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

Mei Zhou

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Nursing Science in Adult and Gerontological Nursing (International Program)

Prince of Songkla University

2021

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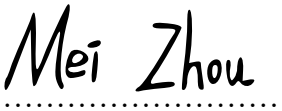
I hereby certify that this work has not been accepted in substance for any degree, and is not being currently submitted in candidature for any degree.



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ABSTRACT

Self-efficacy to report pain is an essential competency for patients who are undergoing oral and maxillofacial surgery (OMFS). This study was to evaluate the effect of a preoperative educational program on self-efficacy to report pain, pain intensity, and pain interferences among patients after oral and maxillofacial surgery.

The quasi-experimental research design was conducted at the Oral and Maxillofacial Surgery Department in Guizhou Provincial People's Hospital. Sixty participants who met the inclusion criteria were assigned to the control group and the experimental group. The 30 participants of the control group received the usual care, whereas the 30 participants of the experimental group received the preoperative self-efficacy educational program based on Bandura's self-efficacy theory on the day before surgery. The set of 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 program, the self-efficacy to report pain of the experimental group was significantly higher than before (t = - 4.94, $p < .001$). Compared with the control group, the experimental group had a significantly higher score of self-efficacy to report pain (t = - 4.72, $p < .000$). At 24-hours after surgery, the average pain and right now pain of the experimental group were significantly lower than that of the control group ($p < .001$). However, there were no significantly differences in neither worst pain nor least pain between the two groups ($p > .05$). At 48-hours after surgery, the worst pain, least pain, average pain and right now pain of the experimental group were significantly lower than that of the control group ($p < .001$). Even though, the pain interferences at 24-hours after surgery of the experimental group showed no significant differences from that of the control group ($p > .05$), the pain interferences at 48-hours after surgery were significantly lower than that of the control group ($p < .01$).

The findings showed that the preoperative self-efficacy pain educational program by applying the four sources of the self-efficacy concept had enhanced the self-efficacy of patients to report postoperative pain, which decreased postoperative pain intensity and pain interferences.

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CHAPTER 1

INTRODUCTION

Although available advanced postoperative pain management techniques exist, the incidence of postoperative pain is still high. Pain after surgery leads to both physical and psychological distress, also increased patient burden. In light of this, effective pain management is required. This chapter states the reason for conducting the study. The main elements include background and significance of the problem, objective of the study, research question, conceptual framework, hypothesis, definition of terms, scope of the study, and significance of the study.

Background and Significance of the Problem

Oral and maxillofacial surgery [OMFS] is the main treatment for the maxillofacial tumor, salivary gland disease, maxillofacial injury, infection, congenital cleft lip, and oral mucosa disease. In China, oral and maxillofacial tumor was one of the most significant popular diseases leading to hospitalization (Liu, Yang, Xing, Huang, & Li, 2011; Tang, 2018; Wang, 2017). According to the report of Xu (2017) from 5775 cases, the tumor in oral and maxillofacial region such as cyst, tumor sample lesions and benign tumor, malignant tumor were 23.1%, 35%, and 41.9% respectively. Almost all of the tumors were distributed in the jaw, facial ministry,

gingival and oral mucosa. Surgery is the primary treatment. Guizhou Provincial People's Hospital is the general hospital, about 180 patients are admitted for OMFS per month, and about 80 patients for tumor surgery.

Different procedures result in varying postoperative pain in the acute phase. The Institute for Clinical Systems Improvement (ICIS) stated the most common types of pain for patients after OMFS are somatic pain (pinprick or sharp), visceral pain (aches or pressure) and neuropathic pain (burning or tingling) (as cited in Roger & Fantuzzo, 2017), which increased mood disturbance (Peisker et al., 2018), difficulty in chewing, swallowing, sleeping and speaking (Zhao, 2015), and lead to decreased quality of life. In Romania, within 24-hours after surgery, 44.2% of 104 patients after maxillofacial tumor excision and oral surgery reported moderate to severe pain (Cazacu et al., 2016). In Britiain, 95% of 75 patients after OMFS had postoperative pain before discharge, among them 33% experienced moderate and 24% experienced severe pain (Coulthard et al., 2000). In German, a prospective cohort study analysis pain intensity on the postoperative day one found 92.2% of 578 patients who underwent OMFS reported pain, 51.3% of them reported moderate to severe pain, 15.9% of patients who underwent fracture repaire surgery stated severe pain (Gerbershagen et al., 2013). In China, a study assessed 60 patients after OMFS, 50% of them reported moderate pain and 8.3% of them reported severe pain (Lu, 2018). In addition, 95.8% of oral and maxillofacial tumor excision patients reported moderate pain 24-hours after surgery (Tao, Zhang, Huang & Li, 2019). After the major surgery

of the craniofacial region, Ge and Wu (2019) found patients experienced severe pain within 6, 12, 24, and 48-hours after surgery.

Previous studies found factors related to post-surgical pain included being between the ages of 18-65 years old (Lautenbacher, Peters, Heesen, Scheel, & Kunz, 2017), gender (Yang et al., 2019), pain expectation (Bayman et al., 2019), anxiety (Cazacu et al., 2016), preoperative pain (Montes et al., 2015), type of surgery (Aduckathil et al., 2013; Bory et al., 2018), and duration of operation (Evan & McCahon, 2019). In addition, preoperative opioid exposure (Keller, Carp, Levy, & Rosen, 1994), high intensity of postoperative pain (Althaus et al., 2012; Vandenkerkhof et al., 2012) and nerve injury (Martinez et al., 2015) were reported as factors to increase the incidence of chronic post-surgical pain.

According to Chou et al. (2016), in regards to postoperative pain management guidelines, preoprative education is as an important component of postoeprative pain management. Providing preoperative pain education led to significant improvement in pain management outcomes (Alaloul, Williams, Myers, Dlauren, & Logsdon, 2015; Egbert et al., as cited in Glowacki, 2015; O'Donnell, 2015). From the PAIN-OUT of 17 countries all over the world, it is evident that engaging the patient in the postoperative pain management process improved pain management outcome and increased patient satisfaction, including lower pain intensity, effective pain relief, and less pain interference in daily living function (Schwenkglenks et al., 2014). Thus, it is of benefit to provide preoperative pain education for patients undergoing OFMS.

In China, studies related to postoperative pain management for the patient after OMFS mostly focus on preoperative education for reducing preoperative stress and depression via the application of 3D-visualization (Zeng, Li, & Yuan, 2018) and video simulation (Tao, Zhang, Huang, & Li, 2019), individual postoperative oral care (Tan, Huang, & Zhu, 2019; Yu, 2018), however, postoperative oral flap care (An, 2018; Wang & Li, 2019; Zhang, Gao, Yan, & Wang, 2018), however, no study has been found focusing on pain management education for patients undergoing OMFS.This indicates the necessity of an evidence-based education program for the patient after OMFS.

A patient has the right to receive adequate pain control (The European Federation of International Association for Study of Pain, 2001). In addition, patients taking responsibility for self-management regarding pain management is the first and foremost step (Committee on Advancing Pain Research, Care, and Education, Board on Health Sciences Policy [CAPRCEBHS], & Institute of Medicine [IOM], 2011; Tick et al., 2018). Additionally, self-management has already been proven as a successful method to enhance the patient's ability to control pain (Delgado et al., 2014; Keefe et al., as cited in CAPRCEBHS & IM, 2011).

Self-management skills are mastered by instilling self-efficacy. Self-efficacy plays a significant role for disease control and health promotion, it as an effective mediator/facilitator to reinforce the patient taking the central role in the recovery process and promotes sustainable, positive outcomes (Resnick, 2018). In regarding

pain self-efficacy, Ruben, Jodoin, Hall, and Blanch-Hartigan (2018) reported that most of the previous most studies focused on chronic pain patients, and there were fewer studies on surgical patients.

Additionaly, Wang et al. (2018) reported among all pre-surgery and surgery-related factors, pre-surgery self-efficacy has a significantly negative relationship to postoperative pain intensity, which means that a patient who has more pre-surgery self-efficacy would report less acute postoperative pain. Beyond that, self-efficacy was also significantly interrelated with depression, and ahd a significant negative correlation with disability, and pain intensity after minor hand surgery (Vranceanu, Jupiter, Chaitanya, Mudgal, & Ring, 2010). A systematic review study reported that pain-related beliefs of specific-self-efficacy had an influence on the patient adherence to pain treatment (Thompson, Broadbent, Bertino, & Staiger, 2016). However, there was no study found applying self-efficacy to enhance patient capability to control postoperative pain after OMFS. Therefore, an intervention should be carried out to enhance the pre-surgical self-efficacy of OMFS patient.

Insufficient preoperative education leads to patient lacking the knowledge and skills of postoperative pain control. For instance, Haynes, Ackloo, Sahota, McDonald, and Yao (2008) stated that patients had weak adherence to prescribed medication; In China, a three provincial-level hospital survey of 128 postoperative patients found that most patients poorly understood pain and pain medication, of which 51.6% believed only unbearable pain needed managing, 18.5% rejected morphine to treat

pain because they believed morphine was addicted, 11.7% reported no pain when felt pain, 23.4% delayed reporting pain (Weiran et al., 2013). Patient self-reporting of pain is the foundation of pain assessment. Patients who endure pain are at major risk factor for uncontrolled pain, and have a high risk of acute post-surgical pain developing into chronic pain (Kuusniemi & Poyhia, 2016).

Accordingly, a nursing intervention is one important part of routine care for patients with pain (Joint Commission International, 2014). In China, Jiajia et al. (2017) reported 27.1 % of nurses provided nursing interventions for patients with mild pain (NRS score 1-3); 29.3% of nurses did not provide nursing interventions when patients experienced moderate pain (NRS score 4-6) and 2.1% of nurses provided nursing interventions when patients were undergoing severe pain (NRS score 7-10). For the nursing practice in postoperative pain management for patients undergoing OMFS, there was no specific study found. This indicated the emergency of changes needed in nursing practice regarding pain management.

Above all, preoperative education is an important component of optimal postoperative pain management (Chou et al., 2016). The concept of self-efficacy is a good social psychological construction, which can transform the knowledge and information of health promotion and education interventions directly or indirectly into behavior (Affendi et al., 2018). However, the existing studies that demonstrate preoperative pain dominated by education among patients undergoing OMFS are rare. The review of literature did not find any studies reporting preoperative educational

programs to enhance patients' self-efficacy to report postoperative pain, particularly among patients after OMFS in China.

Therefore, this quasi experimental study was designed to test the effect of a preoperative educational program on self-efficacy to report pain, pain intensity, and pain interferences among patients after OMFS.

Objectives of the Study

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 that of 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 that of 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 that of the control group after receiving usual care.

Research Questions

1. Is the self-efficacy to report pain within the experimental group after receiving the preoperative pain educational program higher than before?

2. Is the self-efficacy to report pain in the experimental group after receiving the preoperative pain educational program higher than that of the control group after receiving usual care?

3. Are the pain intensities of worst pain, least, average, and right now pain in the experimental group after receiving the preoperative pain education program lower than that of control group after receiving usual care?

4. Is the total score of pain interferences in the experimental group after receiving the preoperative pain education program lower than that of the control group after receiving usual care?

Conceptual Framework

To develop the preoperative education program, the conceptual framework of this study is based on the postoperative pain management guideline (Chou et al., 2016), pain self-efficacy (Nicholas, 2007), theory of self-efficacy (Bandura, 1977), integrated with the literature review (Alaloul, Williams, Myers, Dlauren, & Logsdon, 2015; Cooke et al., 2016; Germossa, Helleso, & Sjetne, 2019; Kol, & Alpar, Erdogan,

2014; Kim et al., 2012; Sauaia et al., 2005; Tao, Zhang, Huang, & Li, 2019; O' Donnell, 2015).

According to the postoperative pain management guideline, preoperative education is one of optimal components and the first step for initiated postoperative pain management (Chou et al., 2016). The contents of educational information as the guideline-recommended are integrated with the reviewed literature including concept of postoperative pain, cause of pain, type of pain, importance of factual reported pain, how to use a pain intensity scale to report pain, side effects of pain medication, pain management plan, and realistic goals for postoperative pain control. Even though video is the most effective method for teaching patient (Tao, Zhang, Huang, & Li, 2019 : Tuong, Larsen, & Armstrong), written material and verbal explanations are necessary for meeting patient requirements to understand what to expect from the experience of pain, their analgesics, what to do if the analgesics do not work, and the likelihood of adverse reactions from the analgesics (Kastanias et al., as cited in Sawhney, Watt-Watson, & McGillion, 2017). Thus, the educational materials which were provided to the patients included a written pamphlet and a video.

According to Bandura (1982), self-efficacy refers to "how well one can execute courses of action required to deal with prospective situations" (p.122). Self-report of pain is a gold standard for pain assessment as well as part of providing patient central-care by learning about patient requirements (IOM, as cited in Ruben, Jodoin, Hall, & Blanch-Hartigan, 2018). The more accurate and timelier the self-

reporting of pain, the more reasonable pain treatment decision-making and appropriate pain medication prescribed, resulting in a the less painful experience. A systematic review and meta-analysis of 12 clinical trial studies revealed that patient-reported pain outcomes enhanced pain management and significantly reduced pain intensity (Adam, Burton, Bond, Bruin, & Murchie, 2017). Thus, increased patient self-efficacy to report pain at time may improve pain management outcomes.

The aim of this study was through the preoperative pain education program to increase patient self-efficacy to report pain. Competency of self-efficacy to report pain is due to mastering the four resources of self-efficacy: enactive mastery experience, vicarious experience, verbal persuasion, physiological and affective states (Bandura, 1997).

Enactive mastery experience. Enactive mastery experience refers to the process of overcoming obstacles, through persistent efforts and participation in successful performance to gain experience, this experience is developed by acquiring behavior, cognition or cognitive-behavioral modification and mastery from a course (Bandura, 1997). The most influential source of self-efficacy (Bandura, 1997, 2009) was found. The stronger the perceived efficacy, the greater the change. In order to reinforce coping with pain for the patient, this study applied learning and practicing the self-reporting of pain and the patient's capabilities of managing pain. The education information was delivered to the patient in the way that was appropriate for their age, literacy level, and understanding through face-to-face communication.

Before starting, the environment was prepared in that no treatment was provided to the patient. The instrumental of self-report sheet was provided to encourage the patient to practice the self-rating of pain and to see the progress of pain reduction. A QR code (scan to watching the video) was attached to the pamphlet as the material which helped the patient to review the key information and to help them remember. In the teaching process, the participant was asked to self-appraise her/his understanding of the material and barriers to learning, then the researcher discussed the self-appraisal with the participant and helped her/him to overcome any barriers identified

Vicarious experience. Based on Bandura (1997), when a person watches others successfully perform task, he or she will raise his/her own self-efficacy belief to persuade his/herself to do the same performance. In this study, in order to increase patient self-efficacy to report pain and the self-rating of pain, the first stepwas management from the participants themselves. This was to increase the patients' belief that they can recognize and self-report pain, and in the video one patient actor role played the skill of self-reporting pain. Secondly, encourage patient to management pain by clinician. This focused on self-reporting pain and the requirement of pain treatment, the one who had OMFS' If yes then are you talking about the patient after OMFS who demonstrated how to self-report pain by using the patient self-report pain sheet everytime this patient felt pain, they would learn the effort of the patient, then compared with himself to make effort to perform the same action (self-report pain by NRS, require pain treatment). The patient in the video can

help persuade the patient watching the video that she/he can also do this. Thus, this can raise a patient's self-efficacy belief to report pain when the patient requires pain treatment. Verbal modeling combined with a skill-based cognitive model can much heighten efficacy belief and achievement (Fecteau & Stoppard, as cited in Bandura, 1997). Thus, the video that was used to carry out in this method, provided a successful performance of the self-reporting of pain to create the same situation in the patient after OMFS to raise the confidence of the patient.

Verbal persuasion. Verbal persuasion serves as an encouragement tool for strengthening personal beliefs in that a person possesses certain capabilities to achieve what they want(Bandura, 1997). Regarding pain after surgery, though it is a subjective personal experience, however, it could be measured by a validated pain scale. The most reliable pain assessment is for the patient themselves to self-report pain as accurately as possible (Jacox et al., as cited in Berry et al., 2001), because the result will be as a clue to judge whether the patient's pain is well controlled or a pain treatment plan should be changed to adequately manage the patient's situation (Chou et al., 2016). Thus, motivational consersations were conducted with the patient. The patient was encouraged to recognize that pain when mild and stable is an acceptable clinical condition, and when pain is moderate or more than moderate, the patient must report this pain to the physicians or nurses in a timely manner. All scores of pain intensity were recorded by the patient themselves on the patient self-report sheet to let them clearly see whether their pain was under control or not, so that increased the

patietns' adherence to their treatment plan as well as learn about the progress of their pain reduction. Except that the patient was informed the significant of manage pain by both physician and themselves, which was to strengthen their self-belief of reporting pain and ask for pain treatment in time.

Physiological and affective states. In judging abilities, people rely on physiological information conveyed by their physical and emotional states (Bandura, 1977, 1997). Before the intervention, an environment was prepared in that there was no treatment given to the patient. In regards to postoperative pain, information was instilled into the patient about the cause, type, and location of pain, as well as impact of pain after surgery, to help the patient prepare his/herself to acknowledge her/his physical condition (e.g change in blood pressure, heart rate, respiratory rate, oxygen saturation) and the sensation, to reduce worry and fear.

Preoperative Self-Efficacy Pain Education Program

Content	Self-Efficacy Sources	Intervention	Outcomes
Postoperative Pain Management • Definition, cause, type, and side effects of postoperative pain • Pain control method ✓ Pharmacological treatment: drug and its mechanism (NASAID, corticosteroid, opioid medication), represent medication, side effects ✓ Non-pharmacological treatment: listen to music, reading, watching TV, deep breathing • How to self-report pain ✓ By using NRS ✓ Report pain location, cause, time, quality • Importance of self-report pain ✓ Recover soon ✓ Appropriate treatment • Skills to oral painkiller Time, method, attention, adverse reactions	Enactive mastery experience	1. Prepare environment, participant' physical and emotional status readiness to learn 2. Encourage participant to learn 3. Encourage participant to self-appraisal of knowledge obtained 4. Encourage participant to self-judgment of capabilities of self-manage pain 5. Summary the point of the information and encourage participant to understand, mastery and remember	Primary outcome -self-efficacy to report pain Secondary outcomes -pain intensity -pain interference
	Vicarious experience	6. Provide video teaching and guide practice to increase participant efficacy to learn and action 7. Discussion and Provide feedback to patient performance 8. Asking participant to express their efficacy expectation and expectation outcome of postoperative pain control	
	Verbal persuasion	9. Encourage patient enactive to self-report and asking pain treatment 10. Encourage patient keep in optimistic	
	Physiological and affective state	11. Discussion the possible physical condition and emotion they may meet, encourage patient to understand the normal sensation and physical condition 12. Provide stress manage strategy	

Figure 1. Conceptual framework of preoperative self-efficacy education program

Hypothesis

1. In the experimental group, self-efficacy to report pain after receiving the preoperative pain education program was higher than before.
2. The patients who received the preoperative pain education program in the experimental group have higher self-efficacy to report pain than those who received usual care in the control group.
3. The pain intensity of worst pain, least, average and right now pain in the experimental group after receiving the preoperative pain education program was lower than that of the control group.
4. The pain interferences of experimental group after receiving the preoperative pain education program was lower than that of the control group.

Definition of Terms

Preoperative Self-Efficacy Pain Education Program. The preoperative self-efficacy pain educational program was developed based on the literature review regarding the postoperative pain management guideline (Chou et al., 2016) and Bandura's self-efficacy theory (1977), integrated with the literature review. The preoperative educational program focused on postoperative pain, which is composed of (1) physical and emotional state preparation, (2) providing information about

postoperative pain, pain score, pain self-report, and pain management, (3) watching the video of the patient role model demonstrating how to self-report after OMFS, and (4) reinforcing self-efficacy to report pain.

Self-efficacy to Report Pain. Based on Bandura (as cited in Bandura 2012) self-efficacy refers to people's belief in their capabilities to achieve a purposed outcome. Self-efficacy influences how much effort and how long a person will put in, in the face of obstacles and unpleasant experiences (Bandura, 1986). In this study, self-efficacy to report pain refers to a patient's self-belief on his/her self-capabilities on reporting pain intensity and pain interference by using the knowledge and skills that she/he learned in the preoperative period through the education program. The outcome was evaluated by the Perceived Self-Efficacy to Report Pain Questionnaire on admission day and the day before surgery.

Pain Intensity. Pain intensity is the baseline pain experience, it is considered to be one of the primary factors that determine the effect of pain on a person's whole function and sense of well-being (Dahl, 1996; Li, Liu, & Herr, 2007). In an acute pain clinical trial, pain intensity and pain relief are the two assay sensitivity components to detect the effectiveness of a pain reducing intervention (Cooper et al., 2016). In this study, pain intensity refers to a patient reporting how much the pain is. It was assessed by the Pain Intensity Scale at its "worst", "least", "average", and "right now" on admission day, the day before surgery, 24-hours and 48-hours after surgery.

Pain Interference. Post-surgical acute pain caused by tissue damage activate

it trigger body potential or actual harm. This results in both physical and psychological distress. In this study pain interference refers to a patient reporting pain after surgery which reflects physical, affective, and social interferences, that is evaluated by the Pain Interference Scale including general activities, mood, walking ability, relationship with others, sleep, and enjoyment of life. Pain interference is measured on admission day, the day before surgery, 24-hours and 48-hours after surgery.

Scope of the Study

This quasi-experimental posttest study was conducted to implement and measure the effectiveness of the preoperative self-efficacy pain education program which was developed by the researcher, for the adult patient undergoing elective tumor excision surgery in Oral and Maxillofacial Surgery Department, Guizhou Provincial People's Hospital. The data collection was collected from October 1, 2020 to December 31, 2020.

Significance of the Study

This study provided the preoperative self-efficacy pain education program which is mainly guided by the four resources of the self-efficacy theory, for

postoperative pain management for patients who undergoing OMFS. From the results of this study, it is evident that the Bandura's self-efficacy theory based preoperative pain education intervention had a positive effect on enhancing patients's self-efficay to report pain, and reduce postoperative pain intensity 24 and 48-hours after OMFS, and pain interferences 48-hours after surgery. Theses outcomes would increase postoperative pain management awareness of patients and health care providers that improve patients' satisfaction.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews the related literatures which relevant to this study. The outline of the reviews is as follows:

1. Pain
    - 1.1 Concept of pain
    - 1.2 Type of pain
    - 1.3 Pain theories and mechanism
    - 1.4 Post-operative pain
2. Pain of Patients with Oral and Maxillofacial Surgery
    - 2.1 Oral and maxillofacial surgery (OMFS)
        - 2.1.1 Incidence/prevalence
        - 2.1.2 Type and characteristics of OMFS
    - 2.2 Pain of patients with oral and maxillofacial surgery
        - 2.2.1 Incident
        - 2.2.2 Characteristics and effect of surgical-pain after OMFS
3. Guideline of the Postoperative Pain Management
    - 3.1 Preoperative education
    - 3.2 Pain assessment

Pain

Concept of Pain

Pain is a common symptom in life and it has an inherent subjective nature. McCaffery defined it as whatever a person says it is, and it exists whenever (as cited in Luedtke, & Peltier, 2017). Pain is referred to as “unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (Mersky et al., 1979, p.s217). Thereafter, the International Association for the Study of Pain [IASP] (2012) stated it was “a questionable sensation in a part or parts of the body, but it is also always unpleasant and therefore also an emotional experience”. These descriptions reflect pain is a painful sensation resulting from destroyed tissue, and it causes uncomfortable feelings. Thus, it is indicated that who reports pain may be suffering from physical and physiological dysfunction. Alternatively, based on pain subjective property, painful sensations maybe personally dissimilarly. So that in clinically, patient self-statement of pain is the most reliable indicator of pain assessment (Jacox et al., as cited in Berry et al., 2001).

Notably, pain is a multidimensional phenomenon, including physical, sensory, affective, cognitive, behavioral, and sociocultural dimensions (McGuirc, 1987). McGuire (1992) argued that the physical dimension comprises of pain location, onset, duration, etiology, and syndrome; the sensory dimension consists of pain intensity, quality, and pattern; the affective dimension refers to pain impact on

one's mood state, such as anxiety, depression, and well-being; the cognitive dimension extends to pain meaningness and its associated thought in the progress, such as view of self, coping skills and strategies, previous treatment, attitudes and beliefs, as well as factors influencing pain; the behavioral dimension is related to increased or decreased present pain though communication, physical activities, medications, sleeps etc.; the sociocultural dimension extends to personal pain perception and response influenced by a wide range of cultural backgrounds, society, and environment. The latest definition of pain is a painful experience of sensory, emotional, cognitive and social dimensions associated with tissue damage or potential tissue damage (IASP, Williams & Craig, 2016).

Type of Pain

Pain can be classified according to pain experience, such as location of pain (low back pain, myofascial pain), duration of pain (acute and chronic pain), cause of pain (neurogenic pain), and sensory of pain (allodynia, hypoalgesia). Acute pain response directly after tissue injury, primarily it serves as a protection pathway for damaged tissue, and lasts within 3 months (Sluka, 2016). However, chronic pain is considered more seriously than acute pain, and it is defined as pain lasting more than 3 to 6 months after the initial tissue damaged (Sluka, 2016). Neurogenic pain is "pain that arises from actual or threatened damage to non-neural tissue and is due to the activation of nociceptors" (IASP, 2017a). Allodynia refers to a painful sensation

provoked by normal non-noxious stimuli (IASP, 2017b). Normally the stimuli are nonpainful, but the response is painful beyond the normal reaction. In contrast to allodynia, hypoalgesia is defined as the status of the absence of pain response regarding to a normal painful stimulation (ISAP, 2017b).

Pain Theories and Mechanism

In 1900, the first researcher named Sherrington agreed pain contained both sensory and affective experience (as cited in Carli, 2011). Before that time, pain was considered as a conflicting concept, and some researchers believed pain was an emotional sensation, but others thought that pain was a physical response (Luedtke & Peltier, 2017).

At the end of 19th century, *the Specificity Theory* and *the Intensive Theory* of *Pain* was formulated based on experimental founding. *The Specificity Theory of Pain* stated that pain is "a specific sensation, with its own sensory apparatus independent of touch and other senses" (Bonica, 1990, p.7). This theory tried to describe different pain sensory experiences, that is cold, warmth, pressure, and pain. But the theory did not explain allodynia and phantom limb pain (Luedtke & Peltier, 2017).

The Intensive Theory of *Pain* was formalized by German neurologist Wilhelm Erb in 1874. This theory described pain which was a result from highly activated sense of touch (Luedtke & Peltier, 2017). The throey also pointed out that pain intensity of any stimulation and central summation were the necessary elements of the

determination of pain (Chen, 2011; Luedtke & Peltier, 2017; Moayedi & Davis, 2013; Perl, 2007).

