

# Relationships Among Pain, Sleep Disturbances, and Depressive Symptoms in Outpatients From a Comprehensive Cancer Center

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**Purpose/Objectives:** To describe the pain experience of outpatients with cancer and explore the relationships with sleep disturbance, depression, and patient functioning.

**Design:** Descriptive, cross-sectional study.

**Setting:** Outpatient clinics at a large comprehensive cancer center in the southeastern United States.

**Sample:** 85 patients with a pain intensity level of at least 3.

**Methods:** Secondary analysis of baseline data.

**Main Research Variables:** Pain intensity and distress, pain interference, sleep disturbance intensity, and distress and depression.

**Findings:** The sample included men and women with a mean age of 54 years and 13 years of education. Mean present pain intensity on the Brief Pain Inventory scale was 4.6; mean pain at its worst was 8.3. Mean pain intensity measured with the Memorial Symptom Assessment Scale was 2.4 and pain distress was 2.2. Pain intensity and pain distress had a strong, positive correlation. The mean interference score for the group was 42.8. More than 63% of patients reported a problem with sleep disturbance. Distress from sleep disturbance was significantly correlated with pain intensity and pain distress. Pain interference also was correlated with sleep disturbance intensity and sleep disturbance distress. Pain severity, pain distress, pain right now, and pain interference total scores all were significantly correlated with depression scores.

**Conclusions:** Patients with cancer continue to experience pain during outpatient treatment and report sleep and depressive symptoms related to it.

**Implications for Nursing:** Improvements continue to be needed in assessment and treatment of pain.

## Key Points . . .

- ▶ Many outpatients with cancer continue to have persistent and severe pain.
- ▶ Pain significantly interferes with enjoyment of life, relationships with others, and mood and keeps patients from obtaining needed rest. Better pain control may lead to improvements in symptom distress and emotional well-being.
- ▶ Among outpatients with cancer, pain intensity is highly correlated with distress from pain, interferes with sleep and other daily activities, and has a significant relationship with depression.

Modonesi et al., 2005; Stromgren et al., 2006; Vallerand, 1997; Walsh & Ribicki, 2006). Pain is a subjective and multidimensional experience that requires patients' self-report for healthcare providers to fully understand it (Shin, Kim, Kim, Chee, & Im, 2007; Vallerand). Because of its multidimensional nature, symptom assessment should include intensity, timing, and quality as well as distress and interference with daily functioning (Armstrong, Cohen, & Eriksen, 2004; Lenz, Pugh, Milligan, Gift, & Suppe, 1997).

Rhodes, McDaniel, and Matthews (1998) conceptualized the symptom *experience* to include patients' perceptions of and responses to symptom occurrence and symptom distress. Symptom *occurrence*, according to this conceptualization, includes temporal features and severity (intensity) of the

Although cancer is curable in many, if not most cases, it continues to be feared. Research is producing insights and advances into the causes and cures for cancer, but the problem of symptom management continues. Symptoms from the disease and its treatment with resulting distress continue to be challenging and, according to the National Institutes of Health (NIH) State-of-the Science Panel, should be the focus of future research (Patrick et al., 2003).

Pain is a symptom that has been identified to be among the most prevalent for patients with cancer (Gordon et al., 2005;

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## Literature Review

symptom; temporal features include frequency and duration. Symptom *distress* was defined as the “degree or amount of physical or mental upset, anguish or suffering experienced from a specific symptom” (Rhodes et al., p. 313). Increasingly, investigators are evaluating distress as an important aspect of the symptom experience (Bruera et al., 2001; Graves et al., 2007; McMillan & Small, 2002; Portenoy, Thaler, Kornblith, Lepore, Friedlander-Klar, Kiyasu, et al., 1994).

The aspect of pain that continues to be assessed most frequently is intensity. However, the symptom with the highest intensity is not always the most distressing to the patient (McClement, Woodgate, & Degner, 1997; McMillan & Small, 2002; Portenoy, Thaler, Kornblith, Lepore, Friedlander-Klar, Coyle, et al., 1994; Tishelman, Degner, & Mueller, 2000). Particularly for patients with cancer, if pain is perceived as a symptom of progression of the disease, the affective dimension and the meaning of pain may have even more influence on the rating and recall of intensity (Smith, Gracely, & Safer, 1998).

Cancer pain interferes with patients’ lives and functioning. Therefore, in addition to pain severity and distress, ratings of pain interference also need to be examined (Serlin, Mendoza, Nakamura, Edwards, & Cleeland, 1995; Stromgren et al., 2006; Vallerand, 1997; Wells, Murphy, Wujcik & Johnson, 2003). Although more pain tends to cause more interference with daily activities, the pain severity-interference relationship is nonlinear; moderate-to-severe pain rather than very severe pain seems to cause more interference with function (Serlin et al.).

Pain also is believed to interfere with sleep in patients with cancer. Strong and complex relationships exist between pain and sleep disturbance (Given, Given, Azzouz, & Stommel, 2001; Miaskowski & Lee, 1999; Mystakidou, Parpa, Tsilika, Pathiaki, Gennatas, et al., 2007). However, because of the cross-sectional nature of most of the work in this area, cause and effect relationships have not been established (Vena et al., 2006). Whether pain causes sleep disturbance or is exacerbated by fatigue and lack of sleep is unclear (Mystakidou, Parpa, Tsilika, Pathiaki, Patiraki, et al., 2007).

Depressive symptoms and pain have been identified by the NIH as areas needing research (Patrick et al., 2003). Pain and depressive symptoms commonly are experienced by people with cancer and frequently occur simultaneously (Fleishman, 2004; Hauser, Rybicki, & Walsh, 2006; Reyes-Gibby, Aday, Anderson, Mendoza, & Cleeland, 2006). Despite the prevalence of these symptoms, often they are underassessed and undertreated (Patrick). The purpose of the present study was to describe the pain experience of outpatients with cancer and to explore the relationships among pain, sleep disturbance, depressive symptoms, and pain’s interference with patients’ daily lives. The following questions guided the study.

