

The Effect of Benson's Relaxation on Pain in Patients Post Open Reduction Internal Fixation Extremity Fractures

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ABSTRACT

The most common complaint felt by patients due to fractures and the main complaint of patients after surgery is pain. Pain that is felt continuously can result in clinical and psychological changes. Benson's relaxation can be an alternative intervention in patients with Post Open Reduction Internal Fixation (ORIF) limb fractures to reduce pain by stimulating the pituitary gland to release endorphins and inhibit pain impulses from the cerebral cortex and thalamus. Benson Relaxation is safe and easy to do, has no risk of injury/side effects. The purpose of this study was to determine the effect of Benson relaxation on pain in patients with Post Open Reduction Internal Fixation (ORIF) limb fractures in the Dahlia Room at Mardi Waluyo General Hospital, Blitar. The research design uses a quasi-experimental pre-post test design. The population was all post ORIF patients with extremity fractures in the Dahlia (surgical) room at Mardi Waluyo Blitar Hospital with a total of 35 patients. The sample was post ORIF extremity fracture patients in the Dahlia Room of Mardi Waluyo General Hospital Blitar with a total sample of 13 respondents in each group using the Consecutive Sampling technique. Pain measurement data uses a Numerical Rating Scale. Statistical test using independent t-test. The results showed that the mean decrease in pain score in the Benson relaxation intervention group was 1.10, while the mean decrease in pain score in the control group was 0.44 with a pvalue of $0.00 < \alpha 0.05$. It was concluded that there was an effect of Benson relaxation on pain in patients with Post Open Reduction Internal Fixation (ORIF) limb fractures. Benson relaxation is effective in reducing pain in patients with post open reduction internal fixation (ORIF) limb fractures. There needs to be a standard operating procedure regarding Benson's relaxation, so that later it can be implemented by all nurses.

Keywords: Benson Relaxation, Pain, Fracture, Post ORIF

Background

A fracture is a break in the continuity of bone, both in joint cartilage and epiphyseal cartilage, whether total or partial, caused by direct or indirect trauma, resulting in disruption of the human need for mobilization (1). The most common complaint felt by patients due to fractures and the main complaint of patients after surgery is pain (2). Pain that is felt continuously can result in clinical and psychological changes (3), so it is necessary to carry out good pain management.

In Indonesia, based on Riskesdas 2018, the national fracture incidence rate is 5.5%. Meanwhile, the incidence of fractures in East Java is 5.8%. Based on the fracture incidence

rate, East Java is still above the national figure (4). Data from the last 6 months (July-December 2022) in the Dahlia Room (Surgery room) at the Mardi Waluyo Hospital, Blitar City, shows that the majority of cases were musculoskeletal trauma, namely fractures in the extremities, 258 cases. 167 cases (65%) were fractures of the lower extremities, 91 cases (35%) were fractures of the upper extremities. Based on this data, the incidence of fractures at Mardi Waluyo Hospital is still high. The results of a preliminary study on pain in the Dahlia Room at Mardi Waluyo Blitar Hospital in January 2023 showed that 6 patients had fractures of the upper extremities and lower extremities after surgery, namely 1 patient with a clavicle fracture experienced pain with a visual analog scale (VAS) of 5 and 2 patients with a crucis fracture with a pain scale of 5. Meanwhile, 2 patients with a femur fracture experienced pain with a visual analog scale (VAS) of 6, and 1 patient with hemerus fracture with a pain scale of 6.

Post open reduction internal fixation (ORIF) pain is acute pain whose damage is not only caused by surgery but also due to previous trauma which is an indication for surgery. The series of processes that accompany tissue damage until pain is felt is a process called nociception. When the body experiences trauma (tissue discontinuity), it will stimulate the release of substance P, hydrogen and adenosyn triphosphate from the tissue, mast cells will also release serotonin, bradykinin and prostaglandin where these chemical elements will activate nociceptors through nerve fibers. delta A and delta C. The pain impulses transmitted by the A-delta and C fibers to the nociceptive neuron cells in the dorsal horns of the spinal cord are not all transmitted centrally via the spinothalamic tract. In nociceptive neuron cells there will be an interaction between the incoming impulse and the inhibitory system, both the endogenous inhibitory system and the exogenous inhibitory system. The perception of impulses that are transmitted to the sensory cortex will undergo a very complex process including the process of interpretation and perception which ultimately results in sensible pain. Pain is also influenced by several factors, namely age, gender, past experiences with pain, anxiety, family and social support. Age is an important variable that can affects pain, especially in children and the elderly. Gender is a significant factor in pain response, men rarely report and express and are less able to show pain openly than women. Previous experience of pain influences the perception of current pain (5). Meanwhile, anxiety often increases the perception of pain (6)

