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**TERAPI AKUPRESUR DAN MUROTTAL AL-QURAN TERHADAP INTENSITAS NYERI DAN ENDORPHIN URIN**

(Therapy Acupressure And Murottal Al-Quran On The Pain Intensity And Endorphin Urine)

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Sebagian besar pasien pasca bedah ORIF mengalami rasa sakit pada saat perawatan luka. Terapi obat anti nyeri dan Pengobatan Alternatif Komplementer dapat digunakan untuk menurunkan rasa sakit saat rawat luka. Akupresur dan murottal Al-Qur'an merupakan terapi alternatif yang dapat digunakan untuk mengurangi tingkat nyeri. Penelitian ini bertujuan untuk menjelaskan pengaruh akupresur dan murottal Al-Quran dalam mengurangi intensitas nyeri saat rawat luka pada pasien pasca bedah ORIF dan meningkatkan kadar  $\beta$ -endorfin dalam urin. Penelitian ini menggunakan pendekatan Quasi-Experimental dengan pre-test-post-test. Penelitian ini dilakukan di Rumah Sakit dr. Soebandi. Sampel penelitian dilakukan dengan teknik consecutive sampling, terdiri dari 28 responden. Data dikumpulkan dengan menggunakan kuesioner terstruktur, skala nyeri numerik, kit ELISA, dan dianalisis dengan uji Anova. Akupresur, murottal Al-Quran, serta gabungan akupresur dan murottal Al-Quran secara signifikan dapat mengurangi intensitas nyeri saat rawat luka pada pasien pasca bedah ORIF. Tidak ada intervensi yang lebih efektif antara akupresur, murottal al-Quran, dan gabungan akupresur dan murottal al-Quran dalam mengurangi intensitas nyeri. Akupresur, murottal Al-Quran, gabungan akupresur dan murottal Al-Quran secara signifikan tidak dapat meningkatkan tingkat  $\beta$ -endorfin dalam urin. Akupresur, murottal Al-Quran, dan gabungan akupresur dan murottal Al-Quran adalah terapi alternatif yang baik digunakan untuk mengurangi intensitas nyeri saat rawat luka pada pasien pasca ORIF akan tetapi intervensi ini masih belum dapat meningkatkan  $\beta$ -endorphin dalam urin.

**Kata kunci** : Akupresur; al-quran; pain;  $\beta$ -Endorphin; wound care

**Abstract**

Most of the post-ORIF patients experience pain during wound care. Therapy analgesics and Complementary Alternative Medicine can be used to reduce pain during wound care. Acupressure and murottal Al-Qur'an are an alternative therapy that can be used to reduce pain. This study aims to explain the effect of acupressure and murottal Al-Quran in reducing the intensity of pain during wound care in patients post ORIF and increase levels of  $\beta$ -endorphins in urine. This research uses the Quasi-Experimental approach with pre-test-post-test. This research was conducted in dr. Soebandi Hospital. The sample of research was done by consecutive sampling technique, consist of 28 respondents. Data were collected using structured questionnaires, numeric pain scales, ELISA kits, and analyzed by ANOVA test. Acupressure, murottal Al-Quran, and a combination of acupressure and murottal Al-Quran have significantly reduced the intensity of pain during wound care in patients post ORIF. There is no intervention more effective between acupressure, murottal al-Quran and combination of acupressure and murottal al-Quran in reducing pain intensity. Acupressure, murottal Al-Quran, combined acupressure and murottal Al-Quran significantly can not increase  $\beta$ -endorphin level

*in urine. Acupressure, murottal Al-Quran, and a combination of acupressure and murottal Al-Quran are a good alternative therapy used to reduce pain intensity during wound care in patients post-ORIF but this intervention still can not increase  $\beta$ -endorphin in urine.*

**Keywords:** Acupressure, Al-Fatihah, pain,  $\beta$ -Endorphin, wound care

## INTRODUCTION

Open Reduction and Internal Fixation (ORIF) is a well-implemented surgical procedure for fractures worldwide. The use of fixation tools that are a common trend at the moment is by using intramedullary nails rather than plates and screws (1). Before surgery, one of the most frequently asked questions by the client is a postoperative pain. Pain is a major concern for surgeons because it is closely related to client clinical outcomes and postoperative client health. Good postoperative pain control is essential to prevent negative outcomes such as tachycardia, hypertension, cardiac ischemia, decreased alveolar ventilation, and slow wound healing. Pain is one of three causes of delayed repatriation of postoperative clients, the two other causes are drowsiness and nausea vomiting. However, the reality in the clinic, postoperative pain management is very far from satisfactory (2).

