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# THE EFFECT OF SLOW DEEP BREATHING ON REDUCING PAIN SCALE IN POST-OPERATIVE PATIENTS

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## ABSTRACT

Post-operative pain is the body's reaction to tissue damage caused by a surgical procedure so that the patient will experience discomfort, this can cause sleep quality problems, breathing problems, making the condition worse, the healing process and a long treatment period resulting in increased treatment costs. Pain management can be done using non-pharmacological therapy, one of which is slow deep breathing which will stimulate the parasympathetic nervous system thereby increasing endorphin production and reducing the pain level. The purpose of this research to determine whether there is an effect of slow deep breathing on reducing the pain scale in post-operative patients at Sultan Imanuddin Pangkalan Bun. The method in this research uses a quasi experimental with a one group pre-test and post-test design approach. Consecutive sampling technique, the sample in this study was 57 respondents who underwent 10 minute procedures on post-operative patients after 24 hours. This research instrument uses the NRS (Numeric Rating Scale), where the results of this research are analyzed using the Wilcoxon test. The results before slow deep breathing were carried out, almost all respondents experienced moderate pain, amounting to 45 respondents (78.9%). Meanwhile, after slow deep breathing were carried out by the majority of respondents experienced a change to mild pain, amounting to 34 respondents (59.6%). The results of statistical test analysis using the Wilcoxon test showed that the p value = 0.000, so the p value < □ (0.05). There is an effect of slow deep breathing on reducing the pain scale in post-operative patients at Sultan Imanuddin Pangkalan Bun Regional Hospital.

Keywords: pain; post-operative; slow deep breathing

## INTRODUCTION

Surgery is a medical procedure by opening the body part to be treated through an incision and ending with stitches on the incision wound. Undergoing surgery is a difficult experience for patients. There are several problems during or after surgery that cause fear in patients. The procedure uses anesthesia so that patients do not feel pain during surgery. However, after the operation is complete, when the patient begins to regain consciousness and the effects of the anesthesia have worn off. The patient will feel pain in the incision area and feel discomfort (Mulyadin, 2022). Based on data obtained from WHO, the number of patients with surgical procedures has increased significantly from year to year. It was recorded in 2017 that there were 140 million patients in all hospitals in the world, while in 2019 the data experienced a major increase of 148 million people. In 2020, there were 234 million clients in all hospitals. It is estimated that there are 165 million procedures worldwide each year. In Indonesia, it is estimated that in 2020, surgical procedures will reach 1.2 million people (*World Health Organization*, 2020). Based on data from the Ministry of Health in 2021, surgical procedures were ranked 11th out of 50 treatments for diseases in Indonesia, 32% of which were effective surgical procedures (Kemenkes, 2021). Based on data taken from medical records at Sultan Imanuddin Hospital, Pangkalan Bun, from January to December 2023, the number of patients undergoing general anesthesia (major surgery) was 449 people, spiral anesthesia (moderate surgery) 774 people, and minor surgery 310 people, for the total number of patients undergoing surgery at Sultan Imanuddin Hospital, Pangkalan Bun, was 1533 people (*Badan Pusat Statistik*, 2016).

Pain is an unpleasant sensory and emotional experience in which a person feels an uncomfortable feeling caused by actual or functional tissue damage (SDKI, 2019). While post-operative is the period after surgery begins when the patient is moved to the recovery room and ends until the next examination (Agustin et al., 2020). Post-operative pain is a reaction of the body to tissue damage (starting from skin incisions to damage caused by the surgical process), pulling or stretching of internal organs, or diseases (eg cancer, spinal disorders, etc.) (Andika et al., 2019). As a result of the surgical procedure, the patient will experience discomfort. Pain as a subjective sensory and unpleasant emotional experience is related to actual or potential tissue damage or is felt in events where damage occurs. Body movements and facial expressions can indicate pain, such as clenched teeth, tightly closing the eyes, grimacing, whining, screaming and immobilization of the body (Tiara & Sunarno, 2022). Pain that occurs during surgery is caused by deliberate wounding, shifting of bone fragments. Pain can occur due to stimulation of nerve fiber endings during surgery, disrupting blood supply. Skin fibers that are intentionally incised will cause sharp pain like being stabbed. Most post-operative pain is moderate to severe pain so that patients will often complain of pain, decreased appetite, and others (Bahrudin, 2018).

