Symptom Management and Supportive Care

Pain in Underserved Community-Dwelling Chinese American Cancer Patients: Demographic and Medical Correlates

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LEARNING OBJECTIVES

After completing this course, the reader will be able to:

1. Discuss the prevalence of frequent or persistent pain among non-English-speaking Chinese American cancer patients.
2. Identify factors that were significantly associated with increased pain intensity and pain-related distress in the population studied.

This article is available for continuing medical education credit at CME.TheOncologist.com.

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ABSTRACT

Background. Little is known about cancer pain in Chinese Americans. The objective of this study was to describe the epidemiology of pain in this population. This information is needed to identify and address unmet clinical needs for culturally relevant interventions targeting pain and its consequences.

Methods. A consecutive sample of underserved ethnic Chinese patients in a large community-based oncology practice was screened for persistent or frequent pain. Those patients with pain completed translated instruments assessing demographics, linguistic acculturation, disease-related characteristics, and pain-related characteristics.

Results. Of 312 patients screened, 178 (57.1%) reported frequent or persistent pain, 175 were eligible, and 170 participated. Most participants (85.9%) were born in China and 84.7% overall spoke Cantonese only. The most common cancers were gastrointestinal (28.2%), lung (21.8%),

breast (20.6%), head and neck (12.9%), and genitourinary (4.7%); 43.5% had metastatic disease. The mean worst pain severity on a 0–10 numeric scale was 4.7 (standard deviation, 2.4), with 28.2% of patients rating their worst pain at ≥ 7 of 10. Although 37.6% used opioids and 47.1% used nonopioids, 45.8% reported “little” or “no” pain relief from medications. Complementary or alternative medicine therapies for cancer pain were used by 35.8%. In multiple regression analyses, worst pain was positively associated with acculturation to the English language and opioid therapy, and pain-related distress was positively associated with opioid therapy.

Conclusion. Pain is prevalent among community-dwelling, ethnic Chinese American cancer patients. Additional studies are needed to confirm these results and investigate the finding that higher linguistic acculturation is associated with reports of more intense pain. *The Oncologist* 2011;16:523–533

INTRODUCTION

Chinese Americans are the largest Asian subgroup (3.6 million) in the U.S. [1]. According to recent Census figures, 29% are recent immigrants, and the population overall is characterized by low levels of acculturation and poor socioeconomic status [1, 2]. Cancer is a highly prevalent disorder among Chinese Americans, and several serious tumor types, including nasopharyngeal, liver, and stomach cancer, occur at relatively high rates [3]. Some studies suggest that Chinese cancer patients are at high risk for poorly controlled pain and its consequences because of a greater likelihood of advanced disease on presentation and potential cultural barriers to pain management, including spiritual influences and fatalistic beliefs about pain [4]. As the number of ethnic Chinese adults with cancer increases [5, 6], there is a growing need to better characterize the epidemiology of pain and obtain the information necessary for timely and culturally relevant interventions.

Numerous surveys suggest that the prevalence of cancer pain among ethnic Chinese patients residing in China, Taiwan, or Hong Kong is comparable with that of non-Chinese samples in the U.S. This prevalence is 38%–42% in newly diagnosed patients [4, 7, 8], 48%–83% in those with advanced cancer [4, 9–13], and up to 88% in patients nearing the end of life [14, 15]. Some studies of ethnic Chinese patients from Asia note that pain intensity is generally higher than in western populations [9, 16, 17], whereas others find similar distributions of pain severity [18–20].

Information about cancer pain in the Chinese population residing in the U.S. is very limited. For example, a survey of

50 patients observed that the prevalence of pain was 83.3% and that 28% reported their worst pain as ≥ 7 on a 0–10 scale [21]. Studies with larger samples are needed and have been facilitated in recent years by the development of validated Chinese language instruments. The present study employed these instruments to assess the prevalence and correlates of cancer pain in a sample of economically disadvantaged ethnic Chinese American cancer patients treated in a community setting. The aims were to: (a) identify the prevalence and characteristics of persistent pain and (b) evaluate demographic, cultural, disease-related, and treatment-related correlates of pain intensity and pain-related distress.

