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Effect of Level 1 Progressive Mobilization Therapy on Oxygen Saturation in Patients Diagnosed with Respiratory Failure in ICU of Prof. Dr. H. Aloei Saboe Hospital, Gorontalo City

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ABSTRACT

Level 1 progressive mobilization therapy is a non-pharmacological therapy using a complementary approach that can affect oxygen saturation. The purpose of this study was to determine the effect of level 1 progressive mobilization therapy on oxygen saturation in patients diagnosed with respiratory failure in the ICU of Prof. Dr. H. Aloei Saboe Regional Hospital, Gorontalo City. This study is a quantitative study with a quasi-experimental design using a one-group pre-post test design approach . which only involved one treatment group, namely the group of patients diagnosed with respiratory failure who were given level 1 progressive mobilization therapy intervention. The study population was 51 patients with an accidental sampling technique with a sample size of 45 patients. This research instrument used the SOP for level 1 progressive mobilization and an oxygen saturation observation sheet. Data analysis used the Wilcoxont-test. The results of the study obtained a p-value of 0.000 (α <0.05) meaning that there was an effect of level 1 progressive mobilization therapy on oxygen saturation in patients with respiratory failure at Prof. Dr. H. Aloei Saboe Regional Hospital, Gorontalo City. Level 1 progressive mobilization plays a crucial role in improving respiratory function, accelerating recovery, and maintaining the body's overall physiological balance. This research is expected to serve as a reference for providing nursing care, particularly level 1 progressive mobilization exercises for patients diagnosed with respiratory failure, as an effort to prevent decreased oxygen saturation.

1. INTRODUCTION

The Intensive Care Unit (ICU) is a healthcare environment with high clinical complexity, where patients are treated in critical condition, with physiological instability, and dependent on intensive medical and nursing support. Successful ICU patient care is determined not only by the accuracy of medical diagnosis and therapy, but also by the quality of supportive, preventive, and rehabilitative nursing interventions. One of the most common clinical problems encountered in ICU patients is impaired oxygenation, particularly persistent hypoxemia, characterized by low oxygen saturation despite receiving oxygen therapy according to clinical standards.

In critically ill patients, gas exchange failure occurs when the lungs are unable to maintain adequate arterial oxygen pressure despite ventilatory support (West, 2012). This condition is commonly found in patients with respiratory failure due to severe pneumonia, acute exacerbation of chronic obstructive pulmonary disease (COPD), severe asthma, pulmonary edema, or other cardiopulmonary disorders. Although supplemental oxygen administration and pharmacological therapy are the mainstays of respiratory failure management, in clinical practice, patients still exhibit subnormal oxygen saturation. This indicates that conventional approaches alone are often inadequate in comprehensively addressing hypoxemia.

In intensive care practice, respiratory failure management focuses on airway stabilization, optimizing ventilation and oxygenation, and pharmacological and supportive interventions for the underlying etiology (Marino, 2014). This approach is crucial, but it can often overlook the role of non-pharmacological nursing interventions that have the potential to significantly contribute

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to improving oxygenation. One factor that is often overlooked is immobilization of ICU patients. Patients with respiratory failure often undergo prolonged bed rest due to their weakened clinical condition, the use of medical aids, or concerns about the risk of worsening. Wang et al. (2023) reported that early mobilization of mechanically ventilated ICU patients contributes to improved respiratory outcomes, as indicated by a reduction in the duration of ventilator use and length of ICU stay.

Chronic hypoxemia not only reflects impaired pulmonary oxygenation but is also associated with significant changes in pulmonary hemodynamics, indicating a systemic impact of hypoxemia on the pulmonary vascular system (Han et al., 2025). Clinically, persistent hypoxemia is associated with increased ICU length of stay, a higher need for mechanical ventilation, and an increased risk of complications and mortality. Patients with prolonged impaired oxygenation tend to experience slower recovery, decreased functional capacity, and long-term dependence on respiratory support. From a healthcare system perspective, this condition results in increased workload for healthcare workers, greater resource utilization, and higher healthcare costs.

