian Radium Hospital between December 2004 and June 2006, 342 met the initial screening criterion for the EPOS study, namely that they would be on a regularly scheduled opioid for their cancer pain for at least 3 days. In addition, patients were included if they: were adults more than 18 years of age; had a verified cancer diagnosis; provided a blood sample; and gave written informed consent. The identification of potential patients who met the study's inclusion criteria was performed systematically on all of the inpatient units. Patients who met the study's inclusion criteria were approached by the first author or one of two research nurses who explained the purpose of the study.

A total of 225 patients were enrolled in this study. The remaining 117 were not enrolled because they did not meet one of the inclusion criteria ($n = 34$), were too ill ($n = 33$), refused to participate ($n = 48$), or withdrew participation after enrolment ($n = 2$). This study was approved by the Regional Committee for Medical Research Ethics, Central-Norway and the Norwegian Radium Hospital.

After enrollment, patients completed the Brief Pain Inventory (BPI), Herth Hope Index (HHI), and the European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC QLQ-C30). If the patient was not able to complete the questionnaires independently ($n = 173$), a research nurse read the items to these patients and recorded their answers. Then the research nurse assessed symptom severity by asking all of the patients to respond to the Symptom Severity Checklist using a 4-point Likert scale and rated the patient's Karnofsky Performance Status (KPS). Patients' medical records were reviewed for disease and treatment information (i.e., cancer diagnosis, presence of metastasis, length of time since cancer diagnosis, number of comorbidities). The research nurse followed a set of interview guidelines during data collection. Data were monitored on a regular basis by the third author (K.B.) to insure data integrity.

Instruments

Demographic characteristics. Information was obtained on age, gender, educational level, marital status, and employment status.

Clinical characteristics. Patients' performance status was assessed using the KPS scale,[19] which was rated by the research nurse using a 0 (i.e., dead) to 100 (i.e., normal activity) scale. The KPS has satisfactory predictive and construct validity[20] and interrater reliability.[21,22]

Symptom severity (including anxiety and depression). The observer-rated symptom severity checklist[18,23] consists of 17 symptoms (i.e., pain, fatigue, generalized weakness, anxiety, anorexia, depression, constipation, poor sleep, dyspnea, focal weakness, nausea, confusion, vomiting, diarrhea, itch, hallucinations, hiccups). The research nurses asked the patients to rate each of these symptoms using a 4-point Likert scale (i.e., none, mild, moderate, severe).

Pain characteristics. Pain in the last 24 hours was assessed using the Norwegian version of the BPI-N.[24] Part 1 of the BPI consists of four single items on pain severity (i.e., pain now, as well as least, average, and worst pain). Each item is rated on a 0 (no pain) to 10 (the worst pain I can imagine) numeric rating scale (NRS). Part 2 assesses the extent to which pain interferes with seven aspects of function. Each item is rated on 0 to 10 NRSs. The BPI is valid across cultures and languages,[24,25] is sensitive to changes in pain intensity,[26] and is simple to use.

Information on breakthrough pain (BTP) was obtained by asking patients to indicate whether or not (i.e., yes/no responses) they had BTP elicited by movement, swallowing, defecation, or urination.

Hope. Hope was measured using the Norwegian version of the HHI.[27] The HHI-N was selected because it is short and easy to use.[28] The HHI is based on the definition of hope developed by Dufault and Martocchio.[29] This 12-item questionnaire measures various dimensions of hope using a 4-point Likert scale that ranges from strongly disagree (1) to strongly agree (4). A total score can range from 12 to 48.[28] Higher scores indicate higher levels of hope. Construct validity,[28] divergent validity,[30,31] internal consistency[32] and test–retest correlations[28] were reported to be satisfactory in different international samples.[32–40] The Cronbach α for this study was 0.76.