Continuous post-operative pain can result in clinical and psychological changes in patients and can increase morbidity, mortality, costs and reduce quality of life (7). Patients who experience surgical pain can cause the patient to have a tendency to limit movement (immobilization), resulting in prolonged pain. Inadequate post-operative pain management can lead to a prolonged recovery phase, lengthening hospital stays, increasing hospital care costs and reducing patient satisfaction levels (8).

Treatment of surgical pain is an important issue in health care. In an effort to improve postoperative pain management, it is important to focus on identifying predictors of postoperative pain due to various surgical procedures such as orthopedic surgery which are predictors of postoperative pain (9). Pain management aims to reduce or eliminate pain to the level of comfort felt by the client. There are 2 methods of approach to pain management, namely pharmacological and non-pharmacological interventions. Pharmacological interventions can reduce pain patients are given analgesic drugs (NSAIDs) regularly after surgery but have negative side effects, such as constipation, gastrointestinal bleeding, asymptomatic gastroduodenal ulcers, gastropathy and damage to the gastric mucosa. Therefore, more and more attention is being paid to various nonpharmacological approaches and relaxation interventions as supportive therapies to reduce pain. There are 4 types of relaxation techniques, namely muscle relaxation (progressive muscle relaxation), meditation (attentionfocusing exercise), behavioral relaxation (behavioral relaxation) and breathing (diaphragmatic breathing). One relaxation technique using breathing techniques involving the patient's

confidence factor is Benson Relaxation (10).

Nurses as care givers can provide nursing actions independently through a holistic approach to reduce/eliminate pain and make clients feel comfortable by teaching relaxation techniques (10). Benson relaxation is relaxation using breathing techniques that can be used on patients who are experiencing pain or experiencing anxiety. Results of research conducted by on post-operative antebrachial fracture patients at Sidoarjo District Hospital, on 28 respondents (14 respondents with Benson relaxation intervention and 14 respondents with Asmaul Husna intervention) for 2 days (intervention twice a day) with a duration of 15 minutes. The research results showed that the average pain before the Benson relaxation intervention was 6.07 and the average pain after the intervention was 3.29. Meanwhile, the average pain before the Asmaul Husna intervention was 5.29 and after the intervention it was 2.50. This research shows that Benson relaxation can reduce pain better than the Asmaul Husna intervention. This is also supported by research in appendectomy patients, of the 9 respondents in the intervention group, the pain score before the intervention was 6 respondents (66.7%) with a pain score of 7, 2 respondents (22.2%) with a pain score of 8. Meanwhile after the intervention there were 7 respondents (77.8%) with a pain score of 5, and 2 people (22.2%) with a pain score of 6. The results of the analysis show that Benson relaxation can reduce pain in post-appendectomy patients.

Benson relaxation is the development of a respiratory relaxation response method that involves the patient's belief factors, which can create an internal environment that can help patients achieve a higher state of health and well-being (11). Benson Relaxation is an exercise that is safe and easy to do and does not have any risk of injury/side effects. Benson Relaxation provides benefits not only for physical health (reducing muscle tension), reducing complaints of pain, but is also beneficial for health mental, reducing stress or anxiety through stimulating the release of endorphins and reducing sympathetic nerve activity (12). Benson relaxation according to gate control theory can reduce or reduce pain by inhibiting pain impulses from the cerebral cortex and thalamus so that the gate will close (13). Synergistic effect between stimulation of endorphin release, decreased sympathetic activity and decreased excitability the cerebral cortex and the element of confidence when doing Benson relaxation can potentially have a good effect in reducing pain. Based on the description above, researchers are interested in conducting research entitled "The Effect of Benson Relaxation on Pain in Patients Post Open Reduction Internal Fixation (ORIF) Extremity Fractures in the Dahlia Room at Mardi Waluyo Hospital Blitar"