METHODS

Data were collected from patients at a large community-based oncology practice in Manhattan’s Chinatown, an area that is designated by the U.S. government as economically disadvantaged and medically underserved [22]. The Institutional Review Board at Beth Israel Medical Center in New York approved the protocol and patients consented to the study prior to participation.

Patient Selection and Procedures

A consecutive sample of ambulatory cancer patients was screened and recruited between February 2008 and January 2009. Eligible patients included Asian adults with Chinese ethnicity (self-identified as Chinese); Mandarin, Cantonese, or English as the primary language; active cancer; pain assessed as resulting from cancer or cancer therapy; and an

affirmative response to the following question: “Have you had persistent or frequent pain for at least 3 months?” Patients were excluded if there was evidence of a chronic non-cancer pain syndrome as the primary pain disorder, or if there was evidence of psychopathology or cognitive impairment severe enough to preclude informed consent or completion of the survey instruments.

The community-based office that provided patients for the study is a private practice unaffiliated with a hospital. The practice employs two oncologists who referred patients to the study research assistant, one physician’s assistant, and two nursing staff. Once a patient was identified as potentially eligible, a trained research assistant who was proficient in Mandarin, Cantonese, and English verified the remaining eligibility criteria and invited the patient to participate. Informed consent was obtained in the patient’s primary language. Consenting patients were asked to complete questionnaires that were administered by interview or by written questionnaire in their primary language. The oncologist reviewed the patients’ medical records to abstract disease, cancer treatment, and pain management variables.

Measures

All study measures were previously developed and validated with ethnic Chinese populations (see next section). The selection of potential correlates of pain was guided by the research literature and included extent of disease, sex, education, and insurance [7, 23, 24]. Several items that were created to capture these variables were easily interpretable by respondents and were formally translated in traditional Chinese characters and then back translated by a certified medical translator. The pain screening item [25]—“Have you experienced persistent or frequent pain for the past 3 months or longer?”—was similarly translated.

Demographic Characteristics

Participants reported their age, sex, family status, education, employment, income, insurance, and religious affiliation using items developed for Chinese cancer patients by Lam et al. [26].

Acculturation to the English Language

Acculturation to an English-speaking environment was measured using the Marin and Marin Acculturation Scale [27, 28], an instrument first validated for Spanish speakers and subsequently validated in first-generation Chinese Americans. For this study, only the five-item language use subscale was translated to Chinese and administered. This subscale assesses proficiency and preferences for speaking a certain language in a particular context (e.g., “which lan-

guage do you read and speak?”). Items are rated using a five-point Likert-type scale ranging from 1, only Chinese, to 5, only English and are summed to create a total subscale score. Total subscale scores range from 5, not acculturated, to 25, completely acculturated, with scores in the middle indicating biculturalism. The subscale has good internal consistency (Cronbach’s α , 0.92) and convergent validity based on correlations with generational level ($r = 0.65$), length of U.S. residence ($r = 0.70$), and self-evaluation of ethnic identity ($r = 0.76$) [27].

Disease-Related Characteristics

Patients’ medical charts were reviewed to collect data on the following disease and treatment characteristics: date of cancer diagnosis, cancer site and stage, primary and adjuvant cancer treatment, and disease recurrence. Current cancer treatments could not be reliably ascertained from the available charts and were not included in the statistical analyses.