QOL. The EORTC QLQ-C30 (version 3.0)[41,42] consists of five function scales, seven symptom scales, a financial difficulties scale, and a global health status scale. The raw scores were transformed linearly to a scale that ranges from 0 to 100 using the algorithm from the EORTC QLQ-C30 scoring manual.[43] Higher scores on the function scales and the global health status scale indicate a better level of functioning and overall QOL. In contrast, higher scores on the symptom scales indicate more severe symptoms. The Norwegian version of the EORTC QLQ-C30 has acceptable validity and reliability.[41,44] In this study, the Cronbach α for the three EORTC QLQ-30 subscales that had more than 2 items (i.e., physical functioning, emotional functioning, and fatigue) ranged from 0.80 to 0.81.

Statistical analyses

Data were analyzed using SPSS 15.0 (SPSS, Inc., Chicago, Ill) and the α level was set at 0.05. Descriptive statistics were calculated for the sample's demographic and clinical characteristics. The sample was divided into four mood groups: those who had neither anxiety nor depression, (none on both items [NEITHER]), only anxiety (mild, moderate, or severe anxiety but none on depression [ANX]), only depression (none on anxiety but mild, moderate, or severe on depression [DEP]), or both anxiety and depression (BOTH). In addition, patients were classified into two groups based on whether the patients completed the questionnaires themselves or were interviewed by the research nurse. The percentage of patients in each of the four mood status groups, as well as the demographic and clinical characteristics of these two groups were compared using χ^2, Mann-Whitney, and independent sample *t*-test techniques.

χ^2, Kruskal-Wallis, and one-way analyses of variance (ANOVAs) were used to evaluate for differences among the four mood groups in demographic and clinical characteristics. Based on these initial analyses, significant differences were found in the age and the percentages of men and women in the four mood groups. Based on reported gender differences in anxiety,[45] depression[46] and pain,[47,48] gender and age were added as covariates with mood group as a fixed factor in the subsequent analyses, using an analysis of covariance (ANCOVA). If the overall ANOVA or Kruskal-Wallis test was significant, pairwise contrasts were conducted to determine where the differences were. The *p* value of any of the six pairwise contrasts needed to be <0.008 in order to be significant.

Table 1. Differences in Demographic and Clinical Characteristics among the Four Mood Groups

	NEITHER (1) n = *71 (31.6%)*	*ANX (2)* n = *27 (12.0%)*	*DEP (3)* n = *28 (12.4%)*	*BOTH (4)* n = *99 (44.0%)*	
Characteristics	*Mean ± SD*	*Mean ± SD*	*Mean ± SD*	*Mean ± SD*	*Statistics*
Age (years)	64.1 (±11.7)	55.7 (±12.7)	62.6 (±13.6)	59.0 (±11.5)	**$F = 4.36$, $p = < 0.01$ 1 > 2 & 4[a]**
Number of comorbidities	0.9 (±1.0)	0.9 (±1.1)	1.1 (±1.0)	1.2 (±1.2)	$F = 1.62$, $p = 0.19$
Karnofsky Performance Status	66.3 (15.6)	71.1 (9.3)	64.6 (13.5)	62.2 (17.0)	$F = 2.64$, $p = 0.05$
Years since diagnosis	2.3 (3.8)	2.1 (4.6)	1.9 (2.4)	2.0 (3.3)	$F = 0.13$, $p = 0.94$
	% (N)	% (N)	% (N)	% (N)	
Gender					
Male	62.0 (44)	40.7 (11)	42.9 (12)	40.4 (40)	****K-W $\chi^2 = 8.70$, $p = 0.03$ Male 1 > 4[a]**
Female	38.0 (27)	59.3 (16)	57.1 (16)	59.6 (59)	
Marital status					
Married	67.1 (47)	70.4 (19)	59.3 (16)	63.9 (60)	K-W $\chi^2 = 2.99$, $p = 0.81$
Not married	18.6 (13)	22.2 (6)	22.2 (6)	22.5 (24)	
Widow/widower	14.3 (10)	7.4 (2)	18.5 (5)	10.6 (10)	
Employment status					
Not work	97.1 (68)	92.6 (25)	96.3 (26)	97.8 (91)	K-W $\chi^2 = 1.91$, $p = 0.59$
Work full-part-time	2.9 (2)	7.4 (2)	3.7 (1)	2.2 (2)	
Education					
Primary school	67.2 (47)	40.7 (11)	66.7 (18)	64.1 (59)	K-W $\chi^2 = 10.68$, $p = 0.10$
Secondary school	15.7 (11)	14.8 (4)	7.4 (2)	16.3 (15)	
College/University	17.1 (12)	44.5 (12)	25.9 (7)	19.6 (18)	
Cancer diagnosis					
Other	52.1 (37)	51.9 (14)	46.5 (13)	54.5 (54)	K-W $\chi^2 = 8.08$, $p = 0.78$
Gastrointestinal	14.1 (10)	18.5 (5)	25.0 (7)	11.1 (11)	
Female/reproductive	14.1 (10)	18.5 (5)	7.1 (2)	15.2 (15)	
Prostate	12.7 (9)	3.7 (1)	7.1 (2)	9.1 (9)	
Breast	7.0 (5)	7.4 (2)	14.3 (4)	10.1 (10)	
Presence of metastatic disease					
Yes	74.6 (53)	55.6 (15)	64.3 (18)	71.7 (71)	K-W $\chi^2 = 3.97$, $p = 0.27$
No	25.4 (18)	44.4 (12)	35.7 (10)	28.3 (28)	

