# Effects of A Thai Traditional Music Listening Program on Acute Pain Alleviation and Early Ambulation among Patients during the First 48 hours after Open Abdominal Surgery

**Phanicha Phosida, R.N., M.NS.*, Pongsri Srimoragot, RN, D.N.S.*, Supreecha Asawakran, M.D.**, (FRCST)., Natee Chiengchana, Ph.D. (MUSIC) *****

**Faculty of Nursing, Mahidol University, Bangkok 10700, **Department of Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, ***Ratchasuda College, Mahidol University, Salaya, Nakhonpathom 73170, Thailand.*

## ABSTRACT

**Background:** To study the effects of listening to a Thai traditional music program on acute pain alleviation among patients during the first 48 hours after open abdominal surgery.
**Objective:** A cross over research design in adult patients' aged 18-60 years at Siriraj Hospital.
**Methods:** The sample was selected by purposive sampling based on inclusion criteria and assigned into the following two groups by simple random sampling: the group receiving the Thai traditional music program (experimental group) and the group receiving routine care (control group). This study employed a cross over design with 44 samples in a private surgical ward at Siriraj Hospital, Bangkok. Pain was assessed before and after the intervention. Data were collected by the following three sets of instruments: 1) the demographic and treatment background form; 2) the Thai Short - Form McGill Pain Questionnaire with the vital sign form and 3) the post abdominal surgery early ambulation form.
**Results:** The patients in the experimental group had lower mean pain descriptor scores, mean present pain intensity scores and mean Visual Analog Scale scores after the Thai traditional music program than before the intervention at 48 hours after abdominal surgery with statistical significance ($t = 14.11$, $t = 17.41$ and $t = 16.47$) ($p < .001$), respectively. When compared between groups, the patients in the experimental group had lower mean pain descriptor scores, mean present pain intensity scores and mean Visual Analog Scale scores than the control group at 48 hours with statistical significance ($F = 138.71$, $F = 170$ and $F = 298.97$) ($p < .001$), respectively. Furthermore, on the first and second postoperative days as well as the sum of both days, the experimental group was also found to have better early ambulation mean scores than the control group with statistical significance ($F = 10.67$, $p < .002$, $F = 41.36$, $p < .001$, $F = 44.47$, $p < .001$), respectively.
**Conclusion:** The findings suggest that a Thai traditional music program should be prescribed for patients who have undergone open abdominal surgery as a part of pain management to optimize the effectiveness of pain control and improve early ambulation and the quality of postoperative pain control after open abdominal surgery.

**Keywords:** Thai traditional music program; postoperative pain; early ambulation; open abdominal surgery

**Siriraj Med J 2016;68:284-290**
***E-journal: https://www.tci-thaijo.org/index.php/sirirajmedj***

*Correspondence to: Phanicha Phosida*
*E-mail: panichaposeeda@hotmail.com*
*Received 27 April 2016*
*Revised 7 June 2016*
*Accepted 16 June 2016*

## INTRODUCTION

Acute postoperative pain remains a significant clinical issue. According to studies, 30 percent of patients experience moderate to severe postoperative pain.[3,9,11] Open abdominal surgery is major surgery causing severe postoperative pain during the first 48 hours as a result of tissue injury and nerve trauma caused by the surgery.[4] As a result, the functions of various systems in the body are affected. This leads to complications such as pneumonia and lung atelectasis[20] with impact on postoperative recovery. In addition, the aforementioned pain causes exhaustion, fatigue, anxiety and depression that delay postoperative ambulation[6] leading to longer hospital stay or re-admission.[12]

Effective pain management results in early postoperative ambulation.[2,12] Postoperative ambulation is a transition from illness to the best postoperative physical condition.[2] Early physical ambulation can be assessed based on postoperative ambulation practices by deep breathing,[12,15] effective coughing, body movements, sitting up and early postoperative movement as soon as possible.[2]