In addition to hypoxemia, immobilization of ICU patients contributes to various other complications, such as ICU- acquired weakness , decreased respiratory and peripheral muscle strength, neuromuscular disorders, and decreased activity tolerance. These conditions prolong hospitalization and hinder the patient's rehabilitation process after ICU discharge. Thus, hypoxemia and immobilization are two interrelated problems that can worsen the prognosis of patients with respiratory failure if not addressed comprehensively.

Early mobilization has gained increasing attention as part of critical care. Early mobilization is seen as a strategy to prevent complications from bed rest, maintain physiological function, and accelerate patient recovery. However, given the varying clinical conditions of ICU patients, mobilization cannot be applied uniformly. Therefore, the concept of progressive mobilization was developed as a stepwise approach tailored to patient tolerance and stability. Level 1 progressive mobilization is the earliest stage intended for critically ill patients with activity limitations.

Level 1 progressive mobilization improves diaphragmatic expansion, increases heart muscle contraction, and increases airflow, all of which positively impact the hemodynamic status of critically ill patients (Samosir & Oktarina, 2025). The basic principle of progressive mobilization is the gradual provision of physical activity according to the patient's physiological capacity, with the goal of maintaining vital organ function, improving circulation, improving respiratory conditions, and preventing complications resulting from prolonged bed rest (Taito et al., 2021). Long-term bed rest has been shown to decrease muscle strength, cause joint rigidity, reduce alveolar ventilation, and increase the risk of complications such as lung infections and circulatory disorders (Hermans & Van Aerde, 2020). Therefore, the implementation of initial levels of progressive mobilization, such as changing position in bed or sitting on the edge of the bed, is considered safe and effective for patients with respiratory limitations (Schujmann et al., 2020).

The primary goal of level 1 progressive mobilization is to maintain the patient's physiological stability and prevent complications from prolonged immobilization. Zhang et al. (2018) demonstrated that head-of-bed elevation can improve lung expansion and increase arterial oxygenation without increasing the burden on the respiratory system. Furthermore, passive range-of-motion exercises play a crucial role in maintaining joint flexibility, improving peripheral circulation, and reducing the risk of musculoskeletal complications in patients on prolonged bed rest (Santos et al., 2019).

Although level 1 progressive mobilization has been recommended, its implementation remains challenging. Many studies discuss early mobilization in a general manner without differentiating mobilization levels, and focus primarily on outcomes such as length of stay or functional status, while oxygen saturation is rarely used as a primary outcome. Furthermore, most evidence comes from developed countries, while local evidence in regional hospitals in Indonesia is still limited.

Based on initial observations on September 8–12, 2025, in the ICU of Prof. Dr. H. Aloei Saboe Regional General Hospital, Gorontalo City, patients with respiratory failure often experienced low oxygen saturation despite receiving oxygen therapy. Eight patients showed

oxygen saturation values of 88–92 percent with signs of respiratory distress. Interviews with nurses indicated that level 1 progressive mobilization had not been routinely implemented, although patients given simple interventions such as the semi-Fowler position and breathing exercises tended to show better oxygen saturation stability. Based on these conditions, there is a gap in clinical management, resulting in the suboptimal implementation of non-pharmacological nursing interventions to increase oxygen saturation. Level 1 progressive mobilization has the potential to be a safe, simple, and easily implemented solution by nurses. Therefore, this study aims to analyze the effect of level 1 progressive mobilization on oxygen saturation in patients with respiratory failure in the ICU, to strengthen evidence-based nursing practice and support improvements in the quality of critical care.

2. METHOD

This study used a quasi-experimental design with a one-group pre-posttest approach to assess the effect of level 1 progressive mobilization on changes in oxygen saturation in patients diagnosed with respiratory failure in the ICU. Oxygen saturation measurements were performed before (pre-test) and after (post-test) the intervention in the same group. This design was chosen because it is appropriate for evaluating physiological changes directly following nursing intervention. However, the lack of a control group is a methodological limitation that needs to be considered in interpreting the study results.