[a] Statistically significant pairwise contrasts $p < .008$ (in bold).

**K-W = Kruskal-Wallis.

Results

Differences in the percentage of patients in each mood status group, demographic and clinical characteristics between patients who completed the questionnaires themselves ($n=50$) or were interviewed ($n=173$)

No significant differences were found in the percentage of patients in each of the four mood groups based on how the data were obtained. Patients who were interviewed had significantly lower mean KPS scores ($t=-2.45$, $p=0.02$), were significantly older ($t=5.49$, $p<0.001$), had a higher average number of comorbidities ($t=2.98$, $p<0.01$), and had less education (Mann-Whiteny $Z=-4.92$, $p<0.001$) than those who completed the questionnaires themselves.

Differences in demographic and clinical characteristics among the mood groups

As shown in Table 1, 32% of the patients were categorized in the NEITHER group, 12% in the ANX group, 12% in the DEP group, and 44% in the BOTH group. No differences were found among the four mood groups on any demographic or clinical characteristics except for age and gender. Patients in the BOTH and ANX groups were significantly younger than patients in the NEITHER group. In addition, significantly more men were in the NEITHER than in the BOTH group.

Differences in pain characteristics among the mood groups

No significant differences were found among the four mood groups on presence of BTP and the percent of pain relief. However, as shown in Table 2, significant differences were found among the four mood groups on two of the pain intensity scores, the total interference score, as well as on all of the pain interference items, except for work. After controlling for age and gender, patients in the NEITHER group had significantly lower least pain intensity scores than patients in the BOTH group. In addition, both the NEITHER and the BOTH groups reported significantly lower worst pain intensity scores than the DEP group.

Table 2 summarizes differences in pain interference scores among the four mood groups. In general, patients in the NEITHER group reported lower pain interference scores than the other three mood groups. In terms of the total interference score, patients in the DEP and BOTH groups reported higher scores than those in the NEITHER group. The NEITHER group reported lower scores on interference with relations with other people and interference with sleep than those in the three other groups. As expected, the NEITHER group reported significantly lower mood interference scores than the three other mood groups. Finally, patients in the NEITHER group rated pain interference with enjoyment of life significantly lower than patients in the DEP or BOTH groups.

