International Journal of Health, Economics, and Social Sciences (IJHESS)
Vol. 8, No. 2, April 2026, pp. 1045~1052
DOI: 10.56338/ijhess.v8i2.10511
Website: https://jurnal.unismuhpalu.ac.id/index.php/IJHESS

Effect of Semi Fowler and Right Lateral Position on Increased Oxygen Saturation in Adhf Patients in the CVCU Room of Dr. M. M Dunda Limboto Hospital

Nursila Rauf[1*], Ita Sulistiani[2], Ibrahim Suleman[3]
[1]Mahasiswa Program Studi Ilmu Keperawatan UNG
[2,3]Dosen Program Studi Ilmu Keperawatan UNG

***Corresponding Author:** E-mail: nursilarauf90@gmail.com

Article Info

Article history:

Received 16 Dec, 2025
Revised 19 Jan, 2026
Accepted 24 Feb, 2026

Keywords:

Semi Fowler, Right Lateral, ADHF

ABSTRACT

Acute Heart Failure (ADHF) is often found, namely Acute Decompensated Heart Failure (ADHF) is one of the health problems with a high morbidity and mortality rate, the symptoms that occur are difficulty breathing when resting during the treatment period. Non-pharmacological interventions such as body position regulation are alternatives used by nurses, The most commonly used positions are the semi-fowler and right lateral positions. The purpose of the study was to analyze the effect of the semi-fowler and right lateral position on the Increase in Oxygen Saturation in ADHF patients in the CVCU Room of Dr. M. M Dunda Limboto Hospital. This study is a quantitative research using a Quasi-Experimental, Pretest and Posttest Control group research design.The population in this study was patients treated in a CVCU room with ADHF. Sampling using accidental sampling was a sample size of 30. The research instrument used an oxygen saturation observation sheet. Analysis of univariate and bivariate data of frequency distribution tests and paired t-tests. The results showed a p value of 0.000 which means that there was an influence of the semi fowler and right lateral positions on the increase in oxygen saturation in ADHF patients in the CVCU Room of Dr. M. M Dunda Limboto Hospital. Patients with the right semi-fowler and lateral positions are advised to continue to monitor their oxygen saturation.

INTRODUCTION

Acute Decompensated Heart Failure (ADHF) is one of the health problems with a high morbidity and mortality rate in the world. In the Asian region, heart failure, one of the final manifestations of various cardiovascular diseases that are not optimally treated, is characterized by a sudden worsening. This condition is characterized by the inability of the heart to pump blood adequately to meet the body's metabolic needs, causing symptoms such as shortness of breath, fatigue, and peripheral edema, decreased oxygen saturation, and signs of systemic congestion (Nafisah and Yuniartika, 2023).

Enforcement of the diagnosis of Acute Decompensated Heart Failure (ADHF) with undifferentiated respiratory failure generally begins with an examination of vital signs, especially heart rate and respiratory frequency. A history of previous illnesses, such as heart failure, myocardial infarction, or coronary artery disease, accompanied by complaints of dyspnea (the most frequent symptom), orthopnea, or peripheral edema can lead to possible heart failure as the cause. Certain physical findings, such as third heart sound (S3), jugular vein distension (JVD), or hepatojugular reflux have high specificity but low sensitivity. Meanwhile, the presence of crickets on pulmonary auscultation examination was detected in about 60-70% of patients, but the diagnostic value was limited. Thus, although an anamnesis and physical examination remain important, they are not enough to ensure a comprehensive diagnosis of heart failure (Hickey Sean M., 2019)

Based on a WHO report (2022), it is currently estimated that there are more than 64 million people worldwide living with heart failure, or about 2% of adult population. This condition shows that heart failure is still a major challenge in the cardiovascular field in various countries, both developed and developing countries.

In Indonesia, showing an alarming trend, based on Riskesdas (2018) reported that the prevalence of acute heart failure reached around 1.5% of the total population, a significant increase compared to 2017 which was only 0.3%. This figure is equivalent to 10 million people with heart failure in Indonesia, with the number of hospitalizations reaching around 1.8 million cases per year. The characteristics of patients in Indonesia are also different from developed countries, as they tend to be younger and show more severe clinical symptoms.

