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Application of Deep Breathing Exercise Technique to Reduce Pain Intensity in Postoperative Patients in the Operating Room



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Abstract

Background: Surgery is the process of healing diseases by cutting, slicing or cutting a diseased limb. Pain in postoperative patients if left untreated will cause new problems and slow healing. *Deep breathing exercise* is a non-pharmacological therapy to relieve the pain experienced by the patient. Appendicitis can occur due to various factors that cause rupture of the intestinal lumen or obstruction, if left untreated, it will be a dangerous complication for sufferers. The aims to identify non-pharmacological nursing measures of *deep breathing exercise* in patients with postoperative pain nursing problems.

Methods: This case study is a descriptive case study, which is a case study design that systematically and accurately describes a situation or population area that is factual.

Results: After being given *deep breathing exercise therapy* for 3 days independently and guided by the researcher, respondent 1 experienced a decrease in pain scale 6 to 2 and respondent 2 experienced a decrease in pain scale of 5 to 1.

Conclusions: The results of observations made on both respondents in the administration of non-pharmacological *deep breathing exercise therapy* can reduce the intensity of moderate to mild pain scale in postoperative appendectomy patients.

Keywords: pain, deep breathing exercise, post surgery, case study

Introduction

Surgery is a process of healing the disease by cutting, slicing or slicing the diseased part and then closing the surgical wound by making stitches (Lestari, 2020). The human body has an organ called the appendix or appendicitis, if the appendix is inflamed, this event is called appendicitis. There are two types of appendicitis, namely acute appendicitis and chronic appendicitis, both of which have the same symptoms, namely pain in the lower right

abdomen and anorexia. However, in acute appendicitis it lasts less than 24 hours and in chronic appendicitis it lasts for 3 weeks. The cause of appendicitis is usually due to obstruction or blockage caused by tumors, parasites or hard feces that cause bacteria to accumulate around the appendix and become inflamed, then abscesses and ruptures occur. The appendix can be perforated which can lead to peritonitis (Pratama, 2022).

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In addition to peritonitis, appendicitis can also experience other complications such as abscesses or pus collections, then adhesions or adhesions, as well as appendicular masses or inflamed lumps and the last is a surgical wound infection (ILO) (Priastini, 2022). Management in patients with appendicitis may be given antibiotics. However, if the condition of the appendix is no longer able to survive, the doctor will recommend surgery or appendectomy by laparotomy or laparoscopy. The severity of appendicitis can be seen through supporting examinations such as routine blood tests to find out the number of leukocytes, then ultrasound and CT-Scan to find out the picture of the appendix (Pratama, 2022). After the appendectomy is performed, of course, the patient will suffer pain due to incisions in the surgical area after the effects of anesthesia are gone. In pain management, nurses collaborate with doctors to provide pharmacological therapy, namely the administration of analgesics. Nonpharmacological pain reduction methods include acupressure, hypnosis, music therapy, relaxation therapy, biofeedback, massage therapy, aromatherapy, guided imagination techniques, warm and cold compresses and play therapy (PPNI, 2018).

Nurses are also able to carry out independent interventions, namely providing non-pharmacological therapies such as deep breathing exercises. Deep breathing exercise is able to reduce pain because it can stimulate the body to release endogenous opioids consisting of endorphin and encaphalin hormones that function to regulate pain. In addition to endogenous opioids, the hormone cortisol also plays an important role in the patient's pain sensation. Deep breathing exercise is able to reduce the levels of the hormone cortisol which functions to reduce stress and pain perception in postoperative patients. The World Health Organization (WHO) reported that in 2019 there were 177 appendectomy surgery patients with an incidence of 288 cases per 100,000 population worldwide. The West Java Health Office reported 5,980 cases and 177 deaths (West Java Health Office, 2016). In Bogor district there are 256 cases of appendicitis with 49 female patients and 53 male patients, ranking second out of the total cases. In 2021-2022, many cases of appendicitis occurred in grade V students aged 10-13 years.

Based on the above background, the researcher is interested in conducting a case study entitled The Application of Deep Breathing Exercise Techniques to Reduce Pain Intensity in Postoperative Patients in the

Operating Room of PMI Bogor Hospital. This case study was conducted to obtain an overview of non-pharmacological nursing practices deep breathing exercises in patients with postoperative pain nursing problems.

Methods

The method used is a descriptive design in the form of a case study. This research was conducted from May 19, 2025 to June 13, 2025. This study was conducted in the inpatient room of the surgical ward of PMI Bogor Hospital with 2 respondents. This data collection method is through observation, interviews, physical examinations and documentation studies. Before applying, the researcher asked for the patient's consent to become a respondent by signing an informed consent. The researcher used the Numeric Rating Scale (NRS) pain scale instrument, and to obtain objective data, the researcher examined vital signs before and after the application. The researcher used other instruments such as SOP deep breathing exercise, deep breathing exercise leaflet, Numeric Rating Scale (NRS) pain observation sheet and vital signs observation sheet. The implementation of deep breathing exercise was carried out for 3 days to both patients for 2 minutes in 3 cycles with the application of 1 cycle of 14 seconds and the interval of each cycle was 6 seconds. Deep breathing exercises are performed by asking the patient to take a comfortable position and start breathing air through the nose for 4 seconds, holding the breath for 2 seconds and then exhaling slowly through the mouth for 8 seconds.

