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## A Pilot Study of Relationships Among Pain Characteristics, Mood Disturbances, and Acculturation in a Community Sample of Chinese American Patients With Cancer

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**A**dvances in cancer detection and therapy are extending the life expectancy of patients. However, cancer pain continues to be a persistent, disturbing, and often incapacitating symptom (Katz, 2002; Rahim-Williams et al., 2007; Spiegel, Sands, & Koopman, 1994; van den Beuken-van Everdingen et al., 2007; Wang et al., 1999). Although a number of cancer pain management guidelines have been developed (Gordon et al., 2005; Miaskowski et al., 2005; National Comprehensive Cancer Network, 2009), moderate to severe pain continues to be experienced by 30%–70% of patients undergoing cancer treatment and by up to 90% of patients with advanced disease (Portenoy & Lesage, 1999). In addition, cancer pain can have deleterious effects on patients' quality of life (Katz, 2002; Lin, Lai, & Ward, 2003; Miaskowski & Dibble, 1995; Miaskowski & Lee, 1999; Rustoen, Moum, Padilla, Paul, & Miaskowski, 2005) and often is associated with anxiety and depression (McDaniel, Mussleman, Porter, Reed, & Nemeroff, 1995; Mystakidou et al., 2006).

Cancer pain is multidimensional and includes physiological, sensory, affective, cognitive, behavioral, and sociocultural components (McGuire, 1995). Cultural beliefs and practices can affect the way patients perceive and respond to pain, can influence their communication about pain, and can affect their healthcare decisions about pain (Calliaster, 2003; Kagawa-Singer, 1998). For example, Chen, Miaskowski, Dodd, and Pantilat (2008) noted that Chinese patients' perceptions and management of cancer pain were influenced by the principles of Taoism, Buddhism, and Confucianism. A Taoist might believe that pain occurs if blood circulation (Qi) is blocked and that pain can be relieved by maintaining harmony with the universe. A Buddhist might believe that suffering (i.e., pain) can be relieved by following specifically defined right ways of life. A Confucian might believe that pain is an essential element in life that must be endured and reported only when it becomes unbearable. However, little empiric evidence is available

**Purpose/Objectives:** To describe the pain experience of Chinese American patients with cancer and to examine the relationships among pain characteristics, demographic characteristics, performance status, self-reported analgesic use, mood disturbances, and patients' acculturation levels.

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

**Setting:** Three community-based oncology facilities in the San Francisco, CA, Bay area.

**Sample:** 50 Chinese Americans who reported experiencing pain from cancer.

**Methods:** Participants completed in their preferred language a demographic questionnaire, the Karnofsky Performance Status Scale, the Brief Pain Inventory, the Hospital Anxiety and Depression Scale, the Suinn-Lew Asian Self-Identity Acculturation Scale, and information about analgesic use. Descriptive and correlational statistics were used to evaluate data.

**Main Research Variables:** Pain intensity, pain interference, performance status, anxiety, depression, analgesic use, and acculturation level.

**Findings:** Most of the patients reported moderate to severe pain and moderate levels of interference. Lower levels of acculturation were associated with higher least and worst pain intensity scores and higher pain interference scores. Anxiety and depression scores were in the moderate range. Higher depression scores were associated with higher pain interference scores. Self-reported analgesic use for 62% of the patients was classified as inadequate.

**Conclusions:** A significant percentage of Chinese American patients experience moderate to severe cancer pain that affects their mood and their ability to function.

**Implications for Nursing:** Nurses should assume a proactive role in assessing the physical, emotional, and cognitive dimensions of pain in Chinese American patients. Future research should evaluate the cancer pain experience of these vulnerable patients and develop and test culturally appropriate interventions.

on the relationships between levels of acculturation and pain in Chinese Americans.

Acculturation is a process by which immigrants adopt the values, beliefs, customs, norms, and lifestyle of the

mainstream culture (Suinn, Ahuna, & Khoo, 1992). Studies of various immigrant populations have suggested that acculturation influences health outcomes (Chen & Wu, 2008; Riley et al., 2008). However, the direction of that influence may vary among different ethnic groups as well as for different health conditions (Myers & Rodriguez, 2002). The literature on acculturation and health is limited and has focused primarily on Hispanic or Latino patients (Myers & Rodriguez, 2002). Riley et al. (2008) examined the influence of acculturation on pain in Hispanic adults and found that patients who had lower levels of acculturation and who used English less frequently reported higher levels of pain. Attitudes as well as cultural and personal meanings that are ascribed to a particular disease (e.g., cancer) or symptom (e.g., pain) may influence how an illness or symptom is embodied and lived (Davidhizar & Giger, 2004). Campbell, Flores, and Keefe (2007) examined ethnic differences in the use of pain coping strategies in Hispanic, African American, and Caucasian young adults and found that lower acculturation scores in Hispanic patients were associated with the increased frequency and use of pain coping strategies (i.e., diverting attention and praying or hoping).