Based on the 2023 report of the Gorontalo Provincial Health Office, the number of cases of Acute Decompensated Heart Failure (ADHF) was recorded at 364 patients. The data reflects that the prevalence of ADHF in the Gorontalo area is still quite high and is one of the main causes of patients needing hospital treatment. This high hospitalization rate shows that ADHF is a significant health problem and requires serious attention, both in terms of prevention, early detection, and comprehensive management to reduce the number of illnesses and improve the quality of life of patients.

dr. M.M. Dunda Limboto Hospital is the main referral hospital at the district level in the Gorontalo Province area, which has intensive care facilities such as the Cardiovascular Care Unit (CVCU). This unit routinely treats Acute Decompensated Heart Failure (ADHF) patients. ADHF cases were treated in the CVCU room with the majority of patients in unstable conditions and requiring intensive monitoring. In the period from January to June in 2025 for ADHF patients as many as 141 patients.

In Acute Decompensated Heart Failure (ADHF), the most striking clinical symptoms include dyspnea, which is difficulty breathing that can occur during activity or at rest, due to lung perfusion disorders and decreased heart pump function. Patients sometimes also experience orthopnea, which is shortness of breath when lying down that improves when sitting, indicating pulmonary congestion. In addition, Paroxysmal Nocturnal Dyspnea (PND) is a sudden episode of shortness of breath at night that often wakes the patient up from sleep, due to fluid redistribution while lying down. On auscultation examination, pulmonary edema can be found, where fluid fills the alveoli so as to interfere with oxygen exchange. Advanced heart failure conditions are often characterized by ascites (accumulation of fluid in the abdominal cavity) and pitting edema (swelling with indentations when pressed), which reflect excess fluid in the systemic circulation (Nafisah and Yuniartika, 2023)

Pharmacological application alone is not always enough to stabilize the condition of Acute Decompensated Heart Failure (ADHF) patients quickly and non-pharmacological interventions such as body position regulation are alternatives that can be used by nurses as part of initial management. Certain body positions are known to affect intrathoracic pressure, the return of venous flow to the heart, as well as tissue perfusion (Berman Audrey et al., 2022).

Body position selection is one of the important non-pharmacological interventions to help reduce symptoms and increase oxygen saturation. The most commonly used position is the semi fowler position. The semi-Fowler position is a non-pharmacological intervention that is often used to helps improve oxygenation, especially in patients with critical conditions such as Acute Decompensated Heart Failure (ADHF). This elevation angle of 30–45° effectively expands lung capacity upon inspiration, lowers intrathoracic pressure, and improves gas flow with positive results on oxygen saturation (Nur Antika et al., 2025).

In addition to the application of the semi-fowler position, the position that can be done is the right lateral position. According to Agussalim et al., (2025), the right lateral position is the position of the patient's body lying on its side to the right, with the right side of the body at the bottom and the left side at the top. The right arm is usually straightened or slightly bent, and the left leg is often bent over the right leg to maintain balance and comfort.

The results of a study by Susanti (2021), stated that the semi-fowler and right lateral positions help optimize venous flow to the right atrium, thereby improving preload and strengthening right ventricular contraction, especially in patients with predominantly systemic congestion. The study also noted a decrease in breathing frequency and an increase in oxygen saturation after the intervention. The results showed that the oxygen saturation value before and after the modification of the semi fowler positioning 45◦ with the right lateral showed an average pretest value of 86.87-posttest 98.33. For oxygen saturation values in the semi fowler position (45o) pretest 85.60-posttest 96.00. There is an influence between the two positional actions. However, there was no difference in the effectiveness of the positioning modification of the semi fowler 45◦ with the right lateral and semi fowler 45◦ to increase oxygen saturation.

Research conducted by Agussalim (2025), at Wahidin Sudirohusodo Hospital, Makassar, which is known as one of the largest referral hospitals in South Sulawesi with cardiovascular services comprehensive, showing significant results related to the effectiveness of body position interventions on the patient's respiratory condition. This study was carried out in the period from January to November 2024 by comparing the intervention group and the control group. The results of the analysis showed that the intervention group experienced a statistically significant decrease in the level of dyspnea, which was an average of 3.2 points on the Modified Borg Scale ($p < 0.001$). Meanwhile, in the control group, only a relatively small and statistically insignificant decrease in dyspnea scores was seen. These findings confirm that body-specific posture interventions may be an effective non-pharmacological strategy in lowering symptoms of congestion in patients with cardiovascular disorders.

