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# Effects of brief pain education on hospitalized cancer patients with moderate to severe pain

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**Abstract** The purpose of this randomized controlled study was to assess the effects of a structured pain education program on the pain experience of hospitalized cancer patients. Eligible cancer pain patients were randomly assigned to either an experimental group (receiving pain education 10–15 min per day for 5 days, *n*=15) or a standard care control group (*n*=15). The effects of the intervention on six pain-related variables were evaluated using three instruments. Pain intensity, pain interference with daily life, negative beliefs about opioids, beliefs about endurance of pain, pain catastrophizing (an individual's tendency to focus on and exaggerate the threat value of painful stimuli and negatively evaluate his or her own ability to deal with pain), and sense of control over pain were evaluated by the Brief Pain Inventory—Short Form Taiwanese version (BPI-T), Pain and Opioid Analgesic Beliefs Scale—Cancer (POABS-CA), and the Catastrophizing subscale and the sense of control over pain measure from the Coping Strategies Questionnaire (CSQ). The results indicated that, after completing treatment, patients who had received structured pain education had significantly less pain intensity on average, negative pain beliefs regarding opioids, pain endurance beliefs, and pain catastrophizing than patients in the control group. In addition, patients in the pain education group showed a significant increase in their sense of control over pain. These preliminary results strongly suggest that structured pain education can effectively improve the pain experience of hospitalized cancer patients and should be further implemented clinically.

**Keywords** Cancer pain · Pain education · Pain beliefs · Pain interference · Catastrophizing

## Introduction

Pain is one of the most difficult problems faced by cancer patients in Taiwan. Previous research has shown that 30.7% of newly diagnosed cancer patients in Taiwan experience pain [13], and up to 85% of terminally ill cancer patients experience significant levels of pain [4]. These findings suggest that cancer pain has not yet been controlled in Taiwan, and needs to be alleviated.

One major barrier to effective cancer pain control has been identified as patients' lack of adequate knowledge about cancer pain management [7, 16, 31, 38, 42]. Patients' negative beliefs or misconceptions about cancer pain have also been documented in several studies in Taiwan [23, 24, 25]. These misconceptions include undue concern about the negative physiological effects of using opioids [23, 24, 25], worry about becoming addicted and/or tolerant [23, 24, 25], and difficulties communicating pain problems to heath-care professionals [25]. Negative associations with using opioids, such as the connection between their use and end of life, have also been identified [23, 24].

Social-cultural values also influence patients' pain experience. Clinical observation indicates that Taiwanese patients tend to endure pain, perhaps because expressing one's feelings is not encouraged in Chinese culture, which is influenced by Confucian thought [27]. Studies have shown that Chinese cancer patients have fatalistic thoughts about pain [5, 25] and believe that pain should be endured [23, 24]. These misconceptions may cause patients to hesitate even more to take pain medicine and report pain [5, 25], and make them more likely to endure unnecessary pain.

Since cancer pain is a multidimensional experience with physical, sensory, affective, cognitive, and behavioral dimensions [1], unrelieved cancer pain may lead to a more complicated and negative pain experience that interferes with daily life [14, 26] and function [38] of patients, and be related to patients' cognition [9, 17, 22].

Patients with uncontrolled pain may think more negatively about pain, such as perceiving that their pain cannot ever be controlled [9, 22, 23] and catastrophizing about pain ("an individual's tendency to focus on and exaggerate the threat value of painful stimuli and negatively evaluate one's own ability to deal with pain") (see reference 20, p 326; [21]). For example, Tsai [39] has found that hospitalized patients with pain have moderate to high levels of pain catastrophizing thoughts. Lai et al. [22, 23] have found that cancer patients in Taiwan have very low levels of perceived control over their pain, and this belief plays a significant role in predicting their adherence to analgesic regimens [23]. Negative cognitions about pain, such as catastrophizing, have been identified as one of the most important factors influencing patients' adjustment to disease [19, 36, 40, 41], and perceiving pain as threatening or harmful has been found to decrease patients' hope [3, 35]. The cognitive dimension of pain has been recognized as a critical component of the pain experience of cancer patients, but this dimension has been explored in very few studies.

