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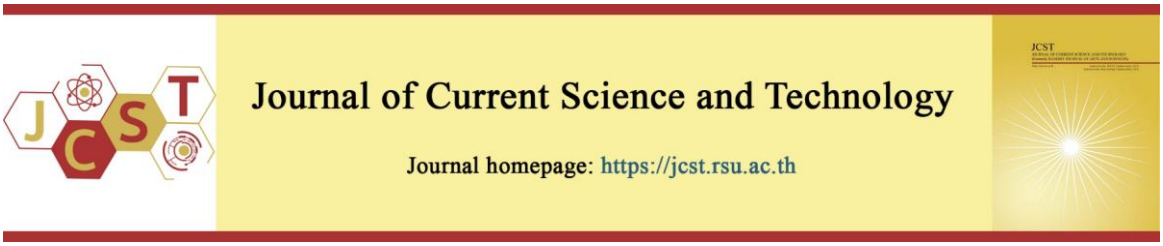


# Effect of preoperative self-efficacy pain education program on self-efficacy to report pain, pain intensity, and pain interferences among patients undergoing oral and maxillofacial surgery

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## Abstract

This study evaluated the effect of preoperative education on self-efficacy to report pain, pain intensity, and pain interferences among patients undergoing oral and maxillofacial surgery. Thirty participants were assigned to the control group, who received no education, and 30 to the experimental group, who received education the day before surgery. The data collection instruments were (1) Demographic and Health Information Sheet, (2) Perceived Self-Efficacy to Report Pain Questionnaire, (3) Pain Intensity Scale, and (4) Pain Interferences Scale. The data were analyzed by paired t-test, independent t-test, and Mann–Whitney U test. After receiving the educational program, the experimental group had significantly self-efficacy reporting scores ($t = -4.94$, $p < .01$). At 24 h after surgery, the experimental group's average pain and right now pain scores were significantly lower than those of the control group ($p = .000$), but there were no significant differences in worst or least pain. At 48 h, the experimental group's worst pain, least pain, average pain, and right now pain were significantly lower than the control group ($p = .000$). Pain interferences followed a similar pattern, with no significant difference at 24 h and significant differences at 48 h ($p < .01$). The findings showed that the preoperative educational program had enhanced the patients' self-efficacy to report postoperative pain. The program could decrease postoperative pain intensity and pain interference.

***Keywords:*** *after oral and maxillofacial surgery; pain intensity; pain interferences; preoperative educational program; self-efficacy to report postoperative pain.*

## 1. Introduction

Oral and maxillofacial surgery [OMFS] is the main treatment for maxillofacial tumor, salivary gland disease, maxillofacial injury, infection, congenital cleft lip, oral mucosa disease. In China, oral and maxillofacial tumors are among the most

common diseases that lead to hospitalization (Tang, 2018; Wang, 2017). Guizhou Provincial People's Hospital is a general hospital where approximately 180 patients are admitted for OMFS per month, of which about 80 patients are admitted for tumor surgery. Previous studies reported that moderate to severe postoperative pain was frequent among patients after OMFS (Cazacu et al., 2016; Lu, 2018; Tao, Zhang, Huang & Li, 2019). Patients experienced somatic pain (pinprick or sharp), visceral pain (aches or pressure) and neuropathic pain (burning or tingling) (Roger & Fantuzzo, 2017), that increased mood disturbance (Peisker et al., 2018), difficulty in chewing, swallowing, sleeping and speaking (Zhao, 2015), and led to decreased quality of life.

Preoperative education regarding pain is an effective strategy to reduce postoperative pain intensity and pain interferences in the various types of surgery (Schwenkglenks et al., 2014). Patient education is a form of cognitive therapy that increases patient knowledge, skills, and competency about postoperative pain. Through the educational program, patients can understand how to express their pain experience and methods for managing pain instead of enduring pain until it becomes unbearable.

Previous studies of pain self-efficacy focused on chronic pain patients (Ruben, Jodoin, Hall, & Blanch-Hartigan, 2018). Fewer studies were conducted among surgical patients. However, Wang et al. (2018) reported that pre-surgery self-efficacy was significantly negatively related to postoperative pain intensity, which means that a patient who has more pre-surgery self-efficacy would report less acute postoperative pain. Because pain is inherently subjective, only the patient can report the amount of pain experienced.