Post-operative pain is usually directly proportional to the type and extent of the incision wound which is relatively short and localized. Post-operative pain that is not managed properly will worsen the patient's condition, impact the healing process, prolong hospitalization, increase treatment costs, decrease quality of life, respiratory disorders, sleep disorders and increase morbidity and morality (Amalia Yunia Rahmawati, 2020). Postoperative pain is still a problem in health services worldwide. Nearly 50% of patients who complete elective surgery experience pain and will lead to an increase in chronic pain rates and a decrease in patient satisfaction with services (Prabandari et al., 2018). The surgical procedure involves making an incision that is deliberate and causes pain. The majority of patients who undergo surgery will experience pain, nearly 20% of patients complain of pain, this figure has not decreased over the past 30 years (Small & Laycock, 2020). According to the World Health Organization (WHO), the measurement of pain severity is divided into three, namely mild pain, moderate pain, and severe pain. By measuring the pain scale, the diagnosis of the disease can be determined and appropriate intervention can be carried out. The pain scale as a measurement of the duration and type of patient pain (Rahayu, Notesya, 2023). Patients have the right to receive proper pain assessment and management. Hospitals must have a process for screening, assessing, and managing pain, consisting of identifying patients with pain during initial assessment and reassessment, providing information to patients that pain can be a result of therapy, procedures, or examinations, providing management to overcome pain, regardless of where the pain originates, in accordance with hospital regulations, communicating and educating patients and families about pain management in accordance with religious backgrounds, cultures, and values adopted (Bahrudin, 2018).

Postoperative pain management to reduce pain is done in two ways, namely pharmacological management and non-pharmacological management. Pharmacological management is collaboration with medical personnel in providing analgesics to relieve pain (Mayenti & Sari, 2020). In general, the pharmacological strategy in providing therapy follows the WHO pain relief ladder (analgesic ladder), examples of drugs are ketorolac ibuprofen, aspirin and others. Non-pharmacological management can be given by nurses so that patients can reduce pain independently, this can be done by means of relaxation techniques, music stimulation, warm compresses, and dhikr therapy techniques. One of the relaxations used is slow deep breathing

(Cynthia Puspariny, Diny Fellyana, 2019). Slow deep breathing is a form of nursing care in which the nurse teaches the patient how to take deep breaths, slow breaths (holding inspiration to the maximum) and how to exhale slowly, in addition to reducing the intensity of pain, deep breathing techniques can increase lung ventilation and increase blood oxygenation (Obar & Sopyan, 2022). Deep and slow breathing can stimulate the autonomic nervous response, namely by reducing the sympathetic nervous response and increasing the parasympathetic response (Pertiwi & Prihati, 2020). Sympathetic nerve stimulation increases body activity, while the parasympathetic response reduces body activity more so that it can reduce metabolic activity (Cahyo et al., 2023). Physiologically, the slow deep breathing relaxation technique will stimulate the parasympathetic nervous system so that it increases endorphin production, reduces heart rate, increases lung expansion so that it can develop optimally, and the muscles become relaxed. The slow deep breathing relaxation technique allows the body to get adequate oxygen input, where oxygen plays an important role in the body's respiratory and circulatory systems (Nurjanah & Yuniartika, 2020).