Recent pain guidelines and systematic reviews have recommended pain education as a key strategy for decreasing patients' misconceptions about pain and enhancing pain control [11, 16, 28, 37]. Several studies have shown that pain education reduces the intensity of pain experienced by cancer patients' [10, 12, 30, 33], improves adherence to cancer pain management regimens [2, 8, 10, 33], and decreases misconceptions about pain [2, 8, 10, 12, 33, 43]. However, little is known about whether a short, brief, structured pain education course can improve patients' sense of control over their pain and decrease their catastrophizing thoughts. Furthermore, most of the above-mentioned studies were conducted on patients living at home. Hospitalized cancer patients in Taiwan are usually more severely affected physically and are more distressed (including higher pain levels) than outpatients. In addition, although health-care professionals may assess and treat cancer pain in patients under their daily care, little is known about whether the addition of a systematic program of structured pain education could enhance the efficacy of routine daily pain care. The severity of cancer pain in Taiwan has created an urgent need for evaluating pain education programs (PEPs) to provide health-care professionals with more comprehensive evidence for future pain control.

The current study was a pilot study for a larger cancer pain intervention project whose aim is to develop and test the effects of a brief structured PEP on the pain experience of hospitalized cancer patients. Pain experience was evaluated by (1) pain intensity (average, current, least and worst), (2) pain interference with daily life, (3) negative beliefs about opioids, (4) beliefs about enduring pain, (5) pain catastrophizing, and (6) sense of control over pain.

## Patients and methods

### Patients and setting

Institutional review board (IRB) approval of the study was obtained before recruiting subjects. Patients were recruited from an inpatient medical oncology ward at a medical center in Taipei. Eligible subjects were cancer patients who (1) were adults (>18 years of age) who were aware of their cancer diagnosis, (2) had cancer-related pain during the 2-week study period, (3) could communicate verbally, and (4) agreed to participate in the study and signed a consent form after receiving a detailed explanation of the study. Patients who had surgery during the 2-week study period were excluded from the study because of the different characteristics of surgical and cancer pain.

### Design and intervention

This study tested the efficacy of a structured pain education intervention using a randomized controlled design with pretest and posttest. Thirty patients were randomly assigned either to an experimental group (pain education, $n$=15) or to a standard control group (standard care, $n$=15).

*Pain education experimental group.* Patients in this group received 10–15 min maximum of structured pain education for 5 days. A masters-prepared oncology nurse with pain control training delivered the intervention each time, using a 16-page pain education booklet developed by the authors for this study. The first 3 days focused on explaining the contents of the pain booklet (see Content

of pain education program below). The last 2 days focused on reviewing and further discussing the contents. All patients in the experimental group also continued to receive the usual course of pain treatment provided to all patients hospitalized with their condition.

*Standard care control group.* In order to provide a comparable amount of time to patients in both groups (10–15 min), the research assistant also visited control patients once a day. Patients in the standard care control group, therefore, received the usual course of pain treatment of the hospital and a 10- to 15-min visit from the research assistant every day for 5 days. The research assistant provided noninvasive routine care as needed to these patients, but did not give any information or interventions related to pain or pain-related symptoms. Any cancer treatment-related or pain management-related questions raised by the patients were referred to their primary nurse.

*Content of pain education program.* A structured PEP and a 16-page booklet regarding pain control were developed with the focus on decreasing misconceptions about cancer pain management. The PEP content was based on findings related to pain control in Taiwan [23, 24, 25], literature review [11, 12, 29, 44], and clinical guidelines for cancer pain management [16, 45].