The choice of a quasi-experimental design was based on ethical and operational considerations. In critically ill ICU patients, establishing a control group that does not receive level 1 progressive mobilization intervention has the potential to pose an ethical dilemma, given that level 1 mobilization is a relatively safe, non-pharmacological intervention with the potential for clinical benefit. Furthermore, fluctuating patient conditions and the limited number of patients meeting the criteria present obstacles to implementing a purely experimental design.

The study population was all patients diagnosed with respiratory failure who were treated in the ICU of Prof. Dr. H. Aloei Saboe Regional General Hospital, Gorontalo City. This study was conducted from October 4 to December 21, 2025. The study sample consisted of 45 patients, obtained using an accidental sampling technique, namely patients who met the inclusion criteria and were available during the study period. This technique was chosen based on practical considerations, but still has the potential for selection bias so that the results of the study need to be generalized carefully. The number of samples was determined according to the availability of patients during the study period and refers to similar studies that use quasi-experimental designs.

Inclusion criteria included patients with respiratory failure with relatively stable hemodynamics, oxygen saturation below normal despite oxygen therapy, and patients or families willing to provide informed consent. Exclusion criteria included patients with unstable hemodynamics, use of invasive mechanical ventilation, contraindications to mobilization such as unstable fractures or spinal injuries, and severe cognitive impairment.

The primary dependent variable was oxygen saturation, defined as the percentage of peripheral blood oxygen saturation measured using pulse oximetry. Measurements were performed at rest with the patient in the same position before and after the intervention. Pre-test data were collected on the first day before the intervention, while post-test data used for statistical testing were collected on the third day after the intervention. Level 1 progressive mobilization intervention was performed once daily for 15 minutes for three consecutive days. The intervention included semi-Fowler positioning, deep breathing exercises, and light active or passive movements of the extremities as tolerated by the patient. The intervention was carried out by nurses according to established procedures with close monitoring of the patient's physiological responses.

This study has received approval from a health research ethics committee. Prior to the study, patients or their families were given an explanation of the study's purpose and procedures and then asked to sign an informed consent. Throughout the study, patient safety, comfort, and confidentiality were maintained in accordance with ethical principles of clinical research.

3. RESULT AND DISCUSSION

Result

Overview of Research Location

This research was conducted at Prof. Dr. Hi. Aloei Saboe Regional General Hospital, located at Jalan Prof. Dr. Hi. Aloei Saboe Number 91, Wongkaditi Timur Village, North City District, Gorontalo City, with an area of ±54,000 m^2. This hospital was built in 1926 and began operating in 1929. In 2005, the hospital moved to its current location and in 2009 was designated as a Type B Non-Educational Hospital owned by the Gorontalo City Government and implemented a BLUD financial management pattern. Furthermore, this hospital obtained full accreditation in 2017, was designated as a main network hospital in 2022, and became a Teaching Hospital of the Faculty of Medicine, Gorontalo State University in 2023. The services available include outpatient care, inpatient care, emergency installation, intensive care, and various medical and non-medical support services.

Respondent Characteristics

In this study, 45 respondents were selected. From all of these respondents, a description of their characteristics was obtained from demographic data. This can be seen in the following table:

Table 1. Respondent Characteristics Based on Demographic Data

Characteristics	(n)	(%)
Age		
19 – 44 years old	14	31
45 - 59 years old	18	40
> 60 Year	13	29
Total	**45**	**100**
Gender		
Man	25	56
Woman	20	44
Total	**45**	**100**
Smoking History		
Yes	24	53
No	21	47
Total	**45**	**100**
Use Oxygen		
Non-Rebreathing Mask (NRM)	45	100
Total	**45**	**100**

Source: Primary Data, 2025

From the results of the study, the distribution of respondents based on age shows that most big respondents aged in range 45 – 59 year as many as 18 respondents (40%). The distribution of respondents based on gender shows that most of the respondents are male as many as 25 respondents (56%). The distribution of respondents based on smoking history shows that most of the respondents have a history of smoking as many as 24 respondents (53%). The distribution of respondents based on cigarette use oxygen shows that all respondents used oxygen therapy in form Non-Rebreathing Mask (NRM), that is as much as 45 respondents (100%).