Method

This research design is a quasi-experimental design with non-equivalent control group before–after design approach, with a population of all post-ORIF fracture patients extremities in the Dahlia (surgical) Room at Mardi Waluyo Blitar Regional Hospital in January 2023. The number of research samples was taken at 26 with the inclusion criteria being patients aged ≥ 16 years, post ORIF lower extremity fracture patients, 8 hours under general anesthesia or spinal anesthesia block (SAB), the patient receives analgesic therapy that has passed the half-life of the drug analgesic (around 4-6 hours) and cooperative and communicative. The research method used was to divide respondents into two groups, namely the relaxation group Benson and control group. The groups were divided according to the order of patients entering the Dahlia Room at Mardi Waluyo Hospital. The samples taken are first treated, the next as a control group and so on until the number sample is met. Pain measurements were carried out before and after administering the intervention with Numerical Rating Scale. The action is carried out for 15 minutes, 2 times a day and carried out for 2 days.

Result

Frequency distribution of respondents' demographic data

Variable	Benson Relaxation Intervention Group		Control Group	
	F	Procentage (%)	F	Procentage (%)
Age (y)				
16-25	2	15.4	3	23.1
26-35	1	7.7	2	15.4
36-45	4	30.7	2	15.4
46-55	2	15.4	5	38.5
56-65	3	23.1	1	7.7
> 65	1	7.7	0	0
Gender				
Man	5	38.5	9	69.2
Woman	8	61.5	4	30.8
Fracture location				
Digiti	2	15.4	4	30.8
Femur	4	30.8	1	7.7
Clavicula	2	15.4	2	15.4
Fibula	1	7.7	0	0
Cruris	1	7.7	3	23.1
Antebrachii	2	15.4	1	7.7
Wrist	1	7.7	0	0
Pedis	0	0	1	7.7
Humerus	0	0	1	7.7
Pain medication				
Ketorolac	13	100	13	100
Total	13	100	13	100

Table 1 above shows that the age of respondents in the Benson relaxation intervention group was at most 30.7% (4) of the respondents were aged between 36-45 years. Meanwhile, in the control group, at most 30.7% (4) of respondents were in the age range 46-55 years. The gender of respondents in the Benson relaxation intervention group was mostly female, namely 61.5% (8) of respondents. Meanwhile, the majority of the control group were men, namely 69.2% (9) of respondents. Based on the fracture location in the Benson relaxation intervention group, the most common were femur fractures, namely 30.8% (4) of respondents. Meanwhile, the control group had the most digit fractures, 30.8% (4) of respondents. For anti-pain medication, both the intervention and control groups all received ketorolac 3 times a day.

Distribution of respondents' pain frequency before taking action in both the control group and the treatment group

Table 2 Distribution of respondents' pain frequency before taking action in both the control group and the treatment group

Variable	Group	N	Mean	SD	Min-Max
Pain	Benson relaxation intervention	13	4.54	1.56	2.0-7.0
	Control	13	3.76	1.48	2.0-6.0

Based on table 2, it shows that the average pain score before Benson relaxation is 4.54 with a standard deviation of 1.56, the score value the lowest pain was 2.0 and the highest was 7.0. Meanwhile, the mean pain score in the control group was 3.76 with a standard deviation of 1.48, the lowest pain score was 12 and the highest was 6.0.

