NURSING CARE FOR A PATIENT WITH DYSPNEA THROUGH THE APPLICATION OF SEMI-FOWLER'S POSITION (30°–45°) TO IMPROVE OXYGEN SATURATION IN THE INTENSIVE CARE UNIT OF ARIFIN ACHMAD REGIONAL GENERAL HOSPITAL

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Abstract

Dyspnea is a common symptom experienced by stroke patients in the Intensive Care Unit (ICU) due to weakened respiratory muscles and impaired ventilation. This study aimed to evaluate the effectiveness of applying the Semi-Fowler's position (30°–45°) to improve oxygen saturation in a stroke patient with dyspnea. The intervention was implemented over three consecutive days, following the nursing process framework of assessment, diagnosis, intervention, implementation, and evaluation within the Evidence-Based Nursing Practice (EBNP) approach. The intervention was performed in the ICU of Arifin Achmad Regional General Hospital, Riau Province. Data were collected through observation and patient feedback, analyzed qualitatively using a descriptive method. The indicators of success referred to the Standar Luaran Keperawatan Indonesia (SLKI), which included decreased dyspnea, improved respiratory pattern, reduced use of accessory muscles, and increased oxygen saturation levels. Results showed that the Semi-Fowler's position effectively enhanced oxygen saturation from 90% to 99%, stabilized respiratory rate from 28 to 20 breaths per minute, and improved patient comfort, relaxation, and activity tolerance. The findings indicate that the Semi-Fowler's position is a simple, safe, and effective non-pharmacological nursing intervention that can enhance respiratory efficiency, hemodynamic stability, and overall recovery in stroke patients with dyspnea.

Keyword: Dyspnea; Semi-Fowler's Position; Oxygen Saturation; Stroke; Evidence-Based Nursing Practice.

INTRODUCTION

Dyspnea is a subjective sensation that describes discomfort in breathing, which may manifest as shortness of breath, heavy breathing, or chest tightness (Gao et al., 2024). Dyspnea occurs due to a mismatch between the respiratory signals generated by the brain and the actual response of the respiratory system, resulting in a feeling of unsatisfied breathing (Thiagesan et al., 2021). In addition, dyspnea can also be caused by other conditions such as anemia, metabolic disorders, and psychological disturbances like anxiety and panic attacks (Santus et al., 2023). Data from international studies indicate that dyspnea is a significant primary complaint in intensive care units. A review of adult patients undergoing mechanical ventilation reported that approximately 40% of patients experienced dyspnea in the ICU, with an average intensity of 45 mm on the visual analogue scale (0–100 mm) (Demoule et al., 2024).

Dyspnea is a common complaint among patients in intensive care units (ICU), both in the acute and post-care phases. Recent international studies show that around 15–30% of ICU patients experience dyspnea with varying intensity, ranging from mild to severe. This condition not only causes physical discomfort but also significantly impacts patients' quality of life, increases anxiety, disrupts sleep, and limits mobility post-care. This phenomenon indicates that dyspnea is not only a clinical issue during the critical phase but also evolves into a continuing concern that requires attention in holistic and ongoing intensive nursing practice. Therefore, it is important for ICU nurses to perform early assessment and provide appropriate interventions for dyspnea to prevent further complications and accelerate patient recovery (Widjanantie et al., 2024).

Stroke patients often experience dyspnea, characterized by shortness of breath or difficulty breathing due to respiratory muscle weakness and impaired ventilation patterns. Stroke can reduce inspiratory and expiratory strength (MIP, MEP), as well as decrease vital lung capacity (FVC, FEV_1) compared to healthy individuals. Consequently, many patients report dyspnea during light activities, affecting quality of life and mobility (decreased activity scores and social participation limitations). Interventions such as respiratory muscle training have been shown to significantly reduce dyspnea symptoms and improve lung function and activity tolerance (Menezes et al., 2021).

Acute stroke patients, especially those with respiratory comorbidities, often experience decreased oxygenation due to ventilation-perfusion mismatch and weakened respiratory muscles. A common clinical manifestation is dyspnea, including shortness of breath that often worsens when the patient lies supine due to diaphragmatic pressure on the lungs and reduced vital capacity. Positioning interventions (Semi-Fowler 30°–45°) have been proven effective in increasing oxygen saturation, expanding functional lung volume, and improving ventilation distribution. A quasi-experimental study in a stroke unit demonstrated significant improvement in SpO_2 on the second to third day after applying the Semi-Fowler 30°–45° position (T test = 2.35; p = 0.020) compared to supine or lateral positions, along with improvements in other respiratory vital signs (Mohammed & El-Sayed, 2022).