The PEP covered 11 aspects of pain education. (1) Cancer pain was introduced by explaining how it interferes with daily life and the benefits of not having cancer pain. (2) Methods and drugs usually used to control cancer pain were presented. (3) Misconceptions about using pain medicine, especially concerns about using opioid-like medicines, were discussed. (4) Common methods to prevent or manage the side effects of pain medicines were explained. (5) Misconceptions about and drawbacks of enduring pain were presented. (6) Non-pharmacological pain interventions were briefly introduced. (7) Ways to assess and monitor pain intensity (using a 0 to 10 numerical scale) were taught, along with (8) ways to communicate pain problems with health-care professionals by using the 0 to 10 numerical rating scale. Finally, patients were told (9) about their rights to discuss pain with health-care professionals and not to suffer from pain, (10) that the patient plays a central and active role in his/her pain control, and (11) that cancer pain can be controlled.

## Measures

The variables measured were pain intensity (on average, current, least, and worst), pain interference with daily life, pain beliefs about using opioids, beliefs about enduring pain, and catastrophizing and beliefs (thoughts) of sense of control over pain and decreasing pain. These variables were measured using the Brief Pain Inventory—Short Form Taiwanese version (BPI-T) [14], the Pain Opioid Analgesics Beliefs Scale—Cancer (POABS-CA) [24], the Coping Strategies Questionnaire—Catastrophizing (CSQ-Cat) [34] and two pain coping effectiveness ratings from the CSQ that assess patients' perception of their ability to control and decrease pain.

*Brief Pain Inventory—Short Form Taiwanese version.* The BPI-T is a self-report scale that assesses two major aspects of pain: its intensity and interference with daily life [14]. It was validated from the Brief Pain Inventory—Short Form Taiwanese version [6, 14]. Pain intensity is measured by four items that rate worst pain intensity, pain intensity on average, least pain intensity, and current pain intensity. Seven items assess the interference of pain with daily life (pain interference). Each item is rated on a numerical scale from 0 ("no pain at all" or "does not interfere") to 10 ("worst possible pain I can imagine" or "completely interferes"). The BPI-T has shown promising psychometric characteristics [14]. In this study, one item that measured interference with "normal work (work outside the home and housework)", was deleted from the BPI-T because it was inappropriate for hospitalized patients. After the work item had been dropped from the original BPI-T, five pain experts (three physician specialists in pain and two doctoral-prepared oncology nurses) found its content validity to be satisfactory. Cronbach's alpha values for the internal consistency reliability of the pain intensity and pain interference subscales in baseline test were 0.90 and 0.77, respectively, in this study. These results suggest that the minor revision of the BPI-T used in this study did not lead to a reduction in the validity of its psychometric properties.

*Pain Opioid Analgesics Beliefs Scale—Cancer.* The POABS-CA was developed to assess a person's beliefs about (1) using opioid analgesics in dealing with cancer pain and (2) enduring pain [24]. The POABS-CA is a ten-item five-point Likert-type instrument. Higher scores indicate more negative beliefs regarding opioids and a greater tendency to endure pain. The instrument shows satisfactory validity [24] and has been shown to be a reliable and stable pain belief scale, with Cronbach's alpha (in baseline test) and test-retest reliability of 0.85 and 0.94, respectively.

*Coping Strategies Questionnaire—Catastrophizing and CSQ sense of control over pain measure.* The CSQ-Cat, from a subscale of the CSQ [34], has six items with a Likert scoring system from 0 to 6. The higher the score, the more the individual tends to catastrophize about pain. The summative score for CSQ-Cat ranges from 0 to 36. The CSQ has been translated into Chinese, has satisfactory psychometrics and has been shown to be appropriate for use in Taiwanese cancer patients with pain [39]. For the purposes of this study, we only used the CSQ-Cat subscale to assess patients' catastrophizing about pain. Cronbach's alpha was 0.89 (in baseline test) in the current study. Two pain coping effectiveness ratings from the CSQ were used to assess patients' sense of control over pain. These items, scored from 0 to 6 were: "Based on all the things you do to cope (with your pain), or deal with your pain, on an average day, how much control do you feel you have over it? (0 no control, 6 complete control)"; and "Based on all the things you do to cope with pain, on an average day, how much are you able to decrease it? (0 can't decrease it at all, 6 can decrease it completely)". Our unpublished results indicate that these two items are moderately correlated ($r$=0.62, $P$<0.0001) and they were thus summed to produce a measure of sense of control over pain. Higher scores indicate greater control over pain perceived by patients.