Univariate Analysis

Oxygen Saturation Before Level 1 Progressive Mobilization Therapy

Table 2. Categories Saturation Oxygen On Respondents Before Level 1 Progressive Mobilization Therapy

Oxygen Saturation	Number (n)	Percentage (%)
90 – 95%	20	44
95 – 100%	25	56
Total	**45**	**100**

Source: DataPrimer, 2025

Based on table 2 it shows that The oxygen saturation category of respondents before the intervention, namely 25 people (56%), had oxygen saturation values in the range of 95–100%, which is included in the normal category. Meanwhile, That, as much as 20 respondents (44%) own mark saturation oxygen in the range of 90–95% which is included in the abnormal category.

Oxygen Saturation After Level 1 Progressive Mobilization Therapy

Table 3. Categories Saturation Oxygen After Level 1 Progressive Mobilization Therapy

Oxygen Saturation	Number (n)	Percentage (%)
95 – 100%	45	100
Total	**45**	**100**

Source: Primary Data, 2025

Table 3 shows that the oxygen saturation levels of respondents after progressive mobilization therapy showed normal results. All 45 respondents (100%) had oxygen saturation values in the 95–100% range, which is considered normal.

Bivariate Analysis

Table 4. Influence Therapy Mobilization Progressive Level 1 To Oxygen Saturation in Respiratory Failure Patients

Progressive Mobilization Therapy Level 1	Statistical Test Results (*Wilcoxon Test*)				*P-value*
	Frequency (n)	Percentage (%)	Min	Max	
Before Intervention	45	94.73 (2.21)	90	98	0.000
After Intervention	45	98.82 (0.80)	97	100	

Source: Primary Data, 2025

Based on the table above, the results of statistical test analysis using the Wilcoxon test obtained a p-value (0.000) <0.05, meaning that there is an effect of progressive mobilization therapy level on oxygen saturation in respiratory failure patients at Prof. Dr. H. Aloei Saboe Regional General Hospital, Gorontalo City. This can also be seen in the mean value before being given progressive mobilization therapy level 1 has a mean value of 94.73 and after being given progressive mobilization therapy level 1 has a mean value of 98.82.

Discussion

Oxygen Saturation Values Before Level 1 Progressive Mobilization Therapy

The results of the study showed that before being given progressive mobilization therapy level 1, the oxygen saturation conditions of respiratory failure patients in the ICU of Prof. Dr. H. Aloei Saboe Regional General Hospital, Gorontalo City were in varying ranges. Some patients showed oxygen saturation values below the normal limit despite receiving oxygen therapy according to intensive care standards, which reflects persistent hypoxemia as is often found in ICU patients with impaired respiratory function. However, the findings also showed that as many as 25 respondents (56%) had oxygen saturation values in the range of 95–100% which is included in the normal category. This indicates that more than half of the patients were still able to maintain adequate blood oxygenation despite being in a risky clinical condition, which is likely related to the continued functioning of respiratory compensation mechanisms so that the gas exchange process was not severely impaired in some patients.

Based on the characteristics of the respondents in this study, the normal oxygen saturation levels in the 25 respondents can be explained by several factors. The first factor is the respondents' age. Although this study was dominated by the pre-elderly group aged 45-59 years, there was still a group of adult respondents who had relatively better lung function. In this age group, lung tissue elasticity, respiratory muscle strength, and alveolar ventilation capacity tend to be maintained, allowing blood oxygenation to be maintained within normal limits. Thomas et al. (2019) explained that lung function declines with age, but the rate of decline varies between individuals, so some adult and elderly patients are still able to maintain normal oxygen saturation at rest.

The second contributing factor is smoking history. In this study, although some respondents had a history of smoking, there were also respondents who did not have a history of smoking or had quit smoking for a certain period. Respondents without cigarette exposure tended to have better alveolar function and oxygen diffusion capacity than active smokers. This allows hemoglobin to bind oxygen optimally, so that oxygen saturation values remain within the normal range. Septia et al. (2016) stated that non-smokers have significantly higher oxygen saturation values than smokers, because there is no disruption of oxygen binding by carbon monoxide. Thus, the presence of non-smokers in this study contributed to the high proportion of normal oxygen saturation.