The results of initial observations conducted by researchers on 12 patients with a diagnosis of ADHF in the CVCU (Cardio Vascular Care Unit) room of dr. M.M. Dunda Limboto Hospital who experienced dyspnea were obtained from the results of interviews with the head of the room and nurses that the application of the semi-fowler and right lateral positions to increase oxygen saturation in ADHF patients has not been applied optimally in the room. They perform more pharmacological actions. So the researcher is interested in conducting a study with the title "The Effect of Semi Fowler and Right Lateral Positions on Increasing Oxygen Saturation in ADHF Patients in the CVCU Room at dr. M.M Dunda Limboto Hospital". From this research, it is hoped that it can become the foundation of evidence-based clinical practice in cardiovascular nursing.

RESEARCH METHODS

This study is a quantitative research using a Quasi-Experimental, Pretest and Posttest Control group research design.The population in this study was patients treated in a CVCU room with ADHF. Sampling using accidental sampling was a sample size of 30. The research instrument used an oxygen saturation observation sheet. Analysis of univariate and bivariate data of frequency distribution tests and paired t-tests.

RESEARCH RESULTS

Respondent Characteristics

Table 1. Of Characteristics of respondents by gender

Gender	N	%
Male	20	66,7
Women	10	33,3
Total	30	100

Based on the table above, it shows that of the 30 respondents, more are male, namely 20 respondents or 66.7%, then 10 respondents are female (33.3%).

Table 2 Characteristics of respondents by age

Age	N	%
Adults 30-59 years old	14	46,7
Elderly ≥ 60 years old	16	53,3
Total	30	100

Based on the table above, it shows that out of 30 respondents, more are elderly, namely 16 respondents or 53.3%, and adults 14 respondents or 46.7%.

Table 3. Characteristics of respondents by occupation

Jobs	N	%
PNS	10	33,3
Merchant	17	23,3
Farmer	12	40,0
Fisherman	1	3,3
Total	30	100

Based on the table above, it shows that out of 30 respondents, more work as traders, namely 17 respondents or 23.3%, and at least 1 respondent or 3.3% work as fishermen.

Table 4. Characteristics of respondents based on disease history

Disease History	N	%
Hypertension	18	60
Diabetes	12	40
Stuart O'Neill		
Total	30	100

Based on the table above, it shows that out of 30 respondents, more have a history of hypertension, namely 18 respondents or 60%, and at least 12 respondents or 40% have diabetes mellitus.

Univariate Analysis

Table 5. Oxygen Saturation Table of ADHF Patients Before Semi Fowler and Right Lateral Positions of the Intervention Group.

Intervention	Categories	n	%
Pre-Test	Normal Abnormal	11 4	36,7 13,3
Post Test	Normal Abnormal	15 -	50
Total		15	100

Based on the table above, it shows that the oxygen saturation of patients before the intervention was within the normal limit of 11 or 36.7% and abnormally 4 or 13.3 and after the right lateral position was carried out to all patients had oxygen saturation within the normal limit or 50%.

Table 6. Oxygen Saturation Table of ADHF Patients Control Group.

Controls	Categories	n	%
Pre-Test	Normal Abnormal	15 -	50
Post Test	Normal Abnormal	15 -	50
Total		15	100

Based on the table above 6, it shows that the patient's oxygen saturation is all within normal limits, namely 15 or 50% and after that all remain to have oxygen saturation within normal limits or 50%.

Bivariate Analysis

Table 7 Effect of Semi Fowler and Right Lateral Positions on Oxygen Saturation of ADHF Patients in the CVCU ROOM OF MM HOSPITAL. Dunda Limboto

Groups	Red	n	St.dev	Sig (2) Tailed)
Pre SPO2 Intervention - Post SPO2 Intrervensi	-2.333	15	1.234	.000
Pre SPO2 Control - Post SPO2 Control	-.933	15	.961	.002

Based on the table above, the results of the research through the paired sample test used that obtained a p-value of 0.000 < 0.05, it can be concluded statistically. There is an Effect of the Semi Fowler and Right Lateral Positions on Oxygen Saturation of ADHF Patients in the CVCU ROOM OF MM HOSPITAL. Dunda Limboto. The results of the study also showed a p-value of 0.002 < 0.05 in the control group of patients who were only in the supination position, this can be concluded that there is a significant influence on the increase in the patient's oxygen saturation, but as many as 50% of patients did not have an increase in saturation so that the saturation value between pre and post tests was in the same number.

DISCUSSION

Semi Fowler and Right Lateral Positions on Increased Oxygen Saturation in ADHF Patients (Intervention Group) in the CVCU Room of the Hospital Mr. Dunda Limboto

The results showed that the oxygen saturation value of patients before the semi-fowler position was within normal limits of 11 or 36.7% (95-97%) and abnormal for 4 patients or 13.3% below 95%.