Cancer pain is frequently under-reported and under-treated in racial and ethnic minority groups (Bernabei et al., 1998; Ezenwa, Ameringer, Ward, & Serlin, 2006; Green et al., 2003). In a study of patients with pain from metastatic cancer (Cleeland et al., 1994), minority patients had twice the risk for inadequate pain management compared to non-Hispanic Caucasian patients. However, although the study evaluated cancer pain treatment among African American, Hispanic, and Caucasian patients (Cleeland et al., 1994), it did not include Chinese Americans, one of the fastest-growing ethnic minority groups in the United States (McCracken et al., 2007). In a review of the cancer pain experience of Chinese patients (Edrington, Miaskowski, Dodd, Wong, & Padilla, 2007), only three studies (Anderson et al., 2000; Cleeland, Gonin, Baez, Loehrer, & Pandaya, 1997; Cleeland et al., 1994) reported on differences in cancer pain intensity and its management among African American, Hispanic, and Caucasian patients. Only two studies (Im, Liu, Kim, & Chee, 2008; Wong-Kim & Merighi, 2007) published subsequent to the review evaluated the perceptions of Asian Americans about cancer pain. In a survey of Asian American patients with cancer (N = 27), Im et al. (2008) found that patients reported that pain was their bodies' reaction to cancer that could not be avoided but could be overcome with positive thinking. However, no data were reported on pain characteristics or patients' level of acculturation. The second study (Wong-Kim & Merighi, 2007) explored the beliefs and use of complementary and alternative medicine (CAM) for cancer pain management in Chinese American patients with breast cancer (N = 30).

Women who were immigrants reported higher pain intensity scores than U.S.-born Chinese patients (4.1 and 3, respectively; 0 indicated no pain and 10 indicated severe pain). Additional pain characteristics were not reported. This lack of knowledge of the pain experience of Chinese American patients with cancer limits clinicians' ability to manage pain in this vulnerable population. To address the paucity of research in this area, this pilot study described the cancer pain experience (i.e., pain intensity, pain locations, pain interference with function, and adequacy of self-reported analgesics use) of a community sample of Chinese American patients with cancer pain and examined the relationships between a number of pain characteristics (e.g., intensity and interference) and demographic characteristics, performance status, self-reported analgesic use, mood disturbances, and patients' level of acculturation.

## Methods

### Participants and Settings

A convenience sample of oncology outpatients with pain was recruited from the Chinese Community Health Resource Center, the Northern California Chinese Unit of the American Cancer Society, and the Comprehensive Cancer Center at the University of California, San Francisco.

Patients were included if they were self-identified as Chinese American, were older than 18 years, had a diagnosis of cancer, had chronic cancer pain for more than three months' duration, reported pain related to cancer in the prior 24 hours (i.e., pain level of 1 or more on a 0 [no pain] to 10 [worst pain imaginable] numeric rating scale [NRS]), and read or understood Chinese (Mandarin or Cantonese dialects) or English. Patients were excluded if they had undergone surgery in the prior three months to identify a sample of patients with chronic cancer pain (Harstall & Ospina, 2003).

### Instruments

The use of translated instruments often is necessary when participants do not speak, read, or understand the language of the original instrument. In addition, research participants may feel more comfortable reading and answering questions in their primary language. When available, standardized, previously translated instruments were used in this study. Some instruments (i.e., demographic questionnaire and consent form) required translation for this study. The translation procedure for these instruments is described in this article. Translated instruments should be conceptually and technically equivalent to the language of the original instruments and culturally and linguistically appropriate for the target population (Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987).

When a previously translated instrument was not available, that instrument was translated into Chinese by the committee method of forward translation and backward translation recommended by Brislin (1970). Then, a committee of four multilingual (Cantonese or Mandarin dialect and English) Chinese-speaking healthcare professionals reviewed the translated instruments and their English versions for clarity, equivalence, and appropriateness for Chinese persons living in northern California. The committee agreed to use traditional Chinese characters for the Chinese translations because these characters reflect the speaking and writing dialect of the Chinese American community in northern California. However, translating an instrument word for word into another language may not adequately account for linguistic and cultural differences (Tu et al., 2005). Therefore, the translation committee members independently examined the wording of the items on each instrument to evaluate the semantic content, the cultural relevancy, and the conceptual equivalence of the translated instruments. Disagreements in the translation process were resolved by consensus among the committee members (Hilton & Skrutkowski, 2002).

