Original Article

Effect of Cancer Pain on Performance Status, Mood States, and Level of Hope Among Taiwanese Cancer Patients

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Abstract
The purposes of this study were: 1) to compare performance status, mood states, and level of hope between patients with cancer pain and patients without cancer pain; and 2) to determine the relationships of pain intensity and pain interference with daily life to performance status, mood states, and level of hope. A total of 233 Taiwanese cancer patients with pain and 251 without pain participated. The self report instruments consisted of the Chinese version of the Profile of Mood States (POMS) short form, the Chinese version of the Herth Hope Index, the Brief Pain Inventory-Chinese version (BPI-C), the Chinese version of the Karnorfsy Performance Scale (KPS), and a demographic questionnaire. The major findings of this study were that cancer patients with pain reported significantly lower levels of performance status and higher levels of total mood disturbance than did cancer patients who did not experience pain after controlling for sex, disease stage, and recruitment site. In addition, patients with cancer pain experienced significantly more anger, fatigue, depression, confusion, and lethargy than did patients without pain after controlling for sex, disease stage, and recruitment site. Among patients with pain, pain intensity was significantly correlated with performance status and mood state, but not with level of hope. Pain interference with daily life was significantly correlated both with performance status, mood state, and level of hope. Pain intensity and pain interference were significantly correlated with each mood state as well as with total mood disturbance. This study has demonstrated the effect of cancer pain on patients' physical, psychological, and spiritual life and has supported the multidimensional notion of the cancer pain experience in Taiwanese patients. J Pain Symptom Manage 2003;25:29–37.

Key Words
Pain, cancer, performance status, mood states, hope

Introduction

Cancer pain has been postulated as a multidimensional phenomenon[1–3] having a significant impact on the overall quality of a cancer patient's life by influencing physical, psychological, and spiritual aspects.[4] Pain is the end

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product of a complex process that may involve emotional, spiritual, cognitive, and sensory components.[5] The concept of pain as a multidimensional phenomenon has greatly influenced the management and assessment of cancer pain. However, up until the last decade, very few researchers comprehensively addressed the simultaneous impact of pain on cancer patients' physical, psychological, and spiritual well-being (i.e., quality of life).[6] Only recently has the relationship between pain and quality of life dimensions been considered in the overall management of cancer pain.[4] There is a paucity of research comprehensively exploring the effect of cancer pain on important patient outcomes,[7] such as performance status, mood states, and level of hope. Moreover, there has been no study extensively investigating the effect of cancer pain in Taiwanese patients. Therefore, the purpose of this study is to investigate the impact of cancer pain on performance status, mood states, and level of hope among Taiwanese patients.

Performance status is a global assessment of a patient's ability for ambulation and self-care.[8] Since the first introduction of performance status assessment,[9] it has become an important prognostic indicator and a useful measure of the effect of cancer treatments.[10,11] Recently, performance status has been applied in cancer pain research to examine the relationship of performance status to cancer symptoms,[12] its effect on neuropsychological performance,[13] its predictive ability of adequate pain management,[14] and its usefulness as an outcome indicator of pain treatment.[15]

Pain causes not only physical but also psychological distress. Intense pain may cause patients' anxiety or worry about disease progression or death to increase,[16] which in turn may increase patients' mood disturbance. Although many studies have explored the relationship between pain and mood states, very little research has been done to compare the mood states between patients with cancer pain and patients without cancer pain.[17]

The effect of cancer pain on spiritual aspects of patients' lives has been little explored or understood. Hope is considered to be an important component of the spiritual dimension of quality of life in cancer patients with pain.[18] Hope is a multidimensional dynamic life force characterized by a confident yet uncertain expectation of achieving a future good which, to the hoping person, is realistically possible and personally significant.[19] Cancer pain may create a sense of hopelessness because patients fear that their lives are not worth continuing or patients lose the meaning of living if they must live in pain.[20] There has been no empirical study exploring the effect of cancer pain on patients' levels of hope.

Therefore, the purposes of this study were as follows: 1) to compare performance status, mood states, and levels of hope between patients with cancer pain and patients without cancer pain; and 2) to determine the relationships among pain and pain interference with daily life, performance status, mood states, and level of hope among Taiwanese cancer patients.