In the US hospitals, 80% of clients reported experiencing postoperative pain, 86% of them suffered moderate, severe pain and extreme pain (3). In a study conducted in Northern Norway, 40.4% of clients suffered postoperative pain where 18.3% of clients had moderate to severe pain (4). Clients with acute postoperative pain, 10.1% to 55.2% of clients may progress to chronic pain (5). Research conducted in Dr. Kariadi Hospital Semarang found that average postoperative clients had moderate to severe pain both on pain intensity and on pain distress (6). The acute postoperative pain felt by the client will be increased at the time of wound care, especially when removing gauze dressing or when changing the gauze. The highest intensity of pain is felt by the client at the time of removal or substitution of the gauze, then at the procedure of cleaning the wound (7).

The principle of wound pain management can be applied to all painful

injuries. Proper use of the analgesic alone or with its combination is key to decreasing the intensity of pain. Unfortunately, not all wound pain can be intervened with systemic analgesics and even some studies indicate poor stigma is aimed at the use of analgesic (7). The use of new drugs such as extended-release epidural morphine (EREM) may cause pruritus and respiratory depression. Fentanyl hydrochloride iontophoretic trans dermal system (fentanyl ITS) has side effects such as nausea, vomiting, pruritus, headache, and moderate to severe headaches (2). Clients who received epidural analgesia, 24.5% experienced an impaired movement of half body on the first day postoperative (8). The use of ketamine as an analgesic can cause feelings of motion sickness, nausea, psychomimetic effects, headache with prolonged use, and possibly lead to cognitive, memory, and mood disorders (9). So that non-pharmacological management can be used instead of analgesic drugs or combination in reducing pain intensity.

Acupressure is a form of touch therapy by using thumb or fingertip pressure to stimulate points on the body to reduce various symptoms of the disease and to reduce stress or pain (10). Acupressure can be used as a therapy to reduce musculoskeletal pain (11). Collateral meridian acupressure therapy (CMAT) can immediately cause an analgesic effect on neck pain (12). While acupressure at the acupuncture point of Li4 may decrease the intensity of labor pain (13). Wilkinson & Faleiro (2007) describes electroacupuncture with low-frequency stimulation (1-2 Hz) can cause the release of endorphins and enkephalin (14).

Murottal Al-Quran can also be used as a complementary intervention in decreasing the intensity of pain. A study has shown that listening to a pleasant al-Quran voice can decrease the intensity of labor pain in primiparous mothers (15).

Reading the word "Allah" can be used as a non-pharmacological therapy, low cost, noninvasive and without side effects can be effective in reducing pain after CABG (coronary artery bypass graft) surgery (16). Reading the word "Allah" can also decrease the intensity of pain and anxiety at the time of replacing the wound on the burned client (17). Wahida, Nooryanto & Andarini (2015) proved that murottal surah Arrahman therapy can increase  $\beta$ -endorphin levels and decrease the intensity of pain in maternal women at the active phase I (18).

### **MATERIALS AND METHODS**

This research used quasi-experimental research which gave manipulation to the independent variable, but without randomization in the sorting between treatment group and control group (19). The research design used was pre-test post-test group design with a control group. This design is used to compare the effectiveness of acupressure interventions, murottal al-Quran Surah al-Fatihah, and a combination of acupressure and murottal al-Quran Surah Al-Fatihah to the intensity of pain and endorphin urine when performed wound care to clients post-ORIF.