Based on previous research (Wulansari et al., 2023) on slow deep breathing to reduce pain during the removal of water seal drainage in pneumothorax patients with 20 respondents divided into two groups, namely the intervention group and the control group, it showed a difference in the average level of pain with a value of 2,366 in the intervention group while in the control group it was 3,100, so that the mean difference value of the two groups was 0.734, which means that there is a significant difference between the two groups, thus slow deep breathing has a significant effect on reducing pain. The study is in line with the study conducted by Mahmudi & Dinaryanti on the effect of a combination of Benson relaxation and slow deep breathing on post-operative pain in cesarean section consisting of 18 respondents using the One Group Pre-Post Test Design Without Control research design showed a significant decrease in pain intensity with an average pain value in respondents before being treated 4.72 and a mean value after being treated 3.00 (Mahmudi & Dinaryanti, 2022). Another study that supports this study is a study conducted by Tamrin on the effect of slow deep breathing on pain in post-operative appendicitis patients with the results of the study showing that out of 30 respondents experienced an average pain of 8.30 in pre-intervention 7 to 10 which is classified as moderate to severe pain and the average pain value in post-intervention is 2 to 3 which is classified as mild pain so that it can be that there is a significant effect between before and after slow deep breathing on reducing the scale of post-operative pain in appendicitis at Sleman Hospital, Yogyakarta (Tamrin et al., 2019).

After conducting a preliminary study in the Meranti Room of Sultan Imanuddin Hospital on 10 patients who had undergone surgery through interviews, it was found that 7 patients experienced mild to moderate pain. Patients did not know about slow deep breathing and overcoming pain with the drug therapy given. Therefore, researchers are interested in conducting a study on "the effect of slow deep breathing on reducing the scale of pain in post-operative patients at Sultan Imanuddin Hospital, Pangkalan Bun".

## METHOD

This research is a quantitative research with a quasi-experimental design with a one group pre-test and post-test approach. The population in this study were all postoperative patients who experienced pain in the Meranti Room of Sultan Imanuddin Hospital, Pangkalan Bun, totaling 128 patients. The sampling technique in this study used consecutive sampling, namely sample selection by determining subjects who met the inclusion criteria and were included in the study until a certain

period of time (Nursalam, 2020). In this study, postoperative patients from minor to moderate surgery in the Meranti Room in July 2024. The instruments in this study were the Standard Operating Procedure for Slow Deep Breathing and a pain scale observation sheet with NRS (Numeric Rating Scale).

## RESULT AND DISCUSSION

Table 1
Respondent characteristics based on gender (n= 57)

| Gender | f | % |
|---|---|---|
| Male | 30 | 52.6 |
| Female | 27 | 47.4 |

Based on the data in table 1, it shows that the majority of respondents were male, as many as 30 respondents (52.6%).

Table 2
Respondent characteristics based on age (n= 57)

| Age | f | % |
|---|---|---|
| 17-25 | 14 | 24.6 |
| 26-35 | 10 | 17.5 |
| 36-45 | 9 | 15.8 |
| 46-55 | 15 | 26.3 |
| >55 | 9 | 15.8 |

Based on the data in table 2, it shows that almost half of the respondents are in the early elderly age, as many as 15 respondents with a percentage (26.3%).

Table 3
Respondent characteristics based on education (n= 57)

| Education | f | % |
|---|---|---|
| No school | 7 | 12.3 |
| Elementary school | 5 | 8.8 |
| Junior high school | 7 | 12.3 |
| Senior high school | 28 | 49.1 |
| College | 10 | 17.5 |

Based on the data in table 3, it shows that the level of education of respondents is almost half, namely high school as many as 28 respondents with a percentage of (49.1%).

Table 4
Respondent characteristics based on job (n= 57)

| Job | f | % |
|---|---|---|
| No work | 7 | 12.3 |
| Employees | 28 | 49.1 |
| Self-employed | 7 | 12.3 |
| Housewife | 15 | 26.3 |

Based on the data in table 4, it shows that almost half of the respondents' jobs are employees, as many as 28 respondents with a percentage of (49.1%).

Table 5
Respondent characteristics based on pharmacological therapy (n= 57)

| Pharmacological therapy | f | % |
|---|---|---|
| Yes | 57 | 100.0 |

Based on the data in table 5, it shows that all 57 respondents received pharmacological therapy (100%).