The next factor is gender. Although the majority of respondents in this study were male, there were still female respondents who were included in the group with normal oxygen saturation. Physiologically, women are known to have a lower risk of chronic lung disease than men, especially related to cigarette exposure and occupational factors. Ntritsos et al. (2018) reported that the prevalence of COPD and chronic respiratory disorders is higher in men, so women tend to have better lung function. This condition allows some female respondents in this study to maintain normal oxygenation even in respiratory failure.

In addition to individual factors, the use of oxygen therapy through a Non-Rebreathing Mask (NRM) was an important factor in maintaining normal oxygen saturation in the 25 respondents. Based on the results of the study, all respondents received oxygen therapy using an NRM, so that patients with mild to moderate respiratory disorders could still maintain oxygen saturation by increasing the high fraction of inspired oxygen. Oxygen therapy with an NRM plays a role in increasing the amount of oxygen entering the alveoli, thereby helping to compensate for ventilation and perfusion disorders that occur. This is supported by Thalib et al. (2023) who found that oxygen therapy using a Non-Rebreathing Mask (NRM) was able to increase and maintain the patient's oxygen saturation levels, from low values before therapy to increasing after therapy was administered. This demonstrates the function of the NRM in maintaining oxygen saturation to reach more optimal values.

Thus, oxygen saturation levels before level 1 progressive mobilization therapy demonstrated variations in respiratory responses in patients with respiratory failure in the ICU. Twenty-five respondents (56%) had oxygen saturation values in the 95–100% range, which is considered normal, indicating that some patients were still in the respiratory compensation

phase. This condition is likely influenced by a combination of factors such as age, which still allows for relatively good lung function, the absence or low exposure to cigarettes, certain gender characteristics, and adequate oxygen therapy support so that blood oxygenation can be maintained within normal limits. However, this condition was not experienced by all respondents, as some patients still showed low oxygen saturation before the intervention. This low oxygen saturation can be influenced by various factors, such as ventilation-perfusion disorders, accumulation of airway secretions, decreased lung expansion, and limited mobility during ICU care. Prolonged immobilization has the potential to cause atelectasis, decreased lung capacity, and respiratory muscle weakness, which ultimately worsens oxygenation. Furthermore, pre-intervention clinical features, such as rapid, shallow breathing and use of accessory muscles, indicate an increased respiratory workload and place the patient in a vulnerable phase for worsening respiratory failure. This confirms that oxygen therapy alone is not always sufficient to correct hypoxemia if mechanical and functional factors of the respiratory system are not optimally addressed. Therefore, oxygen saturation values before level 1 progressive mobilization are an important baseline in assessing the effectiveness of additional interventions that are safe and applicable in daily nursing practice.

In addition to the group of respondents with normal oxygen saturation, the results of this study also showed that before receiving level 1 progressive mobilization therapy , 20 respondents (44%) had oxygen saturation values in the 90–95% range, which is considered abnormal. This finding indicates that nearly half of the patients diagnosed with respiratory failure experienced more pronounced oxygenation impairment, even though all respondents had received oxygen therapy. This condition reflects that the respiratory compensation mechanisms in this group were no longer functioning optimally.

Based on the characteristics of the respondents in this study, the abnormal oxygen saturation conditions in the 20 respondents can be explained by several factors. The first factor is the respondents' age. Most respondents in this study were in the age group above 46 years, which physiologically experiences a decline in lung function. With aging, lung tissue elasticity decreases, alveolar walls become stiffer, and respiratory muscle strength decreases, resulting in suboptimal alveolar ventilation. This condition reduces the lungs' ability to maintain effective gas exchange, resulting in a tendency for oxygen saturation values to decrease. According to a medical review conducted by Dezube and Albert (2025), the aging process is associated with structural and functional changes in the respiratory system, including decreased lung elasticity, weakened respiratory muscles, and reduced vital lung capacity. Although these changes are often asymptomatic in healthy older adults, pulmonary reserve capacity and gas exchange efficiency decline with age, putting them at risk for oxygenation disorders in more severe physiological situations.

