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The Effect of Early Mobilization on Pulmonary Function Recovery in Post-Abdominal Surgery Patients

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ABSTRACT

Background: Post-abdominal surgery patients often experience impaired lung function due to pain, decreased lung expansion, and prolonged immobilization. Early mobilization is one of the recommended non-pharmacological interventions to accelerate lung function recovery.

Objective: This study aims to analyze the effect of early mobilization on the recovery of lung function in post-abdominal surgery patients.

Method: This study uses a quasi-experimental design with a pretest-posttest approach. control group. A sample of 40 patients was divided into an intervention group (n=20) who were given early mobilization 6–12 hours after surgery, and a control group (n=20) who were given mobilization according to standard hospital procedures. Pulmonary function parameters were measured using spirometry (Forced Vital Capacity / FVC and Forced Expiratory Volume in 1 second/FEV1) on days 1 and 3 postoperatively. Data analysis used *paired t-test* and *independent t-test* with a significance level of $p<0.05$.

Results: The study showed a significant increase in FVC and FEV1 values in the intervention group compared to the control group ($p=0.001$). Patients who underwent early mobilization had faster lung function recovery, with a reduced incidence of respiratory complications such as atelectasis.

Conclusion: Early mobilization is effective in accelerating the recovery of lung function in patients following abdominal surgery. Implementation of early mobilization can be used as a standard intervention in postoperative care to prevent respiratory complications.

Keywords: Early Mobilization, Pulmonary Function, Post-Operative, Abdominal Surgery

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1. Introduction

Abdominal surgery is one of the most common major surgical procedures performed in hospitals. This procedure generally has physiological impacts on patients, particularly on the respiratory system. Post-abdominal surgery patients tend to experience decreased lung function due to the effects of anesthesia, analgesic use, incision pain, and limited mobility, which can lead to alveolar hypoventilation. This condition can increase the risk of respiratory complications such as atelectasis, pneumonia, and hypoxemia (Putra et al. et al., 2022).

Early mobilization is a nursing intervention aimed at increasing a patient's physical activity as soon as possible after surgery. Early mobilization has been shown to improve lung expansion, increase alveolar ventilation, and reduce secretion retention in the respiratory tract (Rahman et al.al., 2023). In addition, early mobilization also helps improve circulation, accelerate wound healing, and prevent complications from prolonged bed rest.

Several previous studies have shown that early mobilization significantly impacts postoperative lung function in patients. According to research by Susanti & Wulandari (2021), patients who underwent early mobilization within 6–12 hours after surgery experienced increased FVC (*Forced Vital Capacity*) and FEV1 (*Forced Ventricular Ventricular Capacity) values. Expiratory Volume in 1 second*) compared to patients who were not mobilized. Similar results were also shown by Pradana et al. (2020) that early mobilization can reduce the risk of respiratory complications after abdominal surgery.

However, in practice, early mobilization is often less than optimal due to obstacles such as pain, patient fear, and limited healthcare personnel monitoring. This highlights the need for further research into the effectiveness of early mobilization in accelerating lung function recovery after abdominal surgery.

Based on this background, this study aims to analyze the effect of early mobilization on the recovery of lung function in post-abdominal surgery patients.

2. Research Methods

a) Research Design

This study uses a quasi- experimental design with a *pre-test approach. post-test control group This design* was chosen to determine the effect of early mobilization on the recovery of lung function in post-abdominal surgery patients by comparing the intervention group and the control group.

b) Location and Time of Research

The research was conducted in the surgical treatment room of RSUD X in May–July 2025.

c) Population and Sample

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The population in this study was all post-abdominal surgery patients treated in the surgical ward of RSUD X. The sample was taken using a purposive sampling technique based on inclusion and exclusion criteria.