In the 20th century, many theories of pain had sprung up, such as the *Pattern Theory*, the *Central Summation Theory*, *Gate Control Theory*, *Pain Matrix*, and so on. Among of those theories, the *Gate Control Theory of Pain* specifically described the pain modulatory system including both physical and psychological aspects of pain. This theory was formulated based on the *Specificity Theory* and *Pattern Theory* by Melzack and Wall's in 1965, and it proposed that nerve fiber endings once gated in the dorsal horn of spinal cord can be modulated. The theory (as cited in Carli, 2011) states that pain is primarily provoked by A-delta and C-fibers as an initial consequence of depolarization, which produces nerve impulses that carrying the message of pain. The neural mechanism in the spinal dorsal horn acts as a gate that facilitates or inhibits the pathway of the nerve impulses traveling into the central nervous system. Input of lager-diameter afferent (A delta) and small-diameter afferent into the spinal cord activated the gate, then converged on a substantia gelatinosa (SG) neuron or T cell (result of pain) leading to open or close the gate. This gating mechanism is influenced by large and small fibers. Lager-diameter afferent modulating in the dorsal horn cause the closing of the gate to reducing the transmission of the pain message. The small fibers through blocking the SG inhabitation, activate a transmission T cell to opening the gate. "The large, fast conducting fiber system projects to the central control system which alerts selective

cognitive processes able to influence the descending control system modulating the gating mechanisms" (Carli, 2011, p.177). The gating mechanism widely contributes to the study on the dimensions of pain behavior, cognition, physical, mental and culture. However, the pain perception dose not detailly descripted in the role of nervous system (Luedtke & Peltier, 2017).

In the 21st century, the central and peripheral sensitization and multidimensional pain theory was implemented in the pain treatment research. The animal model of central and peripheral sensitization was done in 1966 (as cited in Czarnecki & Turner, 2018). This model proposed that persisting pain was caused from repeated stimuli in the central and peripheral system (Kindler, Bennett, & Hones, 2011). The nociceptors at the endings of the peripheral nerves activate A-delta and C-fibers that carry the message through impulses into a neurons in the dorsal horn of spinal cord, some of these neurons response to sensations in the second level neurons which transmit the message to the brain. Keep on-going activating the A-delta and C-fibers causing a release of neuromodulators and neurotransmitters such as substance P, and nerve growth factor. This increasing stimuli results in hyperexcitability of the brain, leading to persisting pain.

Post-operative Pain

Pain after surgery is an inevitable, and immediately occurs after the incision (Pogatzki-Zahn et al., 2017). It is generated from the area of incision activation

peripheral and central sensitization as well as humoral factors which leading to pain at rest and during activities (ISAP, 2017). The pain can last from a few days to weeks (Pogatzki-Zahn et al., 2017).

Peripheral sensitization manifests in the change of the primary afferent sensory neurons, which reflects a reduction and/or an enhancement in the threshold of stimulus-response at the peripheral endings of nerve fibers (sensory receptors) (Gangagharan & Kuner, 2013). It activates by chemical mediators (such as substance P, cytokine, bradykinin, etc.) via stimulus nociceptors in the area of the surgical incision. After the incision of the skin, muscles in maxillofacial release of pain mediator prostaglandins', histamine, serotonin, bradykinin, substance P, cytokines as well as noxious stimuli. Some of these translate into nerve impulses by sensory receptors which activate the nociceptors surrounding the traumatic tissue in the area of injury (Wu & Raja, 2011; Malek et al., 2017).

In contrast to other parts of the body, the maxillofacial region is mainly controlled by the trigeminal nerve, the nerve is a mixed nerve that comprises of motor and sensory fibers. The sensory nociception take a larger proportion in the cerebral cortex (Bear, Connors, & Paradiso, 2016). The sensory fibers through the periphery in the maxillofacial region are divided into three major divisions consisting of ophthalmic, maxillary and mandibular division. The free ending fibers (nociceptor) are distributed in the mucosa, skin, muscles, periosteum and dental pulp. The ascending way of pain stimuli in the maxillofacial region also has some differences

compared to from other parts of the body.

The first-order trigeminal afferent from these receptors through unmyelinated C-fibers and myelinated A-delta fibers travel to the trigeminal ganglion (Klein et a., 1992; Desjardins, 2000). The impulse carried by the trigeminal nerve directly move into the brain stem in the region of the pons to the synapse with the trigeminal spinal nucleus. The information of second-order trigeminal neurons project to the thalamus with primary afferent via the spinothalamic and trigeminothalamic pathways, ascending to the thalamus (Ong & Seymour, 2003). Then the third-order afferent neurons in the thalamus project to the area of cerebral cortex activate sensitization (Ong & Seymour, 2003). This result in unpleasant feeling of pain. The pain sensory causes suffering, however, it may reduce in the healing and rehabilitation process (Pogatzki-Zahn et al., 2017).

Factors Influence Postoperative Pain. The factors influencing postoperative pain are divided into physical and psychological factors. Physical factors include age, gender and type of surgery. Psychological factors contain preoperative pain, pain expectation and anxiety.

Age. Age is a common factor being considered in every medical condition treatment. A recent study based on a systematic review and meta-analysis explored evidence on age-related effects in pain perception (pain thresholds and pain tolerance thresholds). The study concluded pain thresholds growth with aging which means advanced ages are linked to decreased pain sensitivity in the lower pain stimuli, while

for the pain tolerance thresholds no changes were found (Lautenbacher, Peters, Heesen, Scheel, & Kunz, 2017). For instance, when a group of patients under 45 years old were compared with patients at the age of 65 or more from oral and maxillofacial wards showed higher cold, warm, pain and touch thresholds in oral and maxillofacial wards (Heft & Robinson, 2010). The older patients generally present poor surgical outcomes compared to younger patients, including delayed recovery of wound healing, increased higher risk of postoperative complications and prolonged hospitalization (Poon, Fung, & Leung, 2013).

Gender. A systematic review and meta-analysis study (Yang et al., 2019) reported that females were about 30% more likely than men to have poor postoperative pain control. Females reported severe pain, compared with males (Mobini, Mehra, & Chigurupati, 2018), they required more than 11% morphine dosage for relief in the acute postoperative period, and the situation was not significant different in elderly patient (Aubrun, Salvi, Coriat, & Riou, 2005).

Type of surgery. Different types of surgeries results in different pain. According to the previous study, the most painful surgical procedure is orthopedic surgery (Aduckathil et al., 2013; Bory et al., 2018). Although patients who underwent oral and maxillofacial surgery normally reported mild to moderate pain (Aduckathil et al., 2013; Bory et al., 2018), it was found that 44.2% of patients experienced moderate to severe pain in the first 24-hour with tumor excision, orthognathic surgery, salivary gland and oral surgery (Cazacu et al., 2016). Similarly, 25.6% of patients who had

undergone reduction of facial bone fracture stated severe pain, and 9% of patients experienced the worst possible pain (Aduckathil et al., 2013).

Preoperative pain. The previous study stated that preoperative pain, no matter whether it existed currently or in the past is associated with postoperative pain intensity and the duration of recovery (Aasvang et al., 2010; Montes et al., 2015). The patient who suffer from pain before surgery are significantly at increased the risk of living with moderate to severe post-surgical pain, compared with those patients who did not have preoperative pain (Sommer et al., 2010). Moreover, 80% of patients who presented with temporomandibular joint pain and 79.5% of patients who presented with orofacial pain before orthognathic surgery had pain lasting for one year after surgery (Agbaje, Luyten & Politis, 2018). The mechanism of how preexisting pain affects postoperative pain is still unclear. Some researchers hypothesiza that this maybe related to continuous pain sensitization provoked by protentional tissue injury (Richebe, Capdevila & Rivat, 2018).

Pain expectation. Pain expectation is widely conducted to understand placebo effects, guide psychotherapy, and hypnosis. It was defined as expectations of non-will, subjective, and behavioral responses to specifically given cues (Kirsch, 1985). Regarding pain, it is one of the important cognitive factors to shape pain experience (Mondloch, Cole, & Frank, 2001; Sommer et al., 2010). Pain experience is directly influenced by actions of the chemical mediator with response expectancies which are affected by personal self-efficacy of coping with pain and possible expected impacts

of external events (e.g pain treatment) (Peerdeman, Van-Laarhoven, Peters, & Evers, 2016). Patients expectations could be explained as the cognition regarding coming affairs (e.g surgery, postoperative outcome, and its related treatment), with the associated probable outcomes (e.g pain, limited movement, slow recovery), and their possible experiences as well as behaviors towards the results. Currently, one study reported that patients who expected postoperative pain strongly related to moderate to severe pain after surgery (Bayman et al., 2019).

***Anxiety*.** Anxiety is described as an uncomfortable or frightening feeling that **is** accompanied by an autonomic response from vagueness or dangerousness of apprehensiveness (Herdman & Kamitsuru, 2018, p.353). Among surgical patients, anxiety would happen before or after surgery. Likewise, regarding the oral operation, 5-7% patients refuse to accept their dental problem due to strong anxiety and/or fear of the dental surgery process (De Jongh, Adair, & Meijerink-Anderson, 2005). It may own to lack knowledge of dental disease and suffering from current pain, and have a fear of worse pain occuring. A study in Romania revealed that 32.7% of patients undergoing oral and maxillofacial surgery presented mild to moderate anxiety, of those who lived with greater post-surgical pain (Cazacu et al., 2016). Anxiety positively correlated with postoperative pain (Ip, Abrishami, Peng, Wong, & Chung, 2009). As we know, anxiety can produce stress. According to a previous animal model experimental study, stress boosts nociceptive activities through changing neural systems leading to hyperalgesia (Imbe, Iwai-Liao & Senba, 2006).

Pain of Patients with Oral and Maxillofacial Surgery

An oral and maxillofacial operation is performed under local or general anesthesia in the oral cavity and/or face with incision of the facial skin in the removal of abnormal tissue, tooth extraction, osteotomy, and flap implantation. This type of surgery consists of detailed and complex surgical procedures in an open routine approach. According to the type of incision path, oral and maxillofacial surgery is divided into 4 groups consisting of the intraoral operation, the maxillofacial and neck operation, the intraoral and extraoral traffic incision operation, and the flap transplantation multi-incision operation (Wang, 2014).

Intraoral Surgery. Intraoral surgery including oral tumor or trauma which is performed through the inner diameter of the mouth: it covers mandible derived tumor, open reduction of jaw fracture, resection of lip buccal and palatine simple swelling tumor and repair of pure jaw deformity, sublingual gland, and tongue body surgery, etc.

Extraoral Maxillofacial and Neck Surgery. Extraoral maxillofacial and neck surgery includes routine parotid gland, submandibular gland tumor or trauma surgery, neck benign tumor surgery, etc.

Intraoral and Extraoral Traffic Operation. Intraoral and extraoral traffic operation include: tumor invasion of two anatomical structures that require simultaneous incisions inside and outside the mouth such as benign and malignant

tumors of the large jaw, oral cancer requiring cervical lymph node dissection, multiple jaw fracture surgeries.

Flap Transplantation Multiple Incision Surgeries. Flap transplantation multiple incision surgeries include oral malignant tumor or trauma loss repair that requires free vascular flap or musculoskeletal flap transplantation on the basis of tumor resection, or bone transplantation alone.

Generally, some of these surgeries lead to moderate to severe pain in spite of patient receiving analgesic medication (Gbotolorun, Dipo-Fagbemi, Olojede, Ebigwei, & Adetoye, 2016; Kashefimehr, Babaloo, Ghanizadeh, Ghasemi, & Mollazadeh, 2017; Rastogi et al., 2014). Due to facial skin, soft tissue, muscle damage and/or trigeminal nerve injury occur during the operational phase (Edens, Khaled, & Napenas, 2016; Kotrashetti, 2017; Yekta et al., 2010). Inferior alveolar nerve and lingual nerve injuries are a protentional consequence in oral and maxillofacial surgery (Agbaje, Luyten, & Politis, 2016). Once never injury occur, it significantly inferenced patients' quality of life, a number of patients experience difficulty in speaking and eating, as well as drinking and sleeping (Renton, & Yilmaz,2012). For the lingual nerve injury, patients may experience the loss of taste sensory, experience heavy/burning paraesthesia pain or hypoesthesia (Biglioli & Colletti, 2018).

Incidence of Post-Surgical Pain after OMFS

Patients after oral and maxillofacial surgery experienced pain related swelling, nausea and vomiting that are caused by emotional response to pain and procedure response to a painful stimulus (Drew, 2015). These types of pain limited a patient's daily activities such as eating, sleeping, speaking and drinking. From a previous study in Britian, 95% of 75 patients after oral and maxillofacial surgery had postoperative pain, 33% experienced moderate, and 24%severe pain (Coulthard et al., 2000). In Germany, 92.2% of 578 of patients reported pain, 51.3% of them experienced moderate to severe pain after oral and maxillofacial surgery, and 15.9% of them stated severe pain (Gerbershagen et al., 2013). In China, 32.2% and 26.9% of 93 patients reported moderate, and severe pain respectively after oral and maxillofacial surgery (Wang, 2014). For the major surgery of the craniofacial region, Ge and Wu (2019) found patients experienced severe pain after surgery.

Characteristics and Effects of Surgical-Pain after OMFS

The most common pain characteristics of patients after OMFS are somatic pain (pinprick or sharp), visceral pain (aches or pressure) and neuropathic pain (burning or tingling) ([ICIS], as cited in Roger & Fantuzzo, 2017). Pain results in prolonged wound healing causing delayed recovery (Widar, Kashani, Alsén, Dahlin, & Rasmusson, 2015), increased the risk of developing to persisting pain, increased hospitalization and economic burden (Global Industry Analysts, 2015). A study

reported that the incidence of chronic postoperative pain after dental surgery is around 7 to 30% (Schoug & Bruce, 2017). In addition, current research reported that postoperative pain leads to patient mood disturbance after mandibular fracture repair surgery (Peisker et al., 2018). In addition, patients after orthognathic surgery had a decreased quality of life, because of limited functioning, physical pain, psychological discomfort, social disability (Sun, 2018). Patient undergoing oral surgery need to speak, eating, drink and breathe around the site of the surgical incision. At the same time, it may induce movement-evoked pain that reflects movement influences pain, and pain influences movement (Corbett et al., 2018).

Guideline on the Management of Postoperative Pain

The "Guideline on the Management of Postoperative Pain" (Chou et al., 2016) is a clinical practice guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council.

According to the guideline (Chou et al., 2016), the recommendations of postoperative pain management components included preoperative education, pain assessment, pharmacological and non-pharmacological pain management planning, organizational policy, and outpatient care.

Preoperative Education

The preoperative education should be tailored based on the patient clinical situation, needs, and preferences (Chou et al., 2016). The information provided should "age appropriate, geared to the person's and family's level of comprehension and general health literacy, cultural and linguistic competency, and supported by timely opportunities to ask questions and receive authoritative and useful answers" (Chou et al., 2016, p.134). It suggests that the content should be included how pain is assessed and reported, when to report, how to use a pain intensity scale to report pain, pharmacological and non-pharmacological pain management plan, and realistic goals for postoperative pain control (Chou et al., 2016). In addition, a written and verbal instruction should be given (Chou et al., 2016). The approaches can be face-to-face instruction, videos, audiotapes, web-bases, or telephone calls (Chou et al., 2016).

Pain Assessment

Pain assessment before surgery should identify existing pain including sites, quality, impact, duration, pain medication and its effectiveness (Chou et al., 2016). Pain assessment after surgery should 1) Accept self-report as the foundation of assessments; 2) Pain assessed at rest and with activities; 3) Use validated pain assessment tool to assess, such as Numerical Pain Rating Scale, Facial Rating Scale ; 4) Assess sites, quality, impact, duration, aggravating and relief factors of pain, and pain interference; 5) Reassessment according to the medication effective peak time,

typical parenteral administration after 15 to 30 minutes, oral administration after 1 hour, nonpharmacological interventions during or immediately after application; 6) Reassessment less frequently for more stable patients, or at the time of nursing shift; 7) Assess pain treatment related side effects, such as nausea, and sedation (Chou et al., 2016).

Pharmacological Pain Management

It is suggested to use multimodal therapies that apply multimodal analgesia combined with nonpharmacological interventions to treat postoperative pain for decreasing the risk of side effects (Chou et al., 2016). For pharmacological interventions, it is recommended that 1) Opioid oral administration as a first consideration for patient who can use the oral route without contradictions as such as after neck surgery, or intestinal obstruction, but not limited to intravenous, intravenous required round-the-clock dosing during the first 24-hour; 2) Intramuscular route for analgesic administration is not recommended for significant pain and unreliable absorption, inconsistent postoperative analgesia without advantages; 3) Intravenous systematic of analgesia by patient-controlled analgesia (PCA) is recommended for patients after surgery procedure except opioid-naive patients; 4) NASIDs and paracetamol are considered for effective to mild to moderate pain for patients without contraindications, with a single oral administration every 6 hours 6-10 mg/kg, and in a maximal of dose not over 3000mg/d, combination with other

medication not over 1500 mg per day; 5) Oral celecoxib 30 minutes to 1 hour for patients who are undergoing major surgery without contraindications, with 200 to 400 mg; 6) Gabapentin or pregabalin considered as a component of multimodal analgesia for reducing opioid consumption after surgery (Chou et al., 2016).

Nonpharmacological Pain Management

Nonpharmacological interventions are recommended as adjunctive therapy and includes physical modalities and cognitive-behavioral modalities (Chou et al., 2016). Physical modalities include transcutaneous electrical nerve stimulation (TENS), acupuncture, massage, cold therapy, heat therapy, continuous passive motion; Cognitive-behavioral modalities included imagery, relaxation, and music therapy. It is recommended that TENS applying to clinical to reduce postoperative for it decrease 25% postoperative analgesic consumption (Bjordal, Johnson, & Ljunggreen, as cited in Chou et al., 2016). For the acupuncture, massage, cold therapy due to insufficient evidence to support, thus keep a neutral opinion.

Organizational Policy

It has been recommended that the organizational structure should develop and refine policices to keep safely and effectively delivery postoperative pain treatment (Chou et al., 2016). In regards to the facilities 1) Where surgery is performed the development, implementation, evaluation and practices should ensure

safe, evidence-based, and effective postoperative pain control; 2) A pain specialist should be ready to be available to provide consultation for the surgical clinicians; and 3) For the neuraxial analgesia and continuous peripheral blocks are performed have policy to support (Chou et al., 2016).

Outpatient Care

For outpatients, it suggested that they are informed them about 1) How to take pain medication and manage side effects; and 2) That by taking central nervous depressants (including alcohol) or illicit drugs combined with opioid medication will result in adverse events and death (Chou et al., 2016).

Current Evidence for Preoperative Education Program

"Pain management is a moral enterprise and emanates from the heart of bioethics" (Brennan, Carr, & Cousins, 2007), and pain relief is the fundamental right for each patient (TEFIASP, 2001). Thus, promoting and enhancing pain management for patients after OMFS is a vital professional for each health provider, to ensure patient safety and to improve the quality of care during hospital stays.

Education as a cognitive behavioral therapy, the mechanism of improvement pain and self-management through multiple biological pathway 1) Primary modulation: directly modulates neural networks in the cortex that represent pain and

other protective outputs; 2) Secondary modulation: ascending pain input is regulated by activation of descending inhibitory pathways through mild nuclei such as the periaqueductal gray or rostral ventral medulla; 3) Teritiary modulation: regulation of red flags resulting from downregulation of other protective systems, such as direct regulation of injurious inputs, immune cell function, triggering fear, increased movement, or altered behavior (Slula & Moseley, 2016).

The goal of the education recommendations and subsequent calls for action is to increase awareness, access and use of safe and effective non-drug treatments through education of practitioners and patients; Dissemination and reimbursement of evidence-based treatment programs; And to promote ongoing research focusing on the short - and long-term therapeutic and economic effects of integrated care practices (Tick et al., 2018).

According to Czarnecki & Turner (2018), the goal of postoperative pain control for patient should 1) Focus on the prevention of pain, 2) Be free of pain in time, 3) Improve of function impact, for acute postoperative patients, pain should decrease by 35% - 45% compared with the start of treatment or in response to a dosage, and with acceptable improvement for patients (Cepeda, Africano, Polo, Alcola, & Carr, 2003), 4) Restore health and quality of life, and 5) Individualized. The goal is met if the patient 1) Expresses pain relief, with pain intensity of less than 3 score on the NRS, 2) Lower occurrence of side effects from an analgesic regimen, 3) Maintain or improve functional status, and 4) Be satisfied with pain management.

Pain is subjective experience, the patient is the most reliable indicator to determinate the existence of pain and pain intensity (Agency for Health Care Policy and Research [AHCPR policy], 1992). In order to improve outcome of pain management as well as integrated the plan, in the preoperative phase it is necessary to support and help the patient to recognize pain, understand pain and empower him/her to report pain correctly, to reduce fear and anxiety, and prevent any postoperative complications (Henry et al., 2016; Sousa et al., 2015). It is recommended that to provide tailored education to a patient cooperated with the patient's age, general level of health literacy, and cultural and linguistic competency must be taken into consideration as well as providing supported timely opportunities for the patient to consult(Chou et al., 2016; Czarnecki & Turner, 2018). The education contents included concept of postoperative pain, causes of pain, types of pain, the importance of the factual reporting pain, how to use a pain intensity scale to report pain, the side effects of pain medication, pharmacological and non-pharmacological pain management plans, and realistic goals for postoperative pain control (Chou et al., 2016; JCAHO, 2018). It is important that written and verbal instruction should be given (Chou et al., 2016). The approaches can be face-to-face instruction, videos, audiotapes, web-bases, or telephone calls (Chou et al., 2016).

Nowadays, education information for inpatient delivery is mostly delivered by written pamphlets, videos, and face-to-face counseling. A systematic review reported that compared with non-video intervention, a tailored video intervention was more

effective to modify patient health behavior, improve patient treatment adherence and self-examination (Tuong, et al., 2014). In China, the first randomized controlled trial pre-post-test design (Tao et al., 2019) with 48 patients in the control and experimental group respectively, used video education for patients before undergoing OMFS and found that it was effective to reduce patient anxiety (SAS score, the control group:11.36±1.90, the experimental group:7.85±1.00, $p<0.05$) and pain (VAS score, the control group:6.28±1.13, the experimental group: 3.86±0.78, $p<0.05$), and increased patient satisfaction (DVSS score the control group:66.67, the experimental group: 93.75, $p<0.05$).

Hence, in this study preoperative education was provided before surgery with a written pamphlet attached to video teaching. The content included the concept of postoperative pain, causes of pain, types of pain, the importance of the factual reporting of pain, how to report pain, how to use a pain intensity scale to report pain, the side effects of pain medication, nonpharmacological pain management and pain management plan, and realistic goals for postoperative pain control.

Current Evidence for Postoperative Pain Management in OMFS

Pain Assessment

Pain assessment before surgery should identify existing pain including sites, quality, impact, duration, pain medication and its effectiveness (Chou et al., 2016).

Pain assessment after surgery should 1) Accept self-report as the foundation of assessments; 2) Pain is assessed at rest and with activities; 3) Use validated pain assessment tools to assess, such as the Numerical Pain Rating Scale, Facial Rating Scale ; 4) Assess sites, quality, impact, duration, aggravating and relief factors of pain, and pain interference; 5) Reassessment according to the effective peak time of medication, typical parenteral administration after 15 to 30 minutes, oral administration after 1 hour, nonpharmacological interventions during or immediately after application; 6) Reassessment less frequently for more stable patient, or at the time of nursing shift; 7) Assess pain treatment related side effects, such as nausea, and sedation (Chou et al., 2016).

Pain assessment is one of the core competencies for nurse regarding pain management (Fish man et al., 2013). Pain assessment is the first step of pain management, and accurate pain assessments help patients to express any painful experience, and provide clues on evaluating current pain treatment. Postoperative pain management guidelines highlighted that pain assessment helps to determine whether the treatment is adequate, whether enough dosage is provided, whether pain control has met the pain management plan, whether other interventions are needed, and whether the pain management plan should be modified (Chou et al., 2016). Last year, the Joint Commission has been launched a hospital standard that pointed out that accurate pain assessment is required for satisfactory pain management, and the hospital takes responsibility on using appropriate tools to assess pain impacts on the

patient functionality. Also, reassessment should be completed in time to track responses to the intervention and determine if the patient who underwent surgery is adversely affected.

Accordingly, pain occurs whether at rest or doing an activity, and it has been reported that pain is more serious to control for movement-evoked pain (Srikandarajah, 2011; Corbett et al., 2018). In a study of mice modal evidenced that sustained open mouth causes stimuli disordered temporomandibular painful (Yun & Wang, 2017). The afferent C-fiber (a persistent, dull, aching sensation) and A-delta (a sharp, well localized sensation) ascending the signal to the central brain irregular. It is suggested to assess pain at rest and with activities (Chou et al., 2016; JACHO, 2018). Accordingly, a different type of intervention shows different time to achieve peak effectiveness. Thus, pain assessment should be conducted at a specific time according to different therapies. It is suggested that the assessment of pain should be 15 to 30 minutes after parental medication administration, and 1 to 2 hours after oral medication administration (Chou et al., 2016). For the nonpharmacological treatment such as acupuncture, and massage, pain assessment could be applied in the period of during or immediately after implementation (Chou et al., 2016). It has been suggested to conduct a comprehensive pain assessment which means assessing more than one dimension of pain (Chou et al., 2016; Czarnecki & Turner, 2018).

Pain Intensity. Pain intensity refers to how much pain the patient feels like, and it is the sensory subdimension of pain. Pain intensity is the baseline pain

experience, it is considered to be one of the primary factors that determine the effect of pain on a person whole function and sense of well-being (Dahl, as cited in Li, Liu, & Herr, 2007). In acute pain clinical trial, pain intensity and pain relief are the two assay sensitivity components to detect the effectiveness of pain reducing intervention (Cooper et al., 2016). Pain intensity that decreased 35% to 45% compared to the start of treatment or in response to a dosage is considered be an acceptable improvement for patient (Cepeda, Africano, Polo, Alcola, & Carr, 2003).

Pain Intensity Assessment Tool. It is found that the most commonly used tools and the patient's prefered pain assessment tools are Numeric Pain Rating Scale [NRS] and Visual Analog Pain Scale [VAS] (Breivik, Bjornsson, & Skovlund, 2000; Brievik et al., 2008; Cooper et al., 2016; Karcioglu et al., 2018; Rasmussen et al., 2018). These two scales are also commonly used in oral and maxillofacial surgery research for the assessment of postoperative pain intensity (Sirintawat et al., 2017). In China, the Face Pain Scale-Revised [FPS-R], NRS, and VAS were used to assess postoperative pain, and among these scales, 83 of 173 the patients preferred the FPS-R, followed by the NRS (Li et al., 2007). The NRS, VAS, FPS-R are certified tools that are reliable and validated to assess acute postoperative pain for adult patients (Chou et al., 2016; Pathak, Sharma, & Jensen, 2018).

Numeric Pain Rating Scale. NRS was developed by Dowine (1978). According to Chou et al. (2016) the valid NRS includes a 6-point scale (NRS 0 to 5), 11-point scale (0 to 10), and 21-point scale (0 to 20). Recently, it was reported that the

11-point scale is a well-established measurement for assessing pain intensity in adolescents (Castarlenas et al., 2017). The 11-point scale consists of a horizontal line with a totally of 11 numbers ranging from 0 to 10, which demonstrates no pain to worst possible pain. Pain intensity is divided into four groups, none, mild, moderate, and severe according to the patient-reported NRS score. According to Jensen (2015, p.232), the on the 11-point scale 0 means no pain; Ratings 1 to 4 indicated mild pain intensity that means pain is obvious but has only a slightly influence on daily functions; Rating 5 to 7 indicates moderate pain intensity that begins at interference certain parts of body functions like sleeping, emotion, relationship, but does not cause significant interference in a wide range of activities; Rating 8 or more indicates severe pain intensity that means pain becomes a core aspect of the patient's life and producing significant interference in a wide range of activities. In order to accurately indicate pain intensity levels, it is important that the patient has a good understanding of NRS scoring (Jensen, 2015).