The second factor that plays a significant role is smoking history. The study results showed that most respondents had a history of smoking, and this group was more prevalent among respondents with abnormal oxygen saturation. Long-term exposure to cigarette smoke can cause damage to the alveolar epithelium, increased airway inflammation, and mucus buildup, which inhibits ventilation and oxygen diffusion. Furthermore, the carbon monoxide in cigarettes has a very high affinity for hemoglobin, reducing its capacity to bind oxygen. This is in line with the World Health Organization (2023) which states that smoking is a major factor that damages the respiratory system and increases the risk of chronic lung disease. Exposure to cigarette smoke causes chronic inflammation of the airways, loss of lung tissue elasticity, and increases the risk of diseases such as chronic obstructive pulmonary disease (COPD), which are associated with impaired ventilation and gas diffusion.

Another factor is gender. The predominance of male respondents in this study also contributed to the high proportion of abnormal oxygen saturation. Epidemiologically, men have a higher prevalence of chronic lung disease, particularly related to smoking and exposure to risky occupational environments. Ntritsos et al. (2018) reported that the prevalence of chronic respiratory disorders is higher in men than in women, making this group more susceptible to decreased oxygenation. This condition increases the likelihood of abnormal oxygen saturation in male patients with respiratory failure.

In addition to individual factors, oxygen use also needs to be critically reviewed in groups with abnormal saturation. Although all respondents used oxygen therapy, not all patients responded optimally to it. In patients with more severe ventilation-perfusion disorders, oxygen therapy alone is often insufficient to increase oxygen saturation within the normal range. West (2012) explains that in more severe respiratory disorders, supplemental oxygen administration does not always optimally increase oxygen saturation. This condition is caused by an imbalance in pulmonary ventilation and perfusion, so that increased inhaled oxygen is not always accompanied by increased blood oxygenation.

Thus, the oxygen saturation condition before being given progressive mobilization therapy level 1 was found that 20 respondents (44%) had oxygen saturation values in the range of 90–95% which is categorized as abnormal, reflecting the presence of a more complex and multifactorial respiratory disorder. Factors such as advanced age, smoking history, male gender dominance, and limited response to oxygen therapy contribute to the body's inability to maintain adequate oxygenation. These findings indicate that the group of respondents with abnormal oxygen saturation is at a higher risk of experiencing worsening respiratory conditions, thus requiring additional, more comprehensive nursing interventions to prevent the development of respiratory failure.

Oxygen Saturation Values After Level 1 Progressive Mobilization Therapy

This study showed a significant change in oxygen saturation after administering level 1 progressive mobilization therapy to patients diagnosed with respiratory failure in the ICU of Prof. Dr. H. Aloei Saboe Regional General Hospital, Gorontalo City. The results of oxygen saturation measurements before and after the intervention showed a tendency for an increase in SpO_2 values after patients were given level 1 progressive mobilization as part of the nursing intervention. These findings indicate that level 1 progressive mobilization has the potential to make a positive contribution to improving oxygenation in patients with respiratory failure who previously experienced hypoxemia despite receiving conventional oxygen therapy.

Clinically, increased oxygen saturation is important for patients with respiratory failure, reflecting improved gas exchange and a reduction in the degree of hypoxemia. This can contribute to reduced shortness of breath, decreased respiratory muscle workload, and help prevent worsening respiratory conditions that could lead to the need for mechanical ventilation. Therefore, the primary findings of this study support the use of relatively safe non-pharmacological nursing interventions as supportive therapy in the care of patients with respiratory failure in the ICU.

After receiving level 1 progressive mobilization therapy, research results showed an increase in oxygen saturation values in patients with respiratory failure in the ICU of Prof. Dr. H. Aloei Saboe Regional Hospital, Gorontalo City. This increase reflects improved oxygenation that occurred after the patients received mobilization intervention, even though the intervention was at the most basic and safe level for critically ill patients. Clinically, this condition was characterized by reduced complaints of shortness of breath, more regular breathing, and decreased use of accessory respiratory muscles in some patients.