*Background information form.* A background information form was used to collect demographic and disease/treatment-related data. Demographic information included gender, age, education level, employment status, religion, and marital status. Disease and treatment-related variables included disease status (localized/metastasized), cancer stage, pain duration (how many months with pain), current anticancer treatment, and performance status which was measured using the Karnofsky performance status index [18], an 11-point scale with scores ranging from normal function (100%) to dead (0%).

## Procedure

IRB approval of the study was obtained before conducting this research. Eligible cancer patients were randomly assigned to either the experimental or control group. A nurse research assistant, an experienced masters-prepared oncology nurse with pain control training, administered the intervention, approached each patient, explained the purposes and procedures of the study, and obtained his/her signed consent. Pretest baseline data were then collected using the instruments described above.

**Table 1** Subjects' demographic and medical characteristics ($n$=30) (*NS* not significant)

| | Control group | Experimental group | *P* value |
|---|---|---|---|
| Gender, *n* (%) | | | |
| Male | 6 (40.0) | 7 (46.7) | NS |
| Female | 9 (60.0) | 8 (53.3) | |
| Age (years) (mean±SD) | 56.07±14.34 | 51.67±11.20 | NS |
| Age groups (years), *n* (%) | | | |
| 20–40 | 1 (6.7) | 2 (13.3) | NS |
| 41–50 | 4 (26.7) | 6 (40.0) | |
| 51–70 | 9 (60.0) | 7 (46.7) | |
| >71 | 1 (6.7) | 0 (0.0) | |
| Education (years) (mean±SD) | 5.13±5.04) | 6.00±3.44) | NS |
| Religion, *n* (%) | | | |
| Yes | 15 (100) | 15 (100) | NS |
| No | 0 | 0 | |
| Marital status, *n* (%) | | | |
| Married | 15 (100) | 14 (93.3) | NS |
| Not married | 0 | 1 (6.7) | |
| Work status, *n* (%) | | | |
| Unemployed | 13 (86.7) | 14 (93.3) | NS |
| Employed | 2 (13.3) | 1 (6.7) | |
| Metastasis, *n* (%) | | | |
| Yes | 15 (100) | 15 (100) | NS |
| No | 0 | 0 | |
| Cancer stage, *n* (%) | | | |
| II | 6 (40.0) | 4 (26.7) | NS |
| III | 2 (13.3) | 4 (26.7) | |
| IV | 7 (46.7) | 7 (26.7) | |
| Performance status, *n* (%) | | | |
| 60 | 6 (40.0) | 6 (40.0) | NS |
| 70 | 7 (46.7) | 7 (46.7) | |
| 80 | 2 (13.3) | 2 (13.3) | |
| Chemotherapy during current month, *n* (%) | | | |
| Yes | 7 (46.7) | 8 (53.3) | NS |
| No | 8 (53.3) | 7 (46.7) | |
| Pain duration (months) (mean±SD) | 4.85±3.65 | 3.99±3.71 | NS |

### Data analysis

Descriptive statistics were used to analyze the frequencies and means of variables. Pretest baseline data for the control and experimental groups were examined using a *t*-test and the chi-squared test (Table 1). Paired *t*-tests were used to examine the differences in mean pretest and posttest scores for each group. Repeated measures analysis of variance (ANOVA) was used to compare differences in means between the two groups. Tables 1, 2, 3, 4 and 5 show these results. In Tables 2, 3, 4 and 5, $t_c$ and $t_e$ are the within-group paired *t*-values for the pretest-posttest comparisons in the control and experimental groups, respectively; $t_p$ is the *t*-value for pretest comparisons between the control and experimental groups. *F* values represent the between-group repeated measures ANOVA.