Distribution of respondents' pain frequency after taking action in both the control group and the treatment group

Table 3 Distribution of respondents' pain frequency after taking action in both the control group and the treatment group

Variable	Group	N	Mean	SD	Min-Max
Pain	Benson relaxation intervention	13	1.54	0.92	0.5-3.0
	Control	13	1.81	1.13	0.5-3.5

Based on table 3, it shows that the average pain score after Benson relaxation is 1.54 with a standard deviation of 0.92, the lowest pain score is 0.5 and the highest is 3.0. Meanwhile, the mean pain score in the control group was 1.81 with a standard deviation of 1.13, the lowest pain score was 0.5 and the highest was 3.5

The effect of Benson relaxation on pain in patients with post open reduction internal fixation (ORIF) extremity fractures

Table 4 Results of analysis of differences in pain in Post Open Reduction Internal Fixation (ORIF) Extremity Fracture patients after being given the Benson relaxation procedure compared to the control group

Variable	Group	N	Mean	Differen t mean	pvalue
Pain	Benson relaxation intervention	13	3.00	1.06	0.01*
	Control	13	1.96		

*Significant at <0.05 with Independent t-test

Based on table 4, from the results of statistical test analysis using the independent t-test at a significance of 0.05, it was found that p value=0.01 with a mean difference in pain reduction of 1.06. This shows that there is an effect of Benson relaxation on pain in patients with post open reduction internal fixation (ORIF) extremity fractures (p value 0.01 < 0.05).

Discussion

Pain post open reduction internal fixation (ORIF) of extremity fractures before Benson relaxation was given in the intervention group and control group. The results showed that the mean pain score before Benson relaxation was 4.54 with a standard deviation of 1.56. Meanwhile, the mean pain score in the control group was 3.76 with a standard deviation of 1.48. That pain is the main complaint reported in post-operative patients. Pain in ORIF patients is acute pain whose damage is not only caused by surgery but also due to previous trauma which is an indication for surgery. Pain score before relaxation intervention.

The gender in the intervention group was mostly women, namely 61.5% (8) people. Gender is a significant factor in pain response, men rarely report and express and are less able

to show pain openly than women. Women will be seen to be more expressive in conveying their feelings than men, so that women will be more visible about what they feel than men. By expressing their expressions, they tend to be more proactive and more open in expressing their feelings, causing the sensation of pain to be felt at a higher level.

Apart from that, it is supported by the location of the fracture in the intervention group, most of which were femur fractures, namely 30.8% (4) people. Fractures will cause damage to the cortex, blood vessels, bone marrow and soft tissue(14). Tissue damage will stimulate the release of substance P, hydrogen and adenosyn triphosphate from the tissue, mast cells will also release serotonin, bradykinin and prostaglandins where these chemical elements will activate nociceptors via delta A and delta C nerve fibers. With the activation of nociceptors via delta nerve fibers A and delta C will cause a sensation of pain. Continuous post-operative pain can result in clinical and psychological changes in patients and can increase morbidity, mortality, costs and reduce quality of life. Pain is also a condition that is more than just a single sensation caused by a particular stimulus. Pain is subjective and individual.

The clinical changes seen in post ORIF patients were especially in patients with long bone fractures (femur, cruris, humerus) such as in the intervention group where the majority of respondents had femur fractures with moderate pain (mean pain score of 4.54) accompanied by objective signs such as grimacing, protective (alert). Injuries to long bones such as the femur and cruris tend to cause quite severe pain sensations because they consist of large and strong muscles and several large nerves.

The average pain in the control group was 3.76, relatively lower than the intervention group. This is due to the location of the fracture, the majority of which are digital fractures, 30.8% (4) of people. A digital fracture is a fracture of a short bone and usually the tissue damage due to the trauma is relatively mild so the pain sensation felt is lower. This is also supported by the gender that is mostly male, namely 69.2% (9) people. Gender is a significant factor in pain response, men rarely report and express and are less able to show pain openly than women. Women will appear to be more expressive in conveying their feelings than men. With a lack of expressiveness, men tend to remain silent and do not express their feelings, causing it to seem as if the pain sensation they feel is lower.

Pain in patients post open reduction internal fixation (ORIF) of extremity fractures after being given Benson relaxation in the intervention group and control group. The research results showed that the average pain score after Benson relaxation was 1.54 with a standard deviation of 0.92, the lowest pain score was 0.5 and the highest was 3.0 and was supported by objective data such as respondents tended to no longer grimace, no longer being protective. When compared with pain before the Benson relaxation intervention, after the Benson relaxation intervention there was a decrease in the average pain score of 1.1. In accordance with the theory that one way of managing pain in post-operative fracture patients is using non-pharmacological techniques, namely relaxation techniques (2). Benson relaxation is the development of a respiratory relaxation response method that involves the patient's belief factors, which can create an internal environment that can help patients achieve a higher state of health and well-being. The movements and stages carried out during Benson relaxation can result in increasing intra-abdominal pressure, so that it can stimulate blood flow both in the inferior vena cava and abdominal aorta, resulting in increased blood flow (vascularization) throughout the body, especially vital organs such as the brain, so that O₂ is sufficient in the body, the brain and body relax (15).