Table 6.
Respondent characteristics based on type of operation (n= 57)

| Type of operation | F | % |
|---|---|---|
| Minor operation | 24 | 42.1 |
| Moderate operation | 33 | 57.9 |

Based on the data in table 6, it can be seen that the majority of respondents underwent moderate surgery, totaling 33 respondents (57.9%).

Table 7
Respondent characteristics based on diagnosis (n= 57)

| Diagnosis | f | % |
|---|---|---|
| Tumor | 8 | 14.0 |
| Cholesis multiple | 3 | 5.3 |
| Soft Tissue Tumor | 16 | 28.1 |
| Appendicitis | 4 | 7.0 |
| Abscess | 6 | 10.5 |
| Fracture | 6 | 10.5 |
| Multiple excision | 4 | 7.0 |
| Polyp | 1 | 1.8 |
| Popliteal ganglion | 1 | 1.8 |
| Tubotympatic chronic | 1 | 1.8 |
| Sinusitis | 1 | 1.8 |
| Thyroid | 1 | 1.8 |
| Hemorrhoids | 2 | 3.5 |
| Anal fistula | 1 | 1.8 |
| Laceratum vulnus | 1 | 1.8 |
| Chronical tonsillitis | 1 | 1.8 |

Based on the data in table 7, it shows that almost half of the patient's diagnosis was Soft Tissue Tumor, which amounted to 16 respondents with a percentage of (28.1%).

Table 8
Respondent characteristics based on pain scale pre-test (n= 57)

| Pain scale | f | % |
|---|---|---|
| Mild pain | 12 | 21.1 |
| Moderate pain | 45 | 78.9 |
| Total | 57 | 100.0 |

Based on the data in table 8, it shows that the pain scale of post-operative patients is almost entirely at the moderate pain level, totaling 45 respondents (78.9%).

Table 9
Respondent characteristics based on pain scale post-test (n= 57)

| Pain scale | f | % |
|---|---|---|
| Mild pain | 34 | 59.6 |
| Moderate pain | 23 | 40.4 |

Table 9, it shows that the pain scale in post-operative patients has changed, where the majority are in the mild pain category, amounting to 34 respondents with a percentage of (59.6%).

Table 10
Respondent characteristics based on pain scale pre-test and post-test (n= 57)

| | f | | p *value* | N |
|---|---|---|---|---|
| | Mild pain | Moderate pain | | |
| *Pre-test* | 12 | 45 | 0,000 | 57 |
| *Post-test* | 34 | 23 | | |

Based on the data in table 10, the results of the Wilcoxon test show that the p value = 0.000, so the p value ≤ α (0.05), so it was decided that H1 was accepted and H0 was rejected, which means that there is an effect of slow deep breathing on reducing the pain scale in post-operative patients.

**Pain Scale Before Slow Deep Breathing is Performed on Post-Operative Patients**

Based on the research data in table 8, it shows that the level of pain scale of post-operative patients before slow deep breathing was performed, most of them were at the moderate pain level, totaling 45 respondents with a percentage of (78.9%). This study is in line with research (Setianingsih, 2018) that the results obtained before slow deep breathing was performed, the pain scale of respondents was at the moderate pain level.The results of the pain scale measurement on respondents can be seen based on the pain scale observation sheet using the NRS (Numeric Rating Scale) where moderate pain is on a scale of 4-6 which objectively the respondents show signs of hissing, grinning, can show the location of the pain, can describe it and can follow orders well.According to IASP (International Association for the Study of Pain), pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or necrosis, described by the sufferer as such (Small & Laycock, 2020). Pain is an unpleasant sensory and emotional experience in which a person feels an uncomfortable feeling caused by actual or functional tissue damage (SDKI, 2019).