## Results

### Subject characteristics and baseline pretest data

In total, 36 patients were eligible for participation. However, two patients refused to participate in the study due to their physical condition, two dropped out during the data collection process because of uncomfortable physical condition, and the other two died during the data collection following a very severe change in their physical condition. The final sample included 30 patients, 15 each in the experimental (pain education) and control (standard care) groups. All the patients had cancer with metastasis, and half were undergoing chemotherapy.

There were no significant differences with respect to demographic characteristics and disease and treatment status (Table 1) between patients in the two groups. More than half of the patients were female, with a mean age around 55 years and an average of 6 years of formal education. Most patients were unemployed and all had religious beliefs. The baseline characteristics of all pain-related variables were not significantly different between the two groups (Table 1). In both groups, patients had been experiencing pain (pain duration) for around 4 months. For patients in the experimental and control groups, the pain intensity on average was 5.00 and 4.33, the worst pain intensity was 6.73 and 6.80, and the overall pain interference with daily life was 5.35 and 5.05, respectively. No significant differences among these pain-related variables were found between the two groups (Tables 2 and 3). In addition, patients' negative beliefs about opioids and pain endurance did not differ significantly at baseline (Table 4). No differences were found in patients' perceived control over pain and catastrophizing about pain between the two groups (Table 5). However, patients in the experimental group had higher catastro-

**Table 2** Pain intensities in the control and experimental groups. Pre- and posttest scores are means±SD ($t_c$ paired *t*-test comparing pretest and posttest scores for control group, $t_e$ paired *t*-test comparing pretest and posttest scores for experimental group, $t_p$ *t*-test comparing pain intensity scores between control and experimental groups at baseline, *F* results for repeated measures ANOVA in control and experimental groups)

| Variable | Control group ($n$=15) | | | Experimental group ($n$=15) | | | Between groups | |
|---|---|---|---|---|---|---|---|---|
| | Pretest | Posttest | $t_c$ | Pretest | Posttest | $t_e$ | $t_p$ | *F* |
| Worst pain intensity | 6.80±2.83 | 5.53±2.88 | 1.99 | 6.73±2.22 | 5.33±2.13 | 2.40* | 0.07 | 0.07 |
| Least pain intensity | 2.87±2.50 | 2.47±1.68 | 0.64 | 2.20±2.04 | 0.93±1.49 | 2.52* | 0.78 | 1.17 |
| Pain intensity on average | 4.33±2.88 | 3.73±1.83 | 0.98 | 5.00±1.07 | 2.80±1.61 | 2.40* | –0.94 | 4.01* |
| Current pain intensity | 3.33±2.72 | 3.47±2.03 | –0.24 | 3.80±2.57 | 1.73±1.87 | 3.46*** | –0.48 | 7.23* |

*$P$<0.05, **$P$<0.01, ***$P$<0.005

**Table 3** Pain interference with daily life in the control and experimental groups. The BPI scores are means±SD ($t_c$ paired *t*-test comparing pretest and posttest scores for control group, $t_e$ paired *t*-test comparing pretest and posttest scores for experimental group, $t_p$ *t*-test comparing pain intensity scores between control and experimental groups at baseline, *F* results for repeated measures ANOVA in control and experimental groups)