Pain-Related Characteristics

Pain descriptors were evaluated using the Brief Pain Inventory-Short Form-Chinese (BPI-SF-C), which has been translated and validated in Chinese medical populations [16]. On this measure, patients reported pain intensity on 0–10 numeric scales for average pain during the past 24 hours and worst pain during the past 24 hours. Other characteristics were assessed, including onset of pain, pain description (e.g., location, intensity, duration, and quality of the pain), site, and the impact of the pain on quality of life. Pain treatments, including current analgesic medications and complementary and alternative medicine (CAM) therapies, were also recorded. The BPI-SF-C has good internal reliability (Cronbach’s α , 0.89 for the pain severity scale and 0.91 for the pain interference scale) [16]. In this study, only the worst pain intensity item was used in the univariate and multivariate analyses, a standard procedure that has been followed in previous research [7, 29–31]. This single-item measurement has been shown to have good concurrent validity (r values in the range of 0.77–0.86) [32], good criterion-related validity [32], and high test–rest reliability ($r = 0.93$) [33]. Worst pain intensity item ratings of 1–4 correspond to mild pain, ratings of 5–6 correspond to moderate pain, and ratings of 7–10 correspond to severe pain based on the correlation with level of pain interference [34].

Pain-Related Distress

Participants reported their current level of pain-related distress using a single item from the Memorial Symptom Assessment Scale-Short Form-Chinese (MSAS-SF-C) [8, 35, 36]. This single-item measurement was used in the univar-

Table 1. Demographics and related characteristics of ethnic Chinese cancer patients with chronic pain presenting to a community oncology practice ($n = 170$)

Characteristic	Sample, n (%)
Female	106 (62.4)
Age (mean $\pm$ standard deviation) ^a	64.3 $\pm$ 13.9
Family status	
Single	4 (2.4)
Married	130 (76.5)
Divorced	7 (4.1)
Widowed	29 (17.1)
Education level ^b	
No formal education	20 (11.9)
Less than high school	68 (40.5)
High school	63 (37.5)
College	16 (9.5)
Postcollege	1 (0.6)
Employment	
Employed	22 (12.9)
Unemployed	37 (21.8)
Retired	88 (51.8)
Homemaker	23 (13.5)
Insurance	
Medicare	97 (57.1)
Medicaid	48 (28.2)
Private	18 (10.6)
Other	7 (4.1)
Religion ^c	
None reported	85 (50.3)
Christianity	24 (14.2)
Buddhism	24 (14.2)
Chinese God worship	21 (12.4)
Ancestor worship	15 (8.9)
Country of birth	
Mainland China	146 (85.9)
Hong Kong	12 (7.1)
Vietnam	3 (1.8)
Taiwan	2 (1.2)
Malaysia	2 (1.2)
Macau	2 (1.2)
Other	3 (1.8)
Years of U.S. residency	
Born in the U.S.	3 (1.8)
1–3 yrs	6 (3.5)
4–7 yrs	13 (7.6)
>7 yrs ^d	148 (87.1)

(continued)

Table 1. (Continued)

Characteristic	Sample, n (%)
Primary dialect spoken	
Cantonese	144 (84.7)
Mandarin	16 (9.4)
Fukienese	7 (4.1)
Other	3 (1.8)
Linguistic acculturation level, mean (min, max)	6.2 $\pm$ 2.7 (5, 22) ^e

^{a,b}Sample sizes for age and educational level were 163 and 168, respectively.^cSample size for religion was 169.^dLess than 7 years = recent immigrant.^e5 = not acculturated, 25 = completely acculturated.

iate analyses based on previous research [37]. The MSAS-SF-C has been validated in Chinese populations with good internal consistency (Cronbach's α values in the range of 0.84–0.91 for the four subscales) [36].

Statistical Analyses

SAS software, version 9.1 (SAS Inc., Cary, NC), was used to calculate all statistical analyses. The analyses focused on the epidemiology and correlates of pain intensity and pain-related distress. Continuous variables were described in terms of the mean $\pm$ standard deviation (SD), and categorical variables were described in terms of the frequency (percentage). Associations between categorical variables and continuous outcomes were calculated using either Student's t -tests or one-way analyses of variance. χ^2 tests were used to test for associations between group variables and categorical outcomes. The degree of linear relationship among continuous variables was evaluated using Pearson product moment correlations. The presence of non-normality in the form of skewness in some of the continuous variables was corrected using a log transformation. Factors identified as significant in the univariate analysis were evaluated in a multivariate analysis using multiple regression, with fixed entry of all factors to determine which were genuinely significant with the outcome as opposed to being possibly confounded with other factors. Because the purpose of the univariate analyses was to identify possible predictors of pain outcomes, no statistical adjustments for the number of comparisons were used. For all analyses, statistical significance was defined as $p < .05$.