In this study, it can be seen that based on the data, almost half of the respondents are in the early elderly age, as many as 15 respondents with a percentage of (26.3%). This study is in line with (Hidayati et al., 2022) which shows that the older a person is, the lower the pain threshold, so they feel more pain. In this study, it can be seen that from all respondents who experienced moderate pain, most were women, as many as 24 respondents (53.3%), while male respondents were more tolerant of pain, as many as 21 respondents with a percentage (46.7%). This is in line with research (Hidayatulloh et al., 2020) which states that female gender has a higher pain scale score compared to male gender, it is clear that the differences in gender and the assistance that arises for pain are the result of the interaction of genetic, anatomical, physiological, neuronal, hormonal, psychological and social factors that modulate pain differently in gender.In addition to age and gender factors, the results of this study can also provide an explanation that the type of surgery is related to the level of pain, in this study the pain scale was moderate, most of the respondents came from the moderate category of surgery, namely 29 respondents (64.4%) while the type of surgery with a small category almost half experienced a moderate pain scale, namely 16 respondents (35.6%). The study conducted (Vitri, 2022) said that patients who underwent moderate category surgery almost all experienced moderate pain with a scale level of 4-6. Based on the description above, it was found that most post-operative patients experienced moderate pain caused by actual or potential tissue damage or necrosis described by the patient and influenced by age, gender and type of surgery.

**Pain Scale After Slow Deep Breathing in Post-Operative Patients**

Based on the data in table 9 shows the results of changes in the pain scale in postoperative patients after slow deep breathing, most of them are in the mild pain category, totaling 34 respondents with a percentage (59.6%). The results of measuring the pain scale in postoperative patients mostly changed to mild pain, the results of these measurements when viewed based on the NRS (Numeric Rating Scale) score are on a scale of 1-3 with the objective criteria that respondents can communicate well.The results of this study showed a change in the average decrease in the pain

scale in 57 respondents, the average pain scale before the slow deep breathing action was 4.5 then re-measured after the action, the average pain was 3.03. These results provide an illustration of a change in the difference in the average pain value of 1.54 on the pain scale after slow deep breathing was performed for 10 minutes.

Slow deep breathing is a slow deep breathing relaxation technique that will stimulate the parasympathetic nervous system so that it increases endorphin production, lowers heart rate, increases lung expansion so that it can develop optimally, and muscles become relaxed. Slow deep breathing is done consciously to regulate breathing deeply and slowly. During slow deep breathing, the breathing frequency slows to less than 10 times per minute with a long exhalation phase (Pertiwi & Prihati, 2020). Physiologically, the slow deep breathing relaxation technique will stimulate the parasympathetic nervous system so that it increases endorphin production, lowers heart rate, increases lung expansion so that it can develop optimally, and muscles become relaxed. The slow deep breathing relaxation technique allows the body to get adequate oxygen input, where oxygen plays an important role in the body's respiratory and circulatory systems (Nurjanah & Yuniartika, 2020). When we do the slow deep breathing relaxation technique, it removes toxins and unused metabolic waste, increases metabolism and produces energy which will then maximize the amount of oxygen that enters and is supplied to all tissues, which can result in a reduced heart rate, improved breathing patterns, and decreased pain levels.

In addition to the influence of slow deep breathing can reduce pain, researchers also tried to link the experience of post-operative pain with the level of education, in this study it can be seen that the level of education of respondents is almost half, namely high school as many as 28 respondents with a percentage (49.1%). Based on the theory according to (Prawito & Shomad, 2019) that the level of individual education affects the ability to think. The higher the level of education, the easier it is for individuals to think rationally and capture new information. After slow deep breathing for 10 minutes in post-operative patients, there was a change in the pain scale from the previous moderate pain scale to the mild pain scale. Slow deep breathing is a relaxation method that can affect the body's pain response. Slow deep breathing causes a decrease in sympathetic nerve activity, an increase in parasympathetic nerve activity, an increase in body relaxation, and a decrease in metabolic activity, thereby reducing the body's pain response.