| Pain interference | Control group (*n*=15) | | | Experimental group (*n*=15) | | | Between groups | |
|---|---|---|---|---|---|---|---|---|
| | BPI score | | $t_c$ | BPI score | | $t_e$ | $t_p$ | *F* |
| | Pretest | Posttest | | Pretest | Posttest | | | |
| Overall | 5.05±2.40 | 3.70±2.96 | 2.58* | 5.35±2.43 | 3.24±2.48 | 2.82* | –0.35 | 0.66 |
| General activity | 4.87±2.88 | 4.27±3.81 | 0.58 | 5.93±3.15 | 2.60±2.80 | 3.88*** | –0.97 | 4.14* |
| Mood | 6.47±2.64 | 3.87±3.64 | 2.86* | 6.00±3.09 | 3.60±3.22 | 2.23* | 0.44 | 0.02 |
| Walking ability | 3.60±3.83 | 3.40±3.62 | 0.44 | 5.27±3.49 | 4.00±3.72 | 1.45 | –1.25 | 1.16 |
| Relations with other people | 4.60±4.01 | 2.33±3.42 | 2.15* | 3.87±3.66 | 2.60±2.67 | 1.17 | 0.52 | 0.44 |
| Sleep | 5.73±3.31 | 3.80±3.41 | 1.94 | 5.07±4.13 | 2.47±3.44 | 2.03 | 0.49 | 0.17 |
| Enjoyment of life | 5.00±4.02 | 4.53±3.62 | 0.55 | 6.00±3.57 | 4.79±3.00 | 1.57 | –0.72 | 0.87 |

*$P$<0.05, **$P$<0.01, ***$P$<0.005

**Table 4** Pain-related beliefs in the control and experimental groups. The POABS-CA scores are means±SD ($t_c$ paired *t*-test comparing pretest and posttest scores for control group, $t_e$ paired *t*-test comparing pretest and posttest scores for experimental group, $t_p$ *t*-test comparing pain intensity scores between control and experimental groups at baseline, *F* results for repeated measures ANOVA in control and experimental groups)

| | Control group (*n*=15) | | | Experimental group (*n*=15) | | | Between groups | |
|---|---|---|---|---|---|---|---|---|
| | POABS-CA score | | $t_c$ | POABS-CA score | | $t_e$ | $t_p$ | *F* |
| | Pretest | Posttest | | Pretest | Posttest | | | |
| Overall | 2.91±0.67 | 2.80±0.51 | 0.54 | 2.92±0.63 | 1.72±0.80 | 5.9*** | –0.02 | 14.65*** |
| Negative effect beliefs | 2.96±0.76 | 2.77±0.63 | 0.92 | 2.92±0.77 | 1.67±0.94 | 5.21*** | 0.14 | 11.13*** |
| Pain endurance beliefs | 2.95±0.95 | 2.84±0.86 | 0.42 | 3.20±0.81 | 1.67±0.22 | 5.64*** | –0.76 | 13.91*** |

*$P$<0.05, **$P$<0.01, ***$P$<0.005

**Table 5** Pain catastrophizing and sense of pain control in the control and experimental groups. The pre- and posttest scores are means±SD ($t_c$ paired *t*-test comparing pretest and posttest scores for control group, $t_e$ paired *t*-test comparing pretest and posttest scores for experimental group, $t_p$ *t*-test comparing pain intensity scores between control and experimental groups at baseline, *F* results for repeated measures ANOVA in control and experimental groups)

| | Control group (*n*=15) | | | Experimental group (*n*=15) | | | Between groups | |
|---|---|---|---|---|---|---|---|---|
| | Pretest | Posttest | $t_c$ | Pretest | Posttest | $t_e$ | $t_p$ | *F* |
| Catastrophizing | | | | | | | | |
| Overall | 14.64±9.54 | 16.20±12.18 | 0.50 | 21.47±8.88 | 11.94±8.76 | 4.65*** | –2.02 | 9.07** |
| It (the pain) is never going to get any better | 2.47±1.77 | 2.67±2.38 | –0.29 | 4.27±1.33 | 2.33±1.84 | 3.71*** | –3.15* | 6.15* |
| It (the pain) overwhelms me | 2.87±2.10 | 2.73±2.19 | 0.17 | 3.20±1.90 | 2.07±2.02 | 2.83* | –0.46 | 1.29 |
| My life isn't worth living | 2.00±1.96 | 2.07±2.12 | –0.13 | 2.60±2.06 | 1.67±1.99 | 2.11* | –0.82 | 2.19 |
| I worry all the time whether it (the pain) will end | 2.33±1.63 | 3.60±2.32 | –2.40* | 3.80±1.86 | 2.33±1.63 | 3.77*** | –2.30 | 17.30*** |
| I can't stand it anymore | 2.60±2.20 | 2.47±2.33 | 0.17 | 4.00±1.77 | 1.80±1.52 | 3.75*** | –1.92 | 4.39* |
| I feel like I can't go on | 2.40±2.16 | 2.67±2.47 | 0.58 | 3.60±1.99 | 1.73±1.53 | 3.34*** | –1.58 | 8.65** |
| Sense of control over pain | | | | | | | | |
| Overall | 2.53±0.87 | 1.63±1.20 | 2.42* | 1.90±1.58 | 2.63±1.30 | –1.86* | 1.36 | 8.12** |
| Ability to control pain | 2.73±0.88 | 1.67±1.18 | 2.87* | 1.80±1.70 | 2.60±1.12 | –1.98* | 1.89 | 11.55*** |
| Ability to decrease pain | 2.33±1.05 | 1.60±1.30 | 1.79 | 2.00±1.56 | 2.67±1.72 | –1.23 | 0.69 | 4.28* |

