Original Article

Relationship Between Pain-Specific Beliefs and Adherence to Analgesic Regimens in Taiwanese Cancer Patients: A Preliminary Study

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Abstract

This pilot cross-sectional study aimed to 1) explore pain beliefs and adherence to prescribed analgesics in Taiwanese cancer patients, and 2) examine how selected pain beliefs, pain sensory characteristics, and demographic factors predict analgesic adherence. Pain beliefs were measured by the Chinese version of Pain and Opioid Analgesic Beliefs Scale—Cancer (POABS-CA) and the Survey of Pain Attitudes (SOPA). Analgesic adherence was measured by patient self-report of all prescribed pain medicine taken during the previous 7 days. Only 66.5% of hospitalized cancer patients with pain (n = 194) adhered to their analgesic regimen. Overall, patients had relatively high mean scores in beliefs about disability, medications, negative effects, and pain endurance, and low scores in control and emotion beliefs. Medication and control beliefs significantly predicted analgesic adherence. Patients with higher medication beliefs and lower control beliefs were more likely to be adherent. Findings support the importance of selected pain beliefs in patients' adherence to analgesics, suggesting that pain beliefs be assessed and integrated into pain management and patient education to enhance adherence. J Pain Symptom Manage 2002;24:415–423. © *U.S. Cancer Pain Relief Committee, 2002.*

Key Words

Cancer pain, beliefs, analgesics, adherence

Introduction

Cancer has been the leading cause of death in Taiwan since 1982,[1] and pain is the major problem experienced by these patients. More than 30% of newly diagnosed cancer patients and 40% of advanced cancer patients in Taiwan have been estimated to suffer from pain.[2,3]

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Because pharmacological agents are considered a cornerstone of cancer pain management, patients' adherence (commonly known as compliance) to prescribed analgesics has been recognized as the key to successful cancer pain control. The high prevalence of cancer pain in Taiwan may reflect questionable adherence to prescribed analgesics among cancer patients.

Despite the importance of adhering to prescribed pain medicine or treatment in pain control, however, this issue has not received sufficient attention[4] and only a few studies have examined related problems, such as analgesic non-adherence or hesitation to take analgesics in cancer patients with pain.[5–8] There is even less information regarding the status of adherence to prescribed analgesics in cancer patients in Taiwan. Studying analgesic adherence and related factors in cancer patients with pain is important to help health care professionals better understand these phenomena and lead to more effective cancer pain control in Taiwan.

Various theories of health psychology pertaining to psychological stress and coping,[9] theory of reasoned action,[10] and a cognitive-behavioral pain model[11] have proposed that a person's belief system crucially influences his/her behaviors. Belief has been proposed to be one of the key factors contributing to medication adherence.[12–14] According to the cognitive-behavioral pain theory,[11] the framework on which this study is based, pain beliefs represent a patient's thoughts (cognition) about pain, and pain belief system reflects a person's appraisal of a pain experience.[11,15] Empirical studies have found that selective pain beliefs influence a person's reaction to, coping with, or adjustment to pain.[16–21] However, relatively little attention has been addressed to the influence of pain belief systems on cancer patients' adherence to prescribed analgesics. In the present study, therefore, pain beliefs commonly found in cancer patients were analyzed: beliefs related to the use of pain medication (medication belief) or its adverse effects (negative effect belief), beliefs related to the cultural value of pain reactions (pain endurance belief), and beliefs reflecting patients' overall pain experiences (control, disability, and emotion beliefs). Please refer to Table 1 for a summary of these terms.