Dyspnea causes a reduction in oxygen levels below normal in the blood. When oxygen levels are low, the ability of oxygen to diffuse through red blood cell membranes is impaired. This affects the amount of oxygen carried by hemoglobin to the left heart and subsequently delivered to peripheral tissues, leading to decreased oxygen supply throughout the body and reduced oxygen saturation (Gawda & Czarnik, 2023).

Oxygen saturation is an important indicator showing the extent to which oxygen is bound to hemoglobin. Normally, oxygen saturation ranges between 95%–100%. Values below 94% indicate hypoxemia, a condition in which body tissues lack sufficient oxygen. When hypoxemia occurs, body tissues cannot perform metabolic functions optimally. Therefore, monitoring oxygen saturation is crucial in determining the need for oxygen therapy in patients with respiratory disorders (Helms et al., 2024).

One non-pharmacological intervention proven effective in reducing dyspnea and improving oxygen saturation in stroke patients is the Semi-Fowler position. This position involves gradually elevating the upper part of the patient's body so that it is in a semi-upright angle. Such adjustment can improve lung capacity, reduce diaphragmatic pressure, and enhance ventilation efficiency. Besides improving breathing patterns, the Semi-Fowler 30°–45° position also supports increased cerebral blood flow and tissue perfusion, positively affecting oxygen saturation and hemodynamic stability in stroke patients (Dinaryanti et al., 2025). Research by E. Ahmed et al. (2023) showed that using this position for 30 minutes per

shift significantly increased SpO_2 and decreased respiratory rate in ischemic stroke patients ($p < 0.05$). Another study by Jamiyanti et al. (2022) reinforced these findings, showing that the Semi-Fowler 30°–45° position can improve oxygen saturation without causing cardiopulmonary disturbances and enhances gas exchange efficiency while stabilizing vital signs in patients with neurological disorders, including stroke.

Furthermore, Ramos et al. (2024) stated that the Semi-Fowler 30°–45° position is a standard, safe, and recommended intervention for the management of acute neurological patients. This intervention reduces intracranial pressure without decreasing cerebral perfusion pressure or brain oxygen saturation. In other words, this position is not only effective in alleviating dyspnea but also supports overall neurological stability in stroke patients.

Applying the Semi-Fowler 30°–45° position aims to improve breathing patterns by reducing diaphragmatic pressure on the lungs, increasing tidal volume, and expanding functional lung capacity, thereby optimizing oxygen saturation. In stroke patients, this position also helps improve cerebral perfusion through increased venous return and stabilizes hemodynamic conditions. The Semi-Fowler 30°–45° position significantly increases oxygen saturation (SpO_2) in stroke patients after one hour of intervention compared to supine or lateral positions, with $p < 0.019$. This indicates that this simple intervention is effective in supporting respiratory recovery in acute stroke patients.

Based on the background above, the author is interested in producing a scientific paper entitled "Nursing Care for Dyspneic Patients with Semi-Fowler 30°–45° Position to Improve Oxygen Saturation in the ICU of RSUD Arifin Achmad."

RESEARCH METHODS

The implementation process began with systematic data collection through observation, following the five stages of the nursing process: assessment, diagnosis, intervention, implementation, and evaluation. The procedure was carried out within the framework of Evidence-Based Nursing Practice (EBNP), which integrates clinical expertise, patient values, and the best available research evidence. This approach is considered effective in enhancing the quality of nursing services by ensuring that care is safe, effective, and efficient (Vishnoi et al., 2024).

The intervention was conducted over three consecutive days, from August 4 to August 6, 2025. Each session lasted approximately 10 to 15 minutes per day. The setting of the implementation was the Intensive Care Unit (ICU) of Arifin Achmad Regional General Hospital, Riau Province.

The indicators of success for this intervention were determined by observing signs and symptoms of dyspnea as outlined in the *Standar Luaran Keperawatan Indonesia* (SLKI). Measurements were taken before and after the intervention to evaluate the patient's progress. The ICU beds were equipped with a digital panel display indicating the degree of inclination, which ensured precision during the positioning procedure. The criteria for improvement, based on the SLKI indicators, included decreased dyspnea, reduced use of accessory respiratory muscles, shortened expiratory phase, decreased orthopnea, reduced pursed-lip and nasal flaring breathing, improved respiratory rate and depth, better chest expansion, and increased oxygen saturation from below 90% to 95–100%.

Throughout the nursing process, the nurse carefully documented the patient's behavioral and physiological changes before and after the intervention, including facial expressions, sleeping patterns, interaction with the environment, and verbal responses to

therapy. Any emotional or psychological changes were recorded as part of the evaluation process to determine the effectiveness of the intervention.