Visual Analog Pain Scale. VAS is considered a "gold standard" technique, especially for pain-related research (Bendinger, & Plunkett, 2016). VAS is comprised of a clear horizontal or vertical line a segment 100 millimeters in length, and the two ends of the line describe the extreme of pain, anchored by no pain, and unbearable pain (Jensen, Karoly, & Braver, 1986). Mattacol et al. (1997) stated the VAS provides a continuum spectrum that can subjectively quantify the intensity of pain stimuli. Patients mark a point on the line to express their pain level. The scoring of this scale

is by measuring the distance from the “no pain” end to the patient’s marked with a ruler (Jensen et al., 1986). According to Jensen, Chen, & Brugger (2003), the 100-mm VAS group pain intensity by a standard 4-point categorical scale (none, mild, moderate, severe), with a rating from 0 to 4 mm indicates no pain; 5 to 44 mm indicates mild pain; 45 to 74 mm indicates moderate pain, and 75 to 100 mm indicates severe pain. In the study, a 100-mm VAS with at least 50 or 60 mm required pain medication immediately (Cooper et al., 2016).

The Face Pain Scale-Revised. The FPS-R (Hicks et al., 2001) was created based on the Facial Pain Scale which consists of different six-faces (Bieri et al., 1990). The FPS-R comprises of six different line-drawing faces presented in a horizontal format, with scoring from left to right as 0-2-4-6-8-10. Increasing pain intensity ran from no pain to very much pain (Hicks et al., 2001). Participants were instructed to point out the face that best represented their current level of pain. Primarily, it was designed to assess pain in children, gradually it was applied to the adult population especially for those who are elderly and those with low literacy (Pathak, Sharma, & Jensen, 2018). Chinses studies found that the FPS-R was reliable and validated to assess postoperative pain intensity in adults after surgery (Li et al, 2007; Li, Herr, & Chen, 2009).

The NRS, VAS, and FPS-R are self-report scales widely used to measure pain intensity. The NRS and VAS are most commonly used in the acute pain setting. Both of them are reliable, valid, and sensitive to detect pain change (Bendinger, & Plunkett,

2016). However, the NRS is easier to administer and score, and it can be given in verbal or written form (Jensen et al., 1986). However, the VAS must be given in the written form, and the big drawback of the VAS is that it needs two steps to get the score, the first draw on the line, then the clinician measures the distance (Jensen et al., 1986) by a ruler. The process cannot reflect pain intensity in time and may be difficult in practice due to the long time spend scoring (Hjermstad et al., 2011), which may produce errors. Researchers recommended the FPS-R for use in assessing elderly pain (Miro et al., 2005). The FPS-R consists of six faces ranging from a neutral face to a grimacing face (Hicks, Von Baeyer, Spafford, Van Korlaar, & Goodenough, 2001), After maxillofacial surgery, patients often have facial swelling and asymmetry, especially for alveolar surgery, trauma and fracture repair surgery and implant surgery in face, therefore, it is not suitable or appropriate to assess the patient through facial expressions to present current pain level.

According to the criteria of an intensity scale judgment (Jensen et al., 1986), the NRS shows high compliance and usability (Hjermstad et al., 2011), good sensitivity and generates data for statistical analysis (Karcioglu et al., 2018), in addition, it is easy to administer and prefereed by patients (Li et al., 2007). In addition, the Initiative on Methods, Measurement, and Pain Assessment in Clinical Trail [IMMPACT] recommended applying the NRS to assess pain intensity with a reduction of 10-20% indicating a mild improvement; of 30% or more indicates moderately improvement; of 50% substantial improvement (Dworkin et al., 2008).

Also, the NRS is a standard pain assessment scale (Chou et al., 2016) which can improve communication between physicians and patients, and help to gain deeper insight into a patient's level of pain and the level of pain relief acceptable (Muller-Schwefe et al., 2011). Thus, this study selected the NRS to assess pain intensity.

Pain Interferences. Pain is beyond pain score. It includes multi-faced aspects as mentioned before. Regarding patients after OMFS, post-surgical pain influences physical function, mood, and social disability (Sun, 2018). Thus, a pain assessment should cover both physical and psychological aspects of pain. The American Pain Association members (Bakonja & Farrar, 2015) stated that pain assessment should include "impact of pain on patients and their function" (p.1249).

Multidimension Validated Pain Assessment Tools. The multidimensional pain assessment tools, for assessing more than one aspect of pain with used in OMFS patietns include the Brief Pain Inventory [BPI] and McGill Pain Questionnaire [MPQ] (Sirintawat, Sawang, Chaiyasamut, & Wongsirichat, 2017).

Brief Pain Inventory. The BPI was deviated from the Wisconisin Brief Pain Questionnaire (Daut, Cleelend, & Flanery, 1983) and was originally designed to assess caner pain (Cleeland, & Ryan, 1994). It was purposed to assess the severity of pain and the impact of pain on daily functions (Cleeland, 2009). Recently, researchers have used it to assess postoperative pain after photorefractive keratectomy (Garcia et al., 2016), and general surgery (Sayin, & Akyolcu, 2014). The BPI exists in two formats, long form and short form. In clinical research, the BPI short form has been

widely accepted for use (Cleeland, 2009; Lerman, & Haythornthwaite, 2018). The BPI short form assesses pain intensity and related interference in the past 24-hour (Cleeland, 2009). Pain interferences include general activities, work, sleep, mood, relationship with others people and enjoyment of life. Pain intensity is assessed through recalling the last 24-hours of pain at its worst, least, average, and right now. Both of forms of the BPI are rated by 0-10 scale. The scoring of the BPI is divided into two parts. Pain intensity is determined based on one of four items (at worst, least, average, and right now) or the mean score of those four items; pain interference presents according to the mean score of the seven items. If the seven items completion rate is equal to or more than 50%, the result can be used. It requires the patient to mark the location of the current pain on the body diagram. The previous study stated that most patients can complete the BPI short form by themselves within 2 or 3 minutes (Breivik et al., 2008).

McGill Pain Questionnaire (MPQ). The MPQ is a multidimensional questionnaire that has been designed to assess patient-specific pain experience and includes four major classes of pain descriptors which are the sensory, effective, evaluative, and miscellaneous of pain (Melzack, 1975). It includes the Long-form McGill Questionnaire (LF-MPQ), the short-form McGill Questionnaire (SF-MPQ), and short-Form McGill Pain Questionnarie-2 (SF-MPQ-2) (Melzack, 1975; Melzack, 1987; Dworkin et al., 2009). The short-forms are developed base on the original McGill Questionnaire, All forms of the McGill Pain Questionnaire have been used in

assessing acute pain, chronic pain, and pain (Katz, & Melzack, 2011; Main, 2016). MPQ consists of 78 words divided into 20 subgroups to describe pain qualities. Each subgroup contains 2 to 6 words that fall into the 4 major subclasses: sensory (1-10), affective (11-15), evaluative (16), and miscellaneous (17-20). Each subgroup has a list of words with a given rank, the patient chooses the words from the list with a ranking, and the highest ranking represents the pain experience. The value (score) is according to the descriptor position or rank order within the word set. The Present Pain Intensity is rated by a scale of 6-points (0: none, 1: mild, 2: moderate, 3: distressing, 4: horrible, 5: excruciating). Its administration requires participants using a paper and pencil to circle the location of pain and select the word to represent current pain (Hawker, Mian, Kendzerska, & French, 2011). A higher score interprets worse pain. The Pain Score Index is interpreted in terms of the amount of pain, as evidenced by the number of words used and the level of the word, and the quality of the pain evidenced by the particular word chosen. In painful situations, the standard average score ranges from 24-50% of the highest score. The MPQ takes more time to complete around 15 to 20 minutes to complete (Melzack, 1975), in contrast the SF-MPQ which takes 2 to 5 minutes (Melzack, 1987).

Above all, the BPI and SF-PMQ are multidimensional pain assessment tools, the BPI assesses pain impacts on a patient's daily life, emotions, working ability, relationships, sleep, and enjoyment of life. The SF-PMQ focuses on assessing pain quality, 11 of sensory, 4 of emotion, and it is better to use to detect neuropathic pain.

Thus, compared with the SF-PMQ, the BPI is more comprehensive to assess pain interference for patients after OMFS. As Garra et al. stated, pain measurement should at least reflect patient baseline discomfort and function limitations (as cited in Sirintawat et al., 2017). As mentioned before, almost all patients after OMFS had swelling and edema in the surgical wound or maxillofacial region, nausea and vomiting, difficulty in chewing, swallowing, sleeping (Drew, 2015; Zhao, 2015), and mood disturbance (Peisker et al., 2018). Thus, in this study will use the modified BPI to assess pain interferences for patient after OMFS.

Pharmacological Pain Management

It has been suggested to use multimodal therapies that apply multimodal analgesia combined with nonpharmacological interventions to treat postoperative pain for decreasing the risk of side effects (Chou et al., 2016). For pharmacological interventions, it recommended that 1) Opioid oral administration is the first consideration for patient who can use the oral route without contradictions as such after neck surgery, the intestinal obstruction, but not limited to intravenous, intravenous required round-the-clock dosing during the first 24-hour; 2) Intramuscular route for analgesic administration is not recommend for significant pain and unreliable absorption, inconsistent postoperative analgesia without advantages; 3) Intravenous systematic of analgesia by patient-controlled analgesia (PCA) is recommended for patients after a surgery procedure except opioid-naive patients; 4)

NASIDs and paracetamol are considerable to be effective for mild to moderate pain for patients without contraindications, with single oral administration every 6 hours 6-10 mg/kg, with maximal dose not over 3000mg/d, and in combination with other medication not over 1500 mg per day; 5) Oral celecoxib 30 minutes to 1 hour for patients who are undergoing major surgery without contraindications, with 200 to 400 mg; 6) Gabapentin or pregabalin are considered as a component of multimodal analgesia to reduce opioid consumption after surgery (Chou et al., 2016).

In terms of pharmacological pain management for postoperative pain after OMFS, the Chinese Society of Anesthesiology (2017) recommended that 1) Peripheral nerve blocks via ultrasonic guidance, and / or combination of local anesthesia and local block, 2) Plus acetaminophen or anti-inflammatory drugs [NSAIDs], 3) Epidural anaesthesia combined with the high fat-soluble opioid drug via epidural patient-controlled analgesia [PCEA], 4) Opioid combined with NSAIDs via PCA. The elements of pharmacological intervention in OMFS included pre-emptive analgesia, NSAIDs, corticosteroids, opioid medication, and local analgesia.

Pre-emptive Analgesia. The Preemptive analgesia [PA] application of analgesic regimen(s) before an operation aims to prevent the activation of nociceptors, sensitization opioid consumption and related side effect to amplify pain (Orret, 2006). In oral and maxillofacial surgery, one RCT study reported PA bupivacaine reduced postoperative pain intensity for patients undergoing elective maxillofacial surgery (Krishnan, Shivananda, & Raman, 2010), while, another study

found no significant effect of pain but swelling for patients undergoing third molar extraction surgery (Dikhi, Harish, Srivastava, Singh, 2018).

Nonsteroidal Anti-inflammatory Drug [NSAID]. Prostaglandins could be synthesized in the area of damaged tissue and directly result in noxious stimuli to provoke to release of other pain mediators such as substance P, and histamine (Schwartz, 2006). These mediators can combine with prostaglandins to cause hyperalgesia and vasodilatation, vascular permeability, and edema (Ashburn & Ready, 2000, p.765-777). NSAID is the most commonly used to reduction of prostaglandin concentration leading to inhibit peripheral sensitization (Pogatzki-Zahn et al., 2017). Such as acetaminophen, ibuprofen, and aspirin. The common adverse effects of these drug manifests on gastrointestinal dysfunction include gastritis, gastric ulcer, gastric bleeding. NSAIDs, such as acetaminophen, ibuprofen, and aspirin, are the most commonly used to reduce prostaglandin concentration leading to inhibiting peripheral sensitization (Pogatzki-Zahn et al., 2017). The common adverse effects of these drugs manifest on gastrointestinal dysfunction including gastritis, gastric ulcer, and gastric bleeding. NSAIDs and paracetamol are effective for mild to moderate pain, with a single oral administration every 6 hours 6-10 mg/kg, with maximal dose of not over 3000mg/d, and in combination with other medication not over 1500 mg per day (Chinese Society of Anesthesiology, 2017). However, NASIDs put the patient at risk for gastrointestinal bleeding and ulceration, cardiovascular events, and renal dysfunction, thus the side effects should be monitored when administering. While, as

its reduction of prostaglandin leads to the inhibition of COX-1 enzymes which cause drug-induced acute renal failure (Whelton, 1999). In a systematic review and meta-analysis study, patients who took NSAIDs were at significantly high risk of acute renal failure (Ungprasert et al., 2015).

Corticosteroids. Dexamethasone is one of the widely used corticosteroids to prevent analgesic-induced postoperative nausea and vomiting among the patients after oral surgery (Almeida et al., 2019). The mechanism is still unclear, and the side effects of increasing infection and bleeding are still being researched (Perioperative ADministration of Dexamethasone and Infection [PADDI], 2019). However, minimal adverse effects have occurred according to Dan et al., as well as Ngeow and Lim (as cited in Evans & McCahon, 2019).

Opioid Medication. Opioids are used to blind opioid receptors in the central nerve system to activate the descending pathway and inhibit the transmission of nociceptive from the primary afferent to the dorsal horn. This drug is prescribed for treating moderate to severe acute pain after surgery (The Agency Medical Directors Groups [AMDG], 2015). Opioids include codeine, morphine, fentanyl, and tramadol. The side effects are associated with respiratory depression, excessive sedation, constipation, nausea and vomiting (Chinese Society of Anesthesiology, 2017). When an opioid drug is prescribed, it should start at the lowest dose with a duration of less than 14 days, for if it lasts more than 2 weeks the patient is at risk for disability (Franklin, Stover, Turner, Fulton-Kehoe, & Wickizer, 2008; Fulton-Kehoe, Turner,

Garg, Bauer, Wickizer, & Franklin, 2015). Therefore, it is suggested when patients receive opioid therapy, an assessment for alertness and signs and symptoms of respiratory depression including hypoventilation and hypoxia is undertaken (AMDG, 2015).

Thus, in this study will provide information related to the pain medication of OMFS including NSAID, corticosteroids, and opioid medication, with it represent drug, pain reducing mechanism and side effects.

Non-Pharmacological Pain Management

According to Evan and McCahon (2019), postoperative pain reducing interventions for maxillofacial surgery included relaxation, halotherapy and acupuncture. According to Chou et al. (2016), non-pharmacological therapy in postoperative pain management includes physical therapy and cognitive-behavioral therapy. Physical therapy interventions regarding pain treatment are intended to reduce the sensitization of central sensitization via inhibiting nociceptive fiber input to the spinal dorsal horn to reduce pain (Sluka, 2016). It is also stated the music therapy, as a cognitive-behavioral modality, effectively reduces post-surgical pain, emotional distress, and analgesic usage. Heat and ice, as a conventional method, are also used to reduce pain. Compared with other interventions, music therapy, heat, and ice are non-invasive, and hardly any harm or side effects were observed (Tick et al., 2018).

Music Therapy. Music therapy, as one of the cognitive-behavioral approaches, serves as a collaboration program of treatment in pain management (Turk & Flor, 2014). This approach solves subjective and contextual factors such as distracts a patient's attention, and helps the patient to relax. Music therapy can be used as a method to enhance physical and mental relaxation. (The mechanism for this is described based on the Gate-Control Theory by Tse, Chan, and Benzie (2005), in that it inhibits the descending pathway leading to the gate closing, thus reducing pain response. In the first study of teaching patients to use music, or jaw relaxation and music as a strategy to reduce postoperative pain in the first 48-hours after abdominal surgery, it was revealed that music could improve pain affect. Patients in the study reported that jaw relaxation and listening to music was moderately to markedly useful in alleviating pain sensations and distress (Good, 1995). A meta-analysis of 70 RCTs studies found that music therapy is a benefit intervention for reducing acute, and chronic pain (Lee, 2016).

Guided Imagery. Imagery purposed to increase focuses on the feeling of well-being in which could block the perception of pain (Berry et al., 2001). It is reported as an effective method to alleviate postoperative pain, especially for minor surgeries (Rosendahl, Koranyi, Jacob, Zech, & Hansen, 2016). A systematic review and meta-analysis reported audio recorded guided therapy combined with local analgesia is of benefit to reduce post-surgical pain and enhance recovery (Rosendahl et al., 2016).

Cryotherapy. Cryotherapy is the implementation of cold through the localized or systematic application for therapeutic purpose to lower the skin temperature and subcutaneous tissue without incision (Steinagel, 1996). This is one of the oldest treatments for soft tissue injuries, first documented by Hippocrates (460-377 BC) (Stangel, 1975). Cold application is one of the main nursing interventions for alleviating acute pain problems for patients (NIC, 2018, pp.524). It is effectively practiced to reduce pain for patients in the 24 hours after open heart surgery (Khalkhali, Tanha, Feizi, & Ardabili, 2014), abdominal surgery (Watkins et al., 2014), and gynecologic surgery (Chumkam et al., 2019). In terms of facial surgery, a systematic review and meta-analysis of 61 RCTs included and six of them met meta-analysis reported hiotherapy (Cryotherapy) significantly reduce edema, pain on the postoperative day 2 ($p<0.001$) (Glass, Waterhouse, & Shakib, 2016). In foreign countries, the hiotherapy is a systematic cooling system which maintains the temperature in the surgical wound within 10℃ to 15℃ 12 hours per day, and has been widely used in oral and maxillofacial surgery (Bates & Knepil, 2016; Lateef, AL-Anee, & Agha, 2018). However, this type of therapy has a higher cost compared with cold pack. In these studies, no adverse effects related to cooling occurred. There is a paucity of scientific evidence about the use of cold therapy among patients after oral and maxillofacial surgery (Fernandes, Armond, & Falci, 2019). A study conducted on ankle skin with on-ice and ice experimental trail in a room with the temperature controlled between 21 ℃ and 24 ℃, found cooling (crushed ice) reduced pain by

controlling the skin temperature to within 10 ℃ (reduced by 33%) to 15 ℃ (after applied ice in the range of 20 to 31 minutes, then removing the ice pack) which significantly decreased ($p<0.05$) or locked nerve conduction velocity in the spinal cord, so that a patient's pain threshold and pain tolerance increased (Algafly, & George, 2007). Another study reported that patients after total knee arthroplasty, who used water cold packs and sodium ice packs, preferred the sodium ice pack to reduce pain due to this type of pack being softer, and thus was more appropriate and satisfying for the patients (Pan, Hou, Liang, Fei, & Hong, 2015).

Mouth movement: open mouth with teeth collision. Open mouth with teeth collision explained to the upper and lower teeth biting surface of teeth with slightly strengthen once 36 times first the molar, then incisor teeth, after that the tongue in the cavity against the lower gums, teeth surface agitate (Chen, 2017). The oral and maxillofacial region takes a large part on the somatosensory (Mark, Barry, & Michael, 2016, pp.432) and somatotopic motor of the cerebral cortex (Mark et al., 2016, pp.493). Most of the cerebral cortex is associated with voluntary movement, in particular, the motor cortex is closely related to the oral and maxillofacial area, chewing and knocking teeth can stimuli the sensory cortex and motor cortex (Ohkubo, Morokuma, Yoneyama, Matsuda, & Lee, 2013; Wu et al., 2013). The teeth collision is recorded in Taoism as one of important health behavior which stated benefit to renal and strength teeth, promote salivary production (Wang, 2015). In China, studies application of teeth collision in prevent gingivitis (Feng & Chui, 2016), and oral

function promotion (Ning, Qiu, Chen, & Hu, 2019; Wu et al., 2013). One study used in facial oral and maxillofacial injury patient after surgery to enhance wound healing and oral function recovery (Liu, 2018). These studies results show that teeth collision can promote oral function by stimuli. In the 2015, China Nonprescription Medicines Association recommends teeth collision as a health behavior to promote blood circulation in the mouth tooth, enhance tooth strength and masticatory muscles.

Thus, in this study, as it mainly focused on pain education, the non-pharmacological pain management of listening to music was introduced to the patients to help relieve pain. Other non-pharmacoloigcal methods were not introduced as specific strategies and guidelines are needed.

Postoperative Pain Management Evaluation

Evaluation of pain management as one of role for nurse regarding pain management (ASPMN, 2018). Evidence-based pain management indicators including 1) Initial pain assessment within 24-hour after admission, 2) Pain assessment frequency, 3) Pain intensity assessment use a validate pain scale, 4) Pain location and characteristic were documented at least every 8 hours, 5) Development a care plan, 6) Documented route, dosage, name and time of pharmacological intervention, 7) Applying nonpharmacological intervention based on policy, 8) Monitor opioid-related side effects, 9) Cooperated with physician, and 10) Educated pain information to the patient (Soon et al., 2015). These indicators were evaluated by nursing

documentation. According to Meissner et al. (2018), in acute pain setting the important indicators of the postoperative pain management including structural, process and outcome. For the outcome indicators inspected the effectiveness of care plan, such as pain intensity, pain relief, function, satisfaction, side effects (Meissner et al., 2018).

Thus, in this study the documentation of pain management will be made according to the regulation of evidence-based pain management indicators.

Self-Efficacy

"Knowing is not enough; we must apply. Willing is not enough; we must do." (Goethe, as cited in CAPRCEBHS, & IM, 2011).

Concept of Self-Efficacy

The self-efficacy originally proposed in social learning theory as a common mechanism of psychological change that different influence patterns change coping behavior to some extent by creating and reinforcing self-efficacy (Bandura, as cited in Bandura, 1980). According to Bandura (1982) self-efficacy refers to "how well one can execute courses of action required to deal with prospective situations" (p.122). It was first proved as effective behavior therapy for overcoming the barriers to perform desired behavior through providing treatment of observation others successfully

modeling (Bandura, 1977). From Bandura study of snake phobia treatment by instill self-efficacy theory, finding supported that the higher perceived self-efficacy, the greater impact on the selected behavior change. Additionally, perceived self-efficacy enhances psychosocial function by influencing choice behavior, effort expenditure, persistence, and self-direction (Bandura, as cited in Bandura, 1980). Therefore, self-efficacy can be understood as the intrinsic factor of self-motivation, that can be modified and influence by both external factors and internal factors.

Thereafter, self-efficacy was used as an important concept in modified patient behavior to promote health and prevent disease, it proved level of self-efficacy can impede or enhance the motivation of action. According to Schwarzer & Fuchs (1996) reviewed of self-efficacy application, subjects with higher efficacy belief are more strength to control pain compared with those who had low self-efficacy; when dealing with challenges or threats, self-efficacy affects blood pressure, heart rate and serum catecholamine levels; the recovery of cardiovascular function in patients after coronary artery surgery can also be enhanced by believing that the patient's physical and heart function efficacy; cognitive-behavioral therapy for patients with rheumatoid arthritis enhances their belief in efficacy, reduces pain and joint inflammation, and improves psychosocial functioning.

Bandura stated self-efficacy expectations and outcome expectation are two important but different components in self-efficacy theory (as cited in Smith & Liehr, 2018). Self-efficacy expectation is self-appraisal about personal ability to accomplish

a designed task, nevertheless outcome expectation is self-appraisal what will occur when accomplish the task in succeed (Bandura, as cited in Smith & Liehr, 2018). The outcome expectation mostly dependents on the self-efficacy expectation (Bandura, 1997). Both self-efficacy expectation and outcome expectation influenced physical performance (Smith & Liehr, 2018). The early positive self-efficacy expectation, the better designed behavior performance change (Bandura, 1977, 1980, 1997).

Regarding pain, how well the person tolerates pain determined by the level of pain efficacy expectation of pain control, pain coping, and pain interference (Anderson, Dowds, Pelletz, & Edwards, 1995). Patients with higher self-efficacy reported less severe pain (Bandura, O'Leary, Taylor, Gauthier, & Gossard, 1987), fewer daily disturbances due to pain, greater sense of control over their lives, fewer emotional disturbances and higher activity levels than patients with lower self-efficacy (Anderson, Dowds, Pelletz, & Edwards,1995).

Sources of Self-Efficacy

The competency of self-efficacy can be enhanced by increasing constructions of self-efficacy by the four sources of enactive mastery experience, vicarious experience, verbal persuasion, as well as physiological and affective states (Bandura, 1997).

Enactive Mastery Experience. Enactive mastery experience refers to the process of overcoming obstacles, through persistent efforts and participation in

successful performance to gain experience, this experience is developed by acquiring behavior, cognition or cognitive-behavioral modification and mastery from a course (Bandura, 1997). Master experience occurred when we do something successfully, in other words, we have mastered it. Thus, mastery experience is of performance accomplishments which provide a model of most influential information, for its determined whether a person can master it then to succeed (Bandura, 1997). It as the reliable indicator of personal capabilities (Bandura, 1997). Moreover, mastery experience induces stronger and broader belief in efficacy than vicarious experience, verbal persuasion, and cognitive simulation (Bandura, 1997). Though master experience not only built the sense of readiness to learn, but also created awareness and regulation of effective action performance (Bandura, 1997). The mode of self-efficacy induction of performance accomplishment including participant modeling, performance desensitization, performance exposure, and self-instruction performance (Bandura, 1977).

Vicarious Experience. Vicarious experience also known as observational learning, which occurs when one watches new behavior that in similar situation but performed by others, and reinforcement what he or she received (Glanz, Rimer, & Lewis, 2002). Reinforcement operations are mainly to influence the behavior by generating expectations, thereby generating expected benefits or avoiding future difficulties (Bolles, as cited in Bandura, 1977). From the subjects with snake phobia overcome the phobic in which learning based on observing participants model and

perform the same with the one, thus illustrated obtained perseverance and effort coping with anxious successfully overcome difficulty (Bandura, 1977). From seeing people successful performance that increase personal efficacy beliefs in which they themselves have the ability to master similar activities (Bandura, 1997). They will persuade themselves if others can do, they also have the ability to improve their performance (Bandura; Schunk, Hanson, & Cox, as cited in Bandura, 1997).

The mode of induction includes live modeling and symbolic modeling (Bandura, 1977). Clear outcome in modeled successful behavior conveys efficacy information more strength to promote greater behavior improvement (Kazdin, as cited in Bandura, 1977). When watching modeling, if the performance is successful will raise efficacy to do, conversely, will increase vigilance not to do, and mixed experience of success and failure will instill self-doubt (Bandura, 1997). Modeling is not limited to behavior, it also includes abstract modeling which can train learning and thinking skills of how to apply them by rules and strategies that models used to achieve (Bandura, 1997). Compared with pure verbal modeling of cognitive skill, skill-based cognitive modeling can much heighten efficacy belief and achievement (Fecteau & Stoppard, as cited in Bandura, 1997).

Verbal Persuasion. When people were informed that they do not have ability or skill to do something, they will not to do or easy give up (Bandura, 1994). Verbal persuasion serves as an encouragement tool for strengthen personal beliefs that they possess certain capabilities to achieve what they wanted (Bandura, 1997). The

influence of persuasion and the way performance feedback is constructed or farmed can affect the evaluation of individual efficacy (Bandura, 1997). People often prefer to avoid potential losses in the present rather than ensure potential gains in the future (Tversky & Kahneman, as cited in Bandura, 1997). Therefore, hypothesized that if people know what is harmful for him regarding to their current situation, they will try their best to avoid and make effort as much as they can to prevent bad result and lead in a good direction.