Methods

Subjects and Setting

This study was conducted at the oncology units and outpatient radiotherapy clinics of two teaching hospitals in the Taipei area of Taiwan from August 1999 to July 2000. A convenience sample consisting of inpatients and outpatients with and without cancer-related pain was recruited. To be included in the study patients had to a) be over the age of 18, b) have been given a diagnosis of cancer, and c) be able to communicate in Mandarin or Taiwanese. In addition to these criteria, to be included in the pain group patients had to have experienced pain related to cancer in the last 24 hours (1 or more on a 0–10 scale). Pain caused by surgery or other procedures was excluded.

A total of 233 cancer patients with pain and 251 cancer patients without pain ($n = 484$) participated in this study. Table 1 presents a demographic and pain profile of study participants. Compared to patients without pain, those with pain were more likely to be male, their disease was more likely to have metastasized, and they were more likely to be recruited from inpatient units (Table 1). Cancer sites in patients with pain included colorectal (16%), lung (16%), breast (10%), nasopharyngeal (9%), liver (9%), oral (8%), cervical (8%), gastric (6%), prostate (5%), lymphoma (5%), brain (3%), and various other types (5%). Cancer sites in patients without pain included breast (26%), colorectal (18%), liver (11%), cervical (10%), lung (8%), gastric (6%), nasopharyngeal (6%), oral (4%),

Table 1
Mean (SD) and Number (%) of Demographic and Pain Characteristics of Cancer Patients With Pain (n = 233) and Without Pain (n = 251)

Characteristics	Patients With Pain	Patients Without Pain	t or χ^2
Age (years)	58.06 (14.52)	58.50 (14.77)	t (482) = −0.32, ns
Education (years)	8.28 (5.11)	8.81 (5.15)	t (482) = −1.15, ns
Worst pain	5.20 (3.34)	—	—
Least pain	1.03 (1.60)	—	—
Average pain	2.43 (2.14)	—	—
Pain now	1.54 (2.01)	—	—
Composite pain intensity	2.55 (1.95)		
Pain interference	3.79 (2.76)	—	—
Sex, n (%)			χ^2 (1) = 9.36, P = 0.003[a]
Male	128 (54.90)	103 (41.00)	
Female	105 (45.10)	148 (59.00)	
Marital status, n (%)			χ^2 (1) = 0.35, ns
Married	187 (80.30)	196 (78.10)	
Other	46 (19.70)	55 (21.90)	
Religious affiliation			χ^2 (3) = 0.47, ns
Buddhist or Taoist	176 (75.60)	183 (72.90)	
Christian	19 (8.00)	23 (9.20)	
None	36 (15.50)	43 (17.10)	
Other	2 (0.90)	2 (0.80)	
Disease stage, n (%)			χ^2 (1) = 58.99, P = 0.00[a]
Localized	44 (18.88)	132 (52.59)	
Metastasized	189 (81.12)	119 (47.41)	
Recruitment sites			χ^2 (1) = 27.63, P = 0.00[a]
Inpatient	168 (72.10)	122 (48.60)	
Outpatient	65 (27.90)	129 (51.40)	

ns = not significant.
[a]$P < 0.01$.

lymphoma (4%), brain (3%), and various other types (4%).

Instruments

The instruments consisted of the short form of Profile of Mood States (POMS),[21] the Herth Hope Index,[22] the Brief Pain Inventory-Chinese version (BPI-C),[23] the Karnofsky Performance Scale (KPS),[24] and a demographic questionnaire. Before data collection, the POMS short form, the Herth Hope Index, and the KPS scale were translated into Mandarin Chinese using the translation and back-translation procedure and were verified by a panel of experts to ensure semantics of the Taiwan version of these questionnaires.

Profile of Mood States (POMS) Short Form. The POMS short form[21] was used to assess the patient's mood states in this study. The POMS short form consists of 30 items (based on the 65-item questionnaire in the long form) and contains the same six scales measured by the long form. The POMS measures tension, depression, anger, fatigue, confusion, and vigor. A composite score, the total mood disturbance (TMD) score, is computed by summing each of the individual scores for tension, depression, anxiety, fatigue, and confusion, with vigor scores subtracted to indicate patients' total mood disturbance. Each item of the POMS short form is scored on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). The reliabilities (Cronbach's α) ranged from 0.75–0.95 for an outpatient sample.[21] The reliability (Cronbach's α) for the POMS subscales ranged from 0.75–0.93 for patients with pain and ranged from 0.71–0.91 for patients with no pain (Table 2).