*$P$<0.05, **$P$<0.01, ***$P$<0.005

phizing scores (mean±SD 21.47±9.54) than in the control group (14.64±9.54) at baseline, although the difference was not significant ($P$=0.07).

### Effects of the pain education program

We examined the effects of the PEP on pain intensity, pain interference, beliefs about using opioids and enduring pain, catastrophizing, and sense of control over pain within each group by comparing mean pretest and posttest scores. Repeated measures ANOVA was applied to examine the effects of the PEP between the two groups.

The between-groups comparisons showed that, compared to the control group, patients receiving pain education showed significant decreases in the following pain-related variables: pain intensity on average, current pain intensity, negative beliefs about opioids, pain endurance beliefs, and pain catastrophizing. Over the course of treatment, sense of control over pain was also significantly increased in the experimental group compared to the control group.

Within-group pre- and posttest comparisons revealed that patients in the experimental group had significant decreases in four types of pain intensity (worst, average, least, current; Table 2), overall pain interference with daily life (Table 3), beliefs about the negative effects of opioids and pain endurance (Table 4), and pain catastrophizing. These pre- and posttest comparisons also showed a significant increase in sense of control over pain in the experimental group (Table 5). However, pre- and posttest comparisons for the control group revealed that only overall pain interference decreased significantly (Table 3), but the sense of control over pain also decreased (Table 5).

## Discussion

The results confirmed our hypothesis that structured pain education reduces the negative pain experience of cancer patients and increases their sense of control over pain. Compared to patients in the control group, patients who received 5 days of pain education had significantly less pain intensity on average and least pain intensity. These findings are similar to those of most previous studies in that pain education was found to decrease patients' pain [8, 10, 12, 30, 33]. However, the mean scores of pain intensity found in the previous studies, except in that by De Wit et al. [10], were not reported directly, so a comparison between our findings and only those of De Wit et al. is possible. The magnitude of the decrease in pain intensity in the current study was larger than that found by De Wit et al., particularly for pain intensity on average. Pain intensity on average in the experimental group dropped from a moderate level (mean±SD 5.00±1.07) at pretest to a mild level (2.8±1.61) at posttest. Also, the worst pain intensity in the experimental group dropped from a severe level (6.73±2.22) at pretest to a moderate level (5.33±2.13) at posttest. These findings suggest that our consecutive 5-day pain education protocol was a relatively powerful intervention for helping cancer patients control their pain intensity.

The between-group comparison also showed that misconceptions about pain were significantly decreased at posttest among patients receiving pain education. The results were similar to those of previous studies [2, 8, 10, 12, 33]. In addition to supporting previous assumptions and empirical findings on the effects of pain education on patients' misconceptions about pain control, we further found that a 5-day structured brief PEP can significantly enhance patients' sense of control over pain and decrease negative thoughts about pain (catastrophizing). This pattern of findings, particularly for the sense of control over pain, contrasted with the pattern seen in the control group, where sense of control over pain decreased, with mean scores of 2.53 at pretest and 1.63 at posttest ($t$=2.42, $P$<0.05). At posttest, the findings are particularly interesting and meaningful for pain education. Even though our PEP was not specifically directed at changing patients' negative cognition about their overall pain experience, it offers promise in helping patients develop a more positive cognition about their ability to effectively manage pain. The results strongly suggest that the more skills and knowledge a patient has about pain management and the use of analgesics, the greater is his or her sense of control. The findings also support our assumption that pain is a multidimensional experience [1], influenced not only by sensory processes but also by cognitive processes.