Beliefs directly related to pain medications and side effects have been associated with the sequential use of pain medication. When patients believe medication is appropriate or necessary for dealing with pain or medical problems (medication belief), they tend to use more medication[18] or medical services,[19] express their pain, seek help,[22] and adhere better to a medication regimen.[23] They also use less active pain coping.[22] When patients are more concerned about the adverse effects of analgesics (negative effect belief), they tend to be more hesitant to report pain and use analgesics.[8,24–26]

Pain beliefs related to social–cultural or ethnic values also influence how patients deal with pain[27,28] and take analgesics. Belief that one should endure pain (pain endurance belief) has been found in cultures where stoicism is highly valued[29] or where expression of feelings is not encouraged.[30] This belief may lead patients to avoid medication entirely, or limit the frequency or reduce the dose of medication.[29,31]

Beliefs related to patients' overall perceptions about their pain experiences, such as control beliefs (belief that one can control his/her pain), disability beliefs (belief that one becomes disabled by pain), and emotion beliefs (belief that pain is related to one's emotional status), have been found to be associated

Table 1
Abbreviations and Definitions of Adherence and Belief Variables

Abbreviation	Definition
Adherence	Regularly taking all pain medications as prescribed by a physician
Negative effect belief	Belief that opioids have negative effects on the body
Pain endurance belief	Belief that one should endure as much pain as possible
Control belief	Belief that one can control his/her pain
Disability belief	Belief that one becomes disabled by pain
Medication belief	Belief that medication is best or necessary for dealing with pain
Emotion belief	Belief that pain is related to one's emotional status

with patients' subsequent pain coping. For example, control beliefs have been found to be correlated positively to patients' use of relaxation and exercise, [18] ignoring pain,[32] active pain coping,[22] and negatively correlated to help-seeking and passive pain coping.[22] Disability beliefs have been positively related to patients' use of rest,[18] pain behaviors,[20] expression of pain, help-seeking and passive pain coping,[22] and negatively correlated to use of exercise[18] and active pain coping.[22] Emotion beliefs have been positively related to the use of help-seeking, expression of pain, and passive pain coping.[22] The relationship between these beliefs and analgesic adherence, however, remains unclear due to a paucity of empirical data and should be further examined.

Additionally, sensory characteristics of pain and demographic factors might also be related to selected pain beliefs and analgesic adherence due to the multidimensional features of pain phenomena.[33] For example, sex, age, and education have been found to be associated with medication use in chronically ill patients[34–36] and in patients with cancer pain.[25,26,37] The relationship of these factors to adherence is unclear and needs to be further examined.

Although limited research in Taiwan[25,26,37] has found that cancer patients and their family caregivers' concerns about analgesics were related to their reluctance to report pain and hesitancy to take or administer analgesics, these studies have not directly examined patients' adherence status. Furthermore, previous studies did not simultaneously examine how different kinds of pain beliefs (other than concerns or beliefs regarding analgesics), pain characteristics, and demographic factors together influence cancer patients' analgesic adherence. The specific aims of the study, therefore, were to 1) examine the current status of pain beliefs, analgesic adherence, and the characteristics of adherent and non-adherent groups of Taiwanese cancer patients with pain; and 2) identify factors that could predict adherence to analgesics.

Methods

Subjects and Setting

Data were collected from the oncology inpatient wards of four teaching hospitals in Taipei. Eligible subjects were 1) adult cancer patients aware of their diagnosis and with cancer-related pain during current week; and 2) alert and oriented patients, who were able to sign the consent form. Patients who had had surgery within a month of data collection were excluded.

Measures

Analgesic Adherence. Although drug level monitoring has been recognized as the most accurate method for assessing adherence,[38] it was difficult to apply this method to cancer patients of the current study because of the complicated medications prescribed, the limited availability and expense of the measures,[38,39] custody of specimens, and complexity of interpreting laboratory data.[39] In the current study, therefore, adherence was measured by patient self-report of prescribed pain medications taken during the previous seven days. Analgesic adherence was defined as "regularly taking all pain medications as prescribed by the physician." A one-item self-report questionnaire with five options was developed. The five analgesic-taking options included: 1) regularly took all pain medications, 2) regularly took some prescribed pain medications, 3) took all prescribed pain medications after an increase in pain, 4) took some medications after an increase in pain, and 5) did not take prescribed pain medication most of the time. If a patient took all prescribed pain medication regularly, he/she would be further categorized as adherent. All others were categorized as non-adherent.