Herth Hope Index (HHI). Hope was measured by the Herth Hope Index.[22] The HHI, a 12-item adapted version of the Herth Hope Scale (HHS),[25] assesses the multidimensional aspects of hope in adults. Each item is rated from 1 (strongly disagree) to 4 (strongly agree) and total scores range from 12 to 48, with a higher score reflecting greater hope. The HHI has demonstrated test–retest reliability, internal consistency, criterion-related validity, divergent validity, and construct validity.[22] In this study, the alpha coefficient of the HHI was 0.77 for patients with pain and 0.75 for patients with no pain.

Table 2
Peformance Status (KPS), Emotional States, and Levels of Hope for Patients With Pain (n = 233) vs. No Pain (n = 251)

	Internal Consistency		Mean (SD)		
	Pain	No Pain	Pain	No Pain	*t* value
KPS	—	—	71.90 (18.11)	84.29 (13.71)	−8.48[a]
Hope	0.77	0.75	32.54 (4.19)	33.80 (3.88)	−3.43[a]
Total mood disturbance	0.94	0.91	15.78 (20.98)	6.75 (16.49)	5.10[a]
Tension	0.79	0.75	3.69 (3.72)	2.94 (3.07)	2.41
Anger	0.75	0.71	3.95 (3.65)	2.65 (2.92)	4.30[a]
Fatigue	0.91	0.90	4.82 (4.86)	2.92 (3.60)	4.87[a]
Depression	0.93	0.89	4.70 (5.08)	3.45 (4.23)	2.95[a]
Vigor	0.92	0.91	6.44 (3.98)	8.36 (4.14)	−5.12[a]
Confusion	0.78	0.74	5.46 (4.29)	3.88 (3.34)	4.50[a]

[a] $P < 0.01$.

Brief Pain Inventory-Chinese Version (BPI-C). The Brief Pain Inventory-Chinese version[23] was used in this study to assess the multidimensional nature of pain, including intensity and subsequent interference with life activities in the preceding 24 hours. The first part of the BPI consists of four single-item measures of pain intensity: worst pain, least pain, average pain, and pain now. Each item is rated from 0 (no pain) to 10 (the worst pain I can imagine). The composite of the pain intensity score (i.e., the average of worst pain, least pain, average pain, and pain now) was computed to represent patients' overall pain intensity.[23] The second part of the BPI consists of seven items that assess the extent to which pain interferes with general activity, mood, walking, working, relations with others, sleeping, and enjoyment of life. Each item is rated on a 0–10 scale. An interference score was computed, which was the average of the seven items. The reliability and validity of the BPI-C in a Taiwanese sample with cancer pain has been demonstrated.[16] In this study, the internal consistency for overall pain intensity and pain interference was 0.85 and 0.90, respectively.

Karnofsky Performance Scale (KPS). Patients' performance status was assessed by the Karnofsky Performance Scale. The KPS is rated by a research assistant on a scale of 1–100, in steps of 10. The KPS assigns percentages based on performance as follows: normal activity, 100%; minor symptoms, 90%; moderate symptoms, 80%; self-care only, 70%; needs some help, 60%; needs much help, 50%; disabled, 40%; needs special care, 30%; needs active support, 20%; moribund, 10%; and dead, 0%. The KPS has been documented to have predictive validity.[26]

Demographic Questionnaire. A demographic sheet covering basic questions regarding age, sex, education, and marital status was developed for this study.

Procedure

Approval for this study was obtained from the Human Subject Committees of the two hospitals involved. Patients who met the selection criteria were approached individually by the research assistant who described the study and obtained oral consent. Patients were given a questionnaire that they were asked to fill out independently, with no assistance from others. If a patient was unable to complete the questionnaire on his/her own, the research assistant read questionnaire items to each patient and recorded the answers.