Self-efficacy plays a significant role in disease control and health promotion, is an effective mediator or facilitator to reinforce the patient's central role in the recovery process, and promotes sustainable, positive outcomes (Resnick, 2018). However, studies that demonstrate preoperative pain education among patients undergoing OMFS are rare. The literature review did not find any studies that report a preoperative educational program to enhance patients' self-efficacy to report postoperative pain, particularly among patients facing OMFS in China. Therefore, this quasi-experimental study was designed to test the effect of preoperative educational programs on self-efficacy to report pain, pain intensity, and pain interferences among patients after OMFS.

## 2. Objectives

The study had four objectives:

(1) To compare self-efficacy to report pain within the experimental group before and after receiving the preoperative pain education program.
(2) To compare self-efficacy to report pain between the experimental group after receiving the preoperative pain education program and the control group after receiving usual care.
(3) To compare pain intensity of worst, least, average and right now pain between the experimental group after receiving the preoperative pain education program and the control group after receiving usual care.
(4) To compare total scores of pain interferences between the experimental group after receiving the preoperative pain education program and the control group after receiving usual care.

## 3. Materials and methods

This study was approved by the Center for Social and Behavioral Sciences Institutional

Review Board Prince of Songkla University (Document number: 2020NSt – Qn 009) and the Institutional Review Board of the Guizhou Provincial People's Hospital (Document number: (2020) number 54). This study was conducted in the Oral and Maxillofacial Surgery Department of the Guizhou Provincial People's Hospital from 1 October to 31 December 2020.

3.1 Participants

Patients undergoing OMFS and meeting the inclusion criteria were recruited. The inclusion criteria were 1) age 18–60, 2) ability to communicate clearly by talking and writing, 3) elective case of OMFS, 4) admitted at least 2 days before surgery, and 5) receiving at least 48 h of postoperative care. The exclusion criteria were 1) having a mental health problem or cognitive impairment; 2) receiving pain treatment before surgery; 3) complications occurring during or after surgery, such as respiratory distress or cardiovascular disturbance.

The sample size was calculated using effect size power analysis based on a previous study; the effect size was 2.46 (Tao et al., 2019). However, this present study used a different conceptual framework, educational information, and measurement. To evaluate this study's objectives, the researcher reduced the effect size to 0.72, set the power to.80 and the significance level to .05; thus, the number of participants per group was 25. To prevent incomplete data due to attrition, the sample size increased by 20% in each group (Polit & Beck, 2017). Ultimately, the sample size in this study was 30 people in each group.

This study used consecutive sampling with the matching technique (Beck & Polit, 2018, p.151) to recruit participants. Participants were matched on age (± 5 years), gender, education level and preoperative pain experience to balance the baseline equivalence between the control group and experimental group. Participants in the first planned 6 weeks were included in the control group; the participants in the later planned 6 weeks were included in the experimental group.

3.2 Design

This study was a post-test quasi-experimental study. Patients undergoing OMFS were recruited and signed an informed consent after they fully understood the purpose and process of this study.

3.3 Intervention

The usual care for all participants on one day before surgery was provided by the doctor and nurses; this care included education of health-related problems, treatment plans, surgery preparation plan (clothing, skin, fasting), and potential complications of OMFS.

The preoperative educational program was developed based on the literature review regarding postoperative pain management guidelines (Chou et al., 2016) and Bandura's self-efficacy theory (1977). Three experts approved the content validity of the preoperative educational program. The program was revised following the experts' suggestions until they agreed.

The preoperative educational program focused on postoperative pain, which is composed of (1) physical and effective state, (2) mastering the experience of providing information about postoperative pain, pain score, pain self-report, and pain management, (3) the vicarious experience of a role model patient after oral and maxillofacial tumor excision surgery demonstrating how she reports her pain by video, and (4) encouraging self-efficacy to report pain.

The researcher managed the environment for physical and emotional preparation before

providing approximately 10 min of educational information in the participants' rooms on the unit when the participants' vital signs were stable without any treatment or manipulation between 3:00 and 6:00 pm each day. First, a brief introduction was provided to make the participants comfortable. Then, patients were asked about their understanding of postoperative pain and its management based on their experience. Second, patients were offered an education pamphlet to help them follow the instruction. Third, the patients watched the video by scanning the QR code attached to the last page of the pamphlet. The video showed an OMFS patient reporting her postoperative pain and then inviting the patient to a discussion. Finally, the patients were taught to report their pain by writing in the Self-Report Pain Sheet, where they would record their pain score on the day after surgery.