As the body relaxes, the sensation of pain felt will decrease. However, it cannot be denied that the anti-pain medication given to respondents also contributed to reducing pain in patients, where a total of 13 (100%) patients received analgesic therapy (ketorolac).

Meanwhile, in the control group the average pain score was 1.81 and there was a

decrease in the average pain score of 1.96. According to the inflammatory process begins quickly when a fracture hematoma forms and cytokines are released, and lasts until fibrous tissue, cartilage, or bone formation begins, namely 1-7 days postfracture. The decrease in pain in the control group could also be due to the natural reduction in the inflammatory phase after surgery, so that it decreases day by day, who stated that the duration of pain can last 24 to 48 hours, but can also last longer depending on how the client is able to endure and respond to the pain. Apart from that, respondents also received pharmacological therapy, namely ketorolac. Ketorolac is included in the class of non-steroidal anti-inflammatory drugs (NSAIDs) which work by inhibiting prostaglandin synthesis (16). So that there was a decrease in pain in the control group even though no treatment was given (non-pharmacological therapy), this could have occurred because there was still an effect of the pharmacological therapy given, namely ketorolac. However, the average decrease in pain was smaller compared to the Benson relaxation intervention group.

The results of statistical test analysis using the Independent t-test can show that there is an effect of Benson relaxation on pain in patients with post open reduction internal fixation (ORIF) extremity fractures (p value $0.01 < 0.05$), with a mean difference in pain reduction of 1.06. In line with research at the Meuraxa Hospital in Banda Aceh on 14 respondents that there was a significant influence on the intensity of pain after performing Benson Relaxation on post-operative patients with Femur Fractures (15). Also supported 14 respondents showed that Benson relaxation could reduce pain better than the Asmaul Husna intervention. Similar research was also conducted showed that Benson relaxation can reduce pain in post-appendectomy patients. From other research with similar interventions, which shows that Benson relaxation can reduce the intensity of pain in post-cesarean section patients.

Benson relaxation can reduce discomfort, stress, anxiety, and release the hormone epinephrine. This will have an effect on reducing pain intensity. Postoperative pain is usually accompanied by anxiety, fear and depression. This emotional reaction will increase the sympathetic response, namely increasing levels of catecholamines, noradrenaline and norepinephrine which will worsen the intensity of pain. Benson's relaxation technique is able to inhibit sympathetic nerve activity which results in a decrease in oxygen consumption by the body and subsequently the body's muscles relax, giving rise to a feeling of calm and comfort. Decreased controlling sympathetic nerve activity. Pain will have an effect on reducing pain intensity. Benson Relaxation can help patients achieve a higher state of health and well-being, so that a person will feel calm, which will stimulate the release of endorphin and enkephalin hormones. Apart from that, individuals who are in a calm condition can prevent the release of stress hormones such as serotonin and histamine which are useful as pain neurotransmitters to the brain, so that pain stimuli will be inhibited and pain can be received more slowly by the brain (12). Situational support and calm environmental conditions as well as assistance and attention from the family can be supporting factors, thereby causing a feeling of calm and comfort in the patient, so the pain will automatically decrease.

Conclusion and Recommendations

Pain in extremity fracture patients post open reduction internal fixation (ORIF) before Benson relaxation was given, the average pain was 4.54. Meanwhile in the control group it was 3.76. After being given the intervention, pain in the treatment group decreased by an average of 1.54, while in the control group it decreased by 1.81. Based on data analysis, it can be concluded that there is an effect of Benson relaxation on pain in post-opening patients. reduction internal fixation (ORIF) of extremity fractures. This can be the basis for the nursing committee to modify standard operational procedures for non-pharmacological pain

management, especially for post-operative patients

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