A sample of 170 patients was recruited for this study. This sample size provides 90% power to detect a medium effect size (Cohen's $d = 0.50$) using a Student's t -test with $\alpha = 0.05$.

RESULTS

Demographic and Related Characteristics

A consecutive sample of 312 patients was screened and 178 (57.1%) reported persistent or frequent pain for ≥ 3 months. Of this group, 175 met all the eligibility criteria for participation. Five of these patients declined participation because of a lack of interest ($n = 3$), not feeling well enough to participate ($n = 1$), and no reason specified ($n = 1$). The demographic and related characteristics of the participants are listed in Table 1; the mean linguistic acculturation level of 6.2 (SD, 2.7; range, 5–22) indicates little or no English usage by these patients.

Disease-Related Characteristics

The most prevalent cancer sites were gastrointestinal (28.2%), lung (21.8%), breast (20.6%), head and neck (12.9%), and genitourinary (4.7%) (Table 2). Approximately half of the patients (51.8%) had localized disease and fewer (43.5%) had metastatic disease. Past treatments included chemotherapy (65.3%), surgery (38.8%), and radiotherapy (27.6%).

Pain Prevalence and Characteristics

On the BPI-SF-C, the 170 patients who completed the questionnaires reported a mean score for average pain in the past 24 hours of 2.4 (SD, 1.7; range, 0–8) and a mean score for worst pain in the past 24 hours of 4.7 (SD, 2.4; range, 1–10) (Table 3). More than one quarter (28.2%) reported a worst pain score ≥ 7 , a value consistent with severe pain [34]. The single-item measure of pain-related distress from the MSAS-SF-C showed that 48.2% reported low levels of distress (i.e., “not at all” and “a little bit”), 36.9% had moderate distress (i.e., “somewhat”), and 14.9% had high distress (i.e., “quite a bit” and “very much”).

Overall, 63.9% reported that they currently used a pain treatment, and 36.1% reported that they did not currently use any pain treatment. Of the patients who used a pain treatment, the most prevalent were nonopioid analgesics (47.1%), opioid analgesics (37.6%), and Chinese herbal medicine (11.2%).

Of those participants who reported taking prescription pain medications (50.3%), nearly half (45.8%) rated their level of pain relief as none to little, and more than half (54.1%) rated their pain relief as moderate to complete. Despite this variation, most (75.1%) reported high satisfaction levels (i.e., “moderately,” “very,” and “completely”) with their level of pain relief from their current prescription pain medications, whereas only a minority (25.0%) reported low satisfaction levels (i.e., “not at all” and “a little”).

Most of the participants indicated that they told another

Table 2. Disease-related characteristics of ethnic Chinese cancer patients with chronic pain presenting to a community oncology practice ($n = 170$)

Characteristic	Sample, <i>n</i> (%)
Cancer diagnosis	
Gastrointestinal	48 (28.2)
Lung	37 (21.8)
Breast	35 (20.6)
Head, neck, and thyroid	22 (12.9)
Genitourinary	8 (4.7)
Other	17 (10.0)
Missing	3 (1.8)
Extent of disease	
Localized	88 (51.8)
Metastatic	74 (43.5)
Unknown	8 (4.7)
Cancer treatment since diagnosis	
Surgery	66 (38.8)
Chemotherapy	111 (65.3)
Radiotherapy	47 (27.6)
Hormonal	18 (10.6)

person about having pain (84.1%); this was usually communicated within 1 week following pain onset (79.4%). When patients who indicated that they had not disclosed their pain to anyone (15.9%) were asked to explain the reason, they usually reported that they did not want to see a physician for pain treatment.