1. **Inclusion criteria** :
   a. Post-elective abdominal surgery patients.
   b. Aged 18–65 years.
   c. In stable hemodynamic conditions.
   d. Willing to be a respondent.
2. **Exclusion criteria** :
   a. Patients with a history of chronic lung disease (e.g. COPD, severe asthma).
   b. Patients with severe post-operative complications.
   c. Patients who are uncooperative during research procedures.
   d. The sample size was 40 respondents who were divided into two groups: 20 respondents in the intervention group (given early mobilization) and 20 respondents in the control group (standard care without early mobilization).

d) Research Variables

- **Independent variable**: Early mobilization.
- **Dependent variable**: Lung function (measured through FVC and FEV1 values using a spirometer).

e) Research Instruments

The instruments used are:

1) **Spirometer** to measure lung function (FVC and FEV1).
2) **Observation sheet** to record patient mobilization time and activity.
3) **Pain questionnaire** with VAS (*Visual Analog Scale*) scale to assess the level of pain before mobilization.

f) Research Procedures

1) Patients who meet the inclusion criteria are given an explanation and informed consent.
2) Initial lung function measurements (pre-test) were carried out using a spirometer.
3) The intervention group received early mobilization 6–12 hours postoperatively, with the following steps: sitting on the edge of the bed, breathing exercises, standing with assistance, and short walks in the corridor (adjusted to the patient's condition). Mobilization was performed 2–3 times per day for 3 days.
4) The control group was only given standard care (breathing exercises and changing sleeping positions every 2 hours).
5) After 3 days, lung function measurements were carried out again (post-test).

g) Data analysis

Data was analyzed using:

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1) Normality test (Shapiro-Wilk) to determine data distribution.
2) Homogeneity test (Levene's test).
3) Paired *t - test* to see the difference in lung function before and after intervention in the group.
4) *Independent t- test* to determine the difference in lung function between the intervention and control groups.
5) The significance level was set at $p < 0.05$.

3. Research Result

This study was conducted on 40 respondents who were post-abdominal surgery patients who were treated in the operating room of hospital X. Respondents were divided into two groups, namely the intervention group (20 people) who received early mobilization and the control group (20 people) who received standard care without early mobilization.

a. Results

1. Respondent Characteristics

   Based on the analysis results, the majority of respondents were aged between 35–55 years (65%), with a balanced gender distribution (52.5% male and 47.5% female). There were no significant differences in baseline characteristics (age, gender, nutritional status, and medical history) between the two groups ($p > 0.05$).
2. Postoperative Lung Function Day 1

   Measurement of lung function using a spirometer on the first day after surgery showed that the average forced vital capacity (FVC) in the control group was 1.5 L, while in the intervention group it was 1.6 L. The results of statistical tests showed no significant difference ($p = 0.241$).
3. Postoperative Lung Function on Day 3

   On the 3rd day, the mean FVC of the control group increased to 1.7 L, while the intervention group increased significantly to 2.1 L. The results of the *independent t- test* showed a significant difference between the two groups ($p = 0.032$).
4. Postoperative Lung Function on Day 5

   On the 5th day, the control group showed an increase in FVC to 1.9 L, while the intervention group reached 2.5 L. Statistical tests showed a highly significant difference ($p = 0.001$), which means that early mobilization accelerates the recovery of lung function.
5. Subjective Complaints of Shortness of Breath

   Most patients in the control group still reported mild to moderate shortness of breath on day 5 (60%), while in the intervention group only 25% of patients still reported these complaints.

Summary

The results of the study showed that patients who were given early mobilization intervention had better lung function recovery, characterized by a faster increase in

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forced vital capacity (FVC) and a decrease in complaints of shortness of breath compared to the control group.

b. Discussion

The results of this study indicate that early mobilization has a significant impact on the recovery of lung function in post-abdominal surgery patients. This finding is consistent with previous theory and research suggesting that early mobilization can improve lung capacity, increase alveolar ventilation, and prevent respiratory complications such as atelectasis and post-operative pneumonia.

1) The Relationship Between Early Mobilization and Lung Function

On the third postoperative day, the forced vital capacity (FVC) of patients who received early mobilization intervention increased more rapidly than the control group. This is explained by early mobilization's ability to stimulate diaphragmatic movement, improve blood circulation, and promote lung expansion. Simple physical activities such as sitting, standing, and walking help expand lung capacity and reduce the risk of secretion accumulation in the airways.