Statistical Analysis

Descriptive statistics were used to describe the sample characteristics in terms of demographic and disease-related variables. Chi-square or *t*-tests were used to examine the relationship between patient characteristics and characteristics of pain versus no pain. *T*-tests were employed to determine if scores of performance status, mood states, and level of hope differed in response to patients' experiences of pain. Among patients experiencing cancer-related pain, Pearson's correlations were used to explore the relationship among pain intensity, pain interference, performance status, mood states, and level of hope. All significance levels were set at $\alpha = 0.01$.

Results

Comparisons of Performance Status, Mood Disturbance, and Level of Hope Between Patients With Cancer Pain and Patients Without Cancer Pain

The performance status, level of hope, and mood disturbance scores for cancer patients with pain and without pain are presented in Table 2. Cancer patients with pain reported significantly lower levels of performance status, lower levels of hope, and higher levels of total mood disturbance than did cancer patients who did not experience pain. Also, patients with cancer pain experienced significantly more anger, fatigue, depression, confusion, and lethargy than did patients without pain. In patients experiencing cancer pain, the three highest mood disturbance scores were confusion, fatigue, and depression. In patients experiencing no pain, the three highest mood disturbance scores were confusion, depression, and tension.

Because patients who experienced pain versus patients who experienced no pain differed significantly by sex, disease stage, and recruitment site, it was necessary to control for the potential effect these differences may have had on important outcome variables (i.e., performance status, mood disturbance, and levels of hope) by performing regression analyses. Results indicated that even after controlling for the effect of sex, disease stage, and recruitment site, the patient experience of pain versus no pain was a significant predictor for performance status ($B = 8.98$, $P < 0.01$), total mood disturbance ($B = -7.43$, $P < 0.01$), anger ($B = -1.22$, $P < 0.01$), fatigue ($B = -1.51$, $P < 0.01$), vigor ($B = 1.33$, $P < 0.01$), and confusion ($B = -1.48$, $P < 0.01$). However, levels of hope, tension, and depression did not differ between patients with pain and patients without pain after controlling for sex, disease stage, and recruitment site.

Relationships Among Pain Intensity, Pain Interference, Performance Status, Mood Disturbance, and Level of Hope for Patients With Pain

For patients with pain ($n = 233$), pain intensity was significantly correlated with performance status ($r = -0.18$, $P < 0.01$) and mood states ($r = 0.26$, $P < 0.01$), but not with level of hope. Pain interference was significantly correlated with performance status ($r = -0.43$, $P < 0.01$), mood states ($r = 0.53$, $P < 0.01$), and level of hope ($r = -0.31$, $P<0.01$) (Table 3). Relationships of pain intensity and pain interference to each mood state are presented in Table 3. Pain intensity and pain interference were significantly correlated with each mood state as measured by the POMS as well as significantly correlated with the total mood disturbance.

Discussion

The results of this study provide several important implications for understanding the impact of cancer pain on patients' performance status, emotional state, and level of hope. The findings of this study support the multidimensional notion of the cancer pain experience[1] and demonstrate the effect of cancer pain on the physical, psychological, and spiritual aspects of Taiwanese patients' quality of life. There have been very few studies that directly compare performance status of cancer patients without pain to those with pain,[27] and the re-

Table 3
Relationship of Pain Intensity and Pain Interference to Performance Status, Each Mood State Measured by the POMS, and Level of Hope ($n = 223$)

Variables	Pain Intensity	Pain Interference
Performance status	−0.18[a]	−0.43[a]
Total mood disturbance	0.26[a]	0.53[a]
Tension	0.18[a]	0.38[a]
Anger	0.23[a]	0.45[a]
Fatigue	0.28[a]	0.53[a]
Depression	0.28[a]	0.43[a]
Vigor	−0.14[a]	−0.42[a]
Confusion	0.16[a]	0.37[a]
Level of Hope	−0.11	−0.31[a]

[a] $P < 0.01$.

sults of this study show that pain has deleterious effects on Taiwanese patients' functional status. In this study, patients with cancer pain had significantly lower performance status (KPS) scores than did patients without cancer pain. Both patients' pain intensity and pain interference with daily life were negatively correlated with performance status scores. These results are consistent with the findings in a study conducted in the United States by Miaskowski and Dibble,[27] in which they found that in breast cancer patients, pain-free patients had a significantly better performance scores than did patients without pain.