Univariate Associations: Worst Pain Intensity and Pain-Related Distress

To correct for non-normality, worst pain and pain-related distress were log transformed so that all p -values for univariate associations with these two variables are based on their log values. As expected, worst pain intensity was significantly associated with pain-related distress ($r = 0.60$; $p < .001$) (Table 4). Higher levels of worst pain intensity also were significantly associated with greater acculturation to the English language ($p = .001$) and with the receipt of opioid therapy ($p < .001$). No significant associations with worst pain intensity were observed for any of the other demographic or disease-related characteristics (sex, age, education level, insurance, years of residency in the U.S., and extent of disease).

Higher levels of pain-related distress were significantly associated with metastatic disease ($p = .02$) and also with the receipt of opioid therapy ($p < .001$). No other associations with demographic characteristics (sex, age, education

Table 3. Pain-related characteristics of ethnic Chinese cancer patients with chronic pain presenting to a community oncology practice ($n = 170$)

Characteristic	Frequency (%)
Pain intensity in past 24 hours	
Worst pain, mean (min, max)	4.7 ± 2.4 (1, 10)
Mild (1–4) pain level	86 (50.6)
Moderate (5–6) pain level	36 (21.2)
Severe (7–10) pain level	48 (28.2)
Average pain, mean (min, max) ^a	2.4 ± 1.7 (0, 8)
Mild (1–4) pain level	149 (88.2)
Moderate (5–6) pain level	16 (9.5)
Severe (7–10) pain level	4 (2.4)
Current level of pain-related distress ^b	
Not at all	2 (1.2)
A little bit	79 (47.0)
Somewhat	62 (36.9)
Quite a bit	22 (13.1)
Very much	3 (1.8)
Self-perceived cause of frequent or persistent pain ^c	
Cancer	117 (70.9)
Cancer treatment(s)	43 (26.1)
Don't know	5 (3.0)
Any current pain treatment(s) ^d	
Yes	108 (63.9)
No	61 (36.1)
Current pain treatment	
Opioid analgesics	64 (37.6)
Nonopioid analgesics ^e	80 (47.1)
Injections	0
Chinese herbal medicine	19 (11.2)
Acupuncture	13 (7.6)
Chinese massage (tui na)	8 (4.7)
Energy healing or reiki	5 (2.9)
Chiropractic therapy	5 (2.9)
Qi gong	3 (1.8)
Tai chi	2 (1.2)
Chinese megavitamin therapy	0
Chelation therapy	0
Spiritual healing	0
Meditation	1 (0.6)
Other	5 (2.9)
Take prescription pain medication ^f	
Yes	85 (50.3)
No	84 (49.7)
Level of pain-relief from current prescription pain medications ^g	
None	24 (28.2)

(continued)

Table 3. (Continued)

Characteristic	Frequency (%)
A little pain relief	15 (17.6)
Moderate pain relief	16 (18.8)
A lot of pain relief	14 (16.5)
Complete pain relief	16 (18.8)
Satisfaction with pain relief from current prescription pain medications ^h	
Not at all satisfied	2 (2.5)
A little satisfied	18 (22.5)
Moderately satisfied	34 (42.5)
Very satisfied	23 (28.8)
Completely satisfied	3 (3.8)
Told another person about having pain	
Yes	143 (84.1)
No	27 (15.9)
Who patient first told about having pain ⁱ	
Spouse/other family member	87 (60.8)
Doctor	53 (37.1)
Friend	2 (1.4)
Nurse	1 (0.7)
Other health care professional	0 (0)
Length of time waited before disclosing pain to another person ^j	
Within first week after pain onset	112 (79.4)
<1 month after pain onset	14 (9.9)
>1 month but <3 months after pain onset	6 (4.3)
>3 months after pain onset	9 (6.4)

^{a–c}Sample sizes for: average pain, $n = 169$; pain-related distress, $n = 168$; self-perceived cause of pain, $n = 165$.