Patients were asked to complete, in their preferred language, five instruments: a demographic questionnaire, the Karnofsky Performance Status (KPS) Scale (Karnofsky & Burchenal, 1949) or the KPS-Chinese (KPS-C) version (Lin et al., 2003), the Brief Pain Inventory (BPI) (Cleeland, 1989) or the BPI-Chinese (BPI-C) version (Chen, Chang, & Yeh, 2000), the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) or the HADS-Chinese (HADS-C) version (Chen et al., 2000), and the Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA)-short form (Leong & Chou, 1998) or the SL-ASIA-Chinese (SL-ASIA-C) version (Suinn, Ahuna, & Khoo, 1995).

The demographic questionnaire obtained information on participants' age, gender, education, marital status, yearly income, religious beliefs, and length of time in the United States. Clinical and performance status measures included cancer diagnosis and stage and the KPS (Buccheri, Ferrigno, & Tamburini, 1996; Karnofsky, & Burchenal, 1949) or the KPS-C (Lin et al., 2003), which were designed to measure patients' ability to accomplish normal activities of daily living or their need for help or nursing care. Validity and reliability of the KPS (Buccheri et al., 1996; Mor, Laliberte, Morris, & Wiemann, 1984) and the KPS-C (Chen et al., 2000; Lin et al., 2003) are well established. The Cronbach alpha for the KPS-C was 0.94 in a study of Taiwanese patients with cancer pain (Chen et al., 2000).

The 11-item BPI (Cleeland, 1989) or the BPI-C (Wang et al., 1999) questionnaire was used to assess patients' level of pain intensity and interference with function. Ratings of present, least, average, and worst pain in-

tensity were obtained with a 0 (no pain) to 10 (worst pain imaginable) NRS. Pain interference with seven activities was rated on a 0 (no interference at all) to 10 (complete interference) NRS. A total interference score was calculated as the mean of the seven interference items. In addition, patients completed a body map to indicate the location of their pain, listed the treatments or medications they used for pain management, and reported the percentage of relief from those treatments or medication using a 0% (no relief) to 100% (complete relief) rating scale. The validity and the reliability of the BPI (Cleeland, 1989) and the BPI-C (Wang, Mendoza, Gao, & Cleeland, 1996) are well established. The Cronbach alpha for pain intensity and interference in the BPI-C was 0.89 and 0.92, respectively, in a study of Chinese patients with cancer with pain (Wang et al., 1996). In this study, the Cronbach alphas for pain intensity and pain interference scales were 0.84 and 0.87, respectively.

The Pain Management Index (PMI) measures the adequacy of analgesic medications used by patients (Cleeland et al., 1994). PMI categories are based on the World Health Organization's (WHO's) classification of the potency of analgesics in relationship to a patient's worst pain intensity score (Cleeland et al., 1994; Zelman, Hoffman, Seifeldin, & Dukes, 2003). To construct the index, the analgesics used were categorized as 0, indicating no analgesics; 1, indicating nonopioid analgesics (e.g., nonsteroidal anti-inflammatory drug [NSAID], acetaminophen); 2, indicating weak opioids (e.g., codeine); and 3, indicating strong opioids (e.g., morphine). Patients' worst BPI pain scores were grouped into the following cut points as recommended by Paul, Zelman, Smith, and Miaskowski (2005): 1 indicates a worst pain rating of 1–4, 2 indicates a worst pain rating of greater than 4–7, and 3 indicates a worst pain rating of greater than 7–10. The PMI was computed by subtracting the pain level from the highest analgesic category. Negative PMI scores indicate inadequate analgesic use; positive scores indicate adequate analgesic use for a given level of pain severity.

The 14-item HADS or the HADS-C questionnaire was designed to assess the psychological states of patients with physical issues (Zigmond & Snaith, 1983). Anxiety and depression are each measured with seven items that are rated on a four-point Likert scale. Scores can range from 0–21 on each subscale. A subscale score of 8–10 indicates a doubtful case of anxiety or depression; a subscale score of greater than 11 indicates a definite case of anxiety or depression (Zigmond & Snaith, 1983). Validity and reliability for the HADS (Hermann, 1997; Savard, Laberge, Gauthier, Ivers, & Bergeron, 1998) and the HADS-C (Chen et al., 2000; Ho, Chan, & Ho, 2004) are well established. The Cronbach alpha for anxiety and depression subscales of the HADS-C were 0.9 and 0.79, respectively, in a study of Chinese patients with

cancer pain and with depression (Sze, Wong, Lo, & Woo, 2000). In this study, the Cronbach alphas for the HADS-C anxiety and depression subscales were 0.88 and 0.76, respectively.