Physiological and Affective States. In judging their abilities, people rely on physiological information conveyed by their physical and emotional states (Bandura, 1977, 1997). Physiological indicators are strongly associated with coping stress, obtaining physical performance, and health function (Resnick, 2018). In additional, physical arousal such as sweating, hyperventilating, trembling, stomach upset, that highlights the internal agitation (Scheier, Carver, & Mattews, as cited in Bandura, 1997). Suffering from such disorders influenced self-judgment. People are more likely to expect success when they are not troubled by the arousal of disgust than when they are nervous and emotionally aroused (Bandura, 1977, 1997). Self-efficacy negatively impacted when person is in state of anxiety, fear, or stress, which can result in failure or inability to complete a feared performance (Bandura, 1977). Generally, when people in such state it indicates they are vulnerability to dysfunction, due to high emotional arousal can weaken performance (Bandura, 1997). Thus, the major approach for enhance efficacy belief is to improve physical condition, reduce stress

levels and negative emotional tendencies, and correct misinterpretations of physical condition (Bandura, Cioff, as cited in Bandura, 1997).

Intervention for help to cope with physical condition included 1) visual control to eliminate emotional responses to specific situations (Bandura, as cited in Resnick, 2018), 2) improve physical condition (Bandura, as cited in Resnick, 2018), and 3) change the interpretation of the state of the body (Resnick, Galik, Gruber-Baldini & Zimmerman; Resnick et al.; Schnoll et al.; Van der Maas et al., as cited in Resnick, 2018).

Measurement of Self-Efficacy

The measurement of assessing self-efficacy included self-efficacy level, generality, and strength across activities and contexts (Bandura, as cited in Bandura, 2009). The self-efficacy level terms of task with varying level of difficulty; generality refers to apply self-efficacy beliefs into practice; strength extents to the degree to which a person can accomplish a given task (Bandura, 2009).

The unique feature of self-efficacy is implicated in assessment approach (Bandura, 2009), 1) it is judgement of ability to perform activities rather than appraisal of quality; 2) efficacy is multidimensional nature with different function rather than single aspect , 3) many non-ability impacts can promote or weaken the execution of skills, measures of self-efficacy are situational, 4) self-efficacy is related to their dimension of strength, their dependence on mastery, not normative or other criteria, and 5) self-efficacy antecedent property require evaluation the role of self-

efficacy before perform the activities.

Regarding pain self-efficacy measurement, according to a reviewed article by Miles, Pincus, Carnes, Taylor and Underwood (2011), there are Pain Self-Efficacy Questionnaire (Nicholas, 1989), the Chronic Disease Self-Efficacy Scale (Anderson, Dowds, Pelletz, Edwards, & Peeters-Asdourian, 1995), Arthritis Self-Efficacy Scale (Lorig, Chastain, Ung, Shoor, & Holman, 1989), Pain-Related Self-Scale (Mueller, Hartmann, Mueller, & Eich, 2003). Preoperative Self-Efficacy Scale (Oetker-Black, 1996) which to assess patient postoperative self-care of deep breathing, turning, mobility and pain relaxation. Later, modified pain self-efficacy scale including the short form Pain Self-Efficacy Questionnaire (McWilliams, Kowal, & Wilson, 2015).

Pain Self-Efficacy Questionnaire [PSEQ]. PSEQ was developed by Nicholas (1989) based on Bandura's (1977) self-efficacy theory (Nicholas, as cited in Asghari & Nicholas, 2001), to measure the strength and prevalence of the patient's belief in his/her ability to perform a range of activities despite his/her distress (Asghari & Nicholas, 2001). The PSEQ is a self-report measurement of a total of 10 items. It uses a 7-point scale to rate the confidence of doing present a given condition, wherein zero indicates 'not at all confident' and six indicates 'completely confident'. The patient circle one number to present their confidence for doing an activity or function at present, despite their pain. Total ranges from 0 to 60. The higher score, the stronger of self-efficacy belief. This inventory is globally used in for patient with chronic pain, in Japan, Australia, Portugal, Denmark, Japan, UK, China (Lim, Chen,

Wong, Chan, & Chu, 2007; Yang et al., 2019). It takes patient 10 minutes to complete (Miles, Pincus, Carnes, Taylor, & Underwood, 2011). It also used to assess migraine patient pain self-efficacy before and after surgery (Gfrerer et al., 2018). The original English version of PSEQ has sound construct validity (Nicholas, 2007) internal consistency by Cronbach alpha coefficient .93 and the test-retest reliability value of .86 (Nicholas, McGuire, & Asghari, 2015). In addition, Chinese version of PSEQ internal consistency Cronbach alpha coefficient .95, and test-retest reliability of .91 and sound construct validity (Yang et al., 2019).

The Short Form Pain Self-Efficacy Questionnaire [PSEQ-2]. The SF-PSEQ was developed by Nicholas, McGuire and Asghari (2015) purposed to reduce clinical workload for administration PSEQ. It consists of two items which generated from the original PSEQ of item 5 and item 9, and formed PSEQ-2. The same rating scale used as the PSEQ. Total score of 12, the outcome interpreted as "A person with A score of 5 or less took be considered in need of help with their confidence in functioning in the presence of their pain. A score of 8 or who reflects A desirable level of pain Self -efficacy or confidence in the presence of pain." (Nicholas, McGuire and Asghari, 2015, p.163). PSEQ-2 has been proved be a powerful measure of pain self-efficacy (Nicholas, McGuire and Asghari, 2015). The original English version of PSEQ-2 internal consistency vale of .76 (95% confidence interval [CI] = .73–.80) and test-retest reliability was .87 (95% CI = .80–.91) (Nicholas, McGuire, & Asghari, 2015). Chinese version of PSEQ internal consistency Cronbach alpha coefficient .83,

and test-retest reliability of .88 (Yang et al., 2019).

Since the measurement of level of self-efficacy should be aim and population directed (Bandura, 2012), and the on a unipolar scale ranging from no confidence to complete confidence (Bandura, as cited in Sitzmann, 2013). The two questionnaires content are used to measure the patient's pain self-efficacy for who has chronic pain, which may not fit for the patient who are going to surgery, however, the scale (0 to 6) from confidence to complete confidence present the level of self-efficacy, thus, the researcher will utilize the scale to rate the level of participant self-efficacy.

Preoperative Self-Efficacy Pain Education Program

According to postoperative pain management guidelines (Chou et al., 2016) JACHO standard, and reviewed literatures that preoperative education plays an important role to increase patient understanding and awareness of pain, and improve pain management outcome.

The content of preoperative education includes the concept of postoperative pain, cause of pain, type of pain, importance of factual report pain, how to report pain, how to use the pain intensity scale to report pain, side effects of pain medication, nonpharmacological pain management and pain management plan. The concept of self-efficacy guided the preoperative education delivery. The teaching method was constructed on four sources of self-efficacy consisting of enactive mastery experience,

vicarious experience, verbal persuasion, and physical and affective states.

Base on reviewed information, the fundamental knowledge of postoperative concept (Pogatzki-Zahn et al., 2017), cause (ISAP, 2017), pattern (ICIS, as cited in Roger & Fantuzzo, 2017), and its brief mechanism were introduced to the patient, to build the initial awareness of pain.

In order to help th patient to learn the importance of self-reported pain, the benefits of well pain controlled and the harm of poorly pain control were introduced to the patient. Since the NRS is a validated and reliable pain intensity scale to assess postoperative pain (Chou et al., 2016), that can be given both in verbal and written form (Jensen et al., 1986), Chinese patient preferred and easy understand (Li et al., 2007), and IMMPACT (Dworkin et al., 2008) recommend pain intensity scoring by NRS for pain reduction of 10-20%, 30%, 50% response mild, moderate, substantial improvement. Thus, NRS will be selected as pain rating scale for teaching patient to assess pain by themselves.

The pain medication that commonly used in oral and maxillofacial surgery (Evan & McCahon, 2019) including it represent drug, side effects, and taking skill will be taught. In order to increase patient awareness of pain medication, learning and self-monitoring. What's more, non-pharmacological pain management of listen to music, coldpack therapy, reading will introduce to the patient to self-manage pain.

Overall, present evidence-based constructed education information that should be provided for patient undergoing surgery. Self-efficacy as a key facilitator to modify

patient behavior and enhance patient capabilities to achieve designed task by mastering four sources of self-efficacy. High pain self-efficacy is benefit for patient to reduce pain intensity and improve pain outcome. Thus, the evidence-based preoperative education based on increase self-efficacy to increase patient self-efficacy would be benefit for patient to self-report pain and reduce pain experience. Thus, this study purposed to develop preoperative education program which syncretized the information of postoperative pain management and the method of enhancing self-efficacy.

Therefore, the preoperative pain self-efficacy education program will conduct based on four rescourses of self-efficacy which includes enactive mastery experience, vicarious experience, verbal persuasion, physiological and affective states. Which composed of (1) physical and effective state, (2) master experience of providing information about postoperative pain, pain score, pain self-report, and pain management, (3) vicarious experience of demonstrating patient after oral and maxillofacial tumor excision surgery reports her pain as a role model by video, and (4) encouraging self-efficacy to report pain.

Summary

In summary, the incidence of moderate to severe postoperative pain for patients after OMFS is still high, and this influences a patient's mood and physical

activities. There are number of internal or external factors which are related to patient and surgery. Actually, there are many theories and models that describe the pain mechanism. In general, postoperative pain is generated from the incision wound, which releases the noxious stimuli that ascending to the central brain response to the patient as a painful feeling.

Patient after OMFS had pain related emotional distress and physical functioning limitations. Ineffective pain management impeded patient function recovery and influenced a patient's psychological state.

Many education studies have succeeded in applying self-efficacy to teach patients to control pain by themselves and lower the pain experience. However, there is no study that has reported on a self-efficacy based preoperative education intervention provided for patients undergoing OMFS. Whereby, evidence-based pain management aims to effectively help patients to reduce pain intensity and pain interferences. This study developed the preoperative pain education program constructed on the four sources of self-efficacy purposed to enhance patient self-efficacy to report pain, to reduce pain intensity and pain interferences.

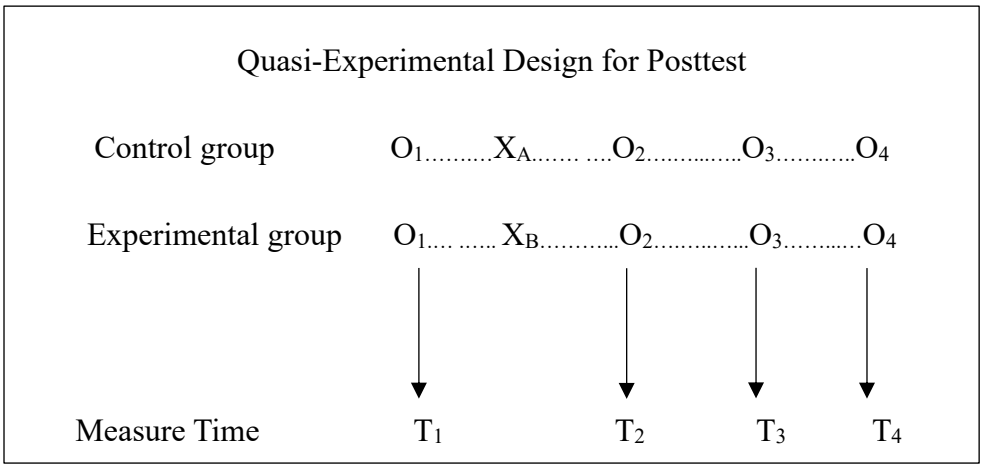
CHAPTER 3

RESEARCH METHODOLOGY

This chapter presents the research methodology details that consist of research design, setting, population and sample, instruments, validity and reliability of the instruments, data collection procedures, ethical considerations, and data analysis of the study.

Research Design

This study was a posttest quasi-experimental design. Participants in the experimental group received the preoperative pain education program, while participants in the control group received usual care as presented in Figure 2.



Note T_1: on admission day, T_2: the day before surgery, T_3: 24-hour after surgery, T_4: 48-hour after surgery

Figure 2. Research design of preoperative self-efficacy pain education program

X_A refers to preoperative usual care provided by doctors and nurses in the ward, the contents which included education of health-related problems, treatment plan, surgery preparation plan (clothing, skin, fasting etc.), and potential complications of OMFS.

X_B refers to the researcher who provided the preoperative education program. 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) 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.

O_1 refers to the measure of the participants' pain intensity and pain interferences on the admission day between-group, and the measure of self-efficacy of pain reported in the experimental group.

O_2 refers to the measure of the participants' self-efficacy to report pain, pain intensity and pain interference the day before surgery.

O_3 refers to the measure of pain intensity and pain interference 24-hours after surgery.

O_4 refers to the measure of pain intensity and pain interference 48-hours after surgery.

Above all, the pain education program was initiated the day before surgery, the first outcome of self-efficacy to report pain was measured before and after the intervention, in addition, the second outcome of the pain intensity and total pain interferences were measured at four times; on admission day, the day before surgery, 24-hours and 48-hours after surgery.

Research Setting

The intervention was conducted at the Oral and Maxillofacial Surgery Department of Guizhou Provincial People's Hospital, Guiyang City, Guizhou Province, China. The Guizhou Provincial People's Hospital is a level-three comprehensive hospital that is organized by the provincial government and is supervised by the Provincial Health and Health Commission. It integrates medical, teaching, scientific research, cadre health care, prevention, rehabilitation and first aid. It has authorized 2,000 beds and opened 3,000 beds. There are 45 beds in the Oral and Maxillofacial Surgery Department. The number of hospitalized patients with surgery in this setting ranges from 100 to 210 monthly. The average monthly total operations were 145 and about 80 cases for oral and maxillofacial tumor surgery.

Patients undergoing oral and maxillofacial tumor excision surgery are often admitted one or two days before surgery and receive routine care from the staff nurse

in the ward. The health education is commonly provided by doctors and staff nurses in this ward the day before surgery. The contents include health condition, treatment plan, education of health-related problems, surgery preparation plan (clothing, skin, fasting etc.), and potential complications of surgery. Pain education is not provided, for example, there is no education around how to report pain, how to assess pain and how to manage pain after surgery.

Patients received ECG monitoring commonly within 24-hours after surgery in the ward. The nurse administration of doctors' prescriptions for treatmentinclude common medication such as anti-inflammatory drugs (NSAIDs). For the patient who reports pain, the doctor prescribes NSAIDs as an intravenous injection or muscle injection, or prescribes aminohydrobisphenol codeine for oral administration. Somtimes, nurses provide icepacks to help patients to reduce pain. Blood pressure, respiratory rate, heart rate, pulse oximeter are recorded every hour in the nurses' notes. Likewise, any changes in clinical condition are treated and recorded in real time.

Study Population and Sample

Target Population

The target population was the patients who underwent elective oral and

maxillofacial tumor excision surgery on the Oral and Maxillofacial Surgery Department, Guizhou Provincial People's Hospital, Guiyang City, Guizhou Province, China.

Sampling Procedure

This study used consecutive sampling with the matching technique (Beck & Polit, 2018, p.151) to recruite participants. A match was based on the participants' age (± 5 years), gender, education level and preoperative pain experience in order to balance the baseline equivalence between the control group and experimental group. Participants on the first planned 6 weeks were included into the control group, the participants on the later planned 6 weeks were included into the experimental group. This grouping method was used to allocate the participants to the experimental group with the same characteristics in the control group to avoid and minimize the intervention diffusion.

Inclusion and Exclusion Criteria

Inclusion criteria. Participants who were undergoing tumor excision surgery and met the following items in the study:

1. Age 18 - 60 years old
2. Communicate with clearly by talking and writing
3. Elective oral and maxillofacial tumor excision surgery

4. Admitted to the ward at least 2 days before surgery

5. Receive postoperative care for at least 48-hour

Exclusion criteria. Participants who met the following items were excluded:

1. Having mental health problems or cognitive impairment

2. Receiving pain treatment before surgery

3. Occurring complications during or after surgery, including respiratory obstruction or cardiovascular disturbance.

Sample Size Calculation

Power analysis of effect size was used to estimate the sample size of the study based on the previous study of Tao et al. (2019). Tao's study was on a video conducted preoperative teaching intervention for patients undergoing OMFS. According to Cohen's d, an effect size of Tao's study was 2.46 (Appendix C). Based on a statistical power analysis of Student t-test, effect size of 2.46, power level of .80, significant level of .05, the total sample size required at least 6.

However, this current study has a different conceptual framework, measurement, and education information compared with Tao's study. To achieve the hypothesis of this study, the researcher reduced the effect size to .72, set power of .80, and significant level of .05, thus 25 participants per group were required (Appendix D). In order to prevent attrition or incomplete data, the sample size was increased by

20% per group (Polit & Beck, 2017, p.395). Ultimately, the sample size in this study was a total of 60 participants, with 30 in the control group and experimental group, respectively.

Response Rate

The participants in this study were recruited from the Oral and Maxillofacial Surgery Department, Guizhou Provincial People's Hospital, Guiyang city, Guizhou province, China. The data collection was undertaken from October 1, 2020 to December 31, 2020. During the period, 60 patients met the inclusion criteria undergoing elective to tumor excision surgery, and no participants withdrew from this program.

Research Instruments

In this study, the instruments consist of two parts, part one was preoperative pain education program and part two was the instruments for data collection.

Part I Preoperative Self-Efficacy Pain Education Program

The preoperative self-efficacy education program in this present study was developed based on postoperative pain management integrated with the four sources

of self-efficacy as developed by Bandura (1977) and outlined in chapter 1. The program instruments consisted of self-efficacy to report pain in the preoperative pain education program, a video, and pamphlet.

Self-efficacy to report pain in preoperative self-efficacy pain education program. The program included face-to-face education, watching a video, self-report pain practice, problem-solving and discussion (Appendix A). The duration of this program was 20 to 25 minutes initiated the day before surgery. Everyone in the experimental group received the same information and guidance from the researcher, and received this program individually for one time.

Video. The researcher provided a 7-minute Chinese version video to administer the pain self-efficacy education program instruction (Appendix B-2). This video was made by the researcher and was validated by three experts in Chinese culture. In the video, the education contents are given by a role model actor who played the role of a patient after parotid gland tumor resection. The video was developed to help increase a participant's capabilities to self-report and record postoperative pain.

Pamphlet. Before teaching, the researcher provided a pamphlet to the participant which contained information associated with self-report postoperative pain, and pain management after surgery, and a QR code was attached so the participants could access the video to help them to imitate a successful patient self-

reporting pain intensity and pain interference after oral and maxillofacial tumor excision surgery (Appendix B-1). The pamphlet was designed to help participants to review as well as reinforce the knowledge and skills to report and manage pain, and increase their confidence to self-report pain. This was convenient for participants to read anytime they wanted.

Part 2 Instrument for Data Collection

The instruments for data collection consisted of four parts, Part I: Demographic and Health Related Information Sheet, Part II: Perceived Self-Efficacy to Report Pain Questionnaire, Part III: Pain Intensity Scale, Part IV: Pain Interference Scale (Appendix F). Another supplementary instrument consisted of Patient Self-Report Pain Sheet to help participants to practice recording pain by themselves or their family member (Appendix B-2) and Documentation Form of Postoperative Pain Management (Appendix B-4).

Part I Demographic and Health Information Sheet [DHIS]

The DHIS consisted of three parts, demographic information, health-related information, and surgery-related information. The contents were age, gender, marital status, educational level, occupation, monthly income, insurance, height and weight, health problem, history of surgery, past and current pain experience, date of surgery, duration of surgery, type of anesthesia, type of incision, and number of drains

inserted.

Part II Perceived Self-Efficacy to Report Pain Questionnaire [PSRPQ]

This questionnaire was developed based on the education information which was developed based on the postoperative pain management guidelines and literature review. This questionnaire was used to measure patient self-efficacy to report pain before surgery. The items 1 to 3 proposed to measure the participant's confidence on self-report pain intensity and used a numerical pain rating scale. Item 4 proposed to measure the patient's confidence on self-recording of pain in the self-report sheet which was provided by the researcher. The items 5 to 7 proposed to measure a participant's confidence on self-reporting least, average, and worst pain in the last 24-hours. Item 8 measured the participant's confidence on self-reporting pain after having received pain treatment. Item 9 measured the participant's confidence on self-reporting the cause of pain. Item 10 measured the participant's confidence on self-reporting pain interferences.

The scale response format used Nicholas Preoperative Pain Self-Efficacy (1989) with a total of 10 items. Each item was answersed by a rating score from 0 to 6 in which "0" indicated not at all confident, "6" indicated completely confident. So that the total score ranged from 0 to 60 in which the higher score indicated stronger self-efficacy(Asghari & Nicholas, 2001). Based on the Nicholas Preoperative Pain Self-Efficacy Questionnaire (1989), the PSRPQ was designed with a total of 10 items,

and each item required the participant to rate only one number (0 to 6) to represent their confidence in given activities with total scores ranging from 0 to 60.

Part III Pain Intensity Scale

The pain intensity scale was a part of the Brief Pain Inventory, and was used to assess pain intensity in the last 24-hours at its “worst”, “least”, “average”, and “right now”, with a rating scale from 0 to 10 in which 0 indicated “no pain” and 10 indicated “pain as bad as you can imagine”. The reliability coefficients of the Chinese version BPI of pain intensity is .89（Wang, Mendoza, Gao & Ceeland, 1996）. The interpretation of pain intensity level is classified into three categories, consisting of mild (1-4), moderate (5-6), and severe (7-10) (Atkinson et al., 2010).

Part IV Pain Interference Scale

The pain interference scale was a part of the Brief Pain Inventory, and was used to assess pain-related physical, affective, and social interferences, including 1) general activities, 2) mood, 3) walking ability, 4) normal work, 5) relationship with others, 6) sleep, 7) enjoyment of life. The rating scale is from 0 to 10, 0 indicates “does not interfere”, 10 indicated “completely interferes”. The reliability coefficients of the Chinese version BPI of pain interference was .92（Wang, Mendoza, Gao & Ceeland, 1996）.

In this study, the Pain Interference Scale was modified for (the No.1 item “general activities” was specificied to change position, turning, sit up; - this is

grammatically incorrect and meaning not clear. Do you mean ‘item 1 was changed to position, turning, sitting up’?) the No. 4 item “normal work” was deleted due to the patients being in hospital. Finally, a total of 6 items were included in the final version of the pain interference scale in the current study. The interpretation of pain inteference level was classified into the three categories of mild (1-4), moderate (5-6), severe (7-10) (Atkinson et al., 2010).

To sum up, in this study, the PSRPQ was used to assess patients’ self-efficacy to report pain before, and after the intervention, and before surgery. The pain intensity scale and pain interference scale were used to assess participants’ pain intensity and pain interferences at 24-hours and 48-hours after surgery.

Patient Self-Report Pain Sheet [PPSRS]

The patient self-report pain sheet comprised of time of pain occurring, the numerical pain rating scale (11-points) to rate pain intensity, and the situation of the patient to report pain to a doctor or nurse, the pain treatment which the patient received, and the pain relief or not, after pain treatment was reviewed. This self-report sheet required the patient to record pain intensity by circling the number which represented their pain intensity, and answering the real situation of what by ticking the “Yes” or “No” option, od when they feel pain and they reported it to the doctor or nurses, and also the pain treatment (painkiller or non-drug method) they received and whether the experienced pain relief or not.

This sheet was designed to measure the correct of pain self-report according to the level of pain intensity to medical staff (nurse or physician), which was explained by the effective reporting rate that was calculated by the actual report divided by the due report, and correct performance. The correct performance of pain self-report was indicated by the reporting of pain intensity to the medical staff according to a pain score more than 3.

Documentation Form of Postoperative Pain Management

The documentation in this study was designed according to the evaluation of pain management (Soon et al., 2015), and according to Meissner et al. (2017) pain measurement should be recorded at least every 8 hours and when a pain intensity score is more than 3, the treatment should be documented. Therefore, the researcher recorded pain management including pain assessment time, pain intensity, location, character, duration, pain relief and aggravating factors, pharmacological dosage, route, and side effects. All of the participants in this study received the same treatment after surgery which included an anti-inflammatory (cefotaxime sodium), detumescence treatment (vitamin C + prednisolone hydride + 500ml of 5% glucose and sodium chloride),liver protection (glutathione), and stomach protection (omeprazole). In the experimental group, 6 participants reported moderate pain intensity to the nurses, three of them applied icepacks to reduce pain, three of them listened to music and read to reduce their pain. In the control group, 19 of the

participants had moderate to severe pain, only 3 of them reported this to the nurse, and 2 of them received dezocine treatment. In addition, there was no record of pain management details in the nursing record sheets for both the control group and experimental group.

Validity and Reliability of the Instruments

All the instruments in this study were evaluated for the validity and reliability before conducting the data collection.

Validity of the instruments. Content validity may be extent to which the content of the tool adequately captures the structure (Polit & Beck, 2017, p.310). In this study, three experts (Appendix H) included three nursing lecturers from the Faculty of Nursing, Prince of Songkla University evaluated the content of all the instruments. The Perceived Self-Efficacy to Report Pain Questionnaire item CVI (I - CVI) score except the third item was .75, the rest 9 I-CVI was 1 and the S-CVI was .95. The Pain Intensity Scale and Pain Interference Scale each I-CVI was 1, and the S-CVI was 1 (Appendix I).

According to Polit and Beck (2017, p.311), the I - CVI score of .80 is considered an acceptable value, and S-CVI scores of .90 are considered as establishing excellent content validity. For the Preoperative Self-Efficacy of Pain Self-Report Questionnaire, the third I-CVI score was .75, so the researcher discussed

this with the experts and revised this based on the experts' recommendations.

Reliability of the instruments. The internal consistency of the instruments was tested with 20 participants who met the inclusion criteria. The value of Cronbach alpha coefficients of preoperative pain self-efficacy of pain self-report questionnaire, pain intensity scale and pain interference were .89, .90 and .76 respectively (Appendix J). For the pain interference scale, because it contained three dimensions of pain, the number of participants was increased to 30 participants to test the internal consistency, and the value of Cronbach alpha coefficient was 0.92 (Appendix J).

Translation of Instruments

The original versions of all the instruments in this study were in English, and since the study was conducted with Chinese people, the researcher used the back-translation technique (as cited in Polit & Beck, 2012) to translate the English versions into Chinese versions. The researcher selected three bilingual translators who work in the nursing area, who are familiar with both English and Chinese languages, and have the ability to understand the variables of the study. The first translator, a nursing student who is studying for a master degree, translated the English versions into Chinese versions. Then, the second translator, a nursing lecturer who has a master degree, translated the Chinese versions back to English versions without seeing the original English versions. Finally, the third translator, a nursing Doctor of Philosophy,

reviewed the original English versions and back translated the English versions to determine equivalent meanings with the cultural similarity of the two versions. There were no conflicts of meaning and cultural similarity of the back-translated versions with the original versions.

Pilot Study

"A pilot study is a trail designed to test planned methods and procedures" (Polit & Beck, 2017, p.177). This procedure helped to test the feasibility of the intervention to address any uncertainties of the intervention to inform of many decisions for a larger sample and more rigorous techniques (Polit & Beck, 2017). In this study, the pilot study was applied to test the practical feasibility of the preoperative pain education program and it took 10-15 minutes to deliver the whole program. 4 participants who met the inclusion criteria and volunteered to join received the preoperative self-efficacy education program. These 4 participants were not included in the real implementation and data collection phase of this study. After that, the researcher asked them about 1) whether they had difficulties in reading and understanding the contents provided; 2) whether they had comments and suggests of improvement for the intervention; 3) whether they found the program acceptable. The 4 participants accepted the program, and said that the pamphlet and practice was easy

to follow and understand.

Data Collection Procedure

Data collection consisted of two phases; the preparation phase and implementation phase (Figure 3).