^dSample size for any current pain treatments, $n = 169$.

^eIncluding nonsteroidal anti-inflammatory drugs or acetaminophen.

^{f,g}Sample sizes for: take prescription pain medication, $n = 169$; level of pain relief from current prescription pain medications, $n = 85$.

^hSatisfaction with pain relief, $n = 80$.

^{i,j}Sample sizes for: who patient first told about having pain, $n = 143$; length of time waited before disclosing pain, $n = 141$.

level, insurance, years of residency in the U.S., and linguistic acculturation) showed statistical significance.

Multivariate Associations: Worst Pain Intensity and Pain-Related Distress

Multivariate analyses were conducted to clarify the extent to which the factors that were significantly associated with worst pain intensity or pain-related distress in the univariate

Table 4. Univariate associations with worst pain intensity and pain-related distress ($n = 170$)

Variable	Sample size	Worst pain ^a	Pain-related distress ^b
Sex ^c			
Male	64	5.0 ± 2.5	2.8 ± 0.9
Female	106	4.6 ± 2.4	2.6 ± 0.7
		$p = 0.29$	$p = 0.14$
Age (yrs)			
<65	91	4.7 ± 2.4	2.6 ± 0.8
≥65	79	4.8 ± 2.5	2.8 ± 0.8
		$p = 0.71$	$p = 0.06$
Education level ^{d,e}			
None	20	5.1 ± 2.5	2.6 ± 0.8
Less than high school	68	4.8 ± 2.4	2.8 ± 0.8
High school	63	4.7 ± 2.5	2.7 ± 0.8
Some college/postcollege	17	4.2 ± 2.3	2.5 ± 1.0
		$p = 0.27$	$p = 0.43$
Insurance			
None	18	4.1 ± 2.6	2.5 ± 0.9
Medicare	97	4.8 ± 2.4	2.8 ± 0.8
Medicaid	48	5.0 ± 2.3	2.6 ± 0.8
Other	7	4.0 ± 3.2	2.4 ± 0.5
		$p = 0.57$	$p = 0.94$
Years resident in U.S.			
Born in U.S.	3	3.3 ± 1.5	2.3 ± 0.6
1–3 yrs	6	4.7 ± 2.4	2.5 ± 0.8
4–7 yrs	13	4.5 ± 2.2	2.5 ± 0.8
>7 yrs	148	4.8 ± 2.5	2.7 ± 0.8
		$p = 0.65$	$p = 0.27$
Linguistic acculturation ^f			
Score ≤5	136	4.4 ± 2.4	2.6 ± 0.8
Score >5	33	6.0 ± 2.4	2.9 ± 0.9
		$p = 0.001$	$p = 0.10$
Extent of disease			
Localized	88	4.4 ± 2.2	2.6 ± 0.7
Metastatic	74	5.2 ± 2.6	2.8 ± 0.8
Unknown	8	4.1 ± 2.7	2.5 ± 0.5
		$p = 0.06^g$	$p = 0.02^g$
Opioid therapy			
No	106	4.1 ± 2.3	2.5 ± 0.7
Yes	64	5.7 ± 2.4	3.0 ± 0.9
		$p < 0.001$	$p < 0.001$

^aItems ranged from 0–10.^bItems ranged from 0–4.^c*t*-tests used for all two-group comparisons.^dAnalysis of variance used for all comparisons of more than two groups.^eSample size for education, $n = 168$.^fSample size for linguistic acculturation, $n = 169$.^g*p*-value comparing patients with metastatic disease versus all other patients.

analyses were independent of one another and therefore contributed uniquely to the explained variance of each of these pain outcomes. Worst pain and pain-related distress were log transformed to correct for non-normality. When worst pain intensity was regressed on linguistic acculturation and the receipt of opioid therapy, both were significant (acculturation: $\beta = 0.20$; $p = .007$; opioid therapy: $\beta = 0.30$; $p < .001$). The overall R^2 value including both factors was 0.14. When pain-related distress was regressed on both opioid therapy and the presence of metastatic disease, only opioid therapy remained significantly associated ($\beta = 0.25$; $p = .001$). The presence of metastases was not significant ($\beta = 0.13$; $p = .09$) because of its association with opioid therapy. The R^2 value for opioid therapy alone was 0.08, whereas with both factors it was 0.09.