The population in this study were inpatient clients in the seruni's room that

had been performed ORIF surgery in dr. Soebandi Hospital Jember. Sampling in this research is done by probability sampling method through consecutive sampling technique. The sample size used in this study was 7 for the acupressure group, 7 for the murottal al-Quran surah al-Fatihah group, 7 for the combined group between acupressure and murottal al-Quran surah Al-Fatihah, and 7 for the control group. This research was conducted in dr. Soebandi Hospital Jember in the seruni's room and held from April 2016 until May 2016.

Independent variables in this study are acupressure, murottal al-Quran Surah al-Fatihah, and combination acupressure with murottal surah al-Fatihah. The dependent variable in this study is the intensity of pain and urinary endorphin levels in the post-ORIF client. The instrument used to measure pain intensity is the numeric pain scale at the time before and after the intervention wound care. Measurement of urinary endorphins using ELISA kit.

### **RESULT AND DISCUSSION**

The result of univariate analysis explains description of respondent characteristics based on gender, age, education, occupation, surgery experience, analgesic medication and pray.

Table 1 Characteristics of respondents in the treatment and control group at dr. Soebandi Hospital Jember, April-May 2016

Characteristics		Acupressur		Al-Fatihah		Combination		control		Sum %
		F	%	F	%	F	%	F	%	
Gender	Male	5	71.4	7	100	7	100	6	85.7	89.3
	Female	2	28.6					1	14.3	10.7
Age (years)	21-30	2	28.57	3	42.86	2	28.57	2	28.57	32.14
	31-40	4	57.14	4	57.14	3	42.86	2	28.57	46.43
	41-45	1	14.29			2	28.57	3	42.86	21.43
Education	Elementary			1	14.29					3.6
	Junior High					1	14.3	2	28.6	10.7
	Senior High	7	100	6	85.71	6	85.7	5	71.4	85.7
Employment	Housewife	2	28.57					1	14.3	10.7
	Farmer	2	28.57	4	57.14	4	57.1	5	71.4	53.6
	Trader	1	14.29							3.6
	Mechanic construction laborer	1	14.29	1	14.29	2	28.6			3.6
	shopkeeper			1	14.29					3.6
	Cooperative	1	14.29							3.6
	Scavenger							1	14.3	3.6
	Broom maker					1	14.3			3.6
	private worker			1	14.29					3.6
	Surgery experience	Yes								
No		7	100	7	100	7	100	7	100	100.0
Analgetic	Ketorolac	5	71.43	7	100	5	71.4	6	85.7	82.1
	Antrain	2	28.57			2	28.6	1	14.3	17.9
Pray	Yes			1	14.29	2	28.6	2	28.6	17.9
	No	7	100	6	85.71	5	71.4	5	71.4	82.1

Table 1 shows that most of the respondents were men, 89.3% in both treatment and control groups. The respondents' age in the treatment and control group was spread evenly between 21-45 years. Educational level of respondents is a high school graduate 85.7% while the most respondent's work is farmers that is 53.6%. All respondents in both treatment and control groups had

never experienced surgery before. The analgesic drug used to reduce pain is ketorolac 82.1%. Respondents who are accustomed to praying in daily life are only 17.9%.

Table 2 Average distribution of pain intensity and urinary endorphins before and after intervention in treatment and control group in dr. Soebandi Hospital Jember, April-May 2016

Variable	Group	N	Mean	SD	SE	P Value
Pain Intensity	Acupressur (pre)	7	5.29	0.951	0.360	0.000
	Acupressur (post)	7	3.00	0.816	0.309	
	Al-Fatihah (pre)	7	4.00	1.000	0.378	0.000
	Al-Fatihah (post)	7	2.14	0.900	0.340	
	Combination (pre)	7	4.57	1.512	0.571	0.000
	Combination (post)	7	2.29	1.113	0.421	
	Control (pre)	7	3.86	0.900	0.340	0.231

Variable	Group	N	Mean	SD	SE	P Value
urinary endorphins	Control (post)	7	3.29	1.704	0.644	0.955
	Acupressure (pre)	7	463.37914	297.985509	112.627936	
	Acupressure (post)	7	453.96014	404.163649	152.759500	
	Al-Fatihah (pre)	7	652.25029	413.827462	156.412079	
	Al-Fatihah (post)	7	677.61743	423.477223	160.059345	
	Combination (pre)	7	525.36857	424.135023	160.307971	
	Combination (post)	7	595.06686	404.743452	152.978645	
	Control (pre)	7	459.32514	452.626174	171.076613	
	Control (post)	7	526.97829	444.397149	167.966334	