Preparation Phase

In this phase, the researcher prepared the study by following these steps: 1) obtained an ethical approval letter from the Center for Social and Behavioral Sciences Institutional Review Board Prince of Songkhla University (Appendix L-1) ; 2) obtained official permission for collecting data from the IRB of Guizhou Provincial People's Hospital (Appendix L-2); 3) translated the program from the English version to Chinese version, and packed all the materials; 4) tested the reliability and validity of the questionnaires; 5) conducted the pilot study.

Implementation Phase

The implementation phase was initiated when the potential participants met the inclusion criteria both in the control group and experimental group. In this study, the participants was informed of the objective, benefits, confidentiality and procedure

of the study. Then, they were informed to sign the consent form (Appendix). The participants were informed that they had the right to withdraw from this study at anytime.

The researcher conducted the baseline assessment by using the DHIS both in the control group and experimental group on admission day. The participants who met the inclusion criteria in the first 6 weeks were assigned into the control group. After completed the data in control group, a matching technique of age (±5 years), gender, education level and preoperative pain experience was applied to allocate participants into the experimental group for the following 6 weeks. The participants who were in the control group received usual care from nursing staff in the ward. However, the participants who were in the experimental group received both usual care from the staff and the preoperative pain education program from the researcher.

In the experimental group, the day before surgery from 3.00 to 6.00 pm., the researcher provided the pain education program to the participant for about 15 to 30 minutes. This was 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) vicarious experience of a patient role model after oral and maxillofacial tumor excision surgery demonstrating how she reports her pain by video, and (4) encouraging self-efficacy to report pain.

Before providing the education, the researcher measured the participant's

self-efficacy to report pain by the PSERPQ and then handed out the pamphlet to the participant.

Step 1: Prepare physical and emotional state of the participants to feel relaxed and cared for, as well as having a readiness to learn.

1) The participant's vital signs were stable, there was no treatment to limit participant activities, such as no infusion administration;

2) The participant did not worry about her/his situation, showing caring for the participant.

Step 2: Provide only the essential postoperative pain and its management information to the participants including

1) Basic concept of postoperative pain (definition, cause, type);

2) Side effects of poorly contolled postoperative pain results;

3) Common pain medication used after surgery, side effects related signs and symptoms;

4) The importance of the timely self-reporting of pain;

5) How to use the self-report sheet to report pain;

6) When to report pain;

7) How to know when pain is well controlled.

In the process, there was time for participants to ask questions when they did not understand and the researcher then explained further to them. After these contents

had been provided and gone over with the participant, the participant was asked to summarise the information she/he learned and she/he was encouraged to express her/his feelings or opinions about the educational information.

Step 3: Watch the video of the role play of the role model patient after OMFS self-reporting pain intensity and pain interferences. The participant was then encouraged to imitate the rolemodel patient. The Patient Pain Self-Report Sheet was then provided to the participant, and she/he was asked to read and use the sheet.

Step 4: To encourage the participant to remember the knowledge and skills provided

1) Discussed with the participant,as king facilitator they think they have, and obstacles she/he thinks she/he met, then talking with her/him to help the participant to overcome the obstacles identified.

2) Encouraged the participant to be confident to self-report pain, and to positively face postoperative pain after surgery.

After the education session, the researcher measured the participant's self-efficacy to report pain again by the PSERPQ.

Before surgery, the researcher measured the participant's pain intensity and pain interference at two separate times using the Pain Intensity Scale, Pain Interference Scale, on admission day and one before surgery.

After surgery the measure time was determined when the participants arrived

on the ward, and the participants received the similar treatments and each participant recorded her/his pain experience, including worst pain, least pain, average pain, right now pain, and also pain interferences at 24-hours and 48-hours. Another supplementary instrument of the Self-Report Pain Sheet was distributed to the participants of both groups to follow their performance to report pain.

Accordingly, the researcher was the only person to collect data and to provide the pain education program. Whereby, the researcher met the participants on total four times, on the participant's admission day, the day before surgery, 24-hours and 48-hours after surgery. In addition, the researcher educated the participants for one time within 20 to 30 minutes, and for collecting data, the participants spent 5 - 10 minutes filling out the questionnaire. This study closed when the 60 participants' data were completed. Figure 3 shows the procedure of program implementation and data collection.

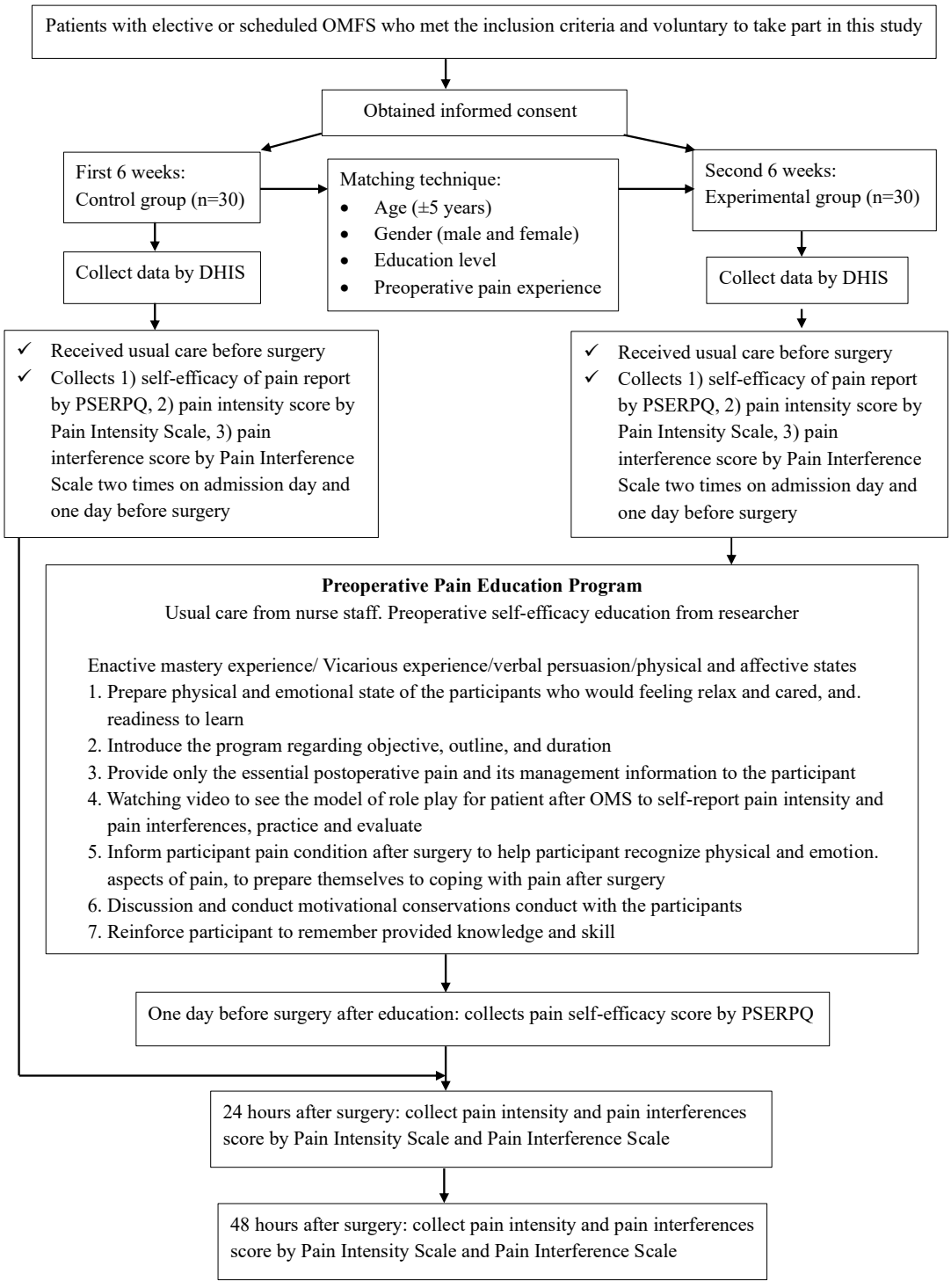


Figure 3. Data collection and implementation of preoperative pain education program

Ethical Considerations

This study maintained ethical principles, in accordance with the principle of respect for human dignity, justice, benefice and risk assessment, informed consent, and the permission of using existing tools (Polit & Beck, 2017). Firstly, the researcher applied for approval from the Center for Social and Behavioral Sciences Institutional Review Board Prince of Songkhla University (Document number: 2020NSt – Qn 009) (Appendix M-1). Secondly, applied for official permission for collecting data from the Institutional Review Board of Guizhou Provincial People's Hospital (Document number: (2020) number 54) (Appendix M-2). During this time, the permission to utilize the research instrument BPI was obtained (Appendix G).

Thirdly, the researcher informed participants of the purpose, benefits, and potential risks of the study by verbal and informed consent (Appendix E). They were informed of the right to take part and the right to withdraw at any time during the study, without any penalty. After the researcher explained the whole process, the participants were allowed to sign their consent on the inform consent form. All the data were collected adhering to the principle of confidentiality in that each participant was given an anonymous number to code the questionnaires. In the case of special circumstances occuring, the researcher and advisor were the only persons who knew the participants information, and the information which could identify the participants

would not be reported in the study or any publication.

Data Analysis

This study applied descriptive and inferential statistics to analyze the data and

test the research hypotheses. The level of significance of .05 and 95 percent confidence interval (CI) were used for all analysis.

Descriptive statistics of frequency, percentage, means, and the standard

deviation were used for presenting the demographic characteristics, health information and surgical features of the participants. In addition, between groups baseline characteristics were tested by independent t-test, Pearson Chi-square, Likelihood Ratio, Linear-by- Linear Association, and Continuity Correction, respectively.

In addition, means and standard deviations were used to analysis self-efficacy to report pain and pain intensity 24-hours after surgery between the control group and experimental group. Meanwhile, the interquartile range was used to present pain intensity 48-hours after surgery and pain interference.

Then, inferential statistics of normality assumption was tested by Z-score which was calculated by Skewness divided by Standard Error or Kurtosis divided by

Standard Error. Assumption of homogeneity of variance of self-efficacy to report pain and pain intensity 24-hours after surgery was tested by Levene's Test for Equality of Variances (Appendix K).

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

CHAPTER FOUR

RESULTS AND DISCUSSION

Results

This chapter aims to identify the differences in preoperative education outcomes between the control group and experimental group with patients who have undergone oral and maxillofacial tumor excision surgery, and to test the research questions and hypothesis of this study.

The results were reported as the following 1) participants' demographic and health-related information, 2) the comparison of self-efficacy to report pain within the experimental group, 3) the comparison of self-efficacy to report pain between the groups, 4) the comparison of pain intensity (worst, average, least and right now) 24 and 48-hours after surgery between the groups, and 5) the comparison of pain interference 24 and 48-hours after surgery between the groups.

Before applying statistical techniques to compare within or between-group differences, graphs were used to describe and explore the data, and the assumption of normality was tested by using Z-score. For the data that met the assumption of normality, inferential statistical of paired t-test and independent t-test were applied; otherwise, non-parametric statistics such as Mann-Whitney U Wilcoxon W test were applied.

Participants' Demographic Characteristic

For the demographic characteristics of the participants that included age, gender, marital status, educational level, occupation, and monthly income, there were no significant differences between the control group and experimental group, as illustrated in Table 1. The age of the participants in the control group ranged from 19 to 59 years with the average age of 38.9 (SD = 13.16) years. There is no difference (t = 1.89; p = .06) when compared with the ages of the participants of experimental group which ranged from 18 to 58 years old with the average age of 32.7 (SD = 12.19) years. In addition, the proportion of females (n = 15) and males (n = 15) in each group was the same and accounted for 50%.

The majority of participants are married both in the control group (n = 20, 66.7%) and experimental group (n = 16, 53.3%). In the control group, 36.7% of participants had a bachelor's degree, and the proportion of participants with primary schooling and secondary schooling were the same at 23.3% (n = 7). By contrast, in the experimental group, participants with secondary schooling education was the as the same with participants with collage made up 33.3% (n = 10), followed by an education level of primary school of 20%. Most of the participants in the two groups had an occupation, but 33.3% (n = 10) and 36.7% (n = 11) did not have an occupation in the control group and experimental group respectively. Monthly income mainly ranged from 2000 to 5000 CNY (n = 13, 43.3%) in the control group and 500 to 2000

CNY (n = 10, 33.3%) in the experimental group, and less than 500 CNY accounted for 23.3% (n = 7) and 30% (n = 9) respectively. The majority of participants (n = 22, 73.3%) in the control group had health insurance, however, only 43.3% (n = 13) of participants in the experimental group had health insurance, and there was a difference of health insurance between-group ($X^2 = 5.554$; $p = .02$).

Table 1

Participants' Demographic Characteristic in Control Group and Experimental Group (N=60)

Characteristic	Control group (n = 30)		Experimental group (n = 30)		Test value	*P value*
	n	%	n	%		
Age	M = 38.9 SD = 13.16 Min-Max = 19 - 59		M = 32.7 SD = 12.19 Min-Max = 18 - 58		1.89[t]	.06
Gender					0[a]	1
Female	15	50	15	50		
Male	15	50	15	50		
Marital status					1.99[b]	.37
Married	20	66.7	16	53.3		
Single	8	26.7	13	43.4		
Divorced	2	6.6	1	3.3		
Educational level					2.04[b]	.73
Primary school	7	23.3	6	20.0		
Secondary school	7	23.3	10	33.3		
High school	4	13.4	4	13.4		
Collage	11	36.7	10	33.3		
Higher collage	1	3.3	0	0.0		
Occupation					4.74[b]	.19
No	10	33.3	11	36.7		
farmer	9	30.0	8	26.7		
teacher	0	0.0	3	10.0		
Others	11	36.7	8	26.6		

Table 1 （continued）

Characteristic	Control group (n = 30)		Experimental group (n = 30)		Test value	*P value*
	n	%	n	%		
Monthly income					4.01[b]	.26
Less than 500 CNY	7	23.3	9	30.0		
500 – 2000 CNY	6	20.0	10	33.3		
2000 – 5000 CNY	13	43.3	6	20.0		
More than 5000 CNY	4	13.3	5	16.7		
Health insurance					5.55[a]	.02
No	8	26.7	17	56.7		
Yes	22	73.3	13	43.3		

Note: *M* = Mean, *SD* = Standard deviation, Min = Minimum, Max = Maximum, *n* = Frequency, *%* = Percentage [t]independent t-test, [a]Pearson Chi-Square, [b]Likelihood Ratio

Health Related Information and Pain Experience

There was no significant differences between the control group and experimental group regarding participants' health related information and pain experience, which included body mass index (BMI), other health problem, past pain experience, and current pain experience, as shown in Table 2. Participants' BMI values ranged from 18.5 to 24 both in the control group and experimental group, followed by 40% (n = 12) and 36.7% (n = 11) of BMI values more than 24 respectively. Also, a large number of participants in the two groups did not have any other health problems, which accounted for 63.3% (n =19) in the control group and 73.3% (n = 22) in the experimental group. The majority of the participants did not have past pain experience and current pain experience in the two groups. There were seven participants in the control group and five participants in the experimental group

who reported mild to moderate pain before surgery.

Table 2

Health Related Information and Pain Experience in Control Group and Experimental Group (N=60)

Characteristic	Control group (n = 30)		Experimental group (n = 30)		Test value	*P value*
	n	%	n	%		
BMI					.25[b]	.89
<18.5	2	6.7	3	10		
=18.5-24	16	53.3	16	53.3		
>24	12	40	11	36.7		
Other health problem					.71[b]	.70
Don't know clearly	8	26.7	6	20		
No	19	63.3	22	73.3		
Yes	3	10	2	6.7		
Tuberculosis	0	0.0	1	50		
Hypertension	2	66.67	1	50		
Hyperostosis	1	33.33	0	0.0		
Past pain experience					.88[b]	.65
Can't remember	2	6.7	1	3.3		
No	21	70	24	80		
Yes	7	23.3	5	16.7		
Pain severity						
Mild	3	42.86	3	60		
Moderate	4	57.14	2	40		
Current pain experience					.42[a]	.52
No	23	76.6	25	83.3		
Yes	7	23.3	5	16.7		
Pain severity						
Mild	6	85.71	5	100		
Moderate	1	14.29	0	0		

Note: BMI means body mass index, *M* = Mean, *SD* = Standard deviation, [t]independent t-test, [a]Pearson Chi-Square, [b]Likelihood Ratio

Surgery Related Information

Regarding the surgery related information between the control group and experimental group, there was no significant difference as illustrated in Table 3. In the control group, the resection of parotid tumor (n = 13, 43.3%) and resection of jaw (n = 11, 36.7%) were the main surgeries. In the experimental group, the main types of surgeries were resection of jaw tumor (n = 17, 56.7%) and tongue tumor resection (n = 7, 23.3%). More than half of the participants (n = 17, 56.7%) in the control group had extraoral maxillofacial and neck incision, followed by intraoral incision (n = 10, 33.3%). In the experimental group, intraoral incision accounted for 53.3% (n = 16) and extraoral maxillofacial and neck incision accounted for 40% (n = 12). In the two groups, almost all of the participants' duration of surgery were more than 60 minutes and without the insertion of drains. For the anesthesia method, all of the participants in the control group received general anesthesia, and except for three of the participants in the experimental group who received local anesthesia, the other 90% (n = 27) of participants received general anesthesia. However, the results showed that there is no difference in the anesthesia method between the groups (p = 1.0).

Table 3

Surgery Related-information in Control Group (n=30) and Experimental Group (n=30)

Characteristic	Control group		Experimental group		Test value	*p*
	n	%	n	%		
Type of surgery					3.59[c]	.06
Resection of parotid tumor	13	43.3	3	10.0		
Resection of jaw tumor	11	36.7	17	56.7		
Tongue tumor resection	2	6.7	7	23.3		
Neck mass resection	4	13.3	1	3.3		
Cheek tumor resection	0		2	6.7		
Type of incision					2.47[b]	.30
Intraoral	10	33.3	16	53.3		
Extraoral maxillofacial and neck	17	56.7	12	40.0		
Intraoral and extraoral traffic	3	10	2	6.7		
Duration of surgery					.0[d]	1.0
>or= 60 minutes	28	93.3	29	96.7		
<60 minutes	2	6.7	1	3.3		
Anesthesia method					0[d]	1.0
General anesthesia	30	100	27	90.0		
Local anesthesia	0	0.0	3	10.0		
Number of drains insertion					0[d]	1.0
0	28	93.3	27	90.0		
1	2	6.7	3	10.0		

Note: *M* = Mean, *SD* = Standard deviation, [b]Likelihood Ratio Fisher's Exact Test, [c]Linear-by-Linear Association, [d]Continuity Correction

The Comparison of Self-efficacy to Report Pain Within Experimental Group

Table 4

Comparison of Self-efficacy to Report Pain Within Experimental Group Before and After Receiving Preoperative Pain Education Program by Pair t-test (N = 30)

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

Note: M = Mean, SD = Standard deviation

According to Table-4, the total score of self-efficacies to report pain before and after receiving the preoperative pain education program in the experimental group are presented. The minimum total score of self-efficacies before the intervention was 0 and the maximum was 60. However, after the intervention, there was a minium total score of 50 and a maximum of 60. After the intervention, the self-efficacy to report pain (M = 57.57, SD = 3.68) was higher than before (M = 42.67, SD = 17.32). There was a significant statistic difference of experimental group self-efficacy before and after the intervention ($p < .001$).

The Comparison of Self-efficacy to Report Pain Between Groups

As Table 4 shows, the total score of self-efficacies to self-report pain was measured by the Perceived Self-Efficacy to Report Pain Questionnaire the day before surgery. According to Table 5, in both the control group (M = 48.1; SD = 10.35) and experimental group (M = 57.57; SD = 3.68), the mean of self-efficacy after the

intervention in the experiment group was significantly higher than that of the control group (t = - 4.72, $p < .001$).

Table 5

Comparison of Self-efficacy to Report Pain the Day After Intervention Before Surgery Between Control Group and Experimental Group by Independent t-test (N = 60)

Item	Control group (n = 30)		Experimental group (n = 30)		*t*-value	*p*	effect size (ES)
	M	(SD)	M	(SD)			
Total score	48.1	10.35	57.57	3.68	-4.72	.000	1.22

Note: M = Mean, SD = Standard deviation

The Comparison of Pain Intensity (worst, average, least and right now) Between Groups After Surgery

Table 6 shows the pain intensity between the control group and experimental group within 24 and 48-hours after surgery. It was found that the mean pain intensity within 24-hours after surgery in terms of worst, least, average, and right now pain, that the mean scores of average pain and right now pain in the experimental group (M = 1.73, SD = 1.91; M = 1.3, SD = 1.78) were significantly lower than the control group (M = 3.77, SD = 2,19; M = 3.5, SD = 2.71, $p < 0.001$). However, there were no differences in either worst pain intensity nor least pain intensity mean scores between groups ($p > 0.05$).

Secondly, Table 6 presents the pain intensity median scores of worst, least, average and right now pain 48-hours after surgery, and there were significant

differences between the control group and experimental group ($p < .001$). Obviously, the median score of pain intensity in the control group was significantly higher than the experimental group.

Table 6

Comparison of Pain Intensity (Worst, least, Average and Right Now) Between Control Group (n=30) and Experimental Group (n=30) 24 and 48-hour after Surgery

Variables	Control group (n = 30)	Experimental group (n = 30)	Test value	*p*	effect size (ES)
	M(SD)	M（SD)			
Pain intensity 24-hour after surgery					
Worst	5.2 (2.89)	4.1 (2.77)	1.50[t]	.14[t]	.39
least	2.5 (2.16)	1.27 (1.66)	2.48[t]	.16[t]	.64
Average	3.77 (2.19)	1.73 (1.91)	3.83[t]	< .001[t]	.99
Right now	3.5 (2.71)	1.3 (1.78)	3.71[t]	< .001[t]	.96
	Mdn (IQR)	Mdn (IQR)			
Pain intensity 48-hour after surgery					
Worst	3 (3)	1 (3)	-	< .001[u]	-
least	2 (2)	0 (1)	-	< .001[u]	-
Average	2.5 (3)	0 (1)	-	< .001[u]	-
Right now,	2.5 (2)	0 (1)	-	< .001[u]	-

Note: M = Mean, SD = Standard deviation, Md = Median, IQR = Interquartile range, [t]independent t-test , [u]Mann-Whitney U Test, "-" means no value

The Comparison of Pain Interferences Between Groups After Surgery

In terms of the median scores of pain interferences, there were no significant differences of pain interferences with 24-hours after surgery between the control group and experimental group (Mdn1 = 12.5, IQR1 = 29 ; Mdn2 = 3.5, IQR2 = 19 , $p = 0.06$) as shown in Table 7. However, there was a significant difference in pain

interferences 48-hours after surgery (Mdn1 =6, IQR1 =21 ; Md2 = 0, IQR2 = 4 , p = 0.001), in which the median score of pain interferences in the experimental group was lower than the control group.

Table 7

Comparison of Pain Interferences Between Control Group (n=30) and Experimental Group (n=30) 24 and 48-hour after Surgery by Mann-Whitney U Test

Variables	Control group	Experimental group	*p*
	Mdn (IQR)	Mdn (IQR)	
Total score of pain interferences after surgery			
24-hour	12.5 (29)	3.5 (19)	0.06
48-hour	6 (21)	0 (4)	0.001

Note: Md = Median, IQR = Interquartile range

Discussion

The purposes of this study was to investigate the effect of preoperative pain education program on the self-efficacy to report pain, postoperative pain intensity and pain interferences. The results of this study indicated the positive effect of the preoperative pain education program on self-efficacy to report pain, 24-hour postoperative pain intensity and 48-hour postoperative pain interferences. The presented the program enhanced a patient's self-efficacy to report pain, reduced postoperative pain intensity and pain interferences. These findings evident fully support the first and second research hypothesis, and partly supported the third and

fourth research hypothesis.

The findings of this study were discussed according to the objectives and hypothesis consisting of three parts. The first part was the participants' demographic and surgery-related information, the second part was the effect of the preoperative pain education program on self-efficacy to report pain, and the third part was the effect of the preoperative pain education program on postoperative pain intensity and pain interferences 24-hours and 48-hours after surgery.

Part 1. Demographic Characteristic and Surgery-Related Information

As previously stated, demographic and surgical-related factors that impact postoperative pain include age, gender, preoperative pain, preoperative opioid exposure, type of surgery, and duration of surgery. In order to control these factors, participants were selected who met the inclusion criteria, and, age, gender and preoperative pain were matched to balance the control group and experimental group. Statistical analysis revealed that there is no differences in these factors between-groups.

In the study, participants in the age range of 18 to 60 were selected, aged patients were not included, so the final mean age in the control group (38.9 ±13.16) and experimental group (32.7±12.19) showed no difference ($p > .05$), according to Wang's (2017) report that the incidence of oral and maxillofacial tumor mainly occurs

in the ages of 14 to 44 with parotid or jaw tumor , which was little similar with the present study. However, the differences between the north and south regions in China, and related diet habits should be of concern. All of the participants at this age range had the benign tumors, including parotid, jaw, tongue, neck, and cheek tumors.

Regarding health insurance, there was a statistical difference between-groups ($p = .018$). According to research in India (Sood & Wagner, 2016), patients with health insurance who seeked tertiary care experienced better postoperative outcomes resulting in less pain. However, there was no research found on the impact of health insurance regarding postoperative pain experience in the China context. So, for health insurance between the control group and experimental group in the present study, whether there was an influence on postoperative pain experience, we are not clear.

Regarding the Body Mass Index (BMI) of the two groups, more than half of the participants were in the normal value range, more than 1/3 of the participants exceeded normal values, however, according to the statement of González-Callejas, Aparicio, De Teresa, and Nestares (2020) a greater BMI was not correlated with higher postoperative pain.

In addition, seven participants in the control group and five in the experimental group had past and current pain experiences, and most of them were had experienced mild pain, only one participant in the control group had moderate current pain, however, and the statistical analysis showed no significant difference between-

groups ($p > .05$). As the previous study reported, pain before surgery was associated with postoperative pain intensity (Montes et al., 2015). The patients who had distress from previous pain experienced significant increased postoperative pain intensity compared with those who had no distress in regards to previous pain (Wang et al., 2018).

In regards to other factors that may impact postoperative pain including surgical incision, Wang (2014) studied that postoperative pain after oral and maxillofacial surgery on the basis of incision presented differences in pain severity, for instance, intraoral incision as well as intraoral and extraoral traffic incision caused moderate pain, extraoral maxillofacial and neck incision caused mild pain, and flap transplantation multiple incision surgeries caused severe pain. In this study, the majority of participants had surgery that involved intraoral, extraoral maxillofacial and neck incisions, and between-groups there was no statistical difference ($p > .05$). This is consistent with Wang's study in that participants experienced mild to moderate postoperative pain which was the same as the current study.

Above all, for the demographic and surgery-related information, there were no significant differences between-groups, which indicated representation of participants undergoing oral and maxillofacial surgery, particularly in Guizhou province, China.

Part 2. Effect of Preoperative Pain Education Program on Self-efficacy to Report Pain

The finding of present study supported the first and the second hypothesis. The first and second hypothesis were accepted. Firstly, the patients who were in the experimental group after receiving preoperative pain education program had higher self-efficacy to report pain than before as Table 4 illustrates. Secondly, the patients in the experimental group had higher levels of self-efficacy on pain self-report after receiving the preoperative pain education program compared with patients in the control group who received usual preoperative education (Table 5). The total score of self-efficacy to report pain in all of the patients in the experimental group was more than 40, which illustrated that each participant had the ability to perform the given task to report postoperative pain when they felt a pain score of more than 3 or if the pain increased even after receiving treatment. These results supported the first and second hypothesis, which indicated that the pain education program before surgery had a good effect on a patient's self-efficacy to report pain.

Additionally, the performance of reporting pain for the experimental group was higher than the control group (Appendix L). Regarding the times of reporting pain less than or equal to 3, the experimental group performed this less frequently than the control group ($p = 0.009$). For the times of reporting pain more than 3, the experimental group performed this more frequently than the control group ($p =$

0.009). In addition, the experimental group had a better understanding of when to report pain to the medical staff and because of that performed higher or better at this than the control group (100%, 33.3%, $p < .001$).

This program was appropriate to apply to the patients who underwent oral and maxillofacial tumor excision surgery. The reason underpinning the positive finding in the present study is due to the application of the pain education program based on Bandura's theory of self-efficacy.

The theory aims to change personal behavior by reinforcing self-efficacy, it has been proved as an effective behavior therapy for overcoming the barriers to perform a desired behavior through providing an intervention that included the observation of another person successfully modeling the desired behavior (Bandura, 1977). Additionally, perceived self-efficacy enhances psychosocial functioning by influencing choice behavior, effort expenditure, persistence, and self-direction (Bandura, as cited in Bandura, 1980). In this study, the preoperative pain education program was conducted based on the four sources of self-efficacy consisting of enactive master experience, vicarious experience, verbal persuasion, and physiological and affective states.

Mastering experience not only builds the sense of readiness to learn, but also creates awareness and regulation of affective action performance (Bandura, 1997). In this study, in order to reinforce the participants' readiness to report pain even when

they were in pain, the information of postoperative pain, and the related method to report and assess postoperative pain, treatment was provided to the participants by individually giving each participant a pamphlet. The researcher taught each participant individually by face to face communication and read the contents of the pamphlet to the participants, discussed any problems they may met over time, which helped the participants to better understand and acknowledge the information as provided. The knowledge acquired helped the participants enhance their self-efficacy.

In terms of vicarious experience, which is mastered by seeing others successfully perform the action and the belief that the person has the confidence to do the performed action, to help the participant acknowledge this experience, a video which showed a patient successfully report and record pain after surgery was provided to the participant. This procedure helped the participants to increase their self-efficacy on self-report and record postoperative pain.

Verbal persuasion was done when the researcher taught the participants. Words of encouragement were provided to the participants to increase their confidence to express their requirements. When encouraged the participants felt more confident and empowered to record and report their pain.

For the physiological and affective states, the participants were allowed to express their concerns and worries, and the researcher discussed these with them, which helped them to relax themselves, as well as enhance their self-efficacy. The

pain experience of pain intensity and pain interference, and related clinical situations were provided in detail. The participants could clearly recognize their situation after surgery which helped them to reduce their worries and anxiety.

Pain self-report efficacy is a cognitive competency for patients, and the performance of pain self-report is an action to carry out this competency. Patient self-efficacy has a strong relationship with patient self-reported outcome (Crijns, Liu, Ring, Bozic, & Koenig, 2019). The self-report efficacy guided self-report performance, which was evident in patients who had higher levels of self-efficacy to report pain, thus performed better report pain performance. This result was consistent with the findings by Thompson, Broadbent, Bertino, and Staiger (2016), who reported that the patient with higher pain self-efficacy has better pain self-reported outcome compared with the patient who has lower pain self-efficacy.

Part 3. Effect of the Preoperative Pain Education Program on Postoperative Pain Intensity and Pain Interferences 24-hour and 48-hour After Surgery

The results of the present study supported the fourth hypothesis but only partly supported the third hypothesis, that between-groups average and right now pain intensity of 24-hours after surgery, as well as worst, least, average, and right now pain intensity of 48-hours after surgery were statistically significantly different, in which the control group pain intensity scores were higher than the experimental group pain

intensity scores. The total pain interferences score in the control group was higher than the experimental group. This indicated that the pain education program had a good effect on postoperative pain experiences.

According to the educational process, patients increased their recognization of postoperative pain including its pain intensity score classification by NRS, how to rate the pain intensity score and report, skills to report and so on. Through the researcher observations and communication, patients in control without the pain education program thought they could tolerate their pain rather than report it to medical staff. This was revealed by the control group patients' incorrect performance of pain self-reporting which was 66.7%, thus the misunderstanding of pain resulted in them having incorrect self-efficacy to report pain. In contrats, patients in the experimental group had a perfect performance of pain self-reporting in that every patient correctly self-report their pain. This indirectly resulted in these patients receiving pain treatment in time, which could explain the pain intensity and pain interferences being lower than the control group.

In present study, pain sensation occurred during oral and maxillofacial region tissue damaged or injury during or after surgery. Different from other part, the oral and maxillofacial region are mainly controlled by the trigeminal nerve, and this mix nerve of sensory nociception takes a larger proportion in the cerebral cortex. The pain transmission depends on two afferent nerve fibers that of A-delta and C fiber. A-delta

fiber is perceived as a sharp or shooting sensation. C fiber is perceived as a dull or aching sensation. The ascending way of pain stimuli in the maxillofacial region also has some differences from other parts of the body. As forementioned, the ascending way of pain stimuli in the maxillofacial region includes three afferents, afferent from the damaged region receptors transmission via two fibers travel to the trigeminal ganglion, the brain stem, the thalamus, then project to the area of cerebral cortex, resulting in pain sensation. The ascending way can be affected by the transmission and perception of pain.

According to the *Gate Control Theory* (Malzack & Wall, 1965), when the pain signals reach the brain closed, leading to pain reduce. This situation occurred when "The large, fast conducting fiber system projects to the central control system which alerts selective cognitive processes able to influence the descending control system modulating the gating mechanisms" (Carli, 2011, p.177). Thus, in this study, patients after surgery returned to the ward although they received the same anti-inflammatory treatment of cefotaxime sodium, the pain intensity score of 19 participants in the control group which was recorded on the Patient Self-Report Sheet was more than 3. However, only three of these participants reported this to the nurse on the ward, and two of these participants received dezocine as treatment to reduce their pain. While, in the experimental group, there were six participants whose pain intensity score was more than 3, and they reported this to the nurse, three of them

received icepacks and three of them reduced their pain by reading and listening to music. Therefore, the reduction in the level of pain intensity and pain interference in the experimental group compared with the control group could be explained by the preoperative pain education program which helped the patients to have a better understanding of pain, which helped them to enhance their self-efficacy belief on coping with pain and managing pain.

Above all, it is evident that the pain education program had a positive effect on reducing postoperative pain for patients who had undergone oral and maxillofacial tumor excision surgery. This study was the first that used *Bandura's Self-efficacy Theory* of four sources to conduct an education program among patients.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

This chapter states the summary of the main findings and the strengths as well as the limitations of the present study.

Conclusion

This quasi-experimental posttest study was conducted to identify the effect of the preoperative pain education program on self-efficacy to report pain, postoperative pain intensity and interference for the patients undergoing oral and maxillofacial tumor excision surgery in Guizhou Provincial People's Hospital. The sample size of the study was 60 adult patients who were older than 18 and less then 60 years old. The participants were admitted to the Oral and Maxillofacial Surgery Department during 1st of October to 31st December 2020. The participants were subject to the inclusion criteria, and assigned into either the control group or experimental group by applying a matching technique in which the control group was collected first and then participants in the experimental group were enrolled according to the control group's age, sex, education level and pain experiences. The experimental group received usual

care from medical staff and the pain education program from the researcher, whereas the control group received usual care from medical staff only.

The preoperative pain education program was delivered one day before surgery around 3 pm to 6 pm, and each participant received the education program from the researcher. The designed 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). The preoperative educational program focused on postoperative pain, which composed of (1) physical and effective state, (2) master experience of providing information about postoperative pain, pain score, pain self-report, and pain management, (3) vicarious experience of a demonstration of a patient as a role model after oral and maxillofacial tumor excision surgery reporting her pain by video, and (4) encouraging self-efficacy to report pain.

The research instruments used to collect data consisted of Demographic Health Information Sheet, Perceived Self-Efficacy to Report Pain Questionnaire, Pain Intensity Scale, and Pain Interference Scale. All the questionnaires were validated by three experts and the S-CVI values were 0.95, 1, and 1 for Preoperative Pain Self-Efficacy of Pain Self-Report Questionnaire, Pain Intensity Scale, and Pain Interference Scale, respectively. The reliability of the Preoperative Pain Self-Efficacy of Pain Self-Report Questionnaire and Pain Intensity Scale was tested among 20

patients in the Oral and Maxillofacial Surgery ward and the Cronbach alpha coefficients were 0.893 and 0.896, respectively. The reliability of the Pain Interference Scale was tested among 30 patients in the ward, and the Cronbach alpha coefficient was 0.922.

Regarding the demographic characteristics of the patients and their clinical characteristics, these were presented by using frequency, percentage, mean and standard deviation. The equivalence between the control group and experimental group was tested by independent t-test, Chi-square, Likelihood ratio, Linear-by-Linear Association and Continuity Correction.

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

Overall, the study included four main findings. Firstly, patients in experimental group after receiving the preoperative pain education program had higher self-efficacy to report pain than before ($p < .001$). Secondly, patients in the

experimental group had significantly higher self-efficacy to report pain than the control group ($t = -4.72$, $p < .001$). Thirdly, pain intensity of least and right now pain 24-hours and 48-hours after surgery in the experimental group was significantly lower than that of control group ($t = 3.83$, $p < .001$; $t = 3.71$, $p < .001$). Finally, in terms of pain interferences at 24-hours after surgery, there was no significantly statistical difference between the two groups ($p > .05$). However, there was a significant difference of pain interferences at 48-hours after surgery ($p < .01$).

Above all, the findings of this study illustrated that the preoperative education program which focused on postoperative pain had a positive effect on enhancing patient self-efficacy to report pain, which would lead to the patient actively participating in postoperative pain management, resulting in lower pain intensity and less pain interferences. Due to preoperative education as routine care and with pain as a common result after surgery, the application of this program into preoperative education could be appropriate.

Strength and Limitation of the Study

The strength of this study was that the preoperative pain education program congruent with the update postoperative pain management guidelines, and also drived patients' self confidence by four sources of Bandura's self-efficacy theory. In addition,

this program could increase nurse role to advocate patients to report their pain intensity. However, there were a few limitations in the study. Firstly, this study was only a posttest reaserch design. Secondly, the nurses in the ward were not involved in the study, and the researcher was the only person to carry out the study.

Implementation and Recommendations

This study provided the effectiveness of self-efficacy on enhancing the evidence-based preoperative pain education program for patients who were undergoing oral and maxillofacial tumor excision surgery. Accordingly, there are some recommendations for nursing practice, nursing education and nursing research.

Nursing Practice

Clinical nurses should provide a self-efficacy enhancing education program for the patient who is undergoing surgery. In addition, nurses should provide learning materials and use a teaching video to guide the patient. The instruments of the Patient Self-Report Sheet would be used in daily care to easily see the patient pain experience and the progress of pain treatment.

Nursing Education

The findings of this study should be used by nurses to educate their patients in enhancing their self-efficacy to report pain. The program of this study can be used to develop further self-efficacy enhancing education programs to help patients to self-manage pain.

Nursing Research

This present study is a quasi-experimental design study without randomization. Therefore, a further study using randomization methodology is strongly recommended to explore selection bias. This study was conducted in a limited period and the researcher was the only person to deliver the program as well as collect the data, so that a further study conducted over a longer period of time with other researchers or research assistants to separate the administration of the intervention and data collection process is necessary. Additionally, this study limited the education contents to self-efficacy to report pain, so that a further study for pain management efficacy for patients should be explored.

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APPENDICES

Appendix A

Preoperative Self-Efficacy Pain Education Guideline for Oral and Maxillofacial Inpatient Guideline

Objective	**Content**	**Activities**		**Teaching time**	**Teaching material**	**Evaluation**
		Researcher	**Participant**			
1. Prepare the participant physical readiness to learn	✧ Participant vital sign are stable ✧ there is no treatment to limit participants activities	Step 1: Check the participants sheet from the computer seeing the vital sign Step 2: Observe the participant Step 3: Ask participant "how are you now?"	• Doesn't receive treatment or the treatment not limited their activities • Answer the researcher question without any discomfort	5 minutes	No	No
2. Prepare the participant	✧ Introduce researcher role ✧ Explain the education	Step 1: introduce name, identity, role in the study	• Pay attention • Listening	5 minutes	No	No

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	**Participant**			
emotional state readiness to learn	objective, outline, and duration. **Objective**: to enhance self-efficacy for self-report pain intensity and pain interferences after surgery which would lead to pain well controlled, and decrease negative pain interferences after surgery. **Outline** ✓ the process of pain education including learning postoperative pain	Step 2: explain the objective of this education program to the participant Step 3: explain the outline of the education program				

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	**Participant**			
	related knowledge, watching video of model player, and reading pamphlet ✓ teaching how to self-report pain intensity and pain interferences 1) to doctor or nurse in the ward, 2) recording on the Patient Self-Report Sheet ✓ discussion					
3. Through providing the knowledge related to postoperative	✧ Definition of pain: Pain is a sensory, emotional, cognitive, and social dimension of painful experience.	Step 1: explain definition, cause of postoperative pain after oral and maxillofacial surgery to the participant	• Pay attention • Listening • Answer researcher's question	10 minutes	Pamphlet (see in Appendix B)	1. Test the participant understanding of the pain score:

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	Participant			
pain and its management, help the participant to gain the mastery experience	✧ Postoperative pain: postoperative pain is acute pain caused by tissue damage or potential tissue damage. After oral and maxillofacial surgery, pain may occur, but it can be controlled. Then postoperative pain will be gradually decreased within 2 – 3 days. However, the inadequate pain management leads	Step 2: explain the pain score to the participant, after that, asking the participant to classification of the pain score Step 3: explain to the participant how to self-report pain score and pain interference, after that giving example of self-pain experience describe to the participant, then ask	• Asking the researcher to explain if they have any question in the learning process			the researcher point out any of the number in the NRS, ask the participant to interpret the pain score meaning (such as “7” means severe pain), they can answer 2. Testing the

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	**Participant**			
	to delay recovery, and develop chronic pain. ✧ Pain is subjective experience. After surgery, you can report pain. You just need to rate "how much do you feel painful " and interpret to the number 0 to 10. • 0 refers to "no pain" • 1 to 3 refers to "mild pain" that means pain is obvious but it slightly influences. you daily functions, such as coughing and deep breathing	them to describe their experience if they ever had to help them self-report pain in details Step 4: explain the importance of self-report pain to the participant, to help them pay attention Step 5: telling the participant tips for report pain Step 6: explain the pharmacological pain management to the				participant self-report of pain interference: The researcher asks them "what should describe when you report your pain to doctor or nurse?" the participant

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	**Participant**			
	• 4 to 6 refers to "moderate pain" that means pain begins at interference parts of your body functions, such as sleeping, emotion, relationship, but not significant interference a wide range of activities • more than 7 refers to "severe pain" to "worst pain" that means pain becomes a core aspect of your life and induce significant interference in a wide range of activities.	participant, teaching them the tips for taking pain medicine Step 7: explain the non-pharmacological pain management to the participant, and encourage them to practice base on their preference				can answer

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	Participant			
	✧ In order to help your medical staffs understand you well, beside pain intensity, you should tell them the following as much as you can: • Where it hurts • What the pain feels like • When it started • How long it has been hurting • What makes it worst • What makes it feel better ✧ Importance of self-report pain:					

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	Participant			
	• Detect whether the treatment for you is adequate • Making decision about the amount of pain medicine dosage is appropriate for you ✧ Tips for report pain: • Whenever you feel pain, you should tell to the nurse or doctor. • When you take pain medicine by oral administration,					

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	Participant			
	within 30 minutes to 1 hours your pain still not relief or decrease, you should tell the nurse or doctor. • When you received IV pain medicine , and 15 to 30 minutes later your pain still not relief or decrease, you should tell the nurse or doctor					

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	Participant			
	✧ Postoperative pain management: • Pharmacological treatment Non-opioid medicine e.g ibuprofen Opioid medicine e.g codeine, dezocine ✧ Tips for taking pain medicine: • The best time to take medicine is when you first feel pain • Know the name of the medicine • Know how you take your pain medicine					

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	**Participant**			
	• Know when you take the pain medicine • Take your pain medicine as you were told by your doctor or nurse ✧ Non-pharmacological pain management: • listening to music • reading a book • watching TV • meditation • deep breathing					
4. The participant through watching the video obtain vicarious	✧ A model player which show the successful performance on self-report pain after surgery	Step 1: the researcher open the video by ipad Step 2: the researcher watches the video with	• Watch video • Follow the video to imitate self-record pain	10 minutes	1. Video (see in Appendix B-3)	The researcher ask the participant

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	Participant			
experience from the model player, then can imitate the model player	(the details seeing in Appendix B-3)	the participant Step 3: the researcher provides the Patient Self-Report Sheet to the participant Step 4: the researcher teaches the participant how to use Patient Self-Report Sheet	on the Patient Self-Report Sheet • Follow the researcher to practice how to use the Patient Self-Report Sheet		2. Patient Self-Report Sheet (see in Appendix B-2)	use the Patient self-report pain sheet to record the pain, they can perform
4. Through informing the participant the	✧ the location of pain commonly on the surgical wound, if any other place occurs, you should concern and	Talking to the participant	• listening	2 minutes	No	No

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	Participant			
pain related condition after surgery, help them to prepare themselves to cope with pain after surgery	report ✧ pain intensity ranges from mild to severe, it depends on type of surgery and also other factors such as age, emotional status optimism is better to reduce pain ✧ pain may be impacted your sleep, cough, or other activities, but it can be controlled ✧ when you feel pain, you heart rate, respiratory rate, blood pressure may be a litter bit increase, this will decrease when it decreases gradually					

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	Participant			
6. Through verbal persuasion encourage the participant enactive to self-report pain and keep in optimistic	✧ "we are going to do everything we can to help keep your pain under control after surgery. Your pain management is our number-one priority. Given (your condition, history, diagnosis, status), we may not be able to keep your pain level at zero. However, we will work very hard with you to keep you as	Step 1: discussion with the participant talking with them about their concern Step 2: saying the encourage word to the participant	• Listening	5 minutes	No	No

Objective	Content	Activities		Teaching time	Teaching material	Evaluation
		Researcher	Participant			
	comfortable as possible” ✧ Don’t worry too much, believe that pain well be controlled well via your effort and health provider effort (doctor and nurse) ✧ We (doctor and nurse) company with you					

Appendix B
Preoperative Pain Self-Report for Patient Undergoing Oral and Maxillofacial Surgery

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Introduction

The goals of postoperative pain management are to reduce the severity of pain and the effect of pain, which benefit for prevent surgical complication, promote recovery, and prevent chronic pain as much as possible. This pamphlet purpose to increase your self-efficacy to tell "how much pain you have" to your doctor or nurse. Then your will receive appropriate pain management. Therefore, contents will explain:

- Pain after oral and maxillofacial surgery
- Pain score and pain self-report
- Postoperative pain management

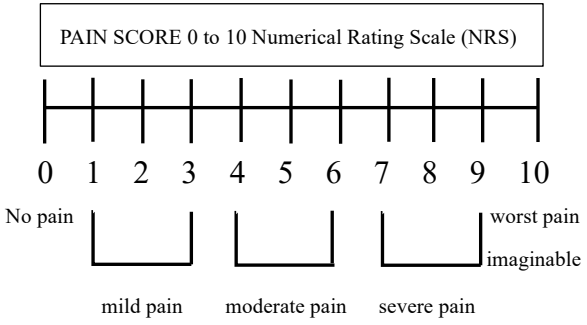
1. Pain after oral and maxillofacial surgery

Pain is a sensory, emotional, cognitive, and social dimension of painful experience. Postoperative pain is acute pain caused by tissue damage or potential tissue damage.

After oral and maxillofacial surgery, pain may occur, but it can be controlled. Then postoperative pain will be gradually decreased within 2 – 3 days. However, the inadequate pain management leads to delay recovery, and develop chronic pain.

2. Pain score and pain self-report

Pain score



0 = "no pain";
1-3 =mild pain;
4 – 6 = moderate pain;
7 – 9 = severe pain;
10 = worst pain imaginable

Pain self-report

Pain is subjective experience. After surgery, you can report pain. You just need to rate "how much do you feel painful" and interpret to the number 0 to 10.

0 refers to "no pain"

1 to 3 refers to "mild pain" that means pain is obvious but it slightly influences you daily functions, such as coughing and deep breathing

4 to 6 refers to "moderate pain" that means pain begins at interference parts of your body functions, such as sleeping, emotion, relationship, but not significant interference a wide range of activities

more than 7 refers to "severe pain" to "worst pain" that means pain becomes a core aspect of your life and induce significant interference in a wide range of activities.

In order to help your medical staffs understand you well, beside pain intensity, you should tell them the following as much

as you can:

- ✧ *Where it hurts*
- ✧ *What the pain feels like*
- ✧ *When it started*
- ✧ *How long it has been hurting*
- ✧ *What makes it worst*
- ✧ *What makes it feel better*

Importance of Pain Self-Report

We believe that everyone can report pain. You are the most reliable one knowing your pain well. Self-report pain helps your medical staff understand your condition well, which benefit to

- Detect whether the pain treatment is adequate to you
- Making decision about the amount of pain medicine dosage is appropriate for you

We hope pain will not interference your regular function, such as breath, cough, change position. Also, not interference your mood. So that if you feel any discomfort, please inform your medical staffs too, they will try their best to treat your pain and help you return to normal life.

Tips for report pain

1. Whenever you feel pain, you should tell to the nurse or doctor.

2. When you take pain medicine by oral administration, within 30 minutes to 1 hours your pain still not relief or decrease, you should tell the nurse or doctor.

3. When you received IV pain medicine , and 15 to 30 minutes later your pain still not relief or decrease, you should tell the nurse or doctor

4. You should record pain score in “Patient Self-report Pain Sheet”, you will know your progress of pain.

3. Postoperative Pain Management

Pharmacological pain management

Postoperative pain is acute pain that can be controlled by medication such as

- Non-opioid medicine e.g. ibuprofen
- Opioid medicine e.g. codeine, dezocine

In order to receiving the appropriate dosage of pain medicine, and avoid the side effects (nausea, vomiting, drowsy), these medications must prescribe by the doctor.

Tips for taking pain medicine

In order to make the pain medicine work effectively, prevent the side effects, and treat your pain on time, you should do as following:

- ✧ The best time to take medicine is when you first feel pain
- ✧ Know the name of the medicine
- ✧ Know how you take your pain medicine
- ✧ Know when you take the pain medicine
- ✧ Take your pain medicine as you were told by your doctor or nurse

- ✧ Report any abnormal feeling to your nurse or doctor
- ✧ Drink more water when you take opioid pain medicine by oral way and without limitation of water intake

Non-pharmacological pain management

There are several methods to control acute pain such as listening to music, reading a book, watching TV, meditation, deep breathing.

You can use some method that you prefer. You can ask nurse and doctor how to use the non-pharmacological pain management appropriately.

When the pain under control, you will feel pain relief, and return to regular life, such as sleep better, return to normal activities sooner, recovery from surgery sooner.

Anyway, no pain after surgery is not always possible. We do not expect you to have no pain after surgery. However, you should know the acceptable pain level that is not disturb your recovery process, and one that allows you to sleep and perform your regular daily activities. The target pain score for patient after surgery at rest less than 3, and during activity less than 4.

Summary

- The pain rating scale is a useful tool to help you to express the intensity of your pain.
- Pain self-report leads to effectively relieve postoperative pain.
- Tell medical staff when you feel pain and they are able to manage pain.
- Pain medicine s can help you cope with your clinical condition better.
- Well-controlled pain will allow you to do daily activities, which will help you regain strength and improve your overall recovery.
- Not all pain is completely relieved. However, through report pain to your medical team, the level of pain control can reach your acceptable goal.

QR scanning for watching

video

Chinese Version of Education Pamphlet

2. 2 疼痛—自我报告

0 代表“无痛”

1-3 代表“轻度疼痛”，表现为：1 安静平卧时不痛，翻身咳嗽时疼痛；2 咳嗽时疼痛，深呼吸不痛；3 安静平卧不痛，咳嗽深呼吸痛

4-6 代表“中度疼痛”，表现为：4 安静平卧时间断疼痛（开始影响生活质量）；5 安静平卧持续疼痛，影响睡眠；6 安静平卧疼痛较重，影响睡眠

7-9“重度疼痛”，表现为 7 疼痛较重，辗转不安，疲乏，无法入睡；8 无法入睡，持续疼痛难忍，全身大汗；9 全身大汗，剧为疼痛无法忍受

10“您能想象的最痛”

为了让主管您的医护人员更好的了解您，除了疼痛程度以外，您应该尽可能的汇报：

- ✧ 哪个部位疼痛（疼痛的部位）
- ✧ 什么样的疼痛（疼痛的性质）
- ✧ 什么时候开始的疼痛（疼痛开始的时间）
- ✧ 疼痛持续了多久（疼痛持续时间）
- ✧ 什么原因使得疼痛变严重了（疼痛加重的诱因）
- ✧ 什么原因使得疼痛减轻了（疼痛减轻的方法）

简介

术后疼痛管理的目的是减轻疼痛的严重程度和疼痛的影响，有利于预防手术并发症，促进康复，预防慢性疼痛。这本小册子的目的是通过提高您的自我效能感，从而是您能尽可能准确地告知医生或者护士“您有多痛”，以帮助您能得到最适合您的疼痛管理。主要内容包括以下几方面：

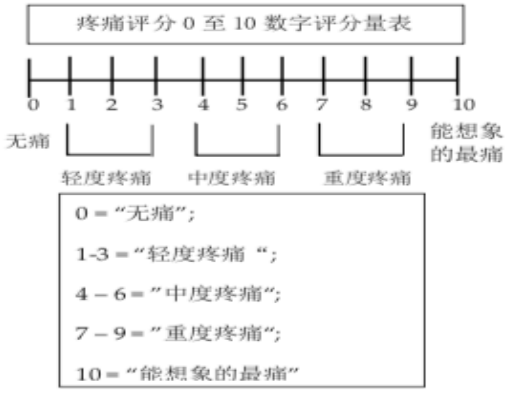
- ✧ 口腔颌面部术后疼痛简介
- ✧ 疼痛评分和疼痛自我报告
- ✧ 术后疼痛管理

1. 口腔颌面部术后疼痛简介

疼痛是一种感觉、情感、认知和社会维度的痛苦体验。术后疼痛是由组织损伤或潜在组织损伤引起的急性疼痛。口腔颌面部手术之后，可能会引起疼痛，这是正常的、可以控制的。术后疼痛在术后 2 至 3 天将会逐渐缓解。但是，若疼痛管理不佳将会导致术后身体恢复延迟，并可能发展为慢性疼痛等并发症。

2. 疼痛评分和疼痛自我报告

2. 1 疼痛评分



0 = “无痛”;

1-3 = “轻度疼痛 “;

4 – 6 = ”中度疼痛“;

7 – 9 = ”重度疼痛“;

10 = “能想象的最痛”

术后通常会有疼痛发生。我们希望您手术后没有疼痛。您应该了解自己可接受的疼痛水平，此水平包括不干扰您身体恢复过程，并能保证正常睡觉和日常活动。术后患者的目标疼痛评分：休息时小于 3 分，运动时小于 4 分。

小结

- ✧ 疼痛评定量表是一个有用的工具，可以帮助您表达您的疼痛程度。
- ✧ 自我报告疼痛能有效管理术后疼痛。
- ✧ 当您感到疼痛时，告诉医务人员，他们能够帮助您处理疼痛。
- ✧ 止痛药可以帮助您更好地缓解疼痛引起症状。
- ✧ 疼痛控制好了，您的日常活动将不受影响，帮助您更快地恢复体力和改善您的健康。
- ✧ 并不是所有的疼痛都能完全缓解。但是，您可以通过向主管您的医护人员报告疼痛，将疼痛控制到您可以接受的水平。

相信自己能做到，你就会成功

扫描下方二维码观看术后病人疼痛自我报告视频

观看扫描

- ✧ 阿片类药物：可待因、地佐辛

为了您获得符合您剂量的止痛药，并避免副作用(恶心、呕吐、嗜睡)，这些药物必须由医生开处方。

吃止痛药的技巧

为了使止痛药发挥有效作用，预防副作用，及时治疗疼痛，您应做到以下几点：

- ✧ 知道止痛药的名称
- ✧ 知道如何服用止痛药
- ✧ 知道什么时候吃止痛药
- ✧ 按照医生或护士的嘱咐服用止痛药
- ✧ 向您的护士或医生报告任何异常的情况
- ✧ 当你口服阿片类止痛药时，如果没有被限制水的摄入量，要多喝水

3.2 非药物性疼痛管理

有几种非药物性方法可以控制急性疼痛，如听音乐、读书、看电视、冥想、深呼吸。

你可以用你喜欢的方法。可以询问护士和医生如何正确使用非药物疼痛管理。

当疼痛得到控制时，你会感到疼痛减轻，并恢复正常生活，如睡眠更好，恢复正常活动更快，手术后恢复更快。

自我报告疼痛的重要性

我们相信每个人都能报告疼痛，同时我们也相信您是知道自己疼痛最可靠的人。您主动报告疼痛将帮助您的医护人员更好的了解您的疼痛状况，有利于他们

- ✧ 判断您是否得到最佳的疼痛治疗
- ✧ 决定适合您的止痛药的剂量

我们希望疼痛不会干扰您的正常身体功能，如呼吸、咳嗽、翻身、睡觉。还有，不要干扰您的情绪。如果您有任何不适，请告您及时知您的医护人员，他们会尽最大的努力帮助您减轻疼痛，帮助您恢复正常生活。

疼痛报告技巧

1. 无论何时，当您感到疼痛时，您应该告知您的医护人员。
2. 当您口服止痛药的时候，在 30 分钟到 1 小时以内，如果您的疼痛没有缓解或减轻，您应该告知您的医护人员。
3. 当您接受了静脉输入止痛药，15 到 30 分钟后，您的疼痛仍然没有缓解或减轻，您应该告知您的医护人员。
4. 您应该在“病人自述疼痛表”中记录疼痛评分，这样您就会知道疼痛的变化情况。”

3. 术后疼痛管理

3.1 药物性疼痛管理

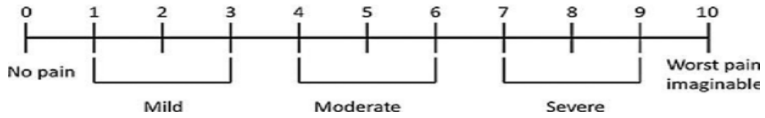
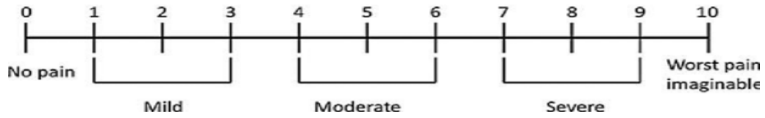
术后疼痛是一种急性疼痛，可以通过药物等控制，例如

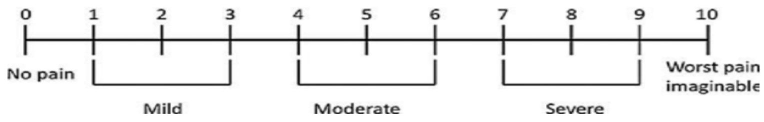
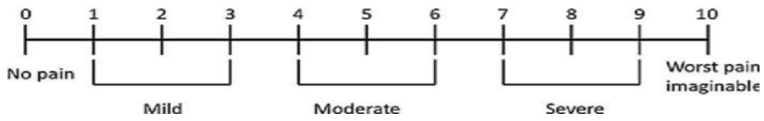
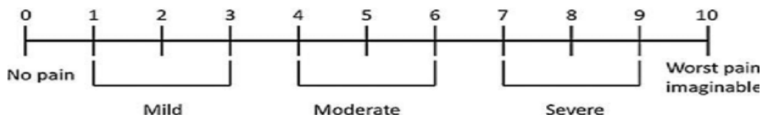
- ✧ 非阿片类药物：布洛芬

2. Patient Self-Report Pain Sheet (recording by patient or with the family's help)

The first day after surgery: / / (date/month/year)

Instruction: when you feel pain, please record the time, circle the number which represent your pain intensity level, and tick "✓" which represent your action, treatment you received and pain relief situation.

Pain Intensity	**Report To Nurse or Doctor**	**Treatment You Received or You Used**	**Pain Relief**
Time: _____ 	1. Yes ( ) Time: ____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method : Yes ( ) No ( )	Yes ( ) No ( )
Time: _____ 	1. Yes ( ) Time: ____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method : Yes ( ) No ( )	Yes ( ) No ( )

<table>
<tr><td>Time: ________________
  </td><td>1. Yes ( ) Time: _____
2. No ( )</td><td>1. Painkiller: Yes ( ) No ( )
2. Non-drug method : Yes ( ) No ( )</td><td>Yes ( )
No ( )</td></tr>
<tr><td>Time: ________________
  </td><td>1. Yes ( ) Time: _____
2. No ( )</td><td>1. Painkiller: Yes ( ) No ( )
2. Non-drug method : Yes ( ) No ( )</td><td>Yes ( )
No ( )</td></tr>
<tr><td>Time: ________________
  </td><td>1. Yes ( ) Time: _____
2. No ( )</td><td>1. Painkiller: Yes ( ) No ( )
2. Non-drug method : Yes ( ) No ( )</td><td>Yes ( )
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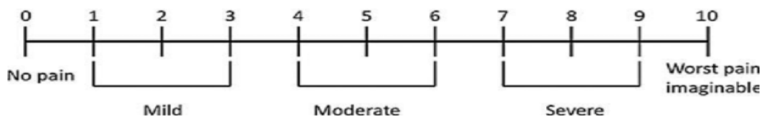
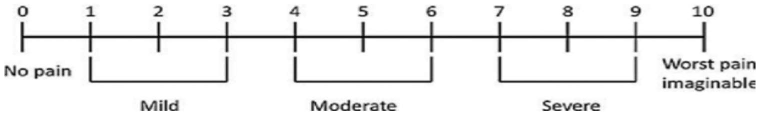
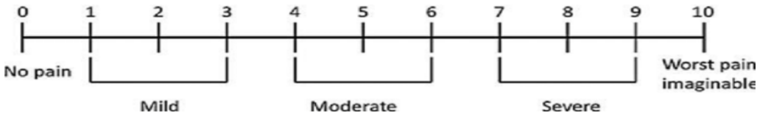
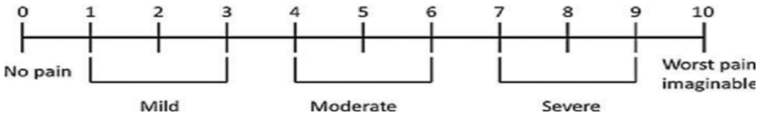
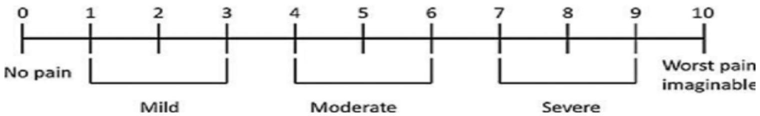
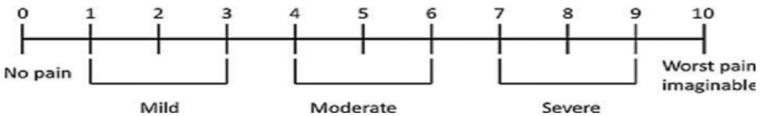
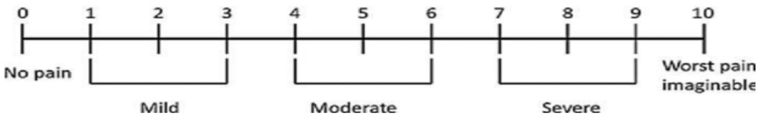
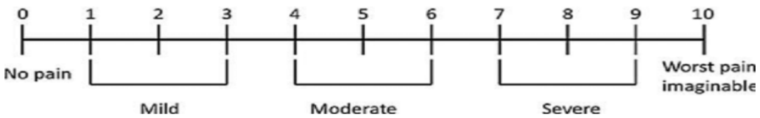
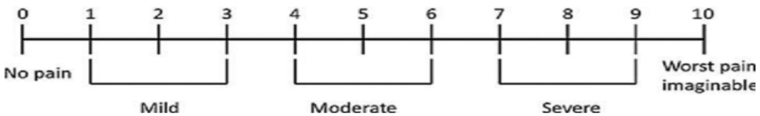
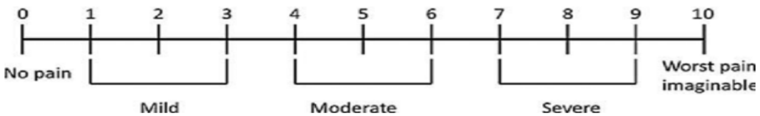
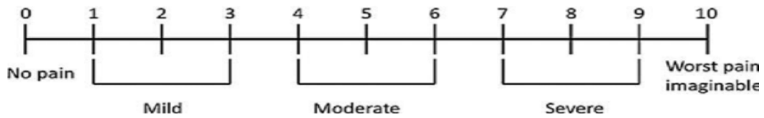
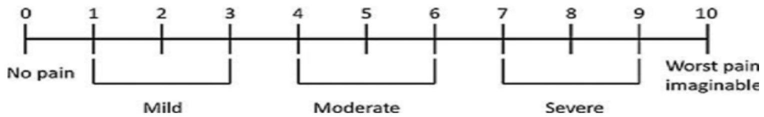
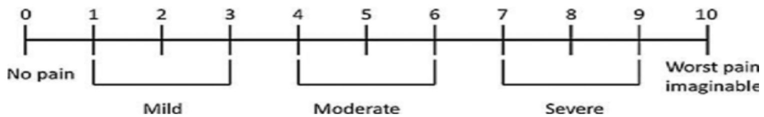
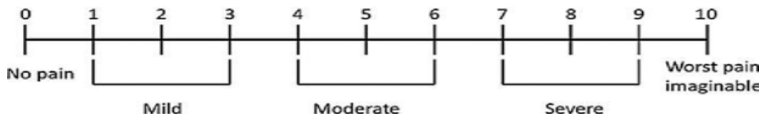
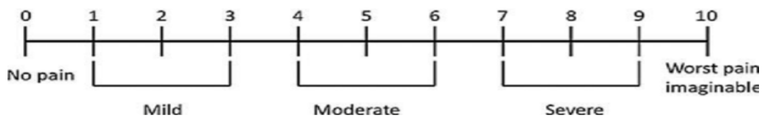
  </td><td>1. Yes ( ) Time: _____
2. No ( )</td><td>1. Painkiller: Yes ( ) No ( )
2. Non-drug method : Yes ( ) No ( )</td><td>Yes ( )
No ( )</td></tr>
</table>

Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )

The second day after surgery: __/__/__ (date/month/year)

Pain Intensity	Report To Nurse or Doctor	Treatment	Pain Relief
Time: ________________  	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________  	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________  	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________  	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )

Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )
Time: ________________ 	1. Yes ( ) Time: _____ 2. No ( )	1. Painkiller: Yes ( ) No ( ) 2. Non-drug method: Yes ( ) No ( )	Yes ( ) No ( )

3. Video for Promote Self-Efficacy of Pain Self-Report for Patients Undergoing Oral and Maxillofacial Surgery

No	Objective	Situation (based on the four sources of self-efficacy)	Script
1.	Introduce the aim of this video to the participant, help participant readiness to learn	Relaxation music, In the room of oral and maxillofacial surgery department (physical and emotional state preparation)	Nowadays, surgery is the main type of treatment for oral and maxillofacial disease. Due to tissue damaged during operation, so after surgery that maybe occur some complications such as pain. Pain is subjective which means the person who experiencing pain is the best one to describe their painful feeling. Pain after surgery is normal however, it can be controlled. The painkiller is the main method to control postoperative pain, but its prescription depends on how much patient report the pain. The pain can be understood by the standard scale, patients learn the scale help to transfer their pain intensity into a number then interpret to health provider to understand. Self-report pain is the foundation and golden standard of pain assessment. In order to control postoperative pain, patient can make their effort to self-report pain.

No	Objective	Situation (based on the four sources of self-efficacy)	Script
2.	Introduce the player	Player who play a role of patient with oral and maxillofacial	My name is Lily, I am 32 years old. I got salivary gland tumor disease. I had tumor remove surgery two day before.
3.	To help the participant to learn the experience before surgery	Before surgery: patient is sitting on the bed and describing experience (vicarious experience)	After I was diagnosis salivary gland tumor, I was worried. However, when I was told that the disease can be treat by surgery, I was hopeful. I think everyone has the same feeling with me. Actually, I was little worry about situation after surgery; I didn't know what would happen. Doctor and nurse provide information about surgery preparation to me, and provide pain information to me. It works, helps me to decrease worries. I learned parts of pain management which I can do to control pain well by myself.
4.	To help the participant to gain the successful	First day after surgery: patient is sitting on the bed and describing pain experience on the first day after surgery, and performed the action she did when she has pain	On the first day after surgery, I had swelling on my face. And sometimes nausea and vomiting, but I could deal with it because my doctor informed me it was the anesthesia related impacts, and also associated with the increased oral secretion. I had ECG monitoring,

No	Objective	Situation (based on the four sources of self-efficacy)	Script
	vicarious experience from the patient including 1) how to self-report pain method; 2) how to self-record pain on the first day after surgery	(enactive mastery experience/ vicarious experience)	oxygen supply, and IV infusion. [Note: normally after surgery if you have wound in the site of intraoral, in order to help the wound healing, you will need to oral gauze packing around 6 hours, after that the secretion in your mouth will increase which may cause you vomiting.] when I felt pain. I pressed the buzzer to inform the nurse. [Note: if you stay alone, you can use the buzzer to report pain; if your family take care of you, you can ask them to help to report pain to the nurse or doctor; also, you can ask the person who around you to help you to report. Don't out of bed when you are monitoring.] The nurse came to see me immediately then I told them my surgical wound pain. She used the numerical rating pain scale to ask me how much pain I felt, and I told her my pain score 7 [picture show the numerical pain rating scale], and I felt hurt, especially when I turning

No	Objective	Situation (based on the four sources of self-efficacy)	Script
			the pain increase. The nurse observed the wound and told me the wound dressing was good [picture catch up the wound: dry and fixed dressing]. [Note: when you feel your surgical site pain, if the wound has dressing, if the dressing wet or you see blood in the surface, please don't touch the wound, directly inform your health provider.] [Note: the first time feel pain should directly tell nurse or doctor, try you best to rate the pain level and pain interference which is better to help doctor to understand you.]. She told me she will report to the doctor, and she comforts me to relax which would help. I followed her. After few minutes, I received painkiller. [Note: the pain medication prescribed dependent on patient clinical condition, not all patients received the same treatment].

No	Objective	Situation (based on the four sources of self-efficacy)	Script
			Around 30 minutes later, the nurse came again to ask me to rate pain again. I told her I felt better and pain score 3. I just point out the score which represent my pain level using the numerical pain rating scale, when you understand that 0 means no pain, 1 to 3 means mild pain, 4 to 6 moderate pain, 7 to 9 severe pain, 10 worst pain. It is easy to rate. [Note: when you have the following situation (1) if you take painkiller by oral, after 1hour your pain not relief or become worse (2) if you receive pain killer by IV infusion, 15 to 30 minutes, you pain still not relief or become worse, you should report to the doctor. If your condition has limitation, you can ask someone which beside you to help you inform nurse or doctor.] On the daytime, I record pain on the paper (Patient Self-Report Sheet). The sheet show the scale very time you rate your pain, you just circle the number which present your pain and record the time. Sometime I

No	Objective	Situation (based on the four sources of self-efficacy)	Script
			asked my family to help me, I told them the pain score, then they write on the sheet. On night, I used to check the Patient Self-Report Sheet, I helps me to remember the pain medication I receive and I can see the progress of pain after surgery. I recorded pain 5 times, and reported to doctor and nurse 3 times when the pain score was 7, 8, 7, respectively. When the pain score was 3, I didn't report to the doctor and nurse because it mild and not interference me. But I recorded.
5.	To help the participant to gain the successful vicarious experience from	Second day after surgery: patient feel better out of bed walk and continue to record pain (enactive mastery experience/ vicarious experience)	On the second day after surgery, I felt better. The nurse told me my vital sign is stable, and they took off monitor and oxygen. I feel relax. When my treatment had finished, I didn't feel discomfort, so I got out of bed, sitting beside the chair and walking around the hallway. [Note: not all patient can out of bed, some patient needs to absolute bed rest such as flap surgery, fracture repair and reduction surgery,

No	Objective	Situation (based on the four sources of self-efficacy)	Script
	the patient including 1) how to self-report pain method; 2) how to self-record pain on the second day after surgery		tracheotomy. Commonly, when patient has minimal surgery, dose not has limitation of treatment, they are allowed to out of bed do activities. However, the situation most depend on patient recovery and their treatment. You should do activities with the permission of your health provider in case of accident event.] This day, I feel less pain than yesterday, I just had mild pain on the daytime total three times, one time was when I turning on bed my wound was touched accident so that cause pain, the pain score was 4, in a few minutes, it relief. Another two times on the afternoon, when I at rest, the pain score was 3 so I didn't tell the nurse. I can clearly see from the sheet that the pain decreased compared with yesterday.
6.	The player share successful experience of	Patient is sitting on the bed and sharing experience (verbal persuasion)	Although pain is subjective, it can be understood by rating the number on the scale of 0 to 10. The scale is easy to understand and record, 0 means no pain, 1 to 3 means mild pain, 4 to 6 moderate pain, 7 to 9

No	Objective	Situation (based on the four sources of self-efficacy)	Script
	self-report pain to encourage the participant performance by themselves		severe pain, 10 worst pain. Sometime, we can't remember everything clearly, however, the sheet can help us to remember, each time I record the pain, and also record the pain treatment I received, and pain relief situation, so that I can check my pain progress. Each time I report to the nurse they can understand me. I received pain treatment based on my self-report. The sheet helps me to see the progress of my pain from first day to second day after surgery. So that help me to increase self-efficacy in self-report pain. It is not difficulty in self-reporting pain by ourselves, we can do our best to participant in pain control after surgery. I can do that belief you can do too.

4. Documentation Form for Postoperative Pain Management (data collected by the researcher)

Date	Time	Onset of pain	Pain score	Location of pain	Character of pain	Pain relief factors (painkiller or nonpharmacological method)	Aggravating factors	Side effect	Impact of pain

Appendix C

Effect Size Calculation

Part 1: effective size calculated for the related study entitle “The Effect and Evaluation of Video Intervention and Education on Stress and Effect of Operation of Patients Undergoing Oral and Maxillofacial Surgery”

In experimental group (n=48), and pain intensity score was measured by visual analog scales (VAS) on day 1 after surgery, the sample size was calculated based on the mean and standard derivation. Finally, the mean score of pain intensity in experimental group (3.86 ± 0.78) was lower than that of control group (6.28 ± 1.13).

Effect Size Calculator for T-Test

For the independent samples T-test, Cohen's *d* is determined by calculating the mean difference between your two groups, and then dividing the result by the *pooled* standard deviation.

$$\text{Cohen's } d = (M_2 - M_1) / SD_{pooled}$$

where:

$$SD_{pooled} = \sqrt{((SD_1^2 + SD_2^2)/2)}$$

Glass' Delta and Hedges' G

Cohen's *d* is the appropriate effect size measure if two groups have similar standard deviations and are of the same size. Glass' *delta*, which uses only the standard deviation of the control group, is an alternative measure if each group has a different standard deviation. Hedges' *g*, which provides a measure of effect size weighted according to the relative size of each sample, is an alternative where there are different sample sizes. (This is important! If you've got different sample sizes then you should use Hedges' *g*.)

Enter Your Values

Please enter the sample mean (*M*), sample standard deviation (*s*) and sample size (*n*) for each group. Two things to note: (1) if you intend to report Glass's *delta*, then you need to enter your control group values as *Group 1*; and (2) if you don't provide values for *n*, the calculator will still calculate Cohen's *d* and Glass' *delta*, but it won't generate a value for Hedges's *g*.

Group 1		*Group 2*	
Mean (*M*):	3.86	Mean (*M*):	6.28
Standard deviation (*s*):	0.78	Standard deviation (*s*):	1.13
Sample size (*n*):	48	Sample size (*n*):	48

Calculate Reset

Success!

Cohen's *d* = (6.28 - 3.86)/0.970902 = 2.492528.

Appendix D

Sample Size Calculation

A-priori Sample Size Calculator for Student t-Tests

This calculator will tell you the minimum required total sample size and per-group sample size for a one-tailed or two-tailed t-test study, given the probability level, the anticipated effect size, and the desired statistical power level.

Please enter the necessary parameter values, and then click 'Calculate'.

Anticipated effect size (Cohen's *d*): 0.72

Desired statistical power level: 0.8

Probability level: 0.05

Calculate!

Minimum total sample size (one-tailed hypothesis): 50

Minimum sample size per group (one-tailed hypothesis): 25

Minimum total sample size (two-tailed hypothesis): 64

Minimum sample size per group (two-tailed hypothesis): 32

Appendix E

Consent Form

Dear Prospective Participants,

I am Mei Zhou, a student for master's degree of nursing (international program) Nursing Faculty of Nursing, Prince of Songkla University at Hatyai Campus. Currently, I am conducting a research study entitled "Effect of Preoperative Self-Efficacy Pain Education Program on Pain Self-Efficacy, Pain Intensity, and Pain Interference Among Patients Undergoing Oral and Maxillofacial Surgery". The purpose of this study is to examine the effectiveness of preoperative pain education program by enhancing your self-efficacy to report pain in self-report pain intensity and pain interferences. Followings are the explanation of the procedures of this study.

1. Explanation Procedure

You are a person who will have oral and maxillofacial surgery and meet our inclusion criteria which include 1) age > 18 years old, 2) communicable, can talk and write smoothly, 3) elective or scheduled surgery, 4) admitted to the OMS ward at least 2 days before surgery, and 5) receiving postoperative care at least 48-hour. if you decide to participant in this study and admission on the first planned 6 weeks of this study, you will be assigned into control group. However, if you admit on the second planned 6 weeks of this study, you will be assigned into experimental group.

In the Control Group

Those who are assigned to control group will receive the standard care that

adherences to the hospital protocol. The care will start at preoperative phase until discharge.

In the Experimental Group

Those who are assigned to experimental group will received standard care that adherence to the hospital protocol and preoperative pain education program which is developed and provided by the researcher. The standard care will give to you until discharge.

The preoperative pain education program aims to educate you about pain and increase your self-efficacy about pain management. The program will be initiated two days before surgery and it will last till the second day after surgery. The researcher is the only educator in this program. The details of preoperative pain education program in the following：

The researcher will 1) prepare the environment and help you to prepare yourself readiness to learn, 2) provide the information about postoperative pain and pain management (drugs, pain reduce mechanism, side effects related sign and symptoms), self-report pain (time, method), 3) watching video within 10 minutes which shared the surgical patient self-report pain and manage pain, 4) imitate and practice, 5) introduce the possible physical and emotional condition after surgery, 6) asking participant to self-appraisal and set goals, and 7) encourage you participant to learn and practice. All these 7 steps will take within 30 minutes. At the end of this session, the researcher will provide the pamphlet to you.

2. Data collection

During data collection time, the researcher will meet the participant five times in total.

The first time, on the participant admission day, the researcher will meet the participant to ask the participant to fill the Demographic and Health Related Information Sheet (12 questions), however, for the BMI will calculate by the researcher, and 13th question will be filled after surgery by the researcher. It will spend 10 to 15 minutes.

The second time, on the two days before surgery, the researcher will meet the participant to ask the participant to fill 1) the Perceived Self-Efficacy to Report Pain Questionnaire (10 questions), 2) Pain Intensity Scale (4 questions), and 3) Pain interference Scale (6 questions), it will spend 20 minutes.

The third time, on the one days before surgery, the researcher will meet the participant to ask the participant to fill 1) the Preoperative Self-efficacy of Pain Self-Report Questionnaire, 2) Pain Intensity Scale, and 3) Pain interference Scale, it will spend 20 minutes.

The fourth time, 24-hour after surgery, the researcher will meet the participant to ask the participant to fill Pain Intensity Scale and Pain interference Scale, it will spend 10 to 15 minutes.

The fifth time, 48-hour after surgery, the researcher will meet the participant to ask the participant to fill Pain Intensity Scale and Pain interference Scale, it will spend

10 to 15 minutes.

Almost questions your response by selection the answer that represent your idea. You will be given a copy of Patient Self-Report Pain Sheet for ease to record about you pain experience by your self-administration. Please response as accurate as possible. Your response is highly valued.

3. Risk and Comfort

There is a minimal potential risk of receiving this program in which would occur during or after educational process, such as you may feel discomfort or stress during receiving education program. In case of feeling discomfort and stress, you can tell the researcher and the researcher will ask you to take a rest and support you to release tension.

4. Benefits

The finding of this study will be benefit to improve nursing intervention for promoting quality of care for patients who undergoing OMS and twill benefit directly to help the participants improve self-capability of aware of postoperative pain, understand pain experience and its treatment, so that would cope with pain. Thus, pain intensity and related effects after surgery will be reduced and quality of life on the patient after OMS will be promoted. Additionally, it will be useful for future related study.

5. Confidentiality

Your responses during the study well be kept in confidentiality. Your name

will not be appeared in any reports and information of the study. The people who work for this study will only able to see your responses without knowing your identity. The information gathered will be used for data analysis but anonymity and confidentiality will be maintained. In addition, when the result of this study is published on a nursing journal or discussed on the conferences, no information given would identify you.

6. Participants and withdrawal from participants

Your participation in this study is voluntary. There is no cost to participant in this study and no financial award. You will be given 30 minutes to think before deciding to participate or refuse from this study. Returning indicates that you understand this form and that you are willing to participant in this research. You also have the right to withdraw participation this study at any time you wish without any consequence. There is no influence on receiving service and any medical treatment if you determined to withdraw from this study.

If you have any queries or you want more information, you can contact me Mei Zhou, at Faculty of Nursing, Prince of Songkla University, Thailand. Or mobile number: 86+15286071213 or email: 1528752584@qq.com. I would be pleased to answer your questions. Or you can contact my advisor Asst. Prof. Dr Hathairat Sangchan, Ph.D. (Nursing), at Faculty of Nursing, Prince of Songkla University, Thailand, mobile 660818975223 or email at hathairat.s@psu.ac.th. Thank you very much for your kind cooperation.

Mei Zhou

Researcher

Certification of Informed Consent

Title: Effect of Preoperative Education Program on Pain Self-Efficacy, Pain Intensity, and Pain Interference Among Patients Undergoing Oral and Maxillofacial Surgery

Researcher: Miss Mei Zhou (Master student, Faculty of Nursing, Prince of Songkla University, Thailand)

Participant's name: Participant's Age:

Participant's consent

I have read or have had read out all the statements in the consent form and do hereby agree to voluntarily participate as a respondent in the study "Effect of Preoperative Education Program on Pain Self-Efficacy, Pain Intensity, and Pain Interference Among Patients Undergoing Oral and Maxillofacial Surgery".

This research study will evaluate preoperative pain education program on pain self-efficacy by Preoperative Pain Self-Efficacy Questionnaire, pain intensity by Pain Intensity Scale, pain interference by Pain Interference Scale. If I agree to participant in the study, I will be educated by the researcher before surgery for approximately 30 minutes.

There would has minimal risk of the study that would cause by uncomfortable or stress during education. And I realize that the risk would not impact on my daily

life function.

I realize that the knowledge gained from this study may help me in the future.

I realize that my participation in this study is entirely voluntary, and I may withdraw from the study at any time I wish. There is no harm if I discontinue my participation in this study, I will be treated as usual.

I understand all study data will be kept confidential. However, this information may be used in nursing publications or presentations.

If I need to, I can contact Miss. Mei Zhou, at Faculty of Nursing, Prince of Songkla University, anytime during this study.

The study has been explained to me. I have read and understand this consent form, all of my questions have been answered, and I agree to participate.

Signature of Participant: ……Date:……

Researcher's note

I have given detail information of the research entitled "Effect of Preoperative Education Program on Pain Self-Efficacy, Pain Intensity, and Pain Interference Among Patients Undergoing Oral and Maxillofacial Surgery". The signature and form returning indicates that the participant understands what is involved and agree to participant in this study voluntarily. I provide opportunities for questions from participants while I also give required answer.

Signature……..(researcher) Date……..

Appendix F

Research Instruments in This Study

Part I Demographic and Health Information Sheet

Instruction: the following items are some information about yourself. Please answer by making [√] in the available space that is appropriate for you and/or filling your information in the blank

1. Age:……years
2. Gender:

   [ ] (1) Male [ ](2) Female
3. Marital status:

   [ ] (1) Married [ ] (2) Single [ ] (3) Divorced/Widowed
4. Educational level:

   [ ] (1) Uneducated [ ] (2) Primary school

   [ ] (3) Secondary school [ ] (4) High school

   [ ] (5) College [ ] (6) Higher college
5. Occupation:

   [ ] (1) No [ ] (2) Government employee

   [ ] (3) Private employee [ ] (4) Retired

   [ ] (5) Others…….
6. Monthly income:

   [ ] (1) Less than 500.000 CNY [ ] (2) 500.000-2, 000.000 CNY

   [ ] (3) 2, 000.000 – 5.000.000 CN [ ] (4) More than 5, 000.000 CNY
7. Health insurance:

[ ] (1) No [ ] (2) Yes, type of insurance……

8. Height =……..meter Weight =…….Kg *BMI = ……(by researcher)

9. Do you have any health problem / illness comorbidity? (if you select “don’t know clearly” or “no” option, please move to answer question 10)

[ ] (1) Don’t know clearly

[ ] (2) No

[ ] (3) Yes, please specify

3-1) Health problem……Treatment or Medication……..

3-2) Health problem……Treatment or Medication……

10. **Past pain experience**: Do you have other physical painful experience before admission? (if you select “can’t remember” or “no” option, please move to answer question 11)

[ ] (1) Can’t remember

[ ] (2) No

[ ] (3) Yes, please specify

3-1) Cause of pain:

[ ]surgery, Please specific date of surgery……...how many times…….

[ ]other……

3-2) Level of the pain: [ ] mild [ ]moderate [ ]severe

3-3) Characteristics of the pain:…….....……

3-4) Location of the pain:……

3-5) Method to relief pain

[ ] medication:……..

[ ] non-pharmacology:…….

11. **Current pain experience:** Do you have any pain now?

[ ] (1) No

[ ] (2) Yes, please specify

2-1) Cause of the pain now:…..……

2-2) Level of the pain: [ ] mild [ ]moderate [ ]severe

2-3) Characteristics of the pain:……

2-4) Location of pain:…….....……..….

2-5) Effect of pain now:……..…

2-6) Method to relief pain

[ ] medication:……

[ ] non-pharmacology:…….……...……..

12. Current surgery information <u>*This data will obtain from patient sheet*</u>

(1) Date of admission:……..…. Date of surgery:……

(2) Diagnosis……

(3) Type of surgery, specify……

(4) Type of incision:

[ ] 1) Intraoral

[ ] 2) Extraoral maxillofacial and neck

[ ] 3) Intraoral and extraoral traffic

[ ] 4) Flap transplantation multiple incision

[ ] 5) Others:……

(5) Duration of surgery:…….……..

(6) Anesthesia method:

[ ] (1) General anesthesia [ ] (2) Local anesthesia

(7) Number of drains insertion:

[ ] (1) 0 [ ] (2) 1 [ ] (3) 2 [ ] (4) 3

(8) Name of the drain:……

(9) Location of the drain:……...

Part II Perceived Self-efficacy to Report Pain Questionnaire

Instruction: how much of your self-confident that you can do the following items at present by cycling one of the numbers on the scale under each item [0 = not at all confident and 6 = completely confident].

Before received the program (2 day before surgery)

1. I can **tell** my pain to nurse or physician **timely**.

0	1	2	3	4	5	6
Not all confident					Completely confident	

2. I can **tell how much pain** I have by **rating number from 0 to 10**.

0	1	2	3	4	5	6
Not all confident					Completely confident	

3. I can **interpret and use the score** to rate my pain that 1 to 3 indicate “mild pain”, 4 to 6 indicate “moderate pain”, 7 to 9 indicate “severe pain”, and 10 indicate “worst pain imaginable”.

0	1	2	3	4	5	6
Not all confident					Completely confident	

4. I can **record my pain** on the Patient Pain Self-Report Sheet.

0	1	2	3	4	5	6
Not all confident					Completely confident	

5. I can **identify at least pain** in the last 24 hour.

0	1	2	3	4	5	6
Not all confident					Completely confident	

6. I can **identify worst pain** in the last 24-hour.

0	1	2	3	4	5	6
Not all confident					Completely confident	

7. I can **identify average pain** in the last 24-hour.

0	1	2	3	4	5	6
Not all confident					Completely confident	

8. I can **identify** that I feel pain gradually decrease or increase, after getting medication or non-pharmacological pain management.

0	1	2	3	4	5	6
Not all confident					Completely confident	

9. I can **identify** what cause my postoperative pain decrease or increase.

0	1	2	3	4	5	6
Not all confident					Completely confident	

10. I can **describe impact of pain**, both on physical and mood.

0	1	2	3	4	5	6
Not all confident					Completely confident	

After received the program (1 day before surgery)

1. I can **tell** my pain to nurse or physician **timely**.

0	1	2	3	4	5	6
Not all confident					Completely confident	

2. I can **tell level** of my pain by **rating number from 0 to 10**.

0	1	2	3	4	5	6
Not all confident					Completely confident	

3. I can **interpret and use the score** to rate my pain that 1 to 3 indicate “mild pain”, 4 to 6 indicate “moderate pain”, 7 to 9 indicate “severe pain”, and 10 indicate “worst pain imaginable”.

0	1	2	3	4	5	6
Not all confident					Completely confident	

4. I can **record my pain** on the Patient Pain Self-Report Sheet.

0	1	2	3	4	5	6
Not all confident					Completely confident	

5. I can **identify at least pain** in the last 24 hour.

0	1	2	3	4	5	6
Not all confident					Completely confident	

6. I can **identify worst pain** in the last 24-hour.

0	1	2	3	4	5	6
Not all confident					Completely confident	

7. I can **identify average pain** in the last 24-hour.

0	1	2	3	4	5	6
Not all confident					Completely confident	

8. I can **identify** that I feel pain gradually decrease or increase, after getting medication or non-pharmacological pain management.

0	1	2	3	4	5	6
Not all confident					Completely confident	

9. I can **identify** what cause my postoperative pain decrease or increase pain.

0	1	2	3	4	5	6
Not all confident					Completely confident	

10. I can **describe impact of pain**, both on physical and mood.

0	1	2	3	4	5	6
Not all confident					Completely confident	

Part III Pain Intensity Scale

Instruction: please rate your pain intensity in the following time points by cycling one of the numbers on the scale under each item [0 = no pain and 10 = pain as much as you can image].

Before surgery

Date……..Time…….

1. Please rate your pain by cycling the number that best describes your pain at its worst in the last 24-hour.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

2. Please rate your pain by cycling the number that best describes your pain at its least in the last 24-hour.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

3. Please rate your pain by cycling the number that best describes your pain on the average.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

4. Please rate your pain by cycling the number that tells how much pain you have right now.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

24-hour after surgery

Date……..Time…….

1. Please rate your pain by cycling the number that best describes your pain at its worst in the last 24-hour.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

2. Please rate your pain by cycling the number that best describes your pain at its least

in the last 24-hour.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

3. Please rate your pain by cycling the number that best describes your pain on the average.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

4. Please rate your pain by cycling the number that tells how much pain you have right now.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

48-hour after surgery

Date……..Time…….

1. Please rate your pain by cycling the number that best describes your pain at its worst in the last 24-hour.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

2. Please rate your pain by cycling the number that best describes your pain at its least in the last 24-hour.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

3. Please rate your pain by cycling the number that best describes your pain on the average.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

4. Please rate your pain by cycling the number that tells how much pain you have right now.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

Part IV Pain Interferences Scale

Instruction: please rate your pain interference by cycling the number that best describes how much interference you have.

Before surgery

Date……..Time…….

1. General activities such as change position, turning, sit up

0	1	2	3	4	5	6	7	8	9	10
Dose not interfere										completely interferes

2. Mood

0	1	2	3	4	5	6	7	8	9	10
Dose not interfere										completely interferes

3. Walking ability

0	1	2	3	4	5	6	7	8	9	10
Dose not interfere										completely interferes

4. Relationship with others

0	1	2	3	4	5	6	7	8	9	10
Dose not interfere										completely interferes

5. Sleep

0	1	2	3	4	5	6	7	8	9	10
Dose not interfere										completely interferes

6. Enjoyment of life

0	1	2	3	4	5	6	7	8	9	10
Dose not interfere										completely interferes

24-hour after surgery

Date……..Time…….

1. General activities such as change position, turning, sit up

0	1	2	3	4	5	6	7	8	9	10

Dose not completely
interfere interferes

2. Mood

0 1 2 3 4 5 6 7 8 9 10

Dose not completely
interfere interferes

3. Walking ability

0 1 2 3 4 5 6 7 8 9 10

Dose not completely
interfere interferes

4. Relationship with others

0 1 2 3 4 5 6 7 8 9 10

Dose not completely
interfere interferes

5. Sleep

0 1 2 3 4 5 6 7 8 9 10

Dose not completely
interfere interferes

6. Enjoyment of life

0 1 2 3 4 5 6 7 8 9 10

Dose not completely
interfere interferes

48-hour after surgery

Date……..Time…….

1. General activities such as change position, turning, sit up

0 1 2 3 4 5 6 7 8 9 10

Dose not completely
interfere interferes

2. Mood

0 1 2 3 4 5 6 7 8 9 10

Dose not completely
interfere interferes

3. Walking ability

0 1 2 3 4 5 6 7 8 9 10

Dose not completely
interfere interferes

4. Relationship with others

0	1	2	3	4	5	6	7	8	9	10
Dose not interfere										completely interferes

5. Sleep

0	1	2	3	4	5	6	7	8	9	10
Dose not interfere										completely interferes

6. Enjoyment of life

0	1	2	3	4	5	6	7	8	9	10
Dose not interfere										completely interferes

Appendix G

Permission to Utilize Research Instruments

Permission for utilize the instrument of Chinese version Brief Pain Inventory

DocuSign Envelope ID: 10DD3139-EB56-4067-B16A-75A59834E056

SYMPTOM ASSESSMENT TOOL LICENSE AGREEMENT

This Symptom Assessment Tool License Agreement (the "Agreement," including both Part I License Information and Part II Terms & Conditions) is entered into as of the Effective Date by and between The University of Texas M. D. Anderson Cancer Center ("MD Anderson") and the Licensee identified below. MD Anderson and Licensee may each hereinafter be individually referred to as a "Party" and collectively as the "Parties."

Under certain license agreements with Symptom Assessment Systems, LLC, MD Anderson has obtained the exclusive right to grant a license to use, reproduce, and/or distribute copies of, the Symptom Assessment Tool. Licensee desires to obtain the right to use, reproduce, and/or distribute copies of, the Symptom Assessment Tool for the Permitted Use described herein.

NOW, THEREFORE, in consideration of the promises, conditions, covenants and warranties herein contained, the Parties agree as follows:

PART I LICENSE INFORMATION

1.	**Licensee**	Name:	Prince of Songkla University
		ATTN:	Mei Zhou
		Address Line 1:	Prince of Songkla University, 15 Kanchanawanit road
		Address Line 2:	kho hong, Hatyai, Songkhla 90110
		Address Line 3:	Thailand
		Address Line 4:	N/A
		Email Address:	1528752584@qq.com
2.	**Permitted Use** Student research (thesis, dissertation)		
3.	**Symptom Assessment Tool** BPI-SF CHINESE-SIMPLIFIED		
4.	**License Fee:** $ 100.00		

IN WITNESS WHEREOF, the parties hereto have caused their duly authorized representatives to execute this Agreement.

Licensee *(see Item 1, above)*

Signed: Mei Zhou
(signature of representative)

Name: Mei Zhou
(printed name of representative)

Title: Master student
(position within Licensee organization)

Date: 29 / 01 / 2020
(date signed by representative)

The University of Texas M.D. Anderson Cancer Center

Signed:
(signature of representative)

Name: Andrew Dennis
(printed name of representative)

Title: Managing Director
(position within MD Anderson)

Date: 1/30/2020 | 12:57 PM CST
(date signed by representative)

1

Appendix H

Experts in This Study

1. Assoc. Prof. Dr. Nongnut Boonyoung

   Dean of Faculty of Nursing

   Nursing Administration Department, Prince of Songkla University, Thailand

2. Asst. Prof. Dr. Luppana Kitrungrote

   Lecturer

   Faculty of Nursing, Prince of Songkla University, Thailand

3. Asst. Prof. Dr. Jintana Damkliang

   Lecturer

   Faculty of Nursing, Prince of Songkla University, Thailand

Appendix I

The Content Validity Index of Research Instruments

1. Perceived Self-Efficacy to Report Pain Questionnaire

Items	Item relevancy to the objective		Content relevancy		Item repetition		Item clarification		Item-CVI
	Relevant	Not relevant	Relevant	Not relevant	Repetitive	Not repetitive	Clarify	Not clarify	
1. I can tell (report) my pain to nurse or physician timely.	3		3			3	3		1
2. I can tell how much pain I have by rating number from 0 to 10.	3		3			3	3		1
3. I can understand the score that 1 to 3 indicate “mild pain”, 4 to 6 indicate “moderate pain”, 7 to 9 indicate “severe	2	1	2	1	1	2	2	1	.75

pain", and 10 indicate "worst pain imaginable".									
4. I can record my pain on the Patient Pain Self-Report Sheet.	3		3			3	3		1
5. I can identify my at least pain in the last 24 hour.	3		3			3	3		1
6. I can identify my worst pain in the last 24-hour.	3		3			3	3		1
7. I can identify my average pain in the last 24-hour.	3		3			3	3		1
8. I can identify that I feel pain gradually decrease or increase, after getting medication or some non-pharmacological pain management.	3		3			3	3		1
9. I can identify factors related to my postoperative pain (decrease or increase	3		3			3	3		1

pain).									
10. I can describe impact of pain, both on physical and mood.	3		3			3	3		1

Scale-CVI is 0.975

2. Pain Intensity Scale

Items	Item relevancy to the objective		Content relevancy		Item repetition		Item clarification		Item-CVI
	Relevant	Not relevant	Relevant	Not relevant	Repetitive	Not repetitive	Clarify	Not clarify	
1. Please rate your pain by cycling the number that best describes your pain at its worst in the last 24-hour.	3		3			3	3		1
2. Please rate your pain by cycling the number that best describes your	3		3			3	3		1

Items	Item relevancy to the objective		Content relevancy		Item repetition		Item clarification		Item-CVI
	Relevant	Not relevant	Relevant	Not relevant	Repetitive	Not repetitive	Clarify	Not clarify	
pain at its least in the last 24-hour.									
3. Please rate your pain by cycling the number that best describes your pain on the average.	3		3			3	3		1
4. Please rate your pain by cycling the number that tells how much pain you have right now.	3		3			3	3		1

Scale-CVI is 1

3. Pain Interferences Scale

Items	Item relevancy to the objective		Content relevancy		Item repetition		Item clarification		Item-CVI
	Relevant	Not relevant	Relevant	Not relevant	Repetitive	Not repetitive	Clarify	Not clarify	
Please rate your pain interference by cycling the number that best describes how much interference you have.	3		3			3	3		1
1. General activities such as change position, turning, sit up	3		3			3	3		1
2. Mood	3		3			3	3		1
3. Walking ability	3		3			3	3		1
4. Relationship with others	3		3			3	3		1
5. Sleep	3		3			3	3		1
6. Enjoyment of life	3		3			3	3		1

Scale-CVI is 1

Appendix J

The Reliability of Instruments

1. Perceived Self-Efficacy to Report Pain Questionnaire

Reliability Statistics

Cronbach's Alpha	N of Items
.893	10

2. Pain intensity scale

Reliability Statistics

Cronbach's Alpha	N of Items
.896	4

3. Pain interference scale

1). First time (20 participants)

Reliability Statistics

Cronbach's Alpha	N of Items
.755	6

2). Second time (30 participants)

Reliability Statistics

Cronbach's Alpha	N of Items
.922	6

Appendix K

Test of Assumptions

Assumption of Normality by Z-score (Skewness divided by Std. Error or Kurtosis divided by Std. Error) of Study Variables

Variables	Control group	Z-score	Experimental group	Z-score	Distribution
Self-efficacy to report pain					
Before intervention	-.617/.833	-.0741	.463/.833	.556	Normal
After intervention	-.749/.833	0.899	-.16/.833	-.190	Normal
Pain intensity 24-hour after surgery					
Worst	.089/.427	0.208	-.202/.833	-0.242	Normal
Least	-.474/.833	-0.569	.582/.833	0.699	Normal
Average	.277/.427	0.649	1.015/.833	1.218	Normal
Right now	-.19/.833	-0.228	.282/.833	0.339	Normal
Pain intensity 48-hour after surgery					
Worst	-.223/.833	-0.268	1.799/.833	2.16	Abnormal
Least	1.833/.427	4.29	2.542/.833	3.05	Abnormal
Average	.807/.427	0	2.491/.427	5.83	Abnormal
Right now	.87/.833	1.04	2.49/.427	5.83	Abnormal
Pain interferences 24-hour					
	.067/.833	0.804	3.478/.833	4.175	Abnormal
Pain interferences 48-hour					
	2.235/.833	2.683	6.398/.833	7.68	Abnormal

Assumption of homogeneity of variance of Study Variables (tested by Levene's Test for Equality of Variances)

Variables	Levene's Test for Equality of Variances	Equal variances
Self-efficacy to report pain	.000	Not assumed
Pain intensity 24-hour after surgery		
Worst	.701	Assumed
Least	.182	Assumed
Average	.264	Assumed
Right now	.039	Not assumed

Appendix L

The Performance of Self-Efficacy to Report pain

Table A

Frequency and Percentage of Performance of Pain Self-report Between Control Group (n=30) and Experimental Group (n=30)

Item		Control group		Experimental group		Test value	*p*	effect size (ES)
		n	%	n	%			
The times of performance of pain self-report less than or equal to 3						25.097[b]	0.009	0.575
	0	4	13.3	1	3.3			
	2	1	3.3	0	0			
	3	1	3.3	0	0			
	4	3	10	0	0			
	5	1	3.3	0	0			
	6	3	10	0	0			
	7	1	3.3	0	0			
	8	0	0	2	6.7			
	9	1	3.3	1	3.3			
	10	1	3.3	0	0			
	11	3	10	2	6.7			
	12	11	36.7	24	3.4			
The times of performance of pain self-report more than						25.097[b]	0.009	0.575
	0	11	36.7	24	80			
	1	3	10	2	6.7			
	2	1	3.3	0	0			
	3	1	3.3	1	3.3			
	4	0	0	2	6.7			

Item		Control group		Experimental group		Test value	*p*	effect size (ES)
3	5	1	3.3	0	0			
	6	3	10	0	0			
	7	1	3.3	0	0			
	8	3	10	0	0			
	9	1	3.3	0	0			
	10	1	3.3	0	0			
	12	4	13.3	1	3.3			
The number of times it should due be reported* to medical staff						4.807[b]	0.44	0.246
	0	28	93.3	24	80			
	1	1	3.3	2	6.7			
	3	1	3.3	1	3.3			
	4	0	0	1	3.3			
	6	0	0	1	3.3			
	12	0	0	1	3.3			
The number of times it should actually be reported** to medical staff						24.694[b]	0.10	0.57
	0	11	36.7	24	80			
	1	4	13.3	2	6.7			
	2	2	6.7	0	0			
	3	1	3.3	1	3.3			
	4	0	0	2	6.7			
	5	1	3.3	0	0			
	6	3	10	0	0			
	7	1	3.3	0	0			
	8	2	6.7	0	0			

Item		Control group		Experimental group		Test value	*p*	effect size (ES)
	9	1	3.3	0	0			
	10	1	3.3	0	0			
	12	3	10	1	3.3			

Note. n=frequency, %=percentage, [b]Likelihood Ratio.
*Due report means that the fact patient report how many time of pain intensity score to medical staff； ** Actually report means that the patient have to report how many times of pain intensity to the medical staff.

Table B

The Interpretation Outcome of Performance of Pain Self-report Between Control Group (n=30) and Experimental Group (n=30)

Control Group				Experimental group				Test value	*p*
Incorrect*		Correct**		Incorrect		Correct			
n	%	n	%	n	%	n	%	30	0.000
20	66.7	10	33.3	0	0	30	100		

Note. N=frequency, %=percentage, [a]Pearson Chi-Square.
*Incorrect means the patient when the pain score more than 3 they should report to the medical staff, but in fact they didn't. **Correct means the patient when the pain score more than 3 they reported to the medical staff.

Appendix M

Approval Letters

1. Ethical Approval for Data Collection from Prince of Songkla University

Certificate of Approval of Human Research Ethics
Center for Social and Behavioral Sciences Institutional Review Board,
Prince of Songkla University

Document Number:	2020 NSt – Qn 009
Research Title:	Effect of Preoperative Pain Education Program on Pain Self-Efficacy, Pain Intensity, and Pain Interferences Among Patients Undergoing Oral and Maxillofacial Surgery
Research Code:	PSU IRB 2020 – NSt 008
Principal Investigator:	Miss Mei Zhou
Workplace:	Master of Nursing Science Program in Adult and Gerontological Nursing (International Program), Faculty of Nursing, Prince of Songkla University
Approved Document:	1. Human Subjects 2. Instrument 3. Invitation and Informed Consent
Approved Date:	17 April 2020
Expiration Date:	17 April 2022

This is to certify that the Center for Social and Behavioral Sciences Institutional Review Board, Prince of Songkla University has approved for Ethics of this research in accordance with Declaration of Belmont.

Sasitorn Phumdoung

(Professor Dr. Sasitorn Phumdoung)
Committee Chairman of Center for Social and Behavioral Sciences
Institutional Review Board, Prince of Songkla University

2. Ethical Approval for Data Collection from Guizhou Provincial People's Hospital

贵州省人民医院伦理委员会
EC of Guizhou Provincial People's Hospital

伦理审查批件

Ethical Review Approval

伦审字（科研）（2020）54 号　　审查日期：2020.10.15

申报课题名称全称（含课题编号及版本号）	术前疼痛宣教对口腔颌面外科患者疼痛自我效能、疼痛强度和疼痛影响的效果评价				
申办者（主要研究者）/承担科室	口腔颌面外科 周美				
项目类别	□国际合作项目（具体说明：　　） □国家级基金项目（具体说明:　　） □省部级科研项目（具体说明：　） □厅局级科研项目（具体说明：　　） □院基金项目（具体说明：　　） □企业资助研究（企业名称：　　） ☑学位课题研究（☑硕士　　□博士　　） □其他（请填写：　　）				
审查文件	复审申请表； 研究方案修改详情； 研究方案（版本号：GZ-ZM-V02-2020；版本日期：2020 年 9 月 27 日）； 知情同意书（版本号：GZ-ZM-V02-2020；版本日期：2020 年 9 月 27 日）。				
审查方式	会议审查□	紧急会议审查□	快速审查☑		
审查类别	初始审查□	跟踪审查□	复审☑		
会议时间	/	会议地点	/		
到会委员	/		邀请专家	/	
委员人数	/人	到会委员	/人	回避委员	/人
表决结果	批准	/票			
	不批准	/票			
	修改后批准	/票			
	修改后再审	/票			
	暂停或终止研究	/票			
讨论结果	批准	☑			
	不批准	□			

Ethical Approval for Data Collection from Guizhou Provincial People's Hospital

(continued)

伦理审查批件（科研）

	修改后批准	☐
	修改后再审	☐
	暂停或终止研究	☐
审查决定	1. 递交的研究方案等资料（详见审查文件），经本伦理委员会审查，符合伦理规范及相关法律，同意开展该项研究。 2. 跟踪审查频率： ☑12 个月　☐6 个月　☐其他： 科研及实验动物伦理分委员会主任委员或副主任委员签名： 贵州省人民医院伦理委员会（盖章） 2020.10.16	
声明	本伦理委员会人员构成和工作程序符合中国 GCP 及国家相关规定	
备注	1. 本批件有效期为 1 年。研究应当在伦理委员会同意之日起 1 年内实施，逾期未实施的，本审查批件自行废止。 2. 研究应须遵循本伦理委员会批准的方案执行，须符合 GCP 和《赫尔辛基宣言》的原则。 3. 自同意研究之日起，请根据本伦理委员会的定期跟踪审查频率，在审查日到期前一个月提交年度/定期跟踪审查报告。 4. 研究过程中，对研究方案和知情同意书等文件的任何修改，均需提交修正案审查，经伦理委员会审查同意后方可实施。 5. 暂停/提前终止临床研究，请及时向伦理委员会提交报告。 6. 发生严重不良事件及影响研究风险受益比的非预期事件，请及时报告本伦理委员会。 7. 发现违反试验方案情况须及时报告本伦理委员会。 8. 完成临床研究，请向伦理委员会提交结题报告、中心小结进行审查。 9. 凡涉及中国人类遗传资源管理办公室批准的研究项目，需获得遗传办公室批准后才能开始研究。	

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Appendix N

List of Instrument Translators

Three translators translating the research instruments are:

1. Ms. Mei Zhou

   RN, Prepared Master's Nursing Student, Faculty of Nursing, Prince of Songkla University, Thailand

2. Mrs. Kun Xu

   Lecturer, Prepared Doctor's Nursing Student, Faculty of Nursing, Prince of Songkla University, Thailand

3. Mrs. Zhongchen Luo

   Lecturer, Faculty of Nursing, Guizhou Medical University， Master Degree of Sun Yat-sen University, China

VITAE

Name Ms. MEI ZHOU

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Education Attainment

Degree	Name of Institution	Year of Graduation
Bachelor of Nursing	Zhunyi Medical University	2015

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