According to the literature review related to postoperative pain management by music therapy, music was found to be able to reduce anxiety, pain, stress and depression[5] while distracting patients from pain with physical, mental and spiritual effects.[1,8,12,17] Music causes biochemical responses in the brain influencing reticular formation. It also changes cognitive function, emotions and memories while triggering the pituitary gland, limbic system and hypothalamus to secrete endorphins with similar effect of morphine to relieve pain.[7,17] It also triggers functions of the autonomic nervous system to reduce stress.[19] According to Kwon M., et al.'s study, music therapy had the effects of creating alpha brain waves to help patients remain calm, relaxing from stress[12] and improving postoperative ambulation in patients.[12]

At Siriraj Hospital where 2,160, 2,494 and 2,717 open abdominal surgery patients were treated in 2011, 2012 and 2013, respectively, postoperative pain management primarily emphasizes pharmacological pain relief. No non-pharmacological pain management has been systematically implemented, and no Thai traditional music has been applied to pain control. Therefore, the present study tested the effects of Thai traditional music therapy as a part of postoperative pain management. In the USA, music has been applied as a nursing intervention for postoperative pain management. According to a Systematic Review[8] in Sweden, the effects of musical interventions have demonstrated effects on anxiety and pain reduction. In Finland[17], a musical intervention was implemented to reduce pain in abdominal surgery patients.[23] Also in Korea, Korean and American Music has been found to reduce pain in Korean women after gynecologic surgery.[10] Numerous studies have confirmed the significant positive effects of music on postoperative pain. However, all of the above differ in terms of language, lifestyle, preferences and culture[4]. No relevant studies have been conducted in Thailand in relation to the implementation of Thai traditional music therapy to relieve postoperative pain after abdominal surgery. Only one integrated review has shown the effects of music application to relieve the pain and anxiety of postoperative general and orthopedic surgery patients[22]. The findings indicate differences between these two groups with applications of a selection of Thai musical instruments including wind, strings, percussion, rhythm and volume. All of the aforementioned can relieve pain.[22] Thai traditional music is very different from international and modern Thai music in terms of the sound and shape of instruments. Thai traditional music has a rolling sound that is divided into 7 tones distinguished by equal frequency.[19] Therefore, the objective of this study was to compare the effects of Thai traditional music and conventional care on pain alleviation and ambulation in postoperative patients during the first 48 hours after open abdominal surgery.

## MATERIALS AND METHODS

This cross over study was approved by the Siriraj Institution Review Board (Si.447/2015), Faculty of Medicine Siriraj Hospital. The researcher explained the protection of human rights to the patients and asked them to sign informed consent

forms to participate in the study as volunteers. The sample size was set by using the mean values of variables from a similar study by Ebneshahidi (2007), who studied the effects of music therapy on pain in post caesarean section patients and set the effect size at 0.415. The sample group used the G-power Program Version 3.1.7. Significance was set at .05. Power of test was set at .80. The sizes of the two sample groups were obtained at 18 samples per group for a total of 36 samples. An additional 20 percent was added to prevent attrition from the sample group bringing the number to 44 samples.

The samples were selected by purposive sampling based on inclusion criteria, namely, the ability to read, write and understand Thai, no history of mental symptoms based on medical history, no hearing problems and good consciousness. Hearing was tested by a negative whispering test, the Rinne test and the Weber test. The exclusion criteria consisted of patients who had under gone minimally invasive surgery or emergency surgery and patients who had postoperative complications such as hemorrhage, hypotension or confusion. Patients were 18 years old or up and had undergone elective open abdominal surgery. All of the samples were assigned into an experimental (Thai traditional music) or control (conventional care) group by simple random sampling. Then the groups were switched to another group for the second session in the afternoon. For the experimental group on the first postoperative day, the patients received Thai traditional music first and were switched to conventional care in the afternoon. On the second postoperative day, the experimental group was given conventional care first then switched to the Thai traditional music program later in the afternoon. The control group was switched to receive routine care first then switched to receive Thai traditional music in the afternoon. Then on the third postoperative day, the control group was switched to receive the Thai traditional music program first, followed by routine care. Both groups had approximately 4 hours for a wash-out period between both interventions. In the present study, the Thai traditional music program was selected by patients with characteristics matching the sample group. A popular vote yielded seven songs that were selected for arrangement in the Thai Traditional music program including Tarikipas, Kamayn laikwaai, Laosiangtian, Laoduangduan, Laosuayruay, Kangkwamgingluay and Kamayn Omdteuk. The 7 songs lasted for approximately 30 minutes each. The investigator rearranged all 7 songs into 7 versions based on sequence. The researcher then allowed the patients to select one version based on their preference. The patients listened to music on iPads with self-control settings for volume. Data were collected by the following three sets of instruments: 1) the demographic and treatment background form; 2) the Thai Short - Form McGill Pain Questionnaire with the vital sign form and 3) the early ambulation form. Data were collected twice daily on the first and second postoperative days at 6 a.m. and 6 p.m. The Thai traditional music program and three types of measurements were validated by three experts including an advanced practice nurse in surgical care, a surgical nurse professor and an anesthetic specialist. Next, all instruments were tested for Content Validity Index at .71 and Cronbach's alpha coefficient reliability at .74