The validity and reliability of adherence self-report measures can be enhanced by decreasing pressure on patients, such by questioning them in a sensitive, non-threatening way and assuring them of confidentiality.[40] These strategies were applied in this study by asking patients, "In general, how did you take your pain medicine during the last seven days?" and assuring them about confidentiality. In addition, patients were re-tested over a 48-hour interval to confirm the consistency of their reports. A 0.93 test–retest coefficient was found.

Pain Beliefs. Six pain beliefs were measured by subscales selected from Pain and Opioid Analgesic Beliefs Scale—Cancer (POABS-CA)[41]

and Survey of Pain Attitude (SOPA).[18,19] The POABS-CA, based on Agency for Health Care Policy and Research (AHCPR)[42] cancer pain guidelines and culturally related pain beliefs observed in clinical settings, was designed to measure negative effect beliefs about opioids (belief that opioids will have negative effects on the body) and pain endurance beliefs (belief that one should endure as much pain as possible). The POABS-CA is an 10-item Likert-type scale with a 0–4 scoring system, where 0 indicates "strongly disagree" and 4 represents "strongly agree." The higher the score on the POABS-CA, the more negative effect beliefs and endurance beliefs the patient has about cancer pain and opioids. Promising psychometric properties of the POABS-CA included satisfactory content validity, clear two-factor structure, internal consistency reliability (Cronbach's alpha = .84) and a stable 48-hour interval test–retest reliability (r = .94).[41] In the present study, subscales that measured negative effect and pain endurance beliefs showed acceptable internal consistency (0.74 and 0.80, respectively).

Four other pain beliefs (control, emotional, medication, and disability beliefs) were measured by the Survey of Pain Attitude (SOPA).[19] The SOPA is a Likert-type scale ranging from 0–4, where 0 indicates "this is very untrue for me" and 4 represents "this is very true for me." The SOPA has been shown to have satisfactory psychometrics when measured in chronic pain patients.[18] Permission to use and translate the SOPA to a Chinese version was received from Dr. Jensen (personal communication). The SOPA was translated and back-translated between English and Chinese based on principles of instrument translation across different languages.[43] The SOPA has been demonstrated in pilot testing to have satisfactory psychometric properties.[21] In the current study, the internal consistency reliabilities of the four belief subscales (control, emotional, medication, and disability beliefs) were 0.81, 0.78, 0.70, and 0.75, respectively. Control belief was negatively correlated to disability belief and medication belief ($r = -0.56$, $P < 0.0001$; -0.40, $P < 0.0001$, respectively). Disability belief was positively correlated to medication belief ($r = 0.40$, $P < 0.0001$). These correlations lend further support for the proposed construct relationship among the SOPA subscales.

Pain Sensory Characteristics. Average pain intensity, worst pain intensity (during the previous seven days), and pain duration were assessed. Pain intensity was measured on a 0–10 Numerical Rating Scale (NRS), where 0 indicates "no pain at all" and 10 represents "the worst pain I can imagine." Pain duration was determined by asking patients, "How many months have you had this pain?"

Demographic Factors. A background information form was used to collect demographic data. Among these factors, age, sex, and education were chosen as variables to be further examined in predicting analgesic adherence.

Data Analysis

Descriptive statistical analysis was used to analyze adherence rate, the distribution of non-adherent patterns, and means for each pain belief. For descriptive purposes, bivariate Pearson's correlations were used to analyze relationships between pain beliefs and all other pain sensory and demographic variables. The *t*-test or Chi-Square test was used to compare differences between adherent and non-adherent groups in the six pain beliefs, pain intensity, duration, age, years of education, and sex. A stepwise logistic regression was further used to determine the best predictors of analgesic adherence.