Table 2. Differences in Pain Characteristics among the Four Mood Groups

Characteristics	*NEITHER (1)* $n=71$ (%) N	*ANX (2)* $n=27$ (%) N	*DEP (3)* $n=28$ (%) N	*BOTH (4)* $n=99$ (%) N	*Statistics*
Percentage of patients with breakthrough pain	74.6 (53)	76.9 (20)	96.4 (27)	80.8 (80)	K-W $\chi^2=6.26$, $p=0.10$
	Mean (SD)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Pain now	2.2 (2.0)	2.8 (1.9)	2.8 (2.1)	3.0 (2.5)	$F=1.09$, $p=0.36$
Least pain	1.4 (1.4)	1.7 (2.3)	2.0 (1.5)	2.2 (1.8)	$\mathbf{F=3.23}$, $\mathbf{p=0.02}$; **$1<4$**[a]
Average pain	3.8 (2.4)	4.0 (2.5)	4.5 (2.0)	4.7 (2.4)	$F=1.84$, $p=0.14$
Worst pain	4.5 (2.7)	5.1 (2.2)	6.5 (2.8)	5.0 (2.5)	$\mathbf{F=3.83}$, $\mathbf{p=0.01}$; **1 & $4<3$**[a]
Percent of pain relief	72.5 (24.6)	67.7 (22.1)	68.9 (22.7)	66.0 (24.9)	$F=1.27$, $p=0.29$
Total pain interference score	3.0 (2.1)	4.3 (2.2)	5.0 (2.4)	5.1 (2.3)	$\mathbf{F=11.69}$, $\mathbf{p<0.001}$; **$1<3$ & 4**[a]
Pain interference daily activity	4.7 (3.6)	5.6 (3.0)	6.5 (3.0)	6.2 (3.1)	$\mathbf{F=2.93}$, $\mathbf{p=0.04}$[b]
Pain interference mood	1.8 (2.4)	4.0 (2.8)	5.1 (2.6)	4.8 (3.2)	$\mathbf{F=16.03}$, $\mathbf{p<0.001}$; **$1<2$, 3 & 4**[a]
Pain interference ability walk	3.5 (3.8)	3.1 (3.1)	5.2 (3.9)	4.8 (3.5)	$\mathbf{F=3.13}$, $\mathbf{p=0.03}$[b]
Pain interference work	5.5 (4.0)	6.1 (3.3)	6.7 (3.9)	7.3 (3.4)	$F=2.51$, $p=0.06$
Pain interference relations to other	1.3 (2.2)	3.6 (2.7)	3.3 (3.0)	3.9 (3.3)	$\mathbf{F=9.78}$, $\mathbf{p<0.001}$; **$1<2,3$ & 4**[b]
Pain interference sleep	2.1 (2.9)	4.7 (3.3)	4.5 (3.4)	3.8 (3.3)	$\mathbf{F=5.14}$, $\mathbf{p<0.01}$; **$1<2,3$ & 4**[a]
Pain interference enjoyment of life	2.0 (2.7)	3.3 (2.8)	4.4 (3.3)	5.1 (3.2)	$\mathbf{F=13.92}$, $\mathbf{p<0.001}$; **$1<3$ & 4**[a]

[a] Statistically significant pairwise contrasts $p<.008$ (in bold).

[b] No statistically significant pairwise contrasts.

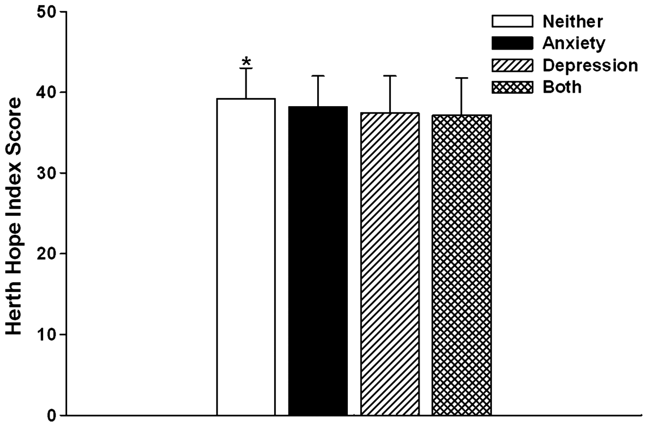

FIG. 1. Differences in total Herth Hope Index (HHI) scores among the four mood groups (*Significantly higher total HHI scores found in the NEITHER group compared to the BOTH group ($p = 0.01$).)