3.4 Instruments for data collection

The data collection instruments used were (1) Demographic and Health Information Sheet, (2) Perceived Self-Efficacy to Report Pain Questionnaire, (3) Pain Intensity Scale, and (4) Pain Interferences Scale. The content validity of the instruments was approved by three experts with S-CVI levels of 0.95, 1 and 1, respectively. Cronbach's alpha was used to determine the internal consistency of the Perceived Self-Efficacy to Report Pain Questionnaire, the Pain Intensity Scale, and the Pain Interferences Scale. The scores were .89, .89, and .92, respectively.

3.5 Data collection procedure

The participants or their family members filled out the Demographic and Health Information sheets. Each participant filled out the perceived self-efficacy to report pain questionnaire on admission day and the day before surgery between 3:00 and 4:00 pm in their single room in the same environment. After surgery, the starting time was determined when the participants arrived at the ward. Each participant recorded their pain experience, including worst pain, least pain, average pain, right now pain, and pain interferences. The participants received similar treatments. Each participant recorded their pain experience, including worst pain, least pain, average pain, right now pain, and pain interferences 24 h and 48 h. Another supplemental instrument, the Self-Report Pain Sheet, was distributed to the participants in both groups to track their actual pain reports.

3.6 Data analysis

Data were analyzed using the Statistical Package for Social Sciences (IBM SPSS) version 22 (IBM Corp, Armonk, New York, 2013). The descriptive statistic, independent t-test, Pearson chi-square, likelihood ratio, linear-by-linear association, and continuity correction were used to analyze the participants' demographic characteristics, health information, and surgical features between groups.

The paired t-test was used to test the difference of the perceived self-efficacy to report pain scores of the experimental group before and after receiving the program. The independent t-test was used to test the difference of the perceived self-efficacy to report pain score, the 24-h worst pain, least pain, average pain, and right now pain between two groups. Due to the violation of normality assumption, the Mann–Whitney U test was applied to test the difference of the 48-h worst pain, least pain, average pain, and right now pain, the 24-h pain interferences score and the 48-h interferences score between two groups.

## 4. Results and discussion

4.1 Results

There was no significant statistical difference

between the control group and the experimental group regarding demographic characteristics such as age, gender, marital status, educational level, occupation, monthly income, health information, and pain experience ($p > .05$), except for health insurance type ($p = .018$).

Table 1 shows the self-efficacy scores to report pain before and after receiving the preoperative pain education program in the experimental group. The perceived self-efficacy to report pain score of the experimental group after receiving the preoperative educational program ($57.57 \pm 3.68$) was higher than before ($42.67 \pm 17.32$), and there was a significant statistical difference (paired t-test = −4.94, $p = .000$). In addition, the perceived self-efficacy to report pain score of the experimental group was higher than that of the control group with a significant statistical difference ($p = .000$), as shown in Table 2.

In terms of pain intensity score 24 h after surgery, the mean score of average pain and right now pain of the experimental group was significantly lower than that of the control group ($p = .000$). However, there were no significant differences in worst pain and least pain between the two groups ($p > .05$), as shown in Table 2.

Table 3 showed that the median score of worst pain, least pain, average pain and right now pain in 48 h after surgery between the two groups were significantly different ($p = .000$). The control group's median pain intensity score was higher than the experimental group's score. There was no significant statistical difference between the two groups in terms of pain interferences at 24 h after surgery ($p > .05$). However, there was a significant difference in pain interferences at 48 h after surgery ($p < .01$).

**Table 1** Comparison of self-efficacy to report pain within the experimental group before and after receiving preoperative pain education program by paired t-test (n = 30)

| Item | Experimental group | | | | *t*-value | *p* | effect size |
|---|---|---|---|---|---|---|---|
| | Before | | After | | | | |
| | M | SD | M | SD | | | |
| Total score | 42.67 | 17.32 | 57.57 | 3.68 | −4.94[t] | < .001 | .90 |