**Patient's Pain Intensity**

Based on data of bivariate analysis found in table 2 where the pain Intensity before intervention was compared with pain Intensity after intervention using paired T-test statistic obtained  $p = 0.000$  ( $p < 0.05$ ) which means there is significant difference of pain Intensity before and after intervention at acupressure group, murottal al-Quran surah Al-Fatihah, and a combination of acupressure and murottal al-Quran

Previous research has also suggested that acupressure can be used as a therapy to reduce musculoskeletal pain (11). Collateral meridian acupressure therapy (CMAT) can immediately cause an analgesic effect on neck pain (12). Melzack and Wall (1965) explained that the pain information can only be delivered if the gate is opened by the excitatory neurotransmitter released on the synapse of the pain impulse. If there is a bigger or faster impulse spreading along the thicker beta A fibers through the gate, then the pain impulse will be even more difficult to pass through. A beta A fibers are stimulated by changes in skin temperature or rubbing that will send a temperature change message through a gate rather than a pain message (20).

Acupressure with finger pressure on the skin will cause a pain impulse that rapidly travels along the thicker beta A fibers through the gate, thus closing the pain impulse pathway resulting from wound care intervention. Beta A fibers stimulated

by acupressure using finger pressure on the skin will send acupressure pain messages through the gate rather than pain messages due to wound care, so patients will perceive a decrease in pain levels.

The process of decreasing pain intensity with acupressure intervention can be explained using holistic theory. Acupressure both stimulation (increase *qi* energy) and sedation (reduce *qi* energy) depend on the state of *yin* and *yang* patient. Acupressure at acupuncture points will give a local effect of decreasing pain in the area around the point of pressure. Acupressure energy at the acupuncture point will flow through the meridian stream toward the target organ. The existence of energy flow through the meridians to the organs can be proven through the firing of radioactive technetium that flows along the meridian path. Stimulation and sedation *qi* energy of target organs will have an effect on biochemical, physiological, and perceptual changes. Biochemical changes may include elevated levels of endorphins, physiological changes may be blood and oxygen flow activity, whereas perceptual changes can be a decrease in pain Intensity (21).

An earlier study has shown that listening to a pleasant Quranic voice can decrease the intensity of labor pain in primiparous mothers (15). Reading the word "Allah" can also decrease the intensity of pain and anxiety at the time of replacing gauze dressing on the burned client (17). Referring to the Melzack and Wall (1965)

theory of the pain gate where larger or faster impulses travel along the thicker beta A fibers through the gate, the pain impulse will be difficult to pass through the gate (20). Murottal al-Quran Surah Al-Fatihah will stimulate beta A fibers that will transmit impulses through the gate while closing the gate so that pain signals from wound care cannot reach the central nervous system.

The data of paired T test's result of the pain intensity at table 2 in control group was obtained  $p = 0.231$  ( $p > 0.05$ ) which means there was no significant difference of pain level at the beginning of wound care and at the time of wound care was almost completed in the control group. Patients in the control group were not taught pain management techniques by the nurse. So patients do not understand how to overcome the pain felt during wound care. This is why some respondents do not feel the decrease in pain and some even feel the increase in pain.

#### Levels of urinary endorphins

Based on data of bivariate analysis found in table 2 where urinary endorphins levels before wound care were compared with urinary endorphins after wound treatment in acupressure group, murottal al-Quran and combination of acupressure with murottal al-Quran by using paired T-test obtained  $p > 0.05$  which means there is no significant difference in the statistical analysis of urinary endorphins before and after wound treatment in all the group.

Pomeranz and Stux (1989) describe the mechanism of acupuncture analgesia in which acupressure stimulates the pituitary-hypothalamic complex that causes the systemic release of  $\beta$ -endorphins into the bloodstream from the pituitary gland (22). Several kinds of literature have described clinical studies that measure endorphins before and after physical activity. The results are very contradictory, some studies have reported a significant increase in endorphin levels, another study reported no difference. Several findings have supported the idea that endorphins may be released as a result of exercise with an intensity of at least 60%  $VO_2\max$  within a certain timeframe (23).