Results

Subject Characteristics

A convenience sample of 194 subjects, recruited from four teaching hospitals in Taipei, included 119 men (61.3%) and 75 women (38.7%). Among these subjects, 88.7% were married, with ages from 18–82 years (M = 57; SD = 13.8). Education levels ranged from no formal education (10.3%) to college or higher (41.3%), with a mean of 8.9 years (SD = 5.0). Participant diagnoses included lung cancer (31.4%), primary liver cancer (13.9%), breast cancer (7.2%), gastric cancer (6.2%), colon and rectum cancer (6.2%), gynecological cancer (5.6%) and all others, with the majority in stage IV (70.6%). Patients experienced 3.72 months of pain (SD = 4.11), with an average intensity of 3.49 (SD = 1.77), and pain inten-

sity bursts up to 7.26 (SD = 2.39) during the previous seven days.

Characteristics of Adherent and Non-Adherent Groups

Only two-thirds of participants (66.5%) fully adhered to prescribed analgesics. Among the four non-adherent patterns (Table 2), the largest subgroup was "did not take pain medication most of the time" ($n = 27$).

In general, patients in this study had relatively high scores in medication beliefs (M = 2.74, SD = 0.55), pain endurance beliefs (M = 2.59, SD = 0.77), disability beliefs (M = 2.56, SD = 0.55), and negative effects beliefs (M = 2.45, SD = 0.42). These patients, however, perceived themselves as having relatively little control of their pain (M = 1.52, SD = 0.48), and did not think of their pain as emotion related (M = 1.83, SD = 0.58).

Patients in the adherent group had significantly higher medication and disability beliefs, lower control beliefs and longer duration of pain, and were older and less educated than those in the non-adherent group (Table 3).

There were no differences in pain endurance beliefs, negative effect beliefs, and pain intensity scores between the two groups.

Relationships Among Pain Beliefs, Pain Sensory Characteristics, and Demographic Factors

For descriptive purposes, relationships among pain beliefs, pain sensory characteristics, and demographic factors were examined by Pearson's correlation and *t*-test. The results (Table 4) show that the worst pain intensity and average pain intensity all correlated positively to disability and medication beliefs and correlated negatively to control beliefs. Patients with higher worst pain intensity were likely to have lower pain endurance beliefs. Older people had higher negative effective beliefs, pain endurance beliefs, and medication beliefs and lower control beliefs than those who were younger. Patients with higher education had higher control and emotion beliefs but lower pain endurance beliefs than those less educated. Men had significantly higher medication beliefs than women; the respective means were 2.81 (SD = 0.51) and 2.62 (SD = 0.60) ($t = -2.28$, d.f. = 192, $P < 0.02$).

Factors Predicting Analgesic Adherence

Control and medication beliefs were the only two variables that could significantly predict cancer patients' analgesic adherence, when analyzed by a stepwise logistic regression. The higher a patient's control belief, the less likely he/she was to adhere to prescribed analgesics (odds ratio = 0.393, $P = 0.0001$). In contrast, the higher a patient's medication belief, the more likely he/she was to adhere to the prescribed pain medicine (odds ratio = 2.153, $P = 0.02$). None of the pain sensory and demographic factors, however, could significantly predict analgesic adherence except possibly pain duration, which approached significance ($P < 0.09$).

Discussion

The major purpose of this study was to examine the relationship between pain beliefs and adherence in Taiwanese cancer patients with pain. The results revealed that only 66.5% of these patients adhered to prescribed analgesics, which is similar to other studies[6,7] that reported adherence ranging from 60–72%. Attention should be drawn, however, to the fact that all our subjects were hospitalized patients and were expected to take analgesics as scheduled. The problem of non-adherence is likely to be worse in cancer patients at home without 24-hour professional care. The unsatisfactory adherence rate in this study strongly suggests

Table 2
Distribution of Analgesic-Taking Patterns ($n = 194$)

Analgesic-Taking Patterns	Frequency	Percentage
Regularly took all pain medication (Adherence)	129	66.5
Regularly took some pain medication	5	2.6
Took all pain medication after an increase in pain	19	9.8
Took some pain medication after an increase in pain	14	7.2
Did not take pain medication most of the time	27	13.9