DISCUSSION

In this sample of economically disadvantaged, mostly first-generation and non-English speaking Chinese American cancer patients undergoing treatment in a community oncology practice, the prevalence of frequent or persistent pain was 57.1%, and 28.2% reported a worst pain score ≥ 7 , a value strongly associated with impairment in function and quality of life [34]. This prevalence is consistent with a smaller survey of Chinese American cancer patients [21, 29]. Opioids were given to 37.6% of patients, but only 54.1% of patients receiving opioids reported adequate relief, a rate lower than that observed in opioid-treated white populations [38–44].

Comparison of these data with cancer pain surveys performed in other populations underscores the importance of the problem and the need for both additional research and targeted efforts to improve pain-related therapeutic outcomes in Chinese American populations [38–44]. Previous studies of cancer pain indicate that pain severe enough to require opioid therapy occurs in 30%–60% of patients undergoing active treatment and >70% of those with advanced disease [45–48]. A large longitudinal prospective study performed by the Eastern Cooperative Oncology Group explored the epidemiology of cancer symptoms in ambulatory patients specifically—among 3,106 randomly selected breast, prostate, colorectal, and lung cancer patients (70% women, 22% racial/ethnic minority, 38% with advanced disease) at seven academic (303 patients) and 32 community-based (2,803 patients) oncology practices, the baseline worst pain score was ≥ 5 in 18.9%, compared with 49.4% in the current study [49]. In a prospective cross-sectional European study, a representative sample of 277 randomly selected oncology outpatients with various cancer types, stages, and treatment regimens from a tertiary cancer hospital showed a cancer pain prevalence rate of

17.9%, versus 57.1% in the current study [50]. The data from this community-dwelling sample of ethnic Chinese Americans suggest that the prevalence of cancer pain overall, and severe pain specifically, is higher than that observed in these other groups.

These results do not clarify the causes of inadequately controlled pain. Inadequate treatment was estimated in one systematic review to affect approximately 43% of opioid-treated cancer patients in the U.S. [51] and is likely to be multifactorial. Contributing elements may share features that have been identified for other racial/ethnic groups (e.g., stoicism and preferences for CAM pain therapies) [52] as well as other clinician-related and system-related factors that complicate efforts to assess pain or optimize analgesic therapy. Future studies should evaluate a broad range of factors that may influence treatment use, including patient-related concerns affecting medication adherence, clinician-related issues such as the need for continuing education, and system-related issues such as insurance and pain medication access [53, 54].

The study revealed high satisfaction with pain relief from current prescription medications despite low levels of actual pain relief from these medications. Other studies have shown that the interpretation of satisfaction ratings in pain management is influenced by multiple factors [55, 56]. Ratings are often skewed toward the positive and may be more reflective of the nature of the relationship between the patient and provider than the quality of the actual outcome [55, 57, 58]. Thus, information about the level of pain relief as elicited by the current study may provide a more useful basis for pain clinicians than satisfaction ratings [55].

Among the demographic and medical variables examined, greater acculturation to the English language was the factor most robustly associated with higher pain intensity. This contrasts with a recent study of 50 Chinese American cancer patients by Edrington et al. [29], which found that greater acculturation was associated with lower pain intensity. This difference may be related to variation in sample selection, sample characteristics (e.g., clinical, demographic, health literacy [59], psychosocial [60], and cultural factors [61–63]), and timing of pain treatment delivery. For example, participants in the study by Edrington et al. [29] were self-referred through advertisements in nonclinical and clinical settings and assessed via telephone, whereas patients in the current study were screened in a clinical setting and interviewed in person. This difference did not, however, result in significant variation in disease-related or demographic variables. Rates of metastatic and localized disease in the Edrington et al. [29] sample versus the current sample were comparable (54% and 36% versus 43% and 52%, respectively), as was the duration of pain syndromes