Researchers have emphasized that performance status of cancer patients is a very important prognosticator.[28] Performance status measures have been widely used in oncology research and practice. Oncology researchers or practitioners have applied performance measures for the following purposes:[8] 1) to select patients for inclusion in treatment trials, 2) to stratify patients on the basis of performance status evaluation at the beginning of a clinical trial, 3) to measure the efficacy of treatment, and 4) to measure the quality of survival of cancer patients. When cancer pain has deleterious effects on patients' performance status, this effect may confound the treatment efficacy of a clinical trial and have an impact on the quality of survival of cancer patients. Because this study shows that cancer pain negatively affects patients' performance status and numerous studies have documented performance status as a predictor or prognosis of survival of cancer patients,[29] the question is raised as to whether cancer pain also has a negative impact on patients' survival. Although one study shows that there is no relationship between the patients' reporting of pain on admission and subsequent survival time,[30] more empirical research effort is needed to explore the relationship between cancer pain and patients' survival.

Pain is not a symptom that exists in isolation. Chronic pain, especially, tends to create problems, such as emotional disorder.[31] This phenomenon is suggested by the definition of pain as an "unpleasant sensory and emotional experience associated with actual or potential tissue damage."[32] Psychological distress of cancer patients has been shown to be related to shorter survival.[33,34] In contrast to the physiological components of cancer pain, about which much is known, there has been little prior research on other aspects of cancer pain experiences, such as psychological or spiritual distress. In this study, after controlling for sex, disease stage, and recruitment site, patients who experienced cancer-related pain reported higher levels of anger, fatigue, lethargy, confusion, and total mood disturbance than did patients who did not experience cancer-related pain. Also, levels of pain intensity and pain interference with daily life were significantly correlated with each mood state and the total mood disturbance.

In a study of 200 American cancer patients who were experiencing pain and 169 cancer patients who were pain-free, Glover et al.[17] found that patients who experienced cancer pain scored significantly higher on anxiety, depression, anger, fatigue, confusion, and total mood disturbance, as measured by the Profile of Mood States.[21] These results from the current study conducted in Taiwan are, therefore, consistent with prior studies conducted in other countries,[17,27] which may indicate that cancer pain has a great impact on patients' mood status and emotional distress.

It also appears that emotional state or distress could be related to survival. Recently, researchers[34] demonstrated that emotional distress is significantly associated with shorter survival among lung cancer patients, independent of the influence of the biomedical prognostic factors. Moreover, a series of 5-year, 10-year, and 15-year follow-up studies concluded that patients' psychological or emotional responses to breast cancer were significant predictors of patients' survival.[35–37] Thus, it appears that emotional state or distress could be related to patients' length of survival.

Very limited research effort has gone in to exploring the relationship between mood disturbance and cancer pain. In studies of pain other than cancer pain, investigators have supported the important role of unrelieved pain in emotional disturbances. Feldman and colleagues[38] reported that increased pain led to greater depressed, anxious, and angry moods in chronic pain patients. They also found that depressed mood, but not anxiety or anger, contributed to increases in pain. In one study, it was found that induced depressed mood shortened subjects' tolerance times of laboratory pain.[39] The relation of pain to anxiety has been explored in populations with cancer. Researchers have consistently concluded that in-

creases in cancer pain are significantly related to increases in anxiety.[40–42]

As far as the relationship of anger to perceptions of pain, researchers have claimed that anger is a critical concomitant of the chronic pain experience.[43] In addition, Fernandez and Turk[44] state that chronic pain patients may underreport anger because of denial. In fact, anger is one of the most salient emotional correlates of pain, even though past research has been primarily confined to the study of depression and anxiety.[44] This notion is further supported by a recent study of chronic pain, in which anger toward oneself was significantly associated with pain intensity, and overall anger was significantly related to perceived disability.[45]

The relationship between cancer pain and fatigue has been sparsely explored, although pain and fatigue are two of the most common problems experienced by oncology patients.[46] Pain and fatigue have several components in common[47] and chronic pain is commonly associated with fatigue.[48] One study revealed that poor sleepers reported greater pain intensity and pain unpleasantness than did good sleepers in a sample of chronic pain patients.[49] However, whether poor sleep among cancer pain patients contributes to their fatigue remains controversial. Therefore, additional research is warranted to comprehensively explore the relationship between cancer pain and fatigue.