- What is the level of pain intensity (present, worst, least, and average) and pain distress in patients with cancer experiencing pain?
- What is their pain experience, including pain duration, pain descriptors, pain relief, goals, pain control satisfaction, and pain interference with activities?
- Are pain intensity or pain distress and intensity or distress from sleep disturbance significantly related?
- Are pain intensity, pain distress, or pain interference scores and depressive symptoms significantly related?

Symptoms and their interference with life increase with stage of cancer (Modonesi et al., 2005), although Tishelman, Taube, and Sachs (1991) found that this was not the case with distress. Symptoms cannot be addressed from a purely biomedical perspective; they are multidimensional. Assessment should include physical (intensity) and emotional (distress) aspects to provide comprehensive understanding of patients’ pain (Wells et al., 2003).

### Symptom Occurrence

Pain commonly is seen in patients with advanced cancer. In two samples of hospice patients with cancer, pain consistently was among the top two or three symptoms patients reported with percentages ranging from 80%–83% (McMillan & Small, 2002; McMillan, 1996). Pain intensity can be described as none, mild, moderate, or severe and may have numeric associations of 0 for none, 1–3 for mild, 4–5 for moderate, and 7–10 for severe. The scales used most frequently for assessment of the single dimension of pain intensity are the visual analog scale (VAS) or numeric rating scale (NRS) (Modonesi et al., 2005; Vallerand, 1997). The NRS has shown greater reliability than the VAS, particularly with undereducated and older adult patients (Vallerand). When examining pain as mild (1–4), moderate (5–6), or severe (7–10), Serlin et al. (1995) found that steps between 4–7 were more strongly related to interference with function than higher steps in the assessment.

### Symptom Distress

Melzack and Wall (1965) proposed that central nervous system activities that control attention, emotion, and memories of prior experiences exert control over sensory input such as painful stimuli. Their work led the way for future investigators to explore the sensory and affective aspects of pain. Distress scales measure the degree of upset, anguish, or suffering caused by pain. Several researchers have called for differentiating symptom distress from symptom intensity and frequency (Chiou, 1998; McClement et al., 1997; Rhodes et al., 1998; Tishelman et al., 2000). Chiou defined symptom distress as “how bothered” the patients were by the symptom. The Memorial Symptom Assessment Scale (MSAS) (Portenoy, Thaler, Kornblith, Lepore, Friedlander-Klar, Kiyasu, et al., 1994) is a more comprehensive and multidimensional tool than some others (Vallerand, 1997). Portenoy, Thaler, Kornblith, Lepore, Friedlander-Klar, Coyle, et al. (1994) reported, based on a study of 243 patients, that the proportion of patients who described a symptom as intense or frequent always exceeded the proportion who reported it as distressing, and that the number of symptoms reported was highly associated with greater psychological distress and poorer quality of life using the Functional Living Index-Cancer. They also found that reporting distress along with frequency or severity gave more information than just distress alone. Findings reported by McMillan and Small (2007) using the COPE (calming the nervous system, originating an imaginative plan, persisting in the face of obstacles and failure, evaluating and adjusting the plan) intervention in a randomized control study of 329 hospice patients included a significant improvement in symptom distress while symptom intensity remained constant as the disease progressed. Stromgren et al., (2006) reported similar findings with 175 patients in palliative care who identified pain intensity as the highest priority

symptom; however, pain priority decreased from 44% to 25% over a three-week period.

Some symptom researchers have not carefully delineated symptom intensity and symptom distress. The Edmonton Symptom Assessment System measures intensity of nine different symptoms separately, and scores are summed for an overall symptom distress score. This interpretation of scores suggests that intensity equals distress, an equation that would be questioned by other symptom researchers studying distress (McMillan & Small, 2002; Rhodes et al., 1998). In a study of 32 patients undergoing experimental cancer treatment, pain intensity and pain-affect ratings were measured before and after physical therapy interventions. Although intensity significantly increased ( $p < 0.01$ ) after the intervention, pain affect or distress did not. In addition, patients who believed their pain was related to cancer had higher distress and intensity than those who did not relate the pain to the disease (both  $p < 0.05$ ) (Smith et al., 1998).

### **Pain Interference**

Vallerand, Templin, Hasenau, and Riley-Doucet (2007) evaluated 304 patients with cancer-related pain for pain intensity, location, duration, cause, and descriptors as measured by the Brief Pain Inventory-Short Form (BPI-SF), including the pain interference subscale. Two items measured symptom distress and pain-related distress. The mean pain score was 6.67 (SD = 2.37) on a 0–10 point scale, and pain-related distress was 3.76 (SD = 1.88) on a 0–4 scale. Participants reported a moderate level of interference by pain with all activities. The activities that were rated as most interfered with were work, sleep, enjoyment of life, mood, and general activities.

Wells et al. (2003) used the BPI-SF, a pain-related single-item distress scale, the Profile of Mood States-Short Form, and adequacy of prescribed analgesics in a study of ambulatory patients with cancer. They reported that the unique variance explained by pain-related distress ( $p < 0.001$ ) was beyond the variance explained by intensity, analgesics, or mood.

### **Sleep Disturbance**

Sleep disturbances are a common problem for people with cancer and may precede a cancer diagnosis or be prompted by situational factors such as emotional stress, lifestyle changes, medications or unpleasant physical symptoms such as dyspnea or pain (Berger et al., 2005; Clark, Cunningham, McMillan, Vena, & Parker, 2004; Palesh et al., 2007; Vena, Parker, Cunningham, Clark, & McMillan, 2004). Depression, fatigue, decreased physical functioning, and lower health-related quality of life are associated with sleep disturbance (Given et al., 2001; Palesh et al., 2007; Roscoe et al., 2007; Vena et al., 2006).