Patients' level of acculturation was assessed with the seven-item short form of the SL-ASIA or the SL-ASIA-C. Items are rated on a five-point Likert scale that measures Asian patients' level of acculturation. The SL-ASIA short form uses patients' preferred language to read, write, and speak; ethnic self-identity; and generation level to determine acculturation level. A mean acculturation score is obtained by summing the values of all of the items and dividing the sum by the total number of questions answered (Suinn et al., 1992). The score can range from 1 (indicates low level of acculturation) to 5 (indicates high level of acculturation). A higher score indicates greater Western identification; a lower score indicates stronger Chinese or Asian identification. The validity and reliability of the short forms of the SL-ASIA (Leong & Chou, 1998) and the SL-ASIA-C (Suinn et al., 1995) are well established. The Cronbach alpha for the short form of the SL-ASIA was 0.88 and was found to be highly correlated to the full scale SL-ASIA ( $r = 0.91$ ) (Leong & Chou, 1998). In this study, the Cronbach alpha for the SL-ASIA was 0.87.

## Study Procedures

To facilitate the design and content of a culturally appropriate research study, input was sought from experts among the Chinese American community. The participants identified pertinent cancer pain management issues, assisted with the recruitment and interviews of study participants, and assisted with the analysis of the cultural meanings of the study's results. In addition, participation in community events and research activities that focused on Asian American healthcare issues helped to increase the cultural sensitivity, respectfulness, and flexibility of the primary investigator. Networking with Asian American and Pacific Islander healthcare groups, attending healthcare meetings and conferences, and gathering information on pain beliefs and experiences directly from the Chinese American community over a period of three years facilitated the development of trust and commitment between the primary investigator and the Chinese American community, as well as the identification of cancer pain management issues within the community.

For this study, a research partnership was developed between the Chinese Community Health Resource Center, the Northern California Chinese Unit of the American Cancer Society, and the academic research team at the University of California, San Francisco. The goal of this partnership was to develop a research study that would meet the cancer pain management needs of the Chinese American community. Even with the support from a large

number of Chinese American healthcare professionals, patient recruitment was extremely challenging.

This study was approved by the Committee on Human Research at the University of California, San Francisco. Flyers distributed in the community, to the media, on community bulletin boards, and in physicians' offices were used to recruit patients for this study. Patients who were interested in participating called a specific telephone number. A multilingual (English, Cantonese, and Mandarin) staff member returned their calls, answered their questions, and screened them for

**Table 1. Patient Characteristics**

| Characteristic  | $\bar{X}$ | SD   | Range  |
|---|-----------|------|--------|
| Age (years)   | 62.6      | 11.7 | 39–78  |
| Educational level (years)                             | 11.5      | 4.1  | –      |
| Years in the United States                            | 18        | 10.6 | 3–44   |
| Karnofsky Performance Status Scale score <sup>a</sup> | 68        | 16.8 | 40–100 |
| Acculturation level                                   | 1.8       | 0.6  | –      |
| Hospital Anxiety and Depression Scale                 |           |      | –      |
| Anxiety <sup>a</sup>                                  | 5.96      | 4.6  | 0–18   |
| Depression <sup>a</sup>                               | 6.57      | 4.5  | 0–18   |

| Characteristic           | n  | %  |
|--------------------------|----|----|
| <b>Gender</b>            |    |    |
| Male                     | 16 | 32 |
| Female                   | 34 | 68 |
| <b>Marital status</b>    |    |    |
| Married                  | 33 | 66 |
| Widowed                  | 8  | 16 |
| Divorced                 | 9  | 18 |
| <b>Religious beliefs</b> |    |    |
| None                     | 18 | 36 |
| Christianity             | 15 | 30 |
| Buddhism                 | 13 | 26 |
| Taoism                   | 1  | 2  |
| Other                    | 3  | 6  |
| <b>Country of birth</b>  |    |    |
| Mainland China           | 39 | 78 |
| Vietnam                  | 4  | 8  |
| Hong Kong                | 2  | 4  |
| Taiwan                   | 2  | 4  |
| United States            | 2  | 4  |
| Other                    | 1  | 2  |
| <b>Cancer diagnosis</b>  |    |    |
| Breast                   | 16 | 32 |
| Liver                    | 7  | 14 |
| Lung                     | 7  | 14 |
| Head and neck            | 5  | 10 |
| Gastrointestinal         | 4  | 8  |
| Prostate                 | 1  | 2  |
| Colorectal               | 1  | 2  |
| Other                    | 9  | 18 |
| <b>Disease stage</b>     |    |    |
| Metastatic               | 27 | 54 |
| Localized                | 18 | 36 |
| Unknown                  | 5  | 10 |