Differences in hope among the mood groups

As shown in Figure 1, a significant difference in total HHI scores was found among the four groups ($F = 3.98$, $p = 0.01$). Patients in the NEITHER group had higher HHI scores than those in the BOTH group (39.2 [± 3.8] versus 37.2 [± 4.6]).

Differences in QOL among the mood groups

As shown in Table 3, after controlling for age and gender, patients in the NEITHER group reported a significantly better global health status than patients in the BOTH group. However, no differences where found among the four mood groups on physical function. Patients in the ANX group reported higher role function scores than patients in the BOTH group. As expected, patients in the NEITHER group reported higher emotional function than those in the other three groups. In addition, patients in the ANX group reported higher emotional functioning compared to the BOTH group.

Discussion

To our knowledge, this study is the first to examine the relationships between pain, hope, and QOL among hospitalized cancer patients with pain, who were categorized into one of four mood groups. In this sample of patients on opioids, in which 70% had advanced disease, the overall occurrence of one or both mood disturbances was 68%. That 12% reported anxiety, 12% reported depression, and as many as 44% reported anxiety and depression is consistent with previous studies of patients with advanced cancer that used simple single- or multiple-item scales to evaluate mood disturbance.[4,23]

The finding that 44% of the patients in this study were categorized as having both anxiety and depression is consistent with two studies of patients with advanced cancer that reported co-occurrence rates of 26%[2] to 60%.[4] Findings from these three studies suggest that clinicians need to evaluate patients with advanced cancer with pain for the co-occurrence of these two mood disturbances and develop appropriate treatment strategies.

The lack of differences in BPI pain intensity scores may be related to the fact that all of the patients had pain and were using opioid analgesics. However, the largest difference in pain intensity scores was between the DEP group and the NEITHER group on ratings of worst pain. This difference equates with a large effect size (i.e., $d = 0.77$, where d is the difference between the two means in standard deviation units),[49] which suggests a clinically meaningful difference in worst pain intensity scores.[50]

The findings of lower interference scores in the NEITHER group compared to the other three groups suggest that mood disturbances in patients with cancer pain may be more closely associated with pain interference than with pain intensity. This hypothesis is supported by a Taiwanese study[32] that found higher positive correlations between mood disturbances and pain interference ($r = 0.53$) than between mood disturbances and pain intensity ($r = 0.26$). The lack of differences among the mood groups on interference with work in this sample, may be related to the fact that these patients were hospitalized and not working.

In this sample of hospitalized cancer patients in pain, those in the BOTH group had significantly lower total HHI scores than those in the NEITHER group (i.e., $d = 0.47$). Although the difference in absolute scores is relatively small (i.e., 2 units), the moderate effect size suggests a clinically meaningful difference.[51,52] In addition, this finding is consistent with a previous study of hospitalized Italian patients with cancer[13] that reported that hope was negatively correlated with anxiety and depression.

Table 3. Differences in European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC QLQ-C30) Scores among the Four Mood Groups