Cancer pain is associated with trouble falling asleep, staying asleep, and daytime sleepiness (Palesh et al., 2007; Vena et al., 2006). Although patients with cancer pain experience sleep disturbances, the use of opioids and benzodiazepines do not seem to help patients sleep better (Paltiel et al., 2004). To the contrary, the use of opioids and benzodiazepines for sleep are associated with greater sleep difficulty and lower health-related quality of life (Mystakidou, Parpa, Tsilika, Pathiaki, Gennatas, et al., 2007; Mystakidou, Parpa, Tsilika, Pathiaki, Patiraki, et al., 2007; Paltiel et al.). Some nonpharmacologic interventions, including exercise (Young-McCaughan et al., 2003), relaxation techniques, guided imagery, somatic focusing, cognitive behavioral therapy, education, expressive writ-

ing, and mindfulness-based stress reduction have been shown to be useful in previous research (Clark et al., 2004).

Whether distress over sleep disturbance worsens as pain becomes more severe is unknown. Some evidence suggests that sleep problems continue to intensify, even when pain levels stabilize (Palesh et al., 2007). Specific studies examining the relationship between pain intensity or distress and distress from sleep disturbance have not been conducted.

### **Depressive Symptoms**

Current studies of relationships between depressive symptoms and pain reveal inconsistent results (Teunissen, de Graeff, Voest, & de Haes, 2007). Two cross-sectional studies of patients with advanced malignancy showed no relationship between pain and depressive symptoms (Mystakidou et al., 2006; Teunissen et al.). Several other studies reported significant relationships between the two symptoms (Kurtz, Kurtz, Stommel, Given, & Given, 2002; Mystakidou, Tsilika, et al., 2007; Reyes-Gibby et al., 2006).

Mystakidou et al. (2006) examined relationships between pain and depression in 120 Greek patients using the Greek versions of the BPI (G-BPI) and Hospital Anxiety and Depression Scale (HADS) and found no correlation between pain and depression. The same group of researchers followed this study with a similar study using the Beck Depression Inventory and documented significant relationships among pain severity, pain interference, and depressive symptoms (Mystakidou, Tsilika, et al., 2007).

Teunissen et al. (2007) also used the HADS as a measure of depressive symptoms in 79 hospitalized Dutch patients and found no relationship between depressive symptoms and any physical symptoms, including pain. The authors concluded that the HADS may overestimate depressive symptoms in patients with advanced cancer and does not correlate well with individual reports of depressive symptoms. Interestingly, the authors hypothesized that perhaps as cancer progresses, the relationship between symptoms and mood diminishes. No empirical data were found in a review of the literature that supported this hypothesis but future longitudinal studies may provide evidence to support it (Teunissen et al.).

Patients report that depressive symptoms are among the most distressing symptoms they experience (Stromgren et al., 2006). However, without use of a systematic screening instrument for depression, the majority of cases of depression are not detected by physicians and other healthcare providers in a variety of healthcare settings (Callahan et al., 1994). Poor physical (Reiner & Lacasse, 2006) and social functioning (Kurtz et al., 2002) are associated with pain and depressive symptoms. Depressive symptoms may be correlated with pain interference with enjoyment of life, pain severity, pain interference with general activity, pain interference with mood, and pain interference with normal work (Kurtz et al.; Mystakidou et al., 2006; Mystakidou, Tsilika, et al., 2007).

### **Conceptual Linkages Among Variables**

The literature reveals that pain is a distressing symptom that has the potential to influence almost every aspect of patients' lives, significantly impairing physical and psychological well-being (Patrick et al., 2003; Wells et al., 2003). Pain intensity, distress, and interference with life are important factors to consider as part of pain assessment (Serlin et al., 1995; Stromgren

et al., 2006; Vallerand, 1997; Wells et al.). Pain may interfere with sleep by keeping patients from falling asleep, waking them during the night, or interfering with quality of sleep (Palesh et al., 2007; Vena et al., 2006) and may also contribute to depressive symptoms (Kurtz et al., 2002; Mystakidou et al., 2006; Mystakidou, Tsilika, et al., 2007) such as dysphoria, hopelessness, and lack of enjoyment in life. Despite a vast amount of research that has examined pain in cancer populations, the experience of pain and the relationships among pain, sleep, and depressive symptoms are still not well understood. A thorough understanding of these relationships is critical for healthcare professionals to provide appropriate symptom management to patients. Therefore, this study was undertaken to provide further insight into the relationships among pain intensity and distress, sleep, and depressive symptoms, and how pain affects the daily lives of patients with cancer.

## Methods

The present preliminary study was conducted using baseline data from a larger intervention study supported by the NIH (5R01 008270). Descriptive data were analyzed using the first 85 patients accrued to the study. Although the focus of the intervention for the larger study was to support family caregivers of patients experiencing cancer pain, this analysis focused only on patient symptoms.

### Sample

The sample was accrued at a large comprehensive cancer center designated by the National Cancer Institute in the southeastern United States. Patients had to have a diagnosis of cancer in any stage and present pain intensity at a level of at least 3 on a 0–10 scale. Patients had to be at least 18 years old, have at least a sixth grade education, and have no documented neurologic or psychiatric disorders that would interfere with self-report. Patients were excluded if they did not have a family caregiver, if they had a history of psychiatric problems, or if they were unable to read and understand English.

### Instruments

Presence, severity, and distress of pain and presence, severity, and distress from sleep disturbance were all assessed using the MSAS (Portenoy, Thaler, Kornblith, Lepore, Friedlander-Klar, Kiyasu, et al., 1994). The complete MSAS consists of 33 items, reflecting symptoms commonly associated with cancer in three dimensions: (a) severity of the symptom, (b) frequency with which it occurs, and (c) the distress it produces. The items are scored by summing the items in each subscale (e.g., physical, psychological). The higher the score, the more severe, frequent, or distressing the symptoms are for patients (Portenoy, Thaler, Kornblith, Lepore, Friedlander-Klar, Coyle, et al., 1994; McMillan & Small, 2002).