N = 50

<sup>a</sup> Range is based on information from study participants.

eligibility. Patients who met the inclusion criteria and wanted to participate in the study were given an appointment with a trained, multilingual research assistant who described the study to them, answered their questions, and obtained written informed consent in Cantonese, Mandarin, or English. Patients were given a choice to complete the questionnaires in their preferred language (i.e., English or Chinese). If a patient was unable to read or complete a questionnaire independently, the multilingual research assistant read the instructions and questionnaire items to the patient in the language of the participant's choice and recorded his or her responses. A total of 66 patients were screened for participation in this study. Fifty patients met the inclusion criteria (76% response rate). The primary reason for exclusion was surgery in the past month and absence of cancer pain.

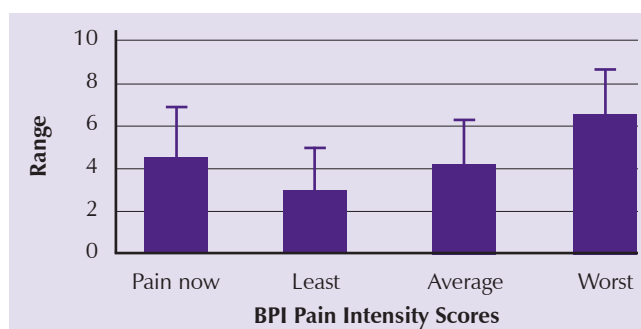
## Data Analyses

Data were analyzed with SPSS® 14.0 statistical software. Descriptive statistics, summarized as frequencies and percentages for categorical variables and means and standard deviations for continuous variables, were used to describe the demographic and clinical characteristics of the patients. Pearson product moment correlations were used to determine the relationships between pain and demographic characteristics (i.e., age and education), function (KPS scores), self-reported analgesic use, mood disturbance (i.e., anxiety and depression), and acculturation. The relationships between each of the study variables and the BPI subscales were evaluated as independent tests. Independent sample t tests were used to evaluate gender differences in each of the study variables. A priori calculation showed that 60 participants would provide at least 80% power to detect significant differences between the study variables at a p value less than 0.05.

## Results

### Demographic and Clinical Characteristics

A convenience sample of 50 patients participated in this study. As summarized in Table 1, most of the patients were born in mainland China (78%), had resided in the United States for approximately 18 years (range = 3–44 years), and were female (68%). The patients tended to be older ( $\bar{X}$  age = 62.6 years; range = 39–78 years), married (66%), and had 11.5 years of formal education. Their religious affiliations were mixed. The patients' mean ( $\pm$  SD) acculturation level was 1.8 (0.63), which indicates a strong Asian (Chinese) identification. Ninety-two percent of the patients completed the Chinese version of the study instruments. The majority of the patients had breast (32%), liver (14%), or lung (14%)



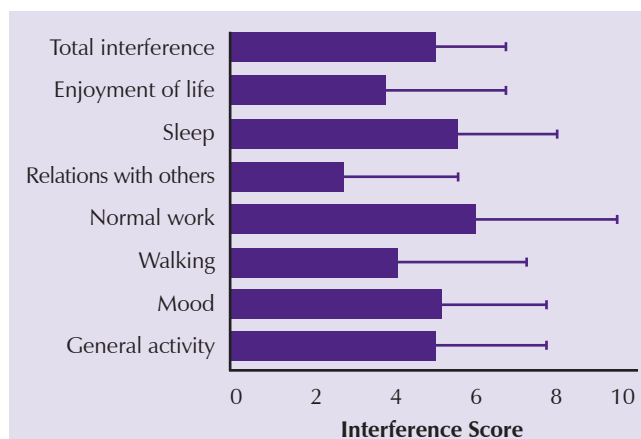
**Figure 1. Study Participants' Pain Intensity Scores on the Brief Pain Inventory (BPI)**

cancer. Fifty-four percent of the patients had metastatic disease.