	NEITHER (1) n = *71*	ANX (2) n = *27*	*DEP (3)* n = *28*	*BOTH (4)* n = *99*	
EORTC QLQ-C30	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Statistics*
Global health status	48.0 (24.9)	41.7 (21.6)	36.3 (24.1)	30.9 (24.6)	**$F = 6.15$, $p < 0.001$;** $1 > 4^a$
Physical function	42.6 (27.5)	45.9 (21.3)	42.4 (23.1)	37.3 (24.1)	$F = 1.08$, $p = 0.36$
Role function	27.0 (31.5)	35.8 (34.2)	19.0 (24.3)	15.1 (22.7)	**$F = 5.15$, $p < 0.01$;** $2 > 4^a$
Emotional function	85.0 (16.3)	66.7 (19.3)	60.7 (25.2)	51.6 (24.4)	**$F = 30.16$, $p < 0.001$;** $1 > 2,3$ & 4^a; $2 > 4^a$
Cognitive function	74.4 (23.0)	65.4 (28.1)	61.9 (27.9)	52.7 (29.4)	**$F = 7.93$, $p < 0.01$;** $1 > 4^a$
Social function	53.1 (33.6)	44.4 (29.2)	39.3 (24.5)	33.7 (29.4)	**$F = 4.03$, $p < 0.01$;** $1 > 4^a$

[a] Statistically significant pairwise contrasts $p < 0.008$ (in bold).

Consistent with previous reports that evaluated depression and anxiety separately,[3,5] mood disturbance in cancer patients with pain was associated with a decrease in QOL. However, in this study that categorized patients with cancer with pain into one of four mood groups, several clinically significant differences in their QOL were found. First, clinically meaningful differences were found among the four mood groups on all of the functional scales except for physical function. Specifically, differences were found between patients in the NEITHER group compared to those in the BOTH group on emotional functioning (i.e., $d = 1.29$), cognitive functioning (i.e., $d = 0.76$), and social functioning (i.e., $d = 0.62$). These differences equate with changes in the moderate (i.e., a difference from 10 to 20) to very much (i.e., a difference of >20) range.[53] In addition, the difference in the global health status score between these two extreme groups reflects a medium effect size (i.e., $d = 68$).

A number of limitations of this study need to be acknowledged. First, the causal relationships between anxiety, depression and pain, hope, and QOL could not be determined due to the study's cross-sectional design. Future research needs to examine changes in these variables over time, as well as test the relationships among the variables that were hypothesized in our introduction. Although the overall sample size was relatively large, the distribution of the mood groups resulted in two groups with relatively small sample sizes. Therefore, findings from this study should be replicated in a larger sample to determine if these occurrence rates are stable and if additional differences exist among the mood groups.

The differences in how the data were collected may influence the validity of the study findings. However, no differences were found in the percentage of patients in each mood status group based on whether patients completed the questionnaires themselves or were interviewed. In addition, the significant differences in a number of characteristics between those who were interviewed and those who completed the questionnaires themselves explain why they needed help. The oldest patients with the poorest functional status were the ones who needed help. This finding is consistent with Wilson and colleagues,[54] who noted that self-administered scales may have limited applicability for some older adults who are terminally ill. Because the patients were fairly ill, respondent burden was a major concern for the researchers. Therefore, as have others,[4] in order to include a representative sample of patients with advanced cancer with pain, patients were afforded the opportunity to provide written or verbal responses to the study questionnaires.

The use of a single-item questionnaire to measure anxiety and depression is a limitation of this study. However, in a recent review of the measurement of psychological distress in palliative care,[55] Kelly and colleagues reported that assessment measures like the Edmonton Symptom Assessment Scale, play an important role in clinical research. In addition, Hotopf and colleagues,[56] noted that a single-item questionnaire has obvious advantages in palliative care populations. Finally, Thekkumpurath and colleagues[57] concluded in a systematic review that unidimensional scales appear to perform equally well compared to the longer versions in palliative care. Equally important, Chochinov[58] noted that making a diagnosis of depression in cancer patients is challenging and that single-item screening proved to be as diagnostically useful as much more complicated self-report scales.

Despite these limitations, findings from this study suggest that patients' level and type of mood disturbance are related to a number of aspects of pain, hope, and QOL. In light of the paucity of research on the co-occurrence of anxiety and depression in cancer patients, and their relationship to pain, hope and QOL, these findings warrant replication in larger cross sectional as well as longitudinal studies.

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Author Disclosure Statement

No competing financial interests exist.

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