Validity and reliability data for the original tool have been strong when the tool was used with patients receiving active cancer therapy. Factor analysis confirmed two factors that distinguished three major groups of symptoms. The three confirmed groups of symptoms were psychological, high prevalence physical symptoms, and low prevalence physical symptoms (Portenoy, Thaler, Kornblith, Lepore, Friedlander-Klar, Kiyasu, et al., 1994). Reliability coefficients indicated strong internal consistency for the subscales ( $\alpha =$

0.83–0.92). For this study, only selected items were used in the analysis, including presence, severity, and distress of pain and sleep disturbance.

The BPI is a self-report scale that includes items about present pain and pain at its worst, least, and on average over the prior 24 hours. The seven-item Interference Subscale assesses pain's interference with daily functioning with subscale scores ranging from 0–70. The subscale asks patients to rate the extent to which their pain interferes with seven functional areas using a series of 0–10 point scales. Evidence of validity was provided by Serlin et al. (1995), who found significant correlations of the Interference Subscale with functional impairment and mood disturbance items from the POMS. Using four cultural groups, Serlin et al. assessed reliability using Cronbach alpha. Resulting alphas ranged from 0.86–0.91. Test-retest reliability was strong for worst pain ( $r = 0.93$ ) and average pain ( $r = 0.78$ ).

The Center for Epidemiological Studies Scale–Depression (CES-D) is a 20-item self-report scale that assesses current depressive symptoms. The CES-D (Radloff, 1977) is a widely used scale that has proven useful as a screening instrument to detect individuals at risk for depression and to measure the symptoms of depression. The CES-D has been translated into multiple languages and has impressive reliability, validity, sensitivity, and specificity. Factor analysis confirmed the structure of the scale. Cronbach alphas were 0.85 for the general public and 0.90 for the psychiatric population (Lewinsohn, Seeley, Roberts, & Allen, 1997).

Demographic data were collected to allow description of the sample. Demographic data included age, gender, ethnicity, years of education, religious affiliation, and marital status. Included also on this form were questions about duration of the pain, goals for pain relief, and satisfaction with pain relief.

### Procedures

The study was approved by the Protocol Research Monitoring Committee at the cancer center and the institutional review board of the University of South Florida. Patients were invited to participate during a regularly scheduled clinic visit at the cancer center. The study was explained, questions answered, and the consent signed before data collection began. The baseline data, collected at the first meeting with the patients, was entered into a database for analysis.

### Data Analysis

Demographic data were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations. Research questions one and two also were analyzed using descriptive statistics. Research questions three and four were analyzed using a series of Pearson correlation coefficients.

## Results

### Sample

The sample was almost equally divided between men and women who were predominantly white, married, and Christian (see Table 1). Family incomes ranged from less than \$10,000 to more than \$100,000. Patients had a mean age of about 54 years ( $SD = 12.1$ ) and reported an average of 13 years ( $SD = 2.2$ ) of formal schooling.

**Table 1. Demographic Characteristics**

Variable	n	%
<b>Gender</b>		
Male	43	51
Female	42	49
<b>Ethnicity</b>		
White	77	91
Black	3	4
Hispanic	3	4
Other	2	2
<b>Marital status</b>		
Married or cohabiting	75	88
Divorced or separated	7	8
Single, never married	2	2
Widowed	1	1
<b>Religious preference</b>		
Non-Catholic Christian	38	45
Catholic	21	25
Jewish	1	1
Other	18	21
None	7	8
<b>Family income (\$)</b>		
< 10,000	4	5
10,001–19,999	13	15
20,000–39,999	20	24
40,000–59,999	21	25
60,000–100,000	10	12
100,000	7	8
Prefer not to answer	10	12

N = 85

*Note.* Because of rounding, not all percentages total 100.

### Pain Intensity

Present pain intensity was assessed on items from two scales, the BPI and the MSAS. On the 0–10 scale from the BPI, the mean pain intensity was in the middle range at 4.6 (SD = 2.3) while pain at its worst on the same scale was high at 8.3 (SD = 1.7), and pain at its least was 3.0 (SD = 1.9) (see Table 2). Average pain over the prior 24 hours was 5.2 (SD = 1.9). The pain severity item on the MSAS asked about intensity and distress on a 1–3 scale. Mean intensity on this scale was 2.4 (SD = 0.62), which is well above the midpoint (would equate to a 7.0 on a 0–10 scale), whereas distress (measured on a 0–3 scale) was 2.2 (SD = 0.87).

**Table 2. Pain and Sleep Intensity and Distress Scores**

Variable	Possible Range	N	$\bar{X}$	SD
<b>Brief Pain Inventory Intensity</b>				
Present	0–10	85	4.6	2.30
Worst	0–10	85	8.3	1.70
Least	0–10	85	3.0	2.10
Average	0–10	85	5.2	1.90
<b>Memorial Symptom Assessment Scale</b>				
Pain severity	1–3	83	2.4	0.62
Pain distress	0–3	84	2.2	0.87
Sleep disturbance severity	1–3	54	2.3	0.65
Sleep disturbance distress	0–3	54	2.2	0.74
<b>Center for Epidemiological Studies Scale–Depression</b>				
Total	0–60	8.3	20.8	10.70

### Pain Experience

All patients had a problem with pain, and patients reported that their pain had lasted 1–372 months, with a group average of 28.8 months. When asked their goal for pain relief on a 0 (no relief) to 10 (complete relief) scale, patient responses ranged from 0–10 with a mean of 6.4. When asked about their satisfaction with current pain control, patient responses again ranged from 0–10 with a mean of 6.0 (see Table 3).

The Pain Interference Subscale of the BPI has seven items and total scale scores that can range from 0–70. The mean interference score for the group was 42.8 (SD = 17.4). The terms used most commonly by this group of patients to describe their pain were aching, sharp, miserable, throbbing, and penetrating (see Table 4). The term used least frequently (8% of patients) was dull.

### Relationship Between Pain and Sleep

A total of 54 patients (64%) reported a problem with sleep disturbance. Severity and distress of patients' sleep disturbance were assessed on 0–4 scales. Mean severity was 2.3 (SD = 0.65) and mean distress was 2.2 (SD = 0.74).