The increase in oxygen saturation after progressive level 1 mobilization can be explained by several physiological mechanisms. Changes in body position and light activity can increase lung expansion, improve ventilation distribution, and optimize the ventilation-perfusion ratio.

Based on the results of the study after being given level 1 progressive mobilization therapy to 45 respondents (100%) for 3 days and re-measurement of oxygen saturation on the respondents, it was found that all 45 respondents (100%) had oxygen saturation values in the range of 95–100% with an average oxygen saturation value in the respondents of 98.82%.

These findings align with research conducted by Wang (2016) that found that progressive mobilization improves partial oxygen pressure (PaO_2), oxygen saturation, and supports diaphragmatic function and effective coughing. Other research also indicates that progressive mobilization therapy has been shown to increase tidal volume in patients on ventilators in the ICU (p-value = 0.000), indicating improved pulmonary ventilation (Samosir & Oktarina, 2020).

When patients are placed in a semi-Fowler's or Fowler's position according to the level 1 mobilization procedure, the diaphragm can work more efficiently, lung space increases, and ventilation at the lung base becomes more optimal. This is supported by Nurfitriawaty and Bangun (2024), who explain that position changes and early mobilization are effective non-pharmacological interventions to improve gas exchange in patients with respiratory disorders. Furthermore, breathing exercises, which are part of the level 1 mobilization procedure, play a role in improving patient breathing patterns. Similar findings were also reported by Suyanti et al., (2019), who studied 16 ICU patients with conditions of decreased consciousness and unstable oxygen saturation and blood pressure. They stated that progressive level 1 mobilization is effective in increasing oxygen saturation and blood pressure stability in patients with decreased consciousness (Suyanti et al, 2019).

This improvement occurs because progressive mobilization promotes increased airflow throughout the lungs, improves respiratory muscle function, and reduces secretion accumulation. This is consistent with the increase in SpO_2 in this study data, where each patient showed an increase after three mobilization sessions.

Overall, the increase in oxygen saturation in this study indicates that progressive mobilization level 1 is an effective and safe intervention for patients at risk of respiratory failure. This intervention not only improves oxygenation but also provides additional benefits such as preventing complications from bed rest, improving respiratory muscle strength, and accelerating the healing process. This intervention is also highly suitable for ICU patients in Indonesia because it does not require special equipment, is easily performed by nurses, and can be adjusted according to the patient's stability.

The Effect of Level 1 Progressive Mobilization Therapy on Oxygen Saturation in Patients with Respiratory Failure at Prof. Dr. Aloie Saboe Regional Hospital

Based on the statistical test results in this study, there was a significant difference between oxygen saturation values before and after progressive mobilization therapy level 1, with a p-value = 0.000. This difference was also seen in the increase in the respondents' average oxygen saturation, from 94.73% before therapy to 98.82% after therapy.

The analysis results showed that level 1 progressive mobilization therapy significantly increased oxygen saturation in respiratory failure patients in the ICU. The difference in oxygen saturation values before and after the intervention confirmed that level 1 progressive mobilization can function as an effective supportive nursing intervention in helping improve patient oxygenation. These findings reinforce the view that non-pharmacological approaches have a crucial role in the management of respiratory failure patients, particularly in situations where oxygen and pharmacological therapy have not yielded optimal results. The effectiveness of this intervention aligns with research by Schallom et al. (2022) who reported that level 1 progressive mobilization in mechanically ventilated patients contributed to improvements in clinical conditions, including increased mobility scores. Furthermore, these findings are consistent with several studies in Indonesia, including Karokaro's (2024) study, which showed that level 1 progressive mobilization can increase oxygen saturation by 2–3% in patients with decreased consciousness in the ICU. The results of this study even showed an average increase in oxygen saturation of 4.1%. Statistically, the results of the Wilcoxon test showed a p-value of 0.000 ($p < 0.05$), which confirmed that there was a significant effect of level 1 progressive mobilization therapy on increasing oxygen saturation in respiratory failure patients at Prof. Dr. Aloei Saboe Regional Hospital.