Interestingly, pain interference with daily life was decreased in both groups as shown by the within-group pre- and posttest comparison, but the difference between the groups was not significant. This lack of difference in pain interference between the groups was probably due to both groups' posttest improvement. Two possible reasons might explain the results. First, hospitalized patients have a very limited "daily life" (free time and activities) within the hospital setting. Therefore, even though the magnitude of change in pain intensity was obviously great between the two groups, this variable may not have much influence on the activities listed in the interference scale, such as "enjoyment of life". Second, patients in the control group received a routine visit from the nurse research assistant once a day. This visit may have increased patients' sense of being supported and cared for (for example, the pain interference on "relations with other people" dropped significantly in the control group but not in the experimental group), thus decreasing the overall pain interference. The latter reason may also help to explain the apparent decrease in worst pain intensity in the control group, although this decrease was not significant

($P$=0.07). Thus, an attitude of caring shown by a pain management provider may itself have a considerable effect on a patients' pain, making the pain more tolerable and decreasing its perceived intensity.

The preliminary results of our structured PEP are very promising for improving the pain experiences of hospitalized cancer patients. However, our pretest data, similar to those of previous studies [23, 24], showed out that misconceptions about the appropriate use of opioids and enduring pain are still major concerns in Taiwanese cancer patients. Patients in both groups reported a moderate level of pain on average and episodes of severe pain, as indicated by the worst pain intensity. The findings also suggest that cancer pain is still not well managed in Taiwan.

The pretest data also revealed that patients in this study had moderate levels of pain catastrophizing. The scores were higher than those found by Tsai [39] in a similar group of hospitalized cancer patients with pain, and much higher than those found in patients with nonmalignant chronic pain [15, 19, 20, 32, 34]. The findings regarding low sense of control over pain are also similar to those of previous studies in Taiwan [22, 23, 39]. Negative cognitions about pain, such as pain catastrophizing, have been associated with poor patient adjustment to their disease process [19, 36, 40]. Thus, our findings on pain catastrophizing and perceived control over pain in hospitalized Taiwanese cancer patients indicate that these patients seem to fare even more poorly than those in previous studies. Taken together, these findings further underscore the cognitive component of the cancer pain experience.

Although the results of this study are promising, they are limited by the nature of pilot testing with relatively few subjects recruited. These results may not be generalized to cancer pain patients in other settings or other countries. In addition, compared to the national picture in Taiwan, our study sample had a relatively low educational level and proportion of males. The fact that the intervention was effective in a sample of patients with a limited education is noteworthy, and suggests that high levels of education are not needed to benefit from this approach. Nevertheless, research is needed to further examine and compare the effects of pain education on patients with various levels of formal education, a more representative gender distribution, and on more subjects and samples from other countries than Taiwan to increase the generalizability of the results. Furthermore, this study did not address how long the effects of structured pain education lasted. Future research should validate the present study's results with a structured PEP, compare its effects with other types of PEPs, and measure how long the effects of pain education last. In addition, we suggest further comparison of the effects of pain education with other types of nonpharmacological pain interventions.

In conclusion, our preliminary results strongly support the effectiveness of a brief (10 to 15 min per day), systematic, and structured PEP in improving the pain experience of hospitalized cancer patients. The results also suggest that systematically providing a brief pain education intervention may enhance outcomes beyond those obtained through regular daily medical care. We therefore strongly recommend that such a program be implemented and integrated into clinical cancer pain management.

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