The continuous exercise of endurance under conditions between lactate production and elimination,  $\beta$ -endorphin levels did not increase until the duration of exercise exceeded about 1 hour (24). Endorphin massage performed four times a week each morning for 20 minutes on the right hand, left hand, neck, and lower back (every 5 minutes) can significantly increase  $\beta$ -endorphin levels in women with postpartum blues (25). In other words, acupressure intervention has not been able to increase urinary endorphins can be due to the lack of duration acupressure that is implemented in patients, because the post ORIF wound care lasts only 15-20 minutes.

Research on the effect of intensity and distance of running on endorphin release in male respondents has indicated an increase in endorphin levels but not significant. Neither does the study compare between running and cycling at 60%  $VO_2\max$  for 1 hour, but statistical analysis proved to be insignificant. In contrast, research by measuring plasma endorphins before and after exercise with high-intensity aerobic endurance for 45 minutes, has resulted in significant increases in endorphin levels. So it gives the idea that opioid peptides will be released as a result of strenuous exercise for a certain amount of time (26).

Previous research has explained the use of yoga as a lifestyle can be used as an effective intervention in reducing stress and inflammation and can increase endorphins after day 10 in patients with chronic disease (27). Intervention by using yoga for 3-6 weeks can decrease cortisol levels, increase levels of prolactin and  $\beta$ -endorphins (28). Referring to some of these studies, the authors suggest that no increase in urinary endorphins is due to the lack of duration of intervention given to respondents since the murottal al-Quran Surah al-Fatihah is only implemented to respondents for 15-20 minutes in a period of wound care. The production of endorphins by the hypothalamus is not optimal, whereas from the previous study it was explained that new endorphin levels

would increase after continuous interventions for several weeks.

The theory of beta-endorphin biotransformation also can not be ignored because opiate peptides are particularly susceptible to enzymatic degradation. The main peptides involved in the opiate peptide degradation process are aminopeptidase, angiotensin-converting enzyme (ACE), insulin degrading enzyme, serine peptidase, dipeptidyl peptidase III and IV (DPP III, DPP IV) (29). Degradation BE 1-31 synthesis by plasma proteinase to BE 1-19 and BE 20-31 occurs with metabolic rate 25 pmol/min. Proteinases responsible for this process are classified as metal-dependent serine proteinase (30). Degradation of beta-endorphins in plasma is faster than in cerebrospinal fluid (31).

The release of one, two, or four amino acids from the C-terminal chain BE 1-31 will decrease the analgesic effect even loss of 8 amino acids from the N-terminal chain BE 1-31 will eliminate analgesic activity (29).

Intervention in the treatment group has not been able to increase urinary endorphin levels due to the biotransformation of beta-endorphins in cerebrospinal fluid and in blood plasma. Degradation of beta-endorphins with a metabolic rate of 25 pmol/min can rapidly decrease endorphin levels before reaching urine. So when beta-endorphins are excreted from the body within urine, beta-endorphin levels have decreased

Table 3 ANOVA test results of pain intensity in the treatment and control group in RS dr. Soebandi Hospital Jember, April-May 2016

Pain Intensity	Multiple Comparisons				Anova
	Variable	Group	Mean	SE	P Value
Acupressur	Al-Fatihah		-.571	.378	.144
	Combination		.000	.378	1.000
	Control		-1.714 <sup>~</sup>	.378	.000
Al-Fatihah	Acupressur		.571	.378	.144
	Combination		.571	.378	.144
	Control		-1.143 <sup>~</sup>	.378	.006
Combination	Acupressur		.000	.378	1.000
	Al-Fatihah		-.571 <sup>~</sup>	.378	.144
	Control		-1.714 <sup>~</sup>	.378	.000
Control	Acupressur		1.714 <sup>*</sup>	.378	.000
	Al-Fatihah		1.143 <sup>*</sup>	.378	.006
	Combination		1.714 <sup>~</sup>	.378	.000