Results

Respondents according to the inclusion criteria, namely post-operative appendectomy patients, willing to be respondents, moderate pain problems, 6-hour postoperative appendectomy patients, cooperative and able to communicate well

Respondent 1

Mrs. N, 21 years old postoperative appendectomy, said that the lower right abdominal pain appeared to be grimaced, appeared to be weak, appeared to have a surgical wound on the lower right abdomen. P (provoking): post appendectomy, Q (quality): like a puncture, R (region): lower right abdomen, S (scale): 6, T (time): pain felt disappears. Vital signs were examined with the results of TD: 132/73 mmHg, RR: 20x/min, Temperature: 36.3oc, Pulse: 82x/min and CRT <2 seconds. Composmentis consciousness,





moderate general state, gcs 15 with E4M6V5. The nursing diagnosis raised by the researcher is acute pain.

Respondent 2

Mrs. E, 22 years old post-operative appendectomy, said that the lower right abdominal pain, appeared to be grimaced, appeared weak, appeared to have surgery wounds on the lower right abdomen. P (provoking): post appendectomy, Q (quality): like a puncture, R (region): lower right abdomen, S (scale): 5, T (time): pain felt disappears. Vital signs were examined with TD results: 99/78 mmHg, RR: 19x/min, Temperature: 36.6oc, Pulse: 92x/min and CRT < 2 seconds. Composmentis consciousness, moderate general state, gcs 15 with E4M6V5. The nursing diagnosis raised by the researcher is acute pain.

The applications that can be done to respondents 1 and 2 are conducting a PQRST assessment, implementing deep breathing exercises, monitoring pain scales and vital signs before and after deep breathing exercises and providing education about deep breathing exercises

Table 1. Vital sign monitoring before and after deep breathing exercise

Table with 5 columns: Indicator, Pre, Day 1, Day 2, Day 3. It contains two tables of vital signs for Mrs. N and Mrs. E.

After non-pharmacological therapy nursing measures were carried out, namely deep breathing exercises for 3 consecutive days, it can be seen on the graph that there was a decrease in the pain scale in both respondents. On respondent 1 on the first day before deep breathing exercise the pain scale was 6 and after that the pain scale was still 6, on the

second day the pain scale before deep breathing exercise 5 and after that the pain scale became 4, then on the third day the pain scale before deep breathing exercise 3 and after that the pain scale became 2. In respondent 2 on the first day before deep breathing exercise the pain scale was 5 and after that the pain scale was still 5, on the second day the pain scale before deep breathing exercise 4 and after that the pain scale became 3, then on the third day the pain scale before deep breathing exercise 2 and after that the pain scale became 1. After non-pharmacological therapy nursing measures were carried out, namely deep breathing exercises for 3 consecutive days, it can be seen in the table that the results of vital signs improved after guided and independent application.

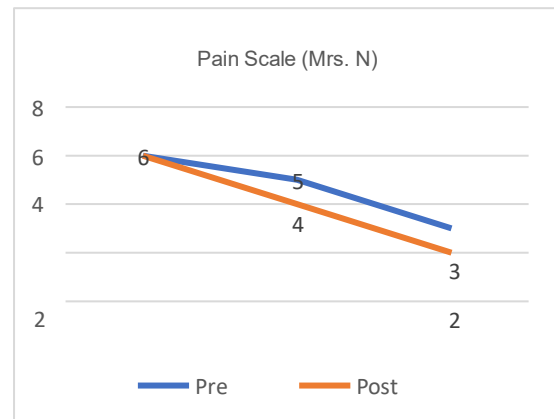


Figure 1. Pain scale before after deep breathing exercise (Mrs. N)

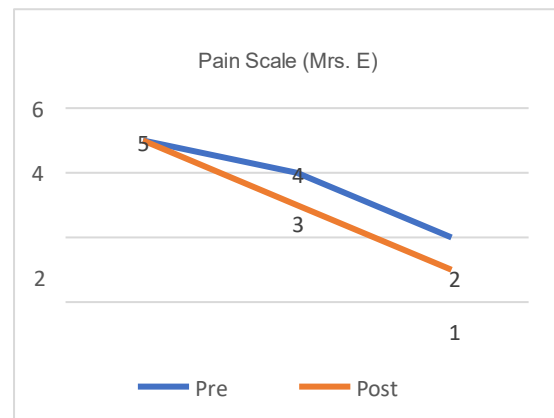


Figure 2. Pain scale before after deep breathing exercise (Mrs. E)