M = Mean, SD = Standard deviation

**Table 2** Comparison of perceived self-efficacy to report pain and 24-h pain intensity between the control group (n = 30) and experimental group (n = 30) by independent t-test

| Item | Control group | | Experimental group | | t-value | p |
|---|---|---|---|---|---|---|
| | M | (SD) | M | (SD) | | |
| Self-efficacy to report pain | 48.1 | (10.35) | 57.57 | (3.68) | −4.720 | .000 |
| Pain Intensity | | | | | | |
| 24 h | | | | | | |
| Worst pain | 5.2 | (2.89) | 4.1 | (2.77) | 1.504 | .138 |
| Least pain | 2.5 | (2.16) | 1.27 | (1.66) | 2.479 | .160 |
| Average pain | 3.77 | (2.19) | 1.73 | (1.91) | 3.830 | .000 |
| Right now pain | 3.5 | (2.71) | 1.3 | (1.78) | 3.711 | .000 |

M = Mean, SD = Standard deviation

**Table 3** Comparison of 48-h pain intensity, 24-h pain interferences, and 48-h pain interferences between the control group (n = 30) and experimental group (n = 30) by Mann–Whitney U test

| Item | Control group | | Experimental group | | *p* |
|---|---|---|---|---|---|
| | Md | (IQR) | Md | (IQR) | |
| **Pain Intensity** | | | | | |
| 48 h | | | | | |
| Worst pain | 3 | (3) | 1 | (3) | .000 |
| Least pain | 2 | (2) | 0 | (1) | .000 |
| Average pain | 2.5 | (3) | 0 | (1) | .000 |
| Right now pain | 2.5 | (2) | 0 | (1) | .000 |
| Pain Interferences | | | | | |
| 24 h | 12.5 | (29) | 3.5 | (19) | .057 |
| 48 h | 6 | (21) | 0 | (4) | .001 |

Md = Median, IQR = Interquartile range

4.2 Discussion

This study aimed to investigate the effect of preoperative educational programs on the self-efficacy to report pain, pain intensity, and pain interference after OMFS. The results of this study indicated the positive effect of the program on the self-efficacy to report pain, 24-h postoperative pain intensity, and 48-h postoperative pain interferences. These results indicate that the program could enhance patients' self-efficacy to report pain and reduce postoperative pain intensity and pain interference.

Pain self-efficacy refers to a person's ability to control and cooperate with pain and its related negative emotions (Nicholas, 2007). It has a strong relationship with the patient's self-reported outcome (Crijns, Liu, Ring, Bozic, & Koenig, 2019). As found in this study, a patient who received a preoperative educational program about postoperative pain presented a higher score of perceived self-efficacy to report pain with better performance of pain self-report, lower pain intensity and less pain interference after surgery than patients who received usual care. This result was consistent with Thompson, Broadbent, Bertino, and Staiger (2016), who reported that patients with higher pain self-efficacy have better self-reported pain outcomes than patients with lower pain self-efficacy.

This finding indicated the effectiveness of four sources of self-efficacy theory that could enhance post-OMFS patients' perceived self-efficacy to report postoperative pain. The four sources of self-efficacy are enactive master experience, vicarious experience, verbal persuasion, and physiological and affective states. After receiving the program, the perceived self-efficacy to report pain score was significantly higher than before the program. In addition, the perceived self-efficacy to report pain scores of the patients who received the program were significantly higher than the scores of patients who received the usual care. This researcher added the Self-Report Pain Sheet as a supplemental instrument to record the performance of pain self-report of the participants in both groups. The data found that compared with the control group, the experimental group had better performance regarding reporting pain to the doctor or nurse when their pain score was higher than 3 (p = .009). The experimental group also reported pain

to medical staff more often than the control group (100%, 33.3%, p = .000). Therefore, this evidence confirmed the effectiveness of the program.

Though there was no similar study to compare with the current program, the findings of the present study were similar to previous education studies such as a nurse-led pain management program (Germossa, Helleso, & Sjetne, 2019), video-conducted preoperative education (Tao et al., 2019), and a script-based communication intervention with pain management (Alaloul, Williams, Myers, Dlauren, & Logsdon, 2015).

## 5. Conclusion

This study demonstrated that the preoperative pain education program, which incorporated Bandura's self-efficacy theory (1977), was congruent with the updated postoperative pain management guidelines. The findings of this study illustrated that a preoperative education program focused on postoperative pain had a positive effect on enhancing patient self-efficacy to report pain, which led to active participation in postoperative pain management, resulting in lower pain intensity and less pain interference. Because preoperative education can be considered routine care and pain is a common result after surgery, this program could increase the nurses' role in advocating for patients to report their pain intensity. Incorporating this program into preoperative education could be appropriate.

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