No correlation was found between intensity of sleep disturbance and either pain intensity or pain distress (see Table 5). However, distress from sleep disturbance was significantly correlated with both pain intensity ( $r = 0.37$ ,  $p = 0.006$ ) and pain distress ( $r = 0.51$ ,  $p = 0.000$ ). In addition, the pain's interference with sleep, measured by an item from the BPI interference scale, was significantly correlated with both sleep disturbance intensity ( $r = 0.51$ ,  $p < 0.001$ ) and sleep disturbance distress ( $r = 0.66$ ,  $p > 0.001$ ). Severity and distress from sleep disturbance also were significantly correlated ( $r = 0.72$ ,  $p < 0.001$ ) with each other.

### Relationship Between Pain and Depressive Symptoms

Several significant correlations were found between depressive symptoms and other symptoms. Pain severity, pain distress, pain right now (from the BPI) and the Pain Interference Subscale scores all were significantly correlated with CES-D scores. In addition, all of the item scores on the Pain Interference Subscale were significantly correlated with depressive symptoms. The strongest item correlation was with the item asking whether pain interferes with mood, followed by the item about pain interfering with relationships. However, pain at its least, average pain,

**Table 3. Pain Duration, Goal for Pain Relief, Satisfaction With Pain Control, and Pain Interference Scores**

Variable	N	$\bar{X}$	SD	Range
Pain duration in months	76	28.8	56.4	1–372
Goal for pain relief	84	6.4	4.1	0–10
Satisfaction with pain control	84	6.0	2.7	0–10
Interference score	85	42.8	17.4	0–70

sleep disturbance severity, and sleep disturbance distress were not correlated with depressive symptoms.

## Discussion

### Sample

A strength of the sample was the almost equal representation of men and women; however, several limitations were found. The sample was not large; a very small sample of minority patients participated; patients had to be able to read and understand English, which eliminated several minority patients; and all patients came from one cancer center in a single geographic location. Future studies should include a more ethnically and geographically diverse sample. An additional limitation was the failure to gather information about the stage of the cancers. This was attempted, but the data were found to be so unreliable that stage was omitted as a variable. Although stage of disease might be in every patient record, how up-to-date the information was had a great deal of variability. For example, the stage might have been recorded the first time the patient was seen and never updated, although it was obvious that the patient's cancer had advanced. Therefore, these data were not included.

The sample was younger than the average patient with cancer at 54 years. Earlier samples in the same geographic region have found a higher average age, up to a 10 years older (McMillan, Tittle, Hagan, & Laughlin, 2000). The younger age is most likely because patients came from a cancer center that is a tertiary referral center for patients diagnosed at other places; older patients are less likely to be referred to a cancer center, but rather are treated in their local communities.

**Table 4. Pain Terms Used by Patients to Describe Pain**

Descriptive Term	N	%
Aching	54	64
Sharp	47	55
Miserable	40	47
Throbbing	37	44
Penetrating	35	41
Stabbing	32	38
Tiring	31	37
Exhausting	29	34
Nagging	29	34
Tingling	25	29
Numb	25	29
Tender	25	29
Burning	24	28
Shooting	24	28
Gnawing	22	26
Unbearable	18	21
Electric-like	15	18
Dull	7	8

The fact that the majority of the patients were married was most likely a result of two issues: the younger age group meant fewer were likely to be widowed, and the larger study from which the data were taken required patients to have a family caregiver; therefore, patients with no spouse were less likely to be included. The presence of an available family caregiver might have biased the results in some unknown ways.

The breakdown of patients by religious preference appears to mirror the community in which the study was conducted. Family income levels were diverse, with some patients having incomes well above the national average. More than half of those who reported their income had incomes higher than \$40,000 per year. In addition, the group appeared to be fairly well educated. Both of these latter findings were likely related to the fact that the sample was drawn from a regional cancer center. Patients who are well-educated and have financial resources are more likely to seek care at a NCI-designated cancer center.

### Pain Intensity and Pain Experience

Given that cancer pain is more likely to occur in more advanced stages of cancer, it is remarkable that the average length of time the patients had been experiencing the pain was 28 months. This finding suggests that patients are living longer with more advanced and painful cancers and that healthcare professionals need to work harder to find ways to diagnose and relieve pain. The patients were asked about their goal for pain relief. Although the mean (6.4) looks reasonable, several patients reported a zero (no relief) on this item, leading investigators to conclude that they were confused about what the item was asking. The item is from a validated scale, the BPI, but it apparently was not reliable in this group. Patients were given forms to take home for completion. Perhaps in future studies, patients with advanced diseases should have assistance with completing forms to ensure that they are completed correctly.

Patients were not entirely satisfied with their current level of pain control. A mean of 6.0 is too far below an acceptable level for a comprehensive cancer center where a palliative care team is available to all patients. Some patients recorded very low scores on this item. This finding was supported by the mean scores found on the present pain intensity measures. Patients reported their present pain to cover the range, all the way up to the maximum for some patients. This unrelieved pain suggests that nurses need to be more vigilant in seeking pain control measures for their patients in pain. It also should be noted that the strong, positive correlation ( $r = 0.73$ ,  $p < 0.001$ ) found between pain intensity and pain distress indicates that as the pain increases, the distress increases; therefore, to decrease distress, nurses must work to decrease pain intensity.

The terms used to describe cancer pain were to be expected. Patients most commonly reported their pain to be aching, sharp, miserable, throbbing, and penetrating. One type of pain that

patients might experience is neuropathic pain. Slightly more than a quarter of patients used descriptive terms that would describe neuropathic pain: tingling (29%), numb (29%), burning (28%), and shooting (28%). Almost 18% described the pain as electric-like. Use of these terms makes it clear that not all pain is of the same type; therefore, healthcare providers need to do a complete assessment of the pain including a patient description to offer the most appropriate interventions.