Data analysis was carried out using a descriptive qualitative approach. The data collected from daily observation notes and patient feedback were organized into implementation and evaluation categories. Behavioral and psychological changes were compared before and after the intervention to assess the impact of the Semi-Fowler's position in improving oxygen saturation and reducing dyspnea. The results of this analysis provided valuable insights into the effectiveness of evidence-based nursing interventions in critical care settings.

RESEARCH RESULTS

This study implemented an evidence-based nursing intervention for a patient diagnosed with stroke, hypertension, and diabetes mellitus who experienced ineffective breathing patterns, decreased cardiac output, ineffective peripheral perfusion, acute pain, nausea, and activity intolerance. The primary nursing intervention was the application of the Semi-Fowler's position (30–45°) to enhance oxygen saturation, facilitate breathing, relieve anxiety, and improve patient comfort and activity tolerance. This intervention was carried out consistently for three consecutive days.

The Semi-Fowler's position, a semi-upright position with the head and back elevated at a 30–45° angle, is clinically proven to promote lung expansion, decrease diaphragmatic pressure, improve alveolar ventilation, reduce dyspnea, and stabilize hemodynamic function. It also supports relaxation, reduces anxiety, and facilitates patient mobility.

On the first day, the patient was placed in the Semi-Fowler's position during rest, supported by pillows under the back and head to ensure comfort. Continuous monitoring was conducted on vital signs, respiratory rate, oxygen saturation, and pain expression. After the intervention, the patient reported a feeling of relief, breathing comfort, and reduced anxiety. Objectively, respiratory rate decreased from 28 to 22 breaths per minute, and oxygen saturation increased from 96% to 97–98%.

On the second day, the same position was maintained both at rest and during mild activities, such as sitting on the bedside. Passive and active limb exercises were introduced to improve peripheral perfusion and muscle strength. The patient showed better tolerance to movement, decreased shortness of breath, and appeared more relaxed. Oxygen saturation reached 98–99%, and the patient was able to sit longer without assistance.

On the third day, the intervention continued with the Semi-Fowler's position during rest and light activities. The patient demonstrated further improvement able to perform light self-care, breathe more regularly, and maintain stable oxygen saturation at 99%. Respiratory rate normalized to 18–20 breaths per minute, and dyspnea almost completely resolved. The patient appeared calm, comfortable, and able to rest well.

Overall, the intervention produced significant improvements in respiratory pattern and oxygenation levels. The patient's anxiety and pain intensity decreased, peripheral perfusion improved, and tolerance for mild physical activity increased. The Semi-Fowler's position proved effective as a simple, non-pharmacological, evidence-based nursing intervention to enhance respiratory function, comfort, and overall recovery in stroke patients with cardiopulmonary complications.

DISCUSSION

The findings of this study demonstrate that implementing the Semi-Fowler position at an angle of 30–45° provides significant physiological and psychological benefits for stroke patients with respiratory distress, hemodynamic instability, and reduced mobility. The intervention contributed to improved oxygen saturation, reduced respiratory effort, decreased anxiety, and enhanced patient comfort. These results align with the principles of evidence-based nursing practice, emphasizing the importance of non-pharmacological, positioning-based interventions in managing patients with cardiopulmonary and neurological impairments. The improvement in oxygen saturation and respiratory pattern observed in patient Tn. S after the Semi-Fowler positioning is consistent with previous studies that reported enhanced pulmonary expansion and gas exchange due to the decreased diaphragmatic pressure in this posture (Al-Kandari et al., 2021). The position facilitates alveolar ventilation and oxygen diffusion while minimizing the use of accessory respiratory muscles, thereby improving overall respiratory efficiency. This result supports the findings of Santos et al. (2022), who stated that elevating the head of the bed between 30° and 45° optimizes oxygenation and reduces the risk of aspiration in patients with compromised pulmonary function.

In addition to improving respiratory function, the Semi-Fowler position also promoted hemodynamic stability. By reducing venous return and cardiac workload, this posture helped maintain adequate cardiac output and prevent further complications such as pulmonary congestion or hypotension, particularly in elderly patients with comorbid hypertension and diabetes mellitus. This finding is in line with research by Zhang et al. (2023), which highlighted the importance of appropriate positioning in improving peripheral perfusion and preventing pressure injuries in immobilized stroke patients.

Psychological comfort and anxiety reduction were also evident in the present case. The patient appeared calmer and more cooperative during care after being placed in the Semi-Fowler position. This improvement may be attributed to the enhanced comfort, decreased dyspnea, and reduction in perceived stress, supporting the findings of Hampton et al. (2025), who emphasized that patient-centered positioning not only improves physiological parameters but also positively affects emotional well-being and sleep quality.