Table 3
Characteristic Differences Between Adherent and Non-Adherent Groups

Pain Beliefs	Adherence Mean (SD)	Non-adherence Mean (SD)	*t*	*P*
Medication belief	2.84 (0.49)	2.54 (0.61)	−3.54	0.0006
Disability belief	2.66 (0.48)	2.35 (0.64)	−3.40	0.0010
Control belief	1.43 (0.44)	1.71 (0.52)	4.01	0.0001
Negative effect belief	2.45 (0.39)	2.44 (0.47)	−0.05	*ns*[a]
Pain endurance belief	2.53 (0.76)	2.72 (0.76)	1.64	*ns*
Emotion belief	1.84 (0.56)	1.82 (0.62)	−0.14	*ns*
Pain intensity at worst	7.45 (2.25)	6.88 (2.61)	−1.58	*ns*
Pain intensity in average	3.53 (1.73)	3.42 (1.84)	−0.41	*ns*
Pain duration	4.17 (4.54)	2.84 (2.91)	−2.47	0.0001
Years of education	8.36 (5.03)	10.05 (4.85)	2.22	0.03
Age	58.54 (13.46)	53.98 (14.15)	−2.19	0.03

[a]Not significant.

that more attention should be focused on this problem to increase the effectiveness of using pain medicine.

Pain beliefs represent patients' own conceptualization of their pain experience.[44] This study shows, however, a negative pain experience in those patients having relatively high scores in disability beliefs, but low scores in control beliefs. Regarding analgesics, patients believed medication was the best way to deal with cancer pain, but they also strongly believed that analgesics caused negative effects and that adults should endure as much pain as possible. Their concerns about the negative effects of analgesics and beliefs about enduring pain were similar to findings on "patients' barriers to pain control."[8,25,26]

The current study, however, found no differences between adherent and non-adherent groups in negative effect and pain endurance beliefs, which is inconsistent with previous findings.[25,26] In other studies, patients' hesitancy to use analgesics was associated with their concern about using analgesics. This inconsistency might be due to different measures of analgesic-taking behaviors. In Lin and Ward's[25] and Lin's[26] studies, patients reported their hesitancy to take analgesics in the previous month.[25,26] Because this measure did not ask whether or not patients actually took analgesics as prescribed, it might therefore assess both patient intention and analgesic-taking behavior. In the current study, patients' self-reported analgesic-taking status was measured. The inconsistency could be explained by proposed differences between intentions and behavior.[10,45] In brief, the influence of pain beliefs on individuals' intention to adhere and adherent behaviors might not have the same mechanism. A lack of difference in negative effect and pain endurance beliefs in the current study might, however, mean that these two beliefs reflect similar concerns and phenomena among all cancer patients with pain.

Table 4
Correlations: Pain Beliefs versus Pain Sensory and Demographic Factors

Variable	Age	Education (years)	Average intensity	Worst intensity	Duration
Control belief	−0.18[a]	0.16[a]	−0.39[e]	−0.46[e]	−0.10
Disability belief	0.06	−0.12	0.33[e]	0.38[e]	0.06
Medication belief	0.15[a]	−0.06	0.14[a]	0.35[e]	0.11
Emotion belief	−0.06	0.24[d]	0.10	−0.05	0.01
Endurance pain belief	0.21[d]	−0.20[b]	−0.08	−0.22[c]	−0.08
Negative effect belief	−0.15[a]	0.07	0.05	−0.02	0.04

[a]$P < 0.05$.
[b]$P < 0.01$.
[c]$P < 0.005$.
[d]$P < 0.001$.
[e]$P < 0.0005$.

Analgesic adherence could be only predicted by higher medication beliefs and lower control beliefs. This result might best be understood in light of Claesson et al.'s definition[46] of adherence as "a positive act . . . because of a perceived benefit." Because subjects in this study, on average, had the worst pain intensity up to 7.26 (SD = 2.39), the necessity of analgesics is obvious. Higher medication beliefs reflect the perceived benefit of using medication among those patients who adhered well.