Before the intervention was carried out in the semi-fowler and right lateral positions, the results were obtained that as many as 4 respondents had a saturation value within the abnormal limit below 95%, which was

13.3% even though the respondents used oxygen assistance. The results of this study showed that patients with ADHF in the CVCU ROOM OF RSUD MM. Dunda limboto often experiences a decrease in oxygen saturation even though they have been given oxygen therapy according to their needs, but the decrease in oxygen saturation did not decrease drastically because in this study the researchers found that there was no large difference in the decrease in saturation value

The patient is only 94% and does not occur for a long time because the patient is on oxygen.

Patients with impaired heart function can cause pulmonary congestion, in this condition, the heart is unable to pump blood as effectively so that there is an increase in pulmonary venous pressure and fluid accumulation in the alveoli as a result of which the oxygen diffusion process is disrupted, so that the oxygen provided is not optimally utilized by the patient's body. Because the main problem is not the lack of oxygen that enters, but the diffusion and perfusion barriers so that the administration of additional oxygen is often not enough, this is what causes saturation to often decrease even though the patient has used oxygen therapy, so that ADHF patients in the CVCU room are monitored periodically, because patients with ADHF if there is a slight decrease in saturation can cause symptoms, therefore patients with ADHF whose saturation value is normal are still monitored periodically because the oxygen needs of the tissues increase due to heavier heart and respiratory work. So that the patient is treated in the CVCU room for high-level monitoring of the general condition of patients with ADHF, With the semi-fowler position, the diaphragm has more optimal movement space so that lung expansion is better, alveolus ventilation is improved, and air distribution to a wider part of the lung becomes more even. In addition, the semi-Fowler position reduces the pressure from the intraabdominal organs on the lungs, thus facilitating gas exchange and improving the efficiency of blood oxygenation. The combination of these factors makes it easier for patients to breathe and oxygen levels in the blood can increase significantly (Pambudi & Widodo, 2020).

The results of this study are in line with the research conducted by Hasna Nafisah (2023), with the title "The Effect of Semi Fowler Position on Oxygen Saturation Levels in Heart Failure Patients" with the Results of the Average Oxygen Saturation before Fowler Position Treatment is 95.27%

Physiologically, the position of the head being elevated by 30–45° reduces abdominal pressure on the diaphragm, increases functional residual capacity, improves ventilation–perfusion ratio, and decreases breath work all contribute to increased oxygenation of CVCU patients with congestive or pulmonary edema. Setting the right and comfortable position in patients is very important, especially for patients who experience shortness of breath, the results of this study show that the semi fowler position is more comfortable and easier to understand by the patient but the fowler position is more effective for reducing shortness of breath and increasing oxygen saturation (Pambudi & Widodo, 2020).

The results showed that the oxygen saturation value of patients after being given a semi-fowler and right lateral position was all patients saturated within the normal limit between 96-100% as many as 15 patients in the intervention group without the use of oxygen assistance. Physiologically, the elevated position of the head by 30–45° reduces abdominal pressure on the diaphragm, increases functional residual capacity, improves the ventilation–perfusion ratio, and decreases breath work all contribute to increased oxygenation of CVCU patients with congestion or pulmonary edema. The right lateral position also significantly increases SpO2 which utilizes the principle of pulmonary perfusion. In this position, the right lung below receives more blood flow due to the influence of gravity, while ventilation continues to be good. This makes the ventilation-perfusion ratio more optimal, so that gas exchange in the alveolus is more efficient. In addition, the right lateral position can also reduce the pressure from the heart and mediastinal organs on the left lung, so that lung expansion is more free. The combination of increased perfusion in the right lung and a more even distribution of ventilation is what supports a significant increase in blood oxygenation. Proper and comfortable positioning of patients is very important, especially patients who experience shortness of breath.

This result is in line with the research of Agussalim, et al (2025) entitled "The Effectiveness of the Right Lateral Position in Reducing Dyspnea in Congestive Heart Failure Patients" which shows that the results of the intervention group experienced a significant decrease in dyspnea, with an average decrease of 3.2 points on the Modified Borg Scale ($p < 0.001$).

In individuals without severe unilateral pathology, the lateral position can recruit nonindependent pulmonary alveoli and optimize secretory drainage, while changes in perfusion may vary depending on heart and lung conditions. Reduces pressure on the