### Pain Characteristics and Mood Disturbance

The BPI's four pain intensity scores are illustrated in Figure 1. Based on the severity classification of Paul et al. (2005), using worst pain intensity scores, 30% of the patients had mild pain, 42% had moderate pain, and 28% had severe pain. The most common sites of pain were back (48%), chest (32%), arms and shoulders (30%), legs (20%), and abdomen (18%). The average number of pain locations was 3.8. The majority of patients (66%) had pain in more than one location.

Fifty-four percent of the patients had pain for seven months or longer. Thirty-four percent had pain for longer than one year (i.e., duration of pain ranged from 1–12 years). As shown in Figure 2, mean scores for the various pain interference items ranged from 2.6–5.9. The mean pain relief score was 49% ( $\pm$  30%). Approximately 37% of the patients reported a pain relief score less than 20%. Mean HADS anxiety and depression scores were 6 ( $\pm$  4.6) and 6.6 ( $\pm$  4.5), respectively.



Note. Range = 0–10

**Figure 2. Means and Standard Deviations for Subscales and Total Pain Interference Scores From the Brief Pain Inventory**

## Self-Reported Use of Analgesics and Complementary and Alternative Medicine

As shown in Figure 3, 62% of the patients had negative PMI scores. The most commonly used analgesics in this sample were acetaminophen, 24%; NSAID, 10%; weak opioids (e.g., hydrocodone), 26%; strong opioids (e.g., morphine, fentanyl patch), 16%; and coanalgesics (e.g., antidepressants, anticonvulsants, steroids), 12%. Although 28% of patients used only CAM, 24% reported using CAM and Western analgesics to treat their cancer pain.

## Relationships Between Demographic and Pain Characteristics

Significant negative correlations were found between years of education and least, average, and worst pain intensity scores, as well as between educational level and the majority of the BPI pain interference scores. In addition, significant negative correlations were found between KPS scores and pain now and least pain, as well as the majority of the pain interference items. No significant relationships were found between age and gender and any of the pain intensity or pain interference scores (see Table 2).

## Relationships Between Mood Disturbance Scores and Pain Characteristics

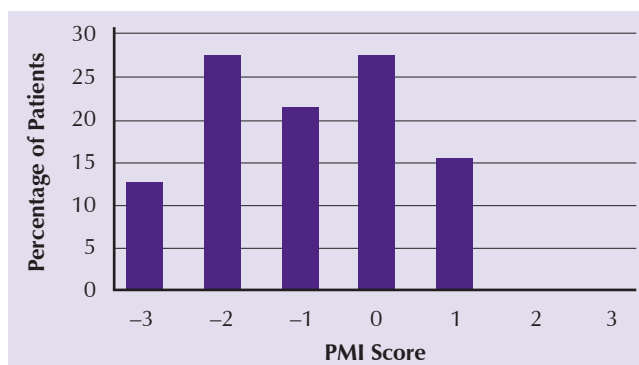
None of the pain intensity scores correlated with either the HADS anxiety or HADS depression scores. However, patients with higher anxiety scores reported significantly higher pain interference scores for mood, relationships with others, enjoyment of life, and the total interference score. In addition, higher depression scores were associated with significantly higher BPI pain interference scores for general activity, mood, walking ability, normal work, relations with others, enjoyment of life, as well as the total BPI interference score (see Table 2).

## Relationships Between Acculturation and Pain Characteristics

Significant negative correlations were found between least pain and worst pain intensity scores and levels of acculturation, such that less acculturated patients had significantly higher least and worst pain intensity scores. In addition, the less acculturated patients reported significantly higher interference scores for walking ability, ability to do normal work, sleep, as well as the total BPI interference score.

## Discussion

To the authors' knowledge, this study is the first to evaluate the experience of cancer pain in a community sample of Chinese Americans and to examine the rela-



N = 50

Note. The PMI runs from a score of -3 (indicating patients with severe pain and no pain relief with analgesia) to 3 (indicating patients with severe pain and adequate pain relief with analgesia).