The fact that patients with lower control belief adhered better to prescribed analgesics might, however, be because they did not have any choice but to take analgesics as scheduled to get better pain control. This inference could be particularly true because control beliefs were negatively correlated to worst pain intensity, average pain intensity (Table 4), and disability beliefs ($r = -0.40$). Taken together, our results reflect a perceived benefit of using medication to control pain weighed against beliefs about the negative concerns of using analgesics and the value of enduring pain. This finding is similar to Horne and Weinmans' study,[23] where adherence was best predicted by necessity/concern difference scores regarding treatment.

Caution should be exercised in applying the result of a negative relationship between control beliefs and adherence. In order to maintain effective pain control, the challenge to health care professionals is how to simultaneously enhance patients' sense of control over pain and strengthen accurate knowledge and concepts about taking analgesics as prescribed. Furthermore, patients with higher education or lower pain intensity had higher control beliefs and they tended to be less adherent (Table 4). Health care professionals should be particularly aware of patients with these characteristics and emphasize the importance of adherence to them.

For example, clinicians can educate patients having high control beliefs by saying, "Some people take a very proactive position and feel they can do many things to control their pain. These other ways, such as relaxation, mild exercise, and so forth, are very important and helpful for good pain management. However, research has shown that sometimes people who like to take charge of their health, or while their pain doesn't bother them, may avoid taking or not take pain medicine. I'd like to emphasize how important it is to regularly take your pain medicine. Taking pain medicine regularly maintains a stable analgesic concentration in your blood, which makes pain control more effective. If you stop taking pain medicine when you feel less pain, the pain could come back sooner. I'd like to encourage you to take your pain medicine, in addition to your own pain control methods, to manage the pain. Discuss your pain with your doctors or nurses, whether it gets worse or improves, to adjust your pain medicine. By combining regular use of pain medicine with other strategies, you will feel even more in control of your pain, have less pain, and have better quality of life."

Pain duration was the only sensory factor with the potential to predict analgesic adherence ($P < 0.09$). Patients with longer pain duration tended to adhere better to prescribed analgesics, in agreement with Hinkley and Jaremko,[47] who found that longer pain duration predicted more frequent use of medical services. Although none of the pain sensory and demographic factors significantly predicted adherence to analgesics, most of these factors were correlated to several pain beliefs (Table 4) and their influence on patient pain beliefs should not be neglected. In other words, pain beliefs might reflect a person's final integration of related demographic and pain sensory factors into their pain experience and thus influence analgesic adherence. A comprehensive clinical assessment, including pain beliefs and factors related to pain beliefs, should be used to improve analgesic adherence.

While these results offer evidence for the influence of selected pain beliefs on cancer patients' adherence to prescribed analgesics, several limitations still remain. Despite the many strategies used in our study to increase the accuracy of self-reported adherence, other methods should be combined with self-report in future studies—for example, double checking analgesic-taking behavior with family members, checking patients' knowledge about his/her pain medicines, and having staff nurses count patient pill consumption. In addition, due to the preliminary nature of this study, other factors that could potentially influence adherence[12] were not measured out of concern for burdening cancer patients with a long questionnaire. Finally, although pain intensity

and demographic factors were correlated to several pain beliefs in the current study, the mechanisms of building particular pain beliefs remain mostly unclear. Future research should further examine these factors, such as family influence,[48] the relationship between patient and therapist, side effects from analgesics, complexity of medication prescribed, knowledge about analgesics,[13] and related pain sensory characters and pain beliefs.

In conclusion, despite the limitations of this study, the results provide data about the current status of analgesic adherence and evidence of the influential role of selected pain beliefs, for example, medication and control beliefs in the current study, in cancer patients in Taiwan. The preliminary findings also support and provide a challenge to develop and test the effects of cognitive-behavioral models, such as changing particular pain beliefs, to enhance cancer patient adherence to pain medication.

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