For patients with progressive life-threatening diseases, pain can add greatly to the debilitating effects of the disease and foster hopelessness and fear.[31] Cancer threatens patients' existence and cancer pain may cause suffering which leads to spiritual distress for cancer patients.[50] Very few studies have investigated the relationship between cancer pain and spiritual dimensions. One such study included 78 cancer patients who were being treated for pain-related problems and found that unrelieved cancer pain has an impact on existential concerns.[41] The study further found that patients with higher pain scores expressed significantly more fear about the future. In this study, after controlling for gender, disease stage, and recruitment site, levels of hope did not differ between patients with pain and patients without pain. However, pain interference with daily life, but not pain intensity, was significantly negatively correlated with level of hope. The lack of significant differences in levels of hope between patients with cancer pain and patients without cancer pain could be due to the limitation of the use of hope measurement tool (i.e., HHI, which was originated in a Western country) in the Taiwanese culture. For example, the majority of the participants in this study were Buddhists and Taoists. It is common for Taiwanese patients to hope for not carrying the Karma into to the next life and hope for a better reincarnation. However, these concepts are not captured in the Herth Hope Index. Therefore, development of a hope measurement tool or modification of the current hope measurement tools for Taiwanese culture may be needed.

Another explanation for the significant relationship between levels of hope and pain interference, but not pain intensity, in this study could be related to the notion of suffering. Chapman and Gavrin[31] have maintained that unrelieved pain can not only create an overwhelming degree of personal discomfort but contribute to suffering in a more insidious way. Suffering is the perceived damage to the integrity of the self and represents a subjective sense of identity.[51] When cancer pain occurs, it can contribute to a disparity between who a person believes himself or herself to have been and, because of pain, who the person has actually become. This disparity is the essence of suffering because it may threaten the integrity of self, not only in the present but also in the future.[31] The contribution of disturbing incongruity between perceived self and actual self to suffering may explain why pain interference with daily life and not pain intensity significantly negatively correlated with level of hope.

The spiritual dimension of cancer pain has been explored much less than other aspects, such as physical or psychological pain. The spiritual dimension of cancer pain may include issues such as hopefulness, suffering, religiosity, uncertainty, positive changes, sense of purpose, meaning of pain, and transcendence.[20] Research has documented that the impact of cancer pain and the meaning of cancer pain affects the spiritual dimension of cancer patients and may cause great distress.[52] The findings of this study support the notion that cancer pain interference with daily life may create a sense of hopelessness, perhaps resulting from patients' fear that their lives are not worth continuing if they must live in pain.[18] Recent research[41] has

demonstrated that unrelieved cancer pain increases patients' fear about the future, which contributes to existential suffering and may in turn threaten patients' levels of hope.

The magnitudes of the correlations between pain intensity and performance status, mood state, and level of hope were quite small (from 0.1–0.3), although some were statistically significant. On the other hand, the magnitudes of the correlations between pain interference with daily life and performance status, mood state, and level of hope were large (ranged from 0.3–0.5). This finding may imply that pain interference with daily life may have more of a negative impact on performance status, mood state, and level of hope than does pain intensity among Taiwanese cancer patients. Therefore, when clinicians perform a cancer pain assessment, not only pain intensity but also pain interference with daily life should be carefully assessed.

In conclusion, this study has demonstrated that Taiwanese cancer patients, similar to cancer patients in Western countries, are affected in many dimensions of their lives by cancer pain. The similarity in these patient responses indicates that the negative impact of cancer pain is not culture specific. It is important for clinicians to make every effort to prevent cancer pain and to relieve pain effectively and promptly. Based on experiences from Western countries, pain therapy that addresses only one component of the pain experience might be destined to fail.[53] Interventions that address the multidimensional aspect of pain by relieving the patient's physical burden, psychological disturbance, and spiritual distress are more likely to lead to long-term benefits, not only for patients in Western countries but also for Taiwanese patients.

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