(54% versus 45% had pain for ≥ 7 months, respectively), age (mean $\pm$ SD, 62.6 $\pm$ 11.7 versus 64.3 $\pm$ 13.9), country of birth (78% versus 86%, mainland China), and acculturation level (strong Chinese identification versus low acculturation to the English language). In contrast to the global measure of acculturation used in the Edrington et al. [29] study, the current study used a measure of linguistic acculturation.

A positive association between linguistic acculturation and pain intensity may be hypothesized to result from other modifying variables not evaluated in the current study. For example, it is possible that acculturation levels are associated with beliefs and perceptions that influence the pain experience, including the willingness to express pain to others; less acculturated patients may have had higher levels of culturally defined stoicism, which inhibited their pain expression. Investigating the potential association between linguistic acculturation and an individual's assertiveness to express their symptoms is an area for future research. In a similar way, family-related influences, including concerns about opioid therapy, have been shown to affect reports of pain outcomes [64]. Additional research is needed to elucidate the impact of these and other factors [65]. Clinically, the finding that pain experience correlates with linguistic acculturation underscores the need for culturally relevant pain assessment and treatment approaches that are tailored to the unique needs of specific immigrant subgroups.

Additional research also is needed to understand the disparate finding related to pain-related distress, which was found to be much lower in this study than in a Veterans Affairs (VA) medical center [66] and unassociated with linguistic acculturation. In the VA study by Chang et al. [66], 52% of 240 cancer outpatients and inpatients reported severe pain-related distress ("quite a bit" or "very much"), compared with 14.9% of 168 cancer outpatients in the current study. Differences in the study populations, including demographic, disease-related, medical, cultural, and psychosocial characteristics, may explain these disparate rates of pain-related distress in the two studies.

The clinical relevance of the pain-related distress measure used in this study is suggested by its association with opioid therapy and metastatic disease, which is consistent with earlier studies in other populations [67, 68]. However, these factors accounted for a relatively low percentage of the variance (9%) in pain-related distress. Thus, other potential factors not evaluated in the current study that may better explain variability in pain-related distress, including distress from other symptoms [37, 69], should be investigated in future studies.

Consistent with previous research documenting preferences for CAM therapies among ethnic Chinese cancer pa-

tients [70], nearly 36% of patients in this study reported using CAM therapies for cancer pain. Additional research is needed with a larger sample to determine the extent to which preferences for specific CAM therapies, and the actual use of these approaches, relate to pain intensity and pain-related distress.

This study focused on Chinese American immigrants, a population that has been underrepresented in cancer pain research, and evaluated a sample of patients characterized by a relatively low socioeconomic status and poor acculturation. Although Chinese language instruments were used, the utility of these measures in poorly educated, low income populations requires further evaluation. Other potential limitations of the study include the use of a nonrandom sampling design, the recruitment of participants from a single oncology practice, the lack of detailed information about specific analgesic medication use, and the possibility that the identification of eligible patients by the oncologist introduced selection bias. The use of single-item measurements for worst pain intensity and pain-related distress in the univariate analyses and multivariate analyses, although less comprehensive, is unlikely to change the results because the BPI-SF pain severity items are highly intercorrelated and comparisons of the results with those from prior studies may still be useful. These limitations should be balanced against respondent burden and the strengths of the study, which include the prospective design, the selection of pain correlates guided by the empirical literature, the large number of poorly acculturated patients from an economically disadvantaged area, and the inclusion of a com-

munity- and practice-based clinical sample that was evaluated using a comprehensive, face-to-face pain interview by a Chinese-speaking interviewer. The study provides new information from a population that has been challenging to study and suggests important avenues for further research and quality improvement activities [65].

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