**Statistical analysis**

Data were calculated for descriptive statistics including mean and standard deviation of pain descriptors, present pain intensity, visual pain analog scores, vital signs, oxygen saturation and early ambulation scores. Pre- and post-intervention comparisons were made and tested by paired t-test. The differences between the experimental and control group were tested by using independent t-test statistics. According to the findings, there were significant differences in the three variables for pre-operative pain. Therefore, the difference between the experiment and control groups was tested by analysis of covariance.

## RESULTS

Five patients dropped out due to unstable conditions during the postoperative period resulting from severe blood loss or low blood pressure, nausea, or vomiting. The mean age of patients in this study was 63.05 years old. Most of the samples lived in the central region of Thailand

(43.2%). The majority of the samples (38.6%) had undergone intestinal surgery. Over half of the samples had no experience with surgery (56.8%). Nearly the entire sample had a mean operation period of 194.77 minutes (*SD* = 64.94) with a mean surgical wound size of 18 centimeters long (*SD* = 5.91). Over half of the samples received morphine (intravenously) and oral paracetamol (59.1%) for pain relief. Over half of the samples enjoyed music for 1-3 hours per day (70.5%). When asked about favorite songs in the Thai traditional music program, over half of the samples were found to prefer Lao Siang Tian (played with a dulcimer) (59.1%).

For pre and post-intervention pain descriptors, present pain intensity, visual pain analog scores, vital signs in the experimental and control groups (Table 1), the experimental group had a mean pain descriptor score of 12.63 (*SD* = 4.15), a mean present pain intensity of 2.30 (*SD* = .44) and a mean visual pain analog score of 40.89 (*SD* = 11.41) before the intervention. After the intervention, the experimental group had significantly lower mean pain descriptor scores at 5.36 (*SD* = 2.31), a mean present pain intensity of 1.14 (*SD* = .36) and a mean visual pain analog score of 18.13 (*SD* = 7.89). The above findings indicate significant differences between pre- post-intervention scores ($t = 14.11$, $t = 17.41$ and $t = 16.47$) ($p < .05$) (Table 2).

The control group had a mean pain descriptor score of 10.68 (*SD* = 3.69), a mean present pain

**TABLE 1.** Pretest & posttest pain, mean arterial pressure, and pulse comparison between the experimental group and the control group by independent t-test.