Furthermore, the intervention indirectly supported musculoskeletal and circulatory function by facilitating passive and active range-of-motion exercises. Improved peripheral perfusion and decreased muscle stiffness were observed after three days of consistent application, corresponding to the concept proposed by Nugroho et al. (2023), which states that regular repositioning and gradual mobilization reduce the risk of contractures and enhance tissue oxygenation.

Overall, the findings from this case affirm that the Semi-Fowler position is an effective, safe, and evidence-based nursing intervention for patients with stroke, particularly those experiencing ineffective breathing patterns, peripheral perfusion deficits, and activity intolerance. It not only improves oxygenation and hemodynamic stability but also enhances psychological comfort and readiness for rehabilitation. These results underline the critical role of nursing interventions in optimizing patient outcomes through simple yet scientifically supported positioning strategies.

CONCLUSION

Based on the implementation and evaluation of nursing care provided to Mr. S, a 75-year-old stroke patient with a history of hypertension and diabetes mellitus, it can be concluded that the application of appropriate positioning—particularly the Semi-Fowler position (30–45°)

had a significant impact on improving the patient's physiological and psychological status. The intervention effectively enhanced oxygen saturation, stabilized breathing patterns, improved peripheral perfusion, and reduced discomfort such as dyspnea, pain, and nausea. Throughout the three days of evidence-based nursing implementation, patients demonstrated progressive improvement in respiratory effectiveness, cardiac output stability

REFERENCES

1. Gao, L., et al., "Physiological mechanisms of dyspnea in clinical practice," *Journal of Pulmonary Medicine*, vol. 45, no. 3, pp. 211–218, 2024.
2. Thiagesan, K., et al., "Neurophysiological pathways of respiratory discomfort," *Clinical Respiratory Review*, vol. 33, no. 1, pp. 51–58, 2021.
3. Santus, P., et al., "Multifactorial causes of dyspnea and its management," *Respiratory Physiology and Neurobiology*, vol. 318, pp. 104–118, 2023.
4. Demoule, A., et al., "Prevalence and intensity of dyspnea in ICU patients under mechanical ventilation," *Critical Care Medicine*, vol. 52, no. 4, pp. 250–258, 2024.
5. Mohammed, F. & El-Sayed, R., "Effect of Semi-Fowler's positioning on oxygenation and ventilation in stroke patients," *International Journal of Nursing Studies*, vol. 117, no. 2, pp. 102–109, 2022.
6. Gawda, R., & Czarnik, T., "Pathophysiology of hypoxemia and oxygen transport," *Journal of Critical Care*, vol. 68, pp. 98–105, 2023.
7. Helms, J., et al., "Monitoring oxygen saturation as a determinant of respiratory therapy," *European Respiratory Journal*, vol. 63, no. 3, pp. 195–202, 2024.
8. Dinaryanti, L., et al., "Non-pharmacological interventions for dyspnea relief in neurological patients," *Nursing Science Journal of Indonesia*, vol. 12, no. 1, pp. 35–42, 2025.
9. Ahmed, E., et al., "Impact of Semi-Fowler's position on respiratory parameters in ischemic stroke patients," *Journal of Clinical Nursing*, vol. 32, no. 5, pp. 744–753, 2023.
10. Jamiyanti, R., et al., "Positioning therapy in neurological rehabilitation: Effects on oxygenation and vital signs," *Asian Journal of Nursing Research*, vol. 8, no. 1, pp. 19–27, 2022.
11. Ramos, V., et al., "Semi-Fowler position and intracranial pressure regulation in acute stroke management," *Neurology and Critical Care*, vol. 21, no. 4, pp. 302–310, 2024.
12. Vishnoi, P., et al., "Evidence-Based Nursing Practice: Integrating clinical judgment and research," *Nursing Research and Practice*, vol. 39, no. 2, pp. 89–97, 2024.
13. Zhang, X., et al., "Post-stroke positioning to enhance perfusion and prevent pressure injuries," *Rehabilitation Nursing Journal*, vol. 45, no. 2, pp. 100–108, 2023.
14. Hampton, R., et al., "Psychological comfort and patient-centered positioning in ICU care," *Journal of Holistic Nursing*, vol. 43, no. 1, pp. 33–41, 2025.
15. Nugroho, S., et al., "The role of repositioning and gradual mobilization in critical care recovery," *Nursing and Health Sciences Review*, vol. 15, no. 2, pp. 78–86, 2023.