### Anecdotal Findings

The original design of the study dictated that patients with pain would be referred to the study by attending physicians and primary nurses; however, the accrual was so low that the research team suspected that patients were being missed. So, the focus of the design was changed to asking patients waiting to be seen if they had a problem with pain; the accrual suddenly doubled. The change occurred after the patients in the present study were accrued. However, this unexpected finding supports the fact that even in the face of “pain as the fifth vital sign” and a strong focus on pain management by accrediting bodies, patients are still experiencing pain that is unrecognized by healthcare providers.

Research assistants also noted that patients with pain who declined to participate did so because they felt that their pain was under control. Also, it should be noted that the study required that patients be having pain of at least a 3 on the 0–10 scale. The research assistants estimated that approximately one-third of patients with pain were not accrued to the study because their pain was already being well-managed. This led them to conclude that some of the oncologists in the cancer center are doing a more effective job of managing pain than many of the others.

### Pain and Sleep

Pain and sleep disturbance often have been linked in the literature (Given et al., 2001; Miaskowski & Lee, 1999; Mystakidou, Parpa, Tsilika, Pathiaki, Gennatas, et al., 2007). On the MSAS pain items, 63% of patients reported a problem with sleep disturbance with intensity and distress means well above the midpoint of the scales ( $\bar{X} = 2.3$  and 2.2). The literature suggests a host of reasons that patients with cancer might have sleep disturbances other than pain, including emotional stress, medications, depression, and unpleasant physical symptoms (Clark et al., 2004; Given et al.; Palesh et al., 2007; Roscoe et al., 2007; Vena et al., 2004, 2006). However, on the BPI, patients reported that it was pain that interfered with their sleep. A total of 58 patients (68%) marked a score of 5–10 on the sleep disturbance scale. Therefore, for this group of patients, although other causes of sleep disturbances may exist, clearly pain was an important one.

Analysis of the relationships between pain and sleep items seems to suggest that intensity of sleep disturbance is not the issue but rather it is distress from the sleep disturbance. No relationships were found between pain intensity and sleep intensity but significant relationships were found between pain intensity and pain distress with sleep distress, suggesting that for these patients, as pain intensity and pain distress increased, distress from sleep disturbances also increased. Sleep is a critical element of quality of life. Loss of sleep can have a negative impact on all activities of daily living and enjoyment of life. Therefore, relieving pain is important to improving sleep and overall quality of life. The strongest relationship was found between sleep

**Table 5. Relationships Between Depressive Symptoms and Other Symptoms**

Variable	CES-D Scores		
	N	r	p
Pain severity	83	0.35	0.001
Pain distress	82	0.45	< 0.001
Pain right now (Brief Pain Inventory)	85	0.31	0.002
Pain at its worst	83	0.33	0.002
Pain at its least	85	0.11	0.330
Pain on average	85	0.19	0.080
Pain control satisfaction	84	-0.19	0.090
Sleep disturbance severity	54	0.23	0.100
Sleep disturbance distress	54	0.22	0.110
Pain interference with			
Mood	85	0.60	<0.001
Relationships	84	0.59	< 0.001
Enjoyment of life	85	0.54	< 0.001
General activity	85	0.46	< 0.001
Sleep	85	0.43	< 0.001
Normal work	85	0.41	< 0.001
Walking ability	84	0.25	0.022
Pain interference total score	85	0.56	< 0.001

CES-D—Center for Epidemiological Studies Scale–Depression

intensity and sleep distress, indicating that the greater the sleep disturbance, the greater patients’ sleep distress.

### Relationship Between Pain and Depressive Symptoms

Depression is commonly found in patients with cancer pain (Kurtz et al., 2002; Mystakidou, Parpa, Tsilika, Pathiaki, Patriaki, et al., 2007; Reyes-Gibby et al., 2006). Study findings supported earlier research in that pain severity, pain distress, pain right now, and pain at its worst all were significantly correlated with CES-D scores. However, the average pain item did not show such a correlation. Similar problems with the average pain item from the BPI were found by Tittle, McMillan, and Hagan (2003) in their study of pain in surgical patients with cancer. In their study, all pain items on the BPI correlated at the expected level with the visual analog pain measure except average pain, which showed a correlation approaching zero. The lack of a significant correlation with the pain on an average item from the BPI is not completely unexpected because it depended on patients’ memory of events over a period in the past. Therefore, these scores may be unreliable because of issues of memory resulting in a nonsignificant finding.

Scores on depressive symptoms also were significantly correlated with the total scores from the Pain Interference Subscale of the BPI. As the pain increasingly interfered with patient’s daily activities and relationships, the depressive symptoms increased. To determine where the strongest relationships might lie, the investigators also explored relationships between depressive symptoms and individual items on the Pain Interference Subscale. It was expected that the strongest relationships would be between the mood, relationships, and enjoyment of life items. However, significant relationships were found with all items on the Pain Interference Subscale. Again, this data clearly indicate that improving patients’ pain might result in less interference of that pain with patients’ lives and result in a reduction of depressive symptoms.

## Conclusions and Implications for Nursing

In an era when many technologic and pharmacologic advances have been made in the battle against cancer pain, it is remarkable that patients continue to have problems with pain, and with sleep and depressive symptoms related to that pain while receiving care in a cancer center. Improvements are needed in the clinical setting to address unrelieved pain and the problems that accompany it. Nurses need to assess pain regularly, plan for its relief, and advocate with physicians to

seek better ways to relieve it. Hospital education departments and schools of nursing need to increase their focus on teaching pain assessment and management as a way to increase the knowledge and skills of nurses who can then better manage pain. Future research also is needed to confirm these findings and to test interventions that will support nurses in their attempts to relieve cancer pain.