**Figure 3. Pain Management Index (PMI) Scores**

tionships between a number of pain characteristics and specific demographic characteristics, as well as depression, anxiety, and level of acculturation. Of note, 70% of the patients in this study reported clinically significant worst pain scores (i.e., pain intensity of 5 or greater on a 0–10 NRS) (Cleeland & Ryan, 1994). Most of the pain intensity scores reported were comparable to or slightly higher than those reported in previous studies of Taiwanese patients with cancer (Chang, Chang, Chiou, Tsou, & Lin, 2002; Chiu, 1999; Ger, Ho, Sun, Wang, & Cleeland, 1999; Ger, Ho, Wang, & Cherng, 1998; Lin, 2000, 2001; Lin & Ward, 1995) and African American and Hispanic American patients (Anderson et al., 2000; Cleeland et al., 1997). However, most of the pain intensity scores reported by the Chinese Americans were higher than those reported by Caucasian Americans with cancer pain (Glover, Dibble, Dodd, & Miaskowski, 1995).

A similar pattern was observed for the pain interference scores. The majority of the pain interference scores reported by these Chinese American patients were comparable to those reported by patients with cancer in Taiwan (Chang et al., 2002; Ger et al., 1999; Lai et al., 2004). However, all of these BPI interference scores were higher than those reported by Caucasian Australian patients with cancer (Potter, Wiseman, Dunn, & Boyle, 2003) but lower than those reported by African American and Hispanic American patients with cancer (Anderson et al., 2000). Although the exact reasons for these differences in pain intensity and interference scores are not readily apparent, several plausible explanations include differences among the study participants in demographic characteristics, cancer diagnoses, extent of metastatic disease, and adequacy of analgesic prescriptions or intake. In addition, differences in pain intensity and interference scores may be because, in part, of the cultural/ethnic differences in pain perception (Johnson et al., 1995) and responses to analgesic medications as was seen in the study of experimental pain (Campbell,

**Table 2. Relationships Among Demographic Characteristics, Mood States, Acculturation, and Pain Characteristics**

| Variable   | Age    | Education | KPS      | PMI    | HADS-A  | HADS-D  | SL-ASIA  |
|--|--------|-----------|----------|--------|---------|---------|----------|
| <b>Pain intensity<sup>a</sup></b>                    |        |           |          |        |         |         |          |
| Pain now   | 0.096  | -0.248    | -0.338*  | -      | 0.072   | 0.238   | -0.152   |
| Least pain   | 0.279  | -0.413**  | -0.352   | -      | 0.113   | 0.174   | -0.404** |
| Average pain   | 0.252  | -0.286*   | -0.131   | -      | 0.134   | 0.106   | -0.043   |
| Worst pain   | 0.005  | -0.308*   | -0.06    | -      | 0.13    | 0.085   | -0.332*  |
| <b>Interference with</b>                             |        |           |          |        |         |         |          |
| General activity                                     | 0.014  | -0.403**  | -0.637** | 0.043  | 0.217   | 0.477** | -0.239   |
| Mood   | -0.101 | -0.374**  | -0.356*  | 0.077  | 0.451** | 0.553** | -0.24    |
| Walking ability                                      | 0.081  | -0.361*   | -0.514** | -0.006 | 0.173   | 0.361** | -0.309*  |
| Normal work  | 0.054  | -0.284*   | -0.567** | 0.034  | 0.258   | 0.427** | -0.4**   |
| Relationships  | -0.208 | -0.015    | 0.032    | 0.143  | 0.512** | 0.371** | -0.086   |
| Sleep  | -0.095 | -0.054    | -0.133   | -0.107 | 0.177   | 0.198   | -0.323*  |
| Enjoy life   | -0.192 | -0.126    | -0.32*   | 0.294* | 0.383** | 0.621** | -0.155   |
| <b>Total pain index score (<math>\bar{X}</math>)</b> | -0.084 | -0.309*   | -0.479** | 0.095  | 0.416** | 0.577** | -0.336*  |

\*  $p < 0.05$ ; \*\*  $p < 0.01$  (two-tailed)

<sup>a</sup> No pain scores are recorded for PMI because they are a component of the index.

HADS-A—Hospital Anxiety and Depression Scale—Anxiety; HADS-D—Hospital Anxiety and Depression Scale—Depression; KPS—Karnofsky Performance Status; PMI—Pain Management Index; SL-ASIA—Suinn-Lew Asian Self-Identity Acculturation Scale

Edwards, & Fillingim, 2004; Rahim-Williams et al., 2007). These differences among ethnic groups warrant additional investigation in large comparative studies of cancer pain management.

Consistent with previous reports in Taiwanese (Chen et al., 2000; Ger et al., 1998; Lin, 2001; Lin et al., 2003) and Caucasian American patients with cancer (Cleeland et al., 1997; Serlin, Mendoza, Nakamura, Edwards, & Cleeland, 1995), increased least and present pain intensity scores were associated with decreases in functional status as measured by the KPS scale in this study. In addition, for most of the BPI interference items, as well as the total interference score, higher scores were associated with poorer functional status. It is unclear why average and worst pain intensity scores were not associated with KPS scores.