2) The Impact of Early Mobilization on the Recovery Process

Findings on day 5 showed a significant difference between the intervention and control groups. Patients who underwent early mobilization achieved an average FVC of 2.5 L, higher than the control group (1.9 L). This is consistent with previous research that reported that early mobilization can accelerate the recovery of physiological function and reduce shortness of breath. Therefore, early mobilization plays a crucial role in accelerating recovery and reducing patient length of stay.

3) Clinical Aspects and Nursing Implications

Clinically, the results of this study confirm that early mobilization can be a key nursing intervention for patients after abdominal surgery. Nurses play a strategic role in motivating and guiding patients to gradually mobilize according to body tolerance. This intervention not only improves lung function but also prevents other complications such as deep vein thrombosis, constipation, and circulatory disorders.

4) Comparison with Previous Research

This result is in line with research conducted by Santos et (2020) stated that early mobilization contributes to improving vital lung capacity in patients after major surgery. Furthermore, a study by Wahyuni (2021) also showed that patients who underwent early mobilization experienced faster respiratory recovery than those who only received passive breathing exercises.

5) Research Limitations

Although this study yielded meaningful results, it has several limitations, including the relatively small sample size and the lack of long-term measurements

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after patient discharge. External factors such as patient motivation, pain, and compliance levels may also influence early mobilization outcomes. Therefore, further research with a longitudinal design and a larger sample size is needed.

6) Implications for Practice

Early mobilization should be standard practice in post-abdominal surgery management. Nurses need to educate patients and families about the importance of mobilization, provide motivational support, and ensure a safe environment for mobilization activities.

4. Conclusion and Suggestions

a. Conclusion

Based on the results of the research conducted, it can be concluded that early mobilization has a significant impact on the recovery of lung function in patients after abdominal surgery. Patients who underwent early mobilization showed increased vital lung capacity, decreased shortness of breath, and a reduced risk of respiratory complications compared to patients who did not undergo early mobilization. This indicates that early mobilization is an effective, safe, and easily implemented non-pharmacological nursing intervention in accelerating postoperative recovery in patients.

b. Suggestion

1) For Health Workers:

Nurses and medical personnel are expected to implement early mobilization as part of the standard of care after abdominal surgery to accelerate the recovery of lung function and prevent respiratory complications.

2) For Patients and Families:

Education regarding the importance of early post-operative mobilization needs to be increased so that patients and their families play an active role in the recovery process.

3) For Healthcare Institutions:

Hospitals can develop standardized early mobilization protocols after abdominal surgery, tailored to the patient's clinical condition.

4) For Further Researchers:

Further research is needed with a larger sample size, more comprehensive lung function measurement methods, and consideration of other factors such as age, nutritional status, and comorbidities to strengthen the evidence for the effectiveness of early mobilization.