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## References

- Armstrong, T., Cohen, M., & Eriksen, J. (2004). Symptom clusters in oncology patient and implications for symptom research in people with primary brain tumors. *Journal of Nursing Scholarship, 36*(3), 197–206.
- Berger, A.M., Parker, K.P., Young-McCaughan, S., Mallory, G.A., Barsevick, A.M., Beck, S.L., et al. (2005). Sleep wake disturbances in people with cancer and their caregivers: State of the science [Online exclusive]. *Oncology Nursing Forum, 32*(6), E98–E126. Retrieved May 27, 2008, from <http://ons.metapress.com/content/7244v4525u2j6408/?p=55d8a2dfb89449aba9d97241fb728425&pi=19>
- Bruera, E., Michaud, M., Vigano, A., Neumann, C.M., Watanabe, S., & Hanson, J. (2001). Multidisciplinary symptom control clinic in a cancer center: A retrospective study. *Supportive Care in Cancer, 9*(3), 162–168.
- Callahan, C.M., Hendrie, H.C., Dittus, R.S., Brater, D.C., Hui, S.L., & Tierney, W.M. (1994). Improving treatment of late-life depression in primary care: A randomized clinical trial. *Journal of the American Geriatrics Society, 42*(8), 839–846.
- Chiou, C. (1998). Development and psychometric assessment of the physical symptom distress scale. *Journal of Pain and Symptom Management, 16*(2), 87–95.
- Clark, J., Cunningham, M., McMillan, S.C., Vena, C., & Parker, K. (2004). Sleep-wake disturbances in people with cancer part II: Evaluating the evidence for clinical decision making. *Oncology Nursing Forum, 31*(4), 747–771.
- Fleishman, S.B. (2004). Treatment of symptom clusters: Pain, depression, and fatigue. *Journal of the National Cancer Institute Monographs, 32*, 119–123.
- Given, B., Given, C., Azzouz, F., & Stommel, M. (2001). Physical functioning of elderly cancer patients prior to diagnosis and following initial treatment. *Nursing Research, 50*(4), 222–232.
- Gordon, D.B., Dahl, J.L., Miaskowski, C., McCarberg, B., Todd, K.H., Paice, J.A., et al. (2005). American Pain Society recommendations for improving the quality of acute and cancer pain management: American Society Quality of Care Task Force. *Archives of Internal Medicine, 165*(14), 1574–1580.
- Graves, K.D., Arnold, S.M., Love, C.L., Kirsh, K.L., Moore, P.G., & Passick, S.D. (2007). Distress screening in a multidisciplinary lung cancer clinic: Prevalence and predictors of clinically significant distress. *Lung Cancer, 55*(2), 215–224.
- Hauser, K., Rybicki, L., & Walsh, D. (2006). Do pain, depression and fatigue cluster in advanced cancer? Paper presented at the 2006 ASCO Annual Meeting Proceedings Part I. *Journal of Clinical Oncology, 24*(18S), 8522.
- Kurtz, M.E., Kurtz, J.C., Stommel, M., Given, C.W., & Given, B. (2002). Predictors of depressive symptomatology of geriatric patients with lung cancer—A longitudinal analysis. *Psycho-Oncology, 11*(1), 12–22.
- Lenz, E.R., Pugh, L.C., Milligan, R.A., Gift, A., & Suppe, F. (1997). The middle range theory of unpleasant symptoms: An update. *Advances in Nursing Science, 19*(3), 14–27.
- Lewinsohn, P.M., Seeley, J.R., Roberts, R.E., & Allen, N.B. (1997). Center for Epidemiological Studies-Depression Scale (CES-D) as a screening instrument for depression among community-residing older adults. *Psychology and Aging, 12*(2), 277–287.
- McClement, S.E., Woodgate, R.L., & Degner, L. (1997). Symptom distress in adult patients with cancer. *Cancer Nursing, 20*(4), 236–243.
- McMillan, S.C. (1996). Pain and pain relief experienced by hospice patients with cancer. *Cancer Nursing, 19*(4), 298–307.
- McMillan, S.C., & Small, B. (2002). Symptom distress and quality of life in patients with cancer and newly admitted to hospice home care. *Oncology Nursing Forum, 29*(10), 1421–1426.
- McMillan, S.C., & Small, B. (2007). Using the COPE intervention for family caregivers to improve symptoms of hospice patients: A clinical trial. *Oncology Nursing Forum, 34*(2), 313–321.
- McMillan, S.C., Tittle, M., Hagan, S., & Laughlin, J. (2000). Management of pain and pain-related symptoms in hospitalized veterans with cancer. *Cancer Nursing, 23*(5), 327–336.
- Melzack, R., & Wall, P. (1965). Pain mechanisms: A new theory. *Science, 150*(3699), 971–979.
- Miaskowski, C., & Lee, K.A. (1999). Pain, fatigue, and sleep disturbances in oncology outpatients receiving radiation therapy for bone metastasis: A pilot study. *Journal of Pain and Symptom Management, 17*(5), 320–332.
- Modonesi, C., Scarpi, E., Maltoni, M., Derni, S., Fabbri, L., Martini, F., et al. (2005). Impact of palliative care unit admission on symptom control evaluated by the Edmonton Symptom Assessment System. *Journal of Pain and Symptom Management, 30*(4), 367–373.
- Mystakidou, K., Parpa, E., Tsilika, E., Pathiaki, M., Gennatas, K., Smyrniotis, V., et al. (2007). The relationship of subjective sleep quality, pain, and quality of life in advanced cancer patients. *Sleep, 30*(6), 737–742.
- Mystakidou, K., Parpa, E., Tsilika, E., Pathiaki, M., Patiraki, E., Galanos, A., et al. (2007). Sleep quality in advanced cancer patients. *Journal of Psychosomatic Research, 62*(5), 527–533.
- Mystakidou, K., Tsilika, E., Parpa, E., Katsouda, E., Galanos, A., & Vlahos, L. (2006). Psychological distress of patients with advanced cancer: Influence and contribution of pain severity and pain interference. *Cancer Nursing, 29*(5), 400–405.
- Mystakidou, K., Tsilika, E., Parpa, E., Pathiaki, M., Patiraki, E., Galanos, A., et al. (2007). Exploring the relationships between depression, hopelessness, cognitive status, pain, and spirituality in patients with advanced cancer. *Archives of Psychiatric Nursing, 21*(3), 150–161.
- Palesh, O.G., Collie, K., Batiuchok, D., Tilston, J., Koopman, C., Perlis, M.L., et al. (2007). A longitudinal study of depression, pain, and stress as predictors of sleep disturbance among women with metastatic breast cancer. *Biological Psychology, 75*(1), 37–44.
- Paltiel, O., Marzec-Boguslawska, A., Soskolne, V., Massalha, S., Avitzour, M., Pfeffer, R., et al. (2004). Use of tranquilizers and sleeping pills among cancer patients is associated with a poorer quality of life. *Quality of Life Research, 13*(10), 1699–1706.
- Patrick, D.L., Ferketich, S.L., Frame, P.S., Harris, J.J., Hendricks, C.B., Levin, B., et al. (2003). National Institutes of Health State of the Science Conference Statement: Symptom management in cancer: Pain, depression and fatigue July 15–17, 2002. *Journal of National Cancer Institute, 95*(15), 1110–1117.
- Portenoy, R., Thaler, H., Kornblith, A., Lepore, J., Friedlander-Klar, H., Coyle, T., et al. (1994). Symptom prevalence, characteristics and distress in a cancer population. *Quality of Life Research, 3*(3), 183–189.