The results of the Anova statistical test on the pain Intensity in the treatment and control group (table 3) showed a significance with  $p = 0.000$  ( $p < 0.05$ ) which means there was a significant difference in the pain level between the treatment group and the control group. The multiple comparisons table describes the comparison between acupressure

interventions with murottal al-Quran Surah Al-Fatihah ( $p = 0.257$ ), acupressure with combined intervention ( $p = 1,000$ ), and murottal al-Quran Surah Al-Fatihah with combined intervention ( $p = 0.257$ ) obtained  $p > 0.05$  So statistically means that no intervention is most effective among the three interventions in reducing pain intensity in wound care post ORIF.

Table 4 ANOVA test results of urinary endorphins in treatment and control group



in dr. Soebandi Hospital Jember, April-May  
2016

#### Urinary Endorphin

Variable	Group	Multiple Comparisons			Anova
		Mean	SE	P Value	P Value
Acupressur	Al-Fatihah	-34.786143	198.618291	.862	.974
	Combination	-79.117286	198.618291	.694	
	Control	-77.072143	198.618291	.701	
Al-Fatihah	Acupressur	34.786143	198.618291	.862	
	Combination	-44.331143	198.618291	.825	
	Control	-42.286000	198.618291	.833	
Combination	Acupressur	79.117286	198.618291	.694	
	Al-Fatihah	44.331143	198.618291	.825	
	Control	2.045143	198.618291	.992	
Control	Acupressur	77.072143	198.618291	.701	
	Al-Fatihah	42.286000	198.618291	.833	
	Combination	-2.045143	198.618291	.992	

Anova statistic test on urinary endorphins in treatment and control group (table 4) showed significance with  $p = 0.974$  ( $p > 0.05$ ) which means there is no significant difference between acupressure intervention, murottal al-Quran Surah Al-Fatihah, combination, and control group at urinary endorphins level.

Referring to the theory of receptors where beta-endorphins are non-selective endogenous peptides that bind to  $\mu$ -opioid receptors (MOR) and  $\delta$ -opioid receptors (DOR) (29). In the process of pain and addiction modulation, opiate receptors are affected by physiological and pathophysiological conditions such as ion membranous homeostasis, cell proliferation, emotional response, epilepsy seizures, immune function, food, obesity,

#### CONCLUSION

Acupressure, murottal al-Quran Surah Al-Fatihah, and combination acupressure with murottal al-Quran Surah Al-Fatihah are complementary alternative interventions that can be used to reduce pain intensity during wound care in post-ORIF surgical patients. Among the three interventions acupressure, murottal al-Quran Surah Al-Fatihah, and combination acupressure with Surah Al-Fatihah, there is no intervention most effective in reducing pain during wound care in ORIF

respiration, cardiovascular, and neuron degenerative disorders (32). A large amount of beta-endorphins binding to the receptor will affect free beta-endorphin levels in both plasma and urine. Each individual receptor in binding to different beta-endorphins is influenced by many factors. This makes it difficult to know the difference in urinary endorphins in each treatment group. In line with the opinion put forward by Leuenberger (2006) where inconsistent research methods and techniques make it difficult to determine the relationships between treatment groups and endorphin enhancement (26).

surgical patients. Acupressure, murottal al-Quran Surah Al-Fatihah, and a combination of acupressure with Surah Al-Fatihah still can not increase urinary endorphins due to intervention has given when wound care in ORIF surgical patients is too short for about 20 minutes and performed only once.

The results of this study can be used as a reference for hospitals and clinics to create wound care SOP so that it can be used in reducing the intensity of pain. The nurse can provide a choice of complementary alternative interventions

preferred by clients in reducing pain in hospitals, clinics, and homecare. Medical-surgical nurses need to conduct further research related to other complementary alternative techniques in reducing pain by using larger numbers of samples, longer intervention, other neurotransmitter measurements such as serotonin, dopamine, and melatonin, as well as measures of pain mediators such as histamine, serotonin, plasmakinin, and prostaglandins. Patients who have beliefs other than Islam can use the usual prayers in everyday life as a substitute for murottal al-Quran Surah Al-Fatihah in reducing the level of pain.

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