Discussion

The researcher conducted a pain scale assessment on respondent 1 on the first day and found that before deep breathing exercises were carried out a pain scale of 6 and after that the pain scale was still 6, on the second day the





pain scale before deep breathing exercise was 5 and after that the pain scale was 4, then on the third day the pain scale before deep breathing exercise 3 and after that the pain scale becomes 2. Meanwhile, in respondent 2 on the first day before deep breathing exercise the pain scale was 5 and after that the pain scale was still 5, on the second day the pain scale before deep breathing exercise 4 and after that the pain scale became 3, then on the third day the pain scale before deep breathing exercise 2 and after that the pain scale became 1. Then the researcher conducts health education, because this is part of education to respondents 1 and 2 after the implementation of deep breathing exercise, then greets the patient, provides counseling and explains the material to be delivered, namely about deep breathing exercise, the researcher also facilitated leaflets for both respondents to deepen the material that had been delivered and could practice independently. The results of the implementation of the deep breathing exercise that the researcher conducted were in line with the research carried out (Susanti, 2024), that patients with acute pain problems of moderate pain scale can decrease to a mild scale by applying deep breathing exercises independently and assisted by nurses.

Based on research conducted (Susanti, 2024), It shows that the patient's pain scale can decrease from moderate to mild scale by performing deep breathing exercises regularly. In accordance with this theory, it means that the patient is able to perform deep breathing exercises independently because this technique does not require other tools and assistance. Respondents 1 and 2 followed what the researcher instructed and the respondents repeated deep breathing exercises when feeling pain so that there was an effect of deep breathing exercise on reducing the pain scale. This is in line with research (Botutihe, 2022) It was said that there was a significant difference between the scale of pain intensity post op appendicitis before and after deep breathing exercise with a value of $p=0.000$. Based on research conducted (Soumokil, 2023) The application of deep breathing exercises in order to reduce pain intensity in postoperative appendectomy patients in the ER room of the Latu Health Center in 2023 shows that the evaluation results show that the assessment of goals was achieved and the problem was resolved. In contrast to the previous study, in

this study, the researcher used the Numeric Rating Scale (NRS) instrument to find out the picture of pain felt by the respondents as subjective data that was monitored before and after the application of deep breathing exercise, then to obtain objective data, the researcher examined vital signs before and after the implementation of deep breathing exercise with the aim of finding out whether the respondent's vital signs improved after deep breathing exercises.

Limitation

This study has several case limitations, namely time constraints so that it hinders the researcher from finding respondents with appropriate inclusion criteria and both respondents receive pharmacological therapy, namely different analgesics so as to allow different responses to the application of deep breathing exercises, therefore for future research it is hoped to extend the practice time and pay attention to the antibiotics that patients get.

Conclusion

Application of deep breathing exercise in postoperative patients with acute pain nursing problems was able to reduce pain intensity, then this occurred because deep breathing exercise stimulated the body to release endogenous opioids consisting of endorphin and encaphalin hormones which function to regulate and inhibit pain. In addition to endogenous opioids, the hormone cortisol also plays an important role in the patient's pain sensation. Deep breathing exercise is able to reduce the level of the hormone cortisol which functions to reduce stress and pain perception in postoperative patients, thereby reducing pain intensity.

Reference

- Ayu Lestari, F. E. (2020). The relationship between family support and anxiety levels among preoperative cesarean section patients at Lamadukelleng Regional Hospital. *Jurnal Adpertisi*, 1(1), 20–41.
- Botutihe, F., & E. (2022). Effectiveness of deep breathing relaxation techniques on pain intensity among postoperative appendicitis patients. *Garuda Pelamonia Journal of Nursing*, 5(1), 69–73.
- Dewan Pengurus Pusat Persatuan Perawat Nasional Indonesia. (2017). Indonesian





- Nursing Diagnosis Standards (SDKI). DPP PPNI.
- Dewan Pengurus Pusat Persatuan Perawat Nasional Indonesia. (2018). Indonesian Nursing Intervention Standards (SIKI). DPP PPNI.
- Dewan Pengurus Pusat Persatuan Perawat Nasional Indonesia. (2019). Indonesian Nursing Outcomes Standards (SLKI). DPP PPNI.
- Pratama, Y. (2022). Clinical aspects and management of acute appendicitis in children. *Jurnal Kedokteran Nangroe Medika*, 5(3), 33–42.
- Priastini, N. P. (2022). Description of pain management among post-appendectomy patients in 2022. [Undergraduate Thesis/Scientific Report].
- Soumokil, Y., & S. (2023). The effect of deep breathing relaxation techniques on pain

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reduction among post-appendectomy patients in the emergency department of Latu Community Health Center. *Jurnal Ilmu Kesehatan dan Kedokteran*, 2(3), 156–166.

- Susanti, E., & S. (2024). Implementation of deep breathing relaxation techniques for postoperative appendectomy patients with acute pain. *Jurnal Keperawatan Merdeka*, 4(1), 56–61.

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