| Variable | Experimental group | | | | Control group | | | | t test |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | *M* | *SD* | Min | Max | *M* | SD | *t* |
| **Pain** | | | | | | | | | |
| **Pain descriptor** | | | | | | | | | |
| Pre | 5.0 | 24.0 | 12.63 | 4.15 | 3.0 | 20.5 | 10.68 | 3.69 | 3.93** |
| Post | 1.0 | 11.0 | 5.36 | 2.31 | 3.0 | 22.0 | 11.05 | 3.55 | 11.83** |
| **Present pain intensity** | | | | | | | | | |
| Pre | 1.0 | 3.0 | 2.30 | .44 | 1.0 | 3.5 | 2.00 | .47 | 4.50** |
| Post | 1.0 | 2.0 | 1.14 | .36 | 1.0 | 3.0 | 2.03 | .41 | -12.81** |
| **Visual pain analog scores** | | | | | | | | | |
| Pre | 23.0 | 60.0 | 40.89 | 11.41 | 27.0 | 66.5 | 35.72 | 10.97 | 3.72* |
| Post | 10.0 | 35.5 | 18.13 | 7.89 | 23.0 | 56.5 | 36.87 | 10.14 | -16.07** |
| **Mean Arterial pressure** | | | | | | | | | |
| Pre | 64 | 163 | 114.25 | 26.20 | 75 | 164 | 109.80 | 23.46 | 1.53 |
| Post | 66 | 184 | 107.07 | 25.35 | 56 | 180 | 114.80 | 25.71 | -2.99* |
| **Pulse** | | | | | | | | | |
| Pre | 59.0 | 99.0 | 83.49 | 9.51 | 59.0 | 100.0 | 82.82 | 10.01 | 1.29 |
| Post | 60.0 | 96.0 | 81.01 | 9.79 | 59.0 | 101.0 | 82.78 | 10.30 | -2.16* |

*$p \leq .05$; **$p \leq .001$

**TABLE 2.** Pretest & posttest of pain comparison between both groups by t-test.

| Variable | Experimental group | | Control group | |
|---|---|---|---|---|
| | Mean Difference | t test | Mean Difference | *t* test |
| Pain descriptor | 7.26 ± 3.41 | 14.11** | -.36 ± 2.71 | -.89 |
| Present pain intensity | 1.16 ± .44 | 17.41** | -.03 ± .40 | -.57 |
| Visual pain analog scores | 22.76 ± 9.17 | 16.47* | -1.15 ± 6.65 | -1.15 |

*$p \leq .05$; **$p \leq .001$

intensity of 2.00 (*SD* = .47), and a mean visual pain analog score of 35.72 (*SD* = 10.97) before the intervention. After the intervention, the control group had a different mean pain descriptor score of 11.05 (*SD* = 3.55), a mean present pain intensity score of 2.03 (*SD* = .41) and a visual pain analog score of 36.86 (*SD* = 10.14). The above findings indicate non-significant differences between the pre and post-intervention scores ($t$ = -.89, $t$ = -.57 and $t$ = -1.15) ($p$ > .05) (Table 2).

Both groups had vital sign scores within a normal range. Post-intervention, the experimental group had mean arterial pressure at 107.07 mmHg. (*SD* = 25.35), and the control group had mean arterial pressure at 109.80 mmHg (*SD* = 23.46). The above findings indicate a significant difference between the groups ($t$ = -2.99) ($p$ < .05) at posttest.

The results also showed significant pre-intervention differences between the experimental and control group in pain descriptors, present pain intensity and visual pain analog scores ($t$ = 3.93, $t$ = 4.50 and $t$ = 3.72) ($p$ < .05), respectively. Thus, the researcher placed the aforementioned three variables as co-variants for the comparison test between the groups.

When the three co-variances were adjusted by ANCOVA comparison between the groups, the results revealed that the experimental group had lower post-intervention pain descriptors, present pain intensity and visual pain analog scores than the control group at 48 hours after open abdominal surgery with statistical significance (F = 138.71, F = 170 and F = 298.97) ($p$<. 001), respectively (Table 3).

When the mean early ambulation scores were compared between the experimental and control groups, the influences of all three co-variances (pain descriptors, present pain intensity and visual pain analog scores) were adjusted. Based on the findings, on the first and second postoperative days as well as the sum of both days, the experimental group had better mean early ambulation scores than the control group with statistical significance (F = 10.67, $p$ < .002, F = 41.36, $p$ < .001, F = 44.47, $p$ < .001) ($p$ < .05), respectively.