After the test results showed significant changes, this was consistent with the findings of previous research, namely research by Samosir & Oktarina (2025) reporting that progressive mobilization level 1 was able to increase oxygen saturation in critical patients—the results of the pre- post analysis showed an increase in SpO_2 with a p-value = 0.000. This is supported by research by Suyanti et al, (2019) that after mobilization, progressive level 1 saw an increase in oxygen saturation in ICU patients who previously had unstable oxygenation.

The effectiveness of level 1 progressive mobilization in this study was reflected not only in the increase in mean oxygen saturation but also in the consistency of clinical category changes,

with all respondents initially in the abnormal category (100%) changing to normal (100%) after the intervention. These findings demonstrate that a simple, structured, and low-risk intervention such as level 1 progressive mobilization has a significant impact on improving the respiratory condition of patients with respiratory failure, particularly in the early stable phase in the ICU.

Level 1 progressive mobilization also plays a crucial role in improving respiratory function, accelerating recovery, and maintaining the body's overall physiological balance. This is consistent with research by Hartoyo et al. (2017) that found that level 1 progressive mobilization significantly increased oxygen saturation (SpO_2) in patients experiencing decreased consciousness. The primary findings showed a significant increase in oxygen saturation as a result of this mobilization.

Based on the description above, it can be concluded that level 1 progressive mobilization therapy has a positive effect on increasing oxygen saturation in patients with respiratory failure in the ICU of Prof. Dr. Aloei Saboe Regional Hospital. The results of this study have important implications for nursing practice in the ICU, particularly in the management of patients with respiratory failure with persistent hypoxemia. Level 1 progressive mobilization can be integrated into standard care protocols as a non-pharmacological intervention that is supportive and preventive. Structured and consistent implementation has the potential to help nurses improve patient oxygenation without additional reliance on invasive interventions. Furthermore, because this intervention does not require special equipment and can be performed by trained nurses, level 1 progressive mobilization is very relevant to be implemented in regional hospitals with limited resources.

During the study, no hemodynamic deterioration or serious complications were observed due to level 1 progressive mobilization. The intervention was performed on patients with relatively stable hemodynamics and under close supervision by healthcare professionals. This demonstrates that level 1 progressive mobilization is a safe intervention when administered as indicated and taking into account the patient's clinical stability. With a stepwise approach and monitoring of physiological responses, the risk of complications can be minimized.

This study has several limitations. First, the quasi-experimental design without a control group limited the researchers' ability to eliminate confounding factors that might have influenced the increase in oxygen saturation. Second, the accidental sampling technique has the potential to introduce selection bias, requiring caution in generalizing the results. Third, the relatively short intervention period (three days) does not adequately describe the long-term effects of level 1 progressive mobilization on other clinical outcomes such as ICU length of stay or the need for mechanical ventilation.

Future research is recommended to use a randomized controlled trial design to increase the strength of causal inference. Furthermore, studies with larger sample sizes and longer observation periods are needed to evaluate the impact of level 1 progressive mobilization on broader clinical outcomes , including ICU length of stay, need for mechanical ventilation, and mortality. Multicenter studies in various regional hospitals are also needed to strengthen contextual evidence in Indonesia.

4. CONCLUSION

The study found that before progressive mobilization therapy, the respondents' oxygen saturation levels fell into two categories. The majority, 25 (56%) of the respondents, had oxygen saturations in the 95–100% range, which is considered normal, while the remaining 20 (44%) had oxygen saturations in the 90–95% range, which is considered abnormal. The study found that the oxygen saturation of respondents after receiving progressive mobilization therapy showed normal results. All 45 respondents (100%) had oxygen saturation values in the 95–100% range. The results of the calculation using the Shapiro Wilk test obtained a p-value (0.000) < 0.05, which means that there is an effect of level 1 progressive mobilization therapy on oxygen saturation in patients diagnosed with respiratory failure in the ICU room of Prof. Dr. H. Aloei Saboe Regional Hospital, Gorontalo City. This can also be seen in the mean oxygen saturation value before therapy

was given. Level 1 progressive mobilization had a mean value of 94.73 and after being given level 1 progressive mobilization therapy had a mean value of 98.82.

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