Cancer pain can have a deleterious effect on patients' moods (Glover et al., 1995; Spiegel et al., 1994; Strang, 1997). Using cut points for the HADS anxiety and depression scores recommended by Zigmond and Snaith (1983), the prevalence of clinical anxiety and depression in patients in the current study was 30% and 34%, respectively. However, a surprising finding in this study was that none of the pain intensity scores were significantly correlated with the HADS anxiety and depression scores. Although this finding is consistent with those of Sze et al. (2000), in a sample of Chinese patients with cancer in a palliative care setting in Hong Kong, it is not consistent with findings from previous studies in Taiwan (Chen et al., 2000; Lin et al., 2003) that documented positive correlations between pain intensity scores and levels of anxiety and depression. One reason for these differences could be that the Taiwanese studies enrolled hospitalized patients. In addition, in this study, HADS

anxiety and depression scores were lower than those reported by Chen et al. (2000). It should be noted that significant positive correlations were found between many of the pain interference items and HADS anxiety and depression scores. This finding warrants additional investigation in future studies.

The PMI provides an approximation of the adequacy of analgesic medications for cancer pain management. About 62% of the patients in this study reported inadequate analgesic use as measured by the PMI, which is consistent with the finding that the mean pain relief score was only 49%. This finding also is consistent with previous reports by Cleeland et al. (1994, 1997) which found that 59%–65% of African American and Hispanic American patients did not receive adequate analgesic prescriptions for their cancer pain.

Twenty-four percent of the patients in this study used CAM or traditional Chinese medicine (TCM) to manage their cancer pain in conjunction with Western analgesic medications. Twenty-eight percent of the patients ( $n = 14$ ) used only CAM or TCM treatments for their cancer pain. Additional research needs to determine the specific types of CAM or TCM treatments that were used, as well as their effectiveness with or without traditional pharmacologic approaches to cancer pain management.

To the authors' knowledge, this study is the first to examine the relationship between pain characteristics and level of acculturation in Chinese American patients with cancer. Patients who were less acculturated or had a stronger Asian (Chinese) identity reported higher least and worst pain intensity scores and significantly greater pain interference scores with walking ability, ability to do normal work, and sleep, as well as total pain interference. Although this finding warrants

replication, it suggests that Chinese American patients with lower levels of acculturation may be at greater risk for unrelieved cancer pain. Therefore, oncology clinicians should be aware that patients' levels of acculturation may influence their pain experience regardless of the length of time they have lived in the United States.

Consistent with previous studies (Chou, Dodd, Abrams, & Padilla, 2007; Im et al., 2008; Wong-Kim & Merighi, 2007), recruitment of Chinese patients was challenging, possibly because of the stigma associated with cancer (Im et al., 2008; Wong-Kim & Merighi, 2007), pain beliefs, barriers to pain management, or the inherent differences between Western medicine and Eastern or holistic approaches to health care. Different approaches to recruitment may need to be developed to optimize Chinese patient participation in research studies.

Several limitations of this study should be acknowledged. The relatively small sample size and the homogeneity of the sample in terms of acculturation level limit the generalizability of the study findings. In addition, because of the relatively small sample and the characteristics of the patients, as well as the multiple correlations that were performed, the findings from this pilot study should be interpreted with caution and warrant replication in larger and more heterogeneous samples of Chinese Americans, particularly in terms of their acculturation levels. Although 40 of the 50 patients had lived in the United States for more than 10 years, their level of acculturation was low ( $\bar{X} = 1.8$ ), which suggests a strong Asian (Chinese) identification. Although the re-

ruitment of this type of sample was a major goal of this study, future research should include larger numbers of second- and third-generation Chinese American patients with cancer. All of the patients were from a community setting in a large urban area. Therefore, these findings cannot be generalized to hospitalized patients or to patients in more rural areas. Finally, patients' self-reports of their analgesic use were used to calculate the PMI. Future studies should evaluate the medication regimen in more detail (e.g., doses of analgesic medication, adherence to the analgesic regimen, effectiveness of the analgesic regimen).

Future quantitative and qualitative studies with larger numbers of patients need to extend the work reported here on the cancer pain experience of Chinese Americans. These types of studies are needed to plan culturally appropriate intervention studies to improve cancer pain management in this vulnerable population.

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