**The Effect of Slow Deep Breathing on Pain in Post-Operative Patients**

Based on the results of the study in table 10, it shows that in the pre-test, the level of pain scale was moderate pain for 45 respondents with a percentage (78.9%), for the post-test results in post-operative patients there was a significant change in the pain scale where the pain scale became mild pain category for 34 respondents with a percentage (59.6%). This study is in line with research (Igiany, 2018) showing that after giving the slow deep breathing technique for 10 to 20 minutes, it can reduce the intensity of pain more than respondents who were not given the slow deep breathing technique treatment so that it can be said that there is a difference in pain in extremity fracture patients between before and after the slow deep breathing technique was performed, after the Wilcoxon test, the results were obtained, namely Asymp.sig (2-tailed) of 0.000 which means the p value = 0.000 then the p value $\leq \alpha$ (0.05), it can be concluded that there is an effect of slow deep breathing on reducing the pain scale. The results of this study showed a decrease in pain in the experimental group from the results of the independent T test and the dependent T test, the p value < (0.05). Changes in pain scale after slow deep breathing can also be influenced by the type of

surgery where in this study there were two types of surgery, namely minor surgery and moderate surgery. In patients with minor surgery, almost all of them experienced mild pain, from 24 respondents who underwent minor surgery, the post-test results were almost all with mild pain category as many as 21 respondents with a percentage (87.5%). This study is supported by the theory (Vitri, 2022) which states that almost half of patients who underwent minor surgery experienced mild pain with a scale level of 1-3, this shows that the type of surgery is related to the pain experience felt by post-operative patients.

Another study conducted by (Obar & Sopyan, 2022) stated that performing slow deep breathing therapy for 10 minutes can affect the level of recurrence of pain after laparotomy surgery, slow deep breathing can provide relaxation so that the production of hormones that can cause pain can be inhibited so that it can be concluded that there is an effect of slow deep breathing therapy on the scale of pain felt by respondents after undergoing this therapy. The results of the paired sample t-test showed a p value <0.05 which means there is a difference in the level of pain between before and after administering slow deep breathing. Slow deep breathing relaxation techniques will stimulate the parasympathetic nervous system, thereby increasing endorphin production, lowering heart rate, increasing lung expansion so that it can develop optimally, and muscles become relaxed. Slow deep breathing relaxation techniques allow the body to get adequate oxygen input, where oxygen plays an important role in the body's respiratory and circulatory systems (Nurjanah & Yuniartika, 2020). When we do slow deep breathing relaxation techniques, it removes toxins and unused metabolic waste, increases metabolism and produces energy which will then maximize the amount of oxygen that enters and is supplied to all tissues that are fulfilled which can result in reduced heart rate, improved breathing patterns, and decreased pain levels (Pertiwi & Prihati, 2020).

Slow deep breathing is a relaxation used to reduce pain because it can reduce the work of the sympathetic nerves by increasing the inhibitory center of the rhythm which can result in a decrease in the final sympathetic results. Reducing the final sympathetic results can reduce the results of the epinephrine hormone received by the alpha receptor so that it can provoke smooth muscles of the blood vessels so that vasodilation occurs which will reduce peripheral pressure and also reduce pain. When stretching there is an extension of muscle fibers, decreased delivery of nerve impulses to the brain, reduced brain work, and other body benefits, the characteristics of stretching are proven by reduced heart rate, improved breathing patterns and decreased pain levels ((Pertiwi & Prihati, 2020). Based on the description above, after slow deep breathing was performed for 10 minutes, it showed a significant effect on reducing the pain scale in post-operative patients at Sultan Imanuddin Hospital, Pangkalan Bun. Slow deep breathing can stimulate the parasympathetic nervous system, thereby increasing endorphin production, decreasing sympathetic nerve activity, increasing parasympathetic nerve activity, increasing body relaxation, and decreasing metabolic activity. So it is expected that slow deep breathing can be done to reduce the body's pain response

## CONCLUSION

Based on the results of research on the effect of slow deep breathing on reducing the pain scale in post-operative patients at Sultan Imanuddin Hospital, Pangkalan Bun, it was found that: The level of pain scale before slow deep breathing was performed in post-operative patients was almost entirely at a moderate pain level. The levelof pain scale after slow deep breathing in post-operative

patients is mostly in the mild pain category. There is an effect of slow deep breathing on reducing the pain scale in post-operative patients.

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