- Portenoy, R., Thaler, H., Kornblith, A., Lepore, J., Friedlander-Klar, H., Kiyasu, F., et al. (1994). The Memorial Symptom Assessment Scale: An instrument for the evaluation of symptom prevalence, characteristics and distress. *European Journal of Cancer*, 30A(9), 1326–1336.
- Radloff, L.S. (1977). The CES-D scale: A self report depression scale for research in the general population. *Applied Psychological Measurements*, 1(3), 385–401.
- Reiner, A., & Lacasse, C. (2006). Symptom correlates in the gero-oncology population. *Seminars in Oncology Nursing*, 22(1), 20–30.
- Reyes-Gibby, C.C., Aday, L.A., Anderson, K.O., Mendoza, T.R., & Cleeland, C.S. (2006). Pain, depression, and fatigue in community-dwelling adults with and without a history of cancer. *Journal of Pain and Symptom Management*, 32(2), 118–128.
- Rhodes, V.A., McDaniel, R.W., & Matthews, C.A. (1998). Hospice patients' and nurses' perceptions of self-care deficits based on symptom experience. *Cancer Nursing*, 21(5), 312–319.
- Roscoe, J.A., Kaufman, M.E., Matteson-Rusby, S.E., Palesh, O.G., Ryan, J.L., Kohli, S., et al. (2007). Cancer-related fatigue and sleep disorders. *Oncologist*, 12(Suppl. 1), 35–42.
- Serlin, R.C., Mendoza, T.R., Nakamura, Y., Edwards, K.R., & Cleeland, C.S. (1995). When is cancer pain mild, moderate or severe? Grading pain severity by its interference with function. *Pain*, 61(2), 277–284.
- Shin, H., Kim, K., Kim, Y., Chee, W., & Im, E. (2007). A comparison of two pain measures for Asian American cancer patients. *Western Journal of Nursing Research*, 29(5), 545–560.
- Smith, W., Gracely, R., & Safer, M. (1998). The meaning of pain: Cancer patients' rating and recall of pain intensity and affect. *Pain*, 78(2), 123–129.
- Stromgren, A.S., Sjogren, P., Goldschmidt, D., Petersen, M.A., Pedersen, L., & Groenvold, M. (2006). Symptom priority and course of symptomatology in specialized palliative care. *Journal of Pain and Symptom Management*, 31(3), 199–206.
- Teunissen, S.C., de Graeff, A., Voest, E.E., & de Haes, J.C. (2007). Are anxiety and depressed mood related to physical symptom burden? A study in hospitalized advanced cancer patients. *Palliative Medicine*, 21(4), 341–346.
- Tishelman, C., Degner, L., & Mueller, B. (2000). Measuring symptom distress in patients with lung cancer: A pilot study of experienced intensity and importance of symptoms. *Cancer Nursing*, 23(4), 82–90.
- Tishelman, C., Taube, A., & Sachs, L. (1991). Self-reported symptom distress in cancer patients: Reflections of disease, illness or sickness? *Social Science Medicine*, 33(11), 1229–1240.
- Tittle, M.B., McMillan, S.C., & Hagan, S. (2003). Validating the Brief Pain Inventory for use with surgical patients with cancer. *Oncology Nursing Forum*, 30(2), 1–6.
- Vallerand, A. (1997). Measurement issues in the comprehensive assessment of cancer pain. *Seminars in Oncology Nursing*, 13(1), 16–24.
- Vallerand, A., Templin, T., Hasenau, S., & Riley-Doucet, C. (2007). Factors that affect functional status in patients with cancer-related pain. *Pain*, 132(1–2), 82–90.
- Vena, C., Parker, K., Allen, R., Bliwise, D., Jain, S., & Kimble, L. (2006). Sleep-wake disturbances and quality of life in patients with advanced lung cancer. *Oncology Nursing Forum*, 33(4), 761–769.
- Vena, C., Parker, K., Cunningham, M., Clark, J., & McMillan, S. (2004). Sleep-wake disturbances in people with cancer part I: An overview of sleep, sleep regulation, and effects of disease and treatment. *Oncology Nursing Forum*, 31(4), 735–746.
- Walsh, D., & Rybicki, L. (2006). Symptom clustering in advanced cancer. *Supportive Care in Cancer*, 14(8), 831–836.
- Wells, N., Murphy, B., Wujcik, D., & Johnson, R. (2003). Pain-related distress and interference with daily life of ambulatory patients with cancer with pain. *Oncology Nursing Forum*, 30(6), 977–986.
- Young-McCaughan, S., Mays, M.Z., Arzola, S.M., Yoder, L.H., Dramiga, S.A., Leclerc, K.M., et al. (2003). Research and commentary: Change in exercise tolerance, activity and sleep patterns, and quality of life in patients with cancer participating in a structured exercise program. *Oncology Nursing Forum*, 30(3), 441–454.