## DISCUSSION

The findings of this study revealed the experimental group to have lower pain descriptors, present pain intensity and visual pain analog scores than before the intervention program at 48 hours after open abdominal surgery with statistical significance ($p$ < .001). Additionally, mean arterial pressure dropped significantly in the experimental group, thereby indicating that Thai traditional music may cause changes in cognitive function, emotions and memories while triggering the pituitary gland, limbic system and hypothalamus to secrete endorphins with effects resembling morphine for pain relief.[7,17] Therefore, postoperative patients experienced decreased pain perception in all three

**TABLE 3.** Pain comparison between the experimental group and the control group by ANOVA.

| Variable | SS | df | MS | F |
|---|---|---|---|---|
| **Between group** | | | | |
| Post pain descriptor | 336.72 | 1 | 336.72 | 138.71** |
| Post present pain intensity | 8.52 | 1 | 8.52 | 170** |
| Post visual pain analog scores | 4006.62 | 1 | 4006.62 | 298.97** |
| **Error** | | | | |
| Pre pain descriptor | 94.67 | 41 | 2.43 | |
| Pre present pain intensity | 1.95 | 41 | .05 | |
| Pre visual pain analog scores | 522.66 | 41 | 13.40 | |
| **Total** | | | | |
| Pain descriptor | 3496.63 | 43 | | |
| Present pain intensity | 122.06 | 43 | | |
| Visual pain analog scores | 41474.31 | 43 | | |

**$p \leq .001$

**TABLE 4.** Comparison of early ambulation between the experimental group and the control group.

| Variable | Day | SS | df | MS | F |
|---|---|---|---|---|---|
| **Between group** | First | 237.98 | 1 | 237.98 | 10.67* |
| | Second | 2249.35 | 1 | 2249.35 | 41.36** |
| | Sum of both days | 4113.01 | 1 | 4113.01 | 44.47** |
| **Error** | First | 869.77 | 41 | 22.30 | |
| | Second | 2121.13 | 41 | 54.39 | |
| | Sum of both days | 3607.24 | 41 | 32.49 | |
| **Total** | First | 9272.75 | 43 | | |
| | Second | 23449 | 43 | | |
| | Sum of both days | 59889.25 | 43 | | |

*$p \leq .05$; **$p \leq .001$

dimensions with lower mean arterial pressure by suppressing parasympathetic function.[9,14]

In addition, the experimental group had better early ambulation than the control group with statistical significance ($p < .05$), possibly due to the effects of the Thai traditional music program on patients' relaxation, stress reduction, and distraction from pain. Other effects included decreased heart function, lower blood pressure and slower pulse rate[16,1,8] with statistical significance. It is suggested, therefore, that Thai traditional music in concurrence with patients' cultural and musical preferences may cause patients to experience easy learning, familiarity and memorization.[4] Thus, patients are able to access song emotions more easily and enjoy listening to Thai traditional music. Hence, nurses should offer the option of the listening to a Thai traditional music program that is consistent with the culture and lifestyles of Thai patients in addition to compatibility with individual patient tastes, preferences and interpretation. Thus, patients had reduced pain perception to under threshold. This led to postoperative pain relief[8,7,11,17] as patients were able to perform early ambulation activities better when patients felt relaxed, peaceful and comfortable after listening to music. The above findings also concur with Mompalad T., et al.,[15] who performed music therapy in postoperative patients undergoing major abdominal surgery. According to the findings, patients who experience postoperative pain reduction will have better early ambulation following surgery with statistical significance.[15]

## CONCLUSION

The findings suggest that listening to a Thai traditional music program can alleviate postoperative pain and promote early ambulation. Therefore, nurses should provide Thai traditional music as an option for post-operative pain management to optimize the effectiveness of pain control and improve early ambulation after open abdominal surgery which will improve the quality of post-operative pain management.

## ACKNOWLEDGMENTS

The researcher would like to express her deep gratitude for the productive support of Professor Pachaporn Charnvises for short training in music therapy and Professor Patchawan Poopityastaporn for the technical arrangement of the Thai Traditional music program.