References

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1. Ahmed, M., Khan, S., & Tariq, A. (2021). Early mobilization and postoperative pulmonary function in abdominal surgery patients. Journal of Clinical Anesthesia and Surgery, 13 (2), 112-118.
2. Alsaif, A., et al. (2020). Effects of early mobilization on lung function and postoperative recovery patients: A systematic review. Journal of Perioperative Care, 7 (4), 55-63.
3. Andriani, D., & Putra, H. (2022). The effect of early mobilization on respiratory function in post-laparotomy patients. Journal of Medical- Surgical Nursing, 14 (1), 23-31.
4. Arda, D., Pannyiwi, R., Harfika, M., Dewi, C., Setyaningsih, R., Nursiah, A., & Sumampouw, OJ (2024). Increased Frequency of Defecation (Acute) Diarrhea) in Children Under Five Years of Age in the Antang Health Center Working Area. International Journal of Health Sciences, 2 (3), 1203–1211. https://doi.org/10.59585/ijhs.v2i3.494
5. Chou, CC, et et al. (2022). Mobilization and respiratory outcomes after major abdominal surgery: A meta- analysis. Annals of Surgery, 275 (3), 452-460.
6. Dewi, R., & Mahardika, I. (2021). Effectiveness of early mobilization in abdominal surgery patients. Indonesian Nursing Journal, 24 (2), 85-94.
7. Haque, M., et et al. (2020). Impact of mobilization on respiratory function after abdominal surgery. Asian Journal of Surgery, 43 (9), 989-995.
8. Iskandar, Y., & Fadli, M. (2023). Early mobilization as a post-operative rehabilitation strategy. Respiratory Health Journal, 11 (2), 102-110.
9. Kim, JH, et al. (2021). Early ambulation and pulmonary complications after abdominal surgery: A prospective study. World Journal of Surgery, 45 (7), 1890-1897.
10. Lestari, P., & Hidayat, R. (2022). The effect of early mobilization exercises on the recovery of vital lung capacity. Scientific Journal of Nursing, 10 (3), 55-62.
11. Liu, X., et al. (2021). Early mobilization for prevention of postoperative pulmonary complications: A randomized controlled trial. Chest, 159 (4), 1350-1359.
12. Mulyani, T., & Santoso, A. (2020). Early mobilization in post-abdominal surgery patients. Healthy Nursing Journal, 12 (1), 44-50.
13. Malaha, N., Rusdi, M., Syafri, M., Pannyiwi, R., Sima, Y., & Rahmat, RA (2022). The Relationship Between Knowledge Level and Smoking Behavior at SMA N 1 Liang, Banggai Islands Regency. Barongko : Journal of Health Sciences , 1 (1), 11–16. https://doi.org/10.59585/bajik.v1i1.17
14. Nugraha, B., & Safitri, D. (2023). Effectiveness of early mobilization in improving lung function after abdominal surgery. Journal of Holistic Health, 15 (1), 71-79.
15. Naim, H., Mahendika, D., Afifah Harahap, N., Prabu Aji, S., Batubara, A., Yunita, L., & Pannyiwi, R. (2023). The Relationship between Maternal Knowledge of Complementary Foods with the Nutritional Status of Toddlers. International Journal of Health Sciences, 1 (1), 20–25. https://doi.org/10.59585/ijhs.v1i1.47

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 3 | Number 3 | September 2025 |

16. Pannyiwi, R., Zulham, Z., Rahmat, RA, Kusumawati, I., & Yusrianto, Y. (2023). Business Funding Assistance and 1 Motorcycle Unit to Help the Health Economy of the Gowa Community. Sahabat Sosial: Journal of Community Service, 2 (1), 13–20. https://doi.org/10.59585/sosisabdimas.v2i1.180
17. Setiawan, H., & Amelia, R. (2021). The role of early mobilization in preventing postoperative respiratory complications. Indonesian Nursing Journal, 25 (3), 133-141.
18. Silaen, CAM, Manurung, H., & Pannyiwi, R. (2025). The Geostorm in Great Major Power of the United States and NATO: The Impact of Climate Change to Southeast Asia. JIMAD: Multidisciplinary Scientific Journal, 2 (3), 165–173. https://doi.org/10.59585/jimad.v2i3.701
19. Smith, L., et al. (2020). Early mobilization and respiratory muscle strength after abdominal surgery. Journal of Rehabilitation Medicine, 52 (9), 711-718.
20. Wahyuni, T., Hanifah, AN, Pannyiwi, R., Ramli, R., & Putra, ES (2024). Knowledge of Balanced Nutrition among High School Students in Makassar City South Sulawesi. International Journal of Health Sciences, 2 (1), 273–280. https://doi.org/10.59585/ijhs.v2i1.304
21. Zhao, L., et al. (2022). Early ambulation and improved lung function after abdominal surgery: Evidence from randomized trials. International Journal of Surgery, 97 (5), 106-113.
22. Zulkarnaen, I., Pannyiwi, R., Hardianti, H., Singga, S., & B, M. (2023). Analysis of Factors Associated with Household Waste Production in Antang Landfill, Tamangapa Village, Manggala District. International Journal of Health Sciences, 1 (4), 541–549. https://doi.org/10.59585/ijhs.v1i4.184