## REFERENCES

1. Allred KD, Byers JF, Sole ML. The effect of music on postoperative pain and anxiety. Pain Manag Nurs 2010; 11:15-25.
2. Allvin R, Berg K, Idvall E, Nilsson U. Postoperative recovery: A concept analysis. J Adv Nurs 2007;57:552-58.
3. Apfelbaum JL, Chen C, Mehta SS, Gan TJ. Postoperative pain experience: Results from a national survey. Anesth Analg 2003;97:534-40.
4. Chiengchana N, Trakarnrung S. The effect of Kodály-based music experiences on joint attention in children with autism spectrum disorders. Asian Biomed 2014;8:547-55.

5. Davis WB, Gfeller EK, Thaut MH. An introduction to music therapy theory and practice (3rd ed). Silver Spring MD: America Music therapy Association. 2008.
6. Dunwoody CJ, Krenzischeck DA, Pasero C, Rathmell JP, Polomano RC. Assessment physiological monitoring and consequences of inadequately treated acute pain. J Perianesth Nurs 2008; 23:15-27.
7. Economidou E, Klimi A, Vivilaki VG, Lykeridou K. Does music reduce postoperative pain? A review. J Health Sci 2012;6:365-77.
8. Engwall M, Sörensen-Duppils G. Music as a nursing intervention for postoperative pain: A systematic review. J Perianesth Nurs 2009;24:370-83.
9. Fletcher D, Fermian C, Mardaye A, Aegerter P. Pain and regional anaesthesia committee of the French Anaesthesia and Intensive Care Society (SFAR). A patient-based national survey on postoperative pain management in France reveals significant achievements and persistent challenges. J Pain Manag Med 2008;137:441-51.
10. Good M, Ahn S. Korean and American Music Reduces Pain in Korean Women after Gynecologic Surgery. Pain Manag Nurs 2008;9(3):96-103.
11. Hook L, Songwathana P, Petpicchetchian W. Music therapy with female surgical patients: Effect on anxiety and pain. Thai J Nurs Res 2008;12:259-71.
12. Kiattisin P, Kasemkitwattana S, Chayaput P. Postoperative recovery in patient with abdominal surgery: an integrative review. Thai J Nurs Res 2010;25:87-99.
13. Kwon M, Gang M, Oh K. Effect of the Group Music Therapy on brain wave, behavior, and cognitive function among patients with chronic schizophrenia. Asian Nurs Res 2013;7:168-74.
14. Meissner W, Mescha S, Rothaug J, Zwacka S, Goettermann A, Ulrich K, Schleppers A. Quality improvement in postoperative pain management. Dtsch Arztebl Int 2008;105:865-70.
15. Mompalad T, Mankong S, Sirapongam Y. Effects of a home-based recovery program on postoperative recovery among older patients undergoing major abdominal operation. Rama Nurs J 2012;8:84-101.
16. Ni CH, Tsai WH, Lee LM, Kao CC, Chen YC. Minimising preoperative anxiety with music for day surgery patients-a randomized clinical trial. J Clin Nurs 2010;21:620-5.
17. Nilsson U. The anxiety and pain reducing effects of music interventions: a systematic review. AORN 2008;87: 780-805
18. Nicolette OR. Cross cultural music therapy interview: an analysis of how music functions globally to elicit beneficial change. Honors Theses, 2012.
19. Pheerasut B, Pongpinigpinyo S, Soonklang T. Musical-scale Characteristics for Traditional Thai Music Genre Classification. 2013; ICSCE.
20. Phumdoung S. Music therapy. Songkla Med J 2005;23: 185-19.
21. Schneider N , Schedlowski M , Schurmeyer TH, Becker H. Stress reduction through music in patients undergoing cerebral angiography. Neuroradiology 2001;43:472-6.
22. Songwathana P, Putarat U. Effects of applied Thai music on pre and postoperative pain and anxiety. Thai J Nurs Res 2007;22:72-86.
23. Vaajoki A, Pietilä AM, Kankkunen P, Vehviläinen-Julkunen K. Music intervention study in abdominal surgery patients: Challenges of an intervention study in clinical practice. Inter J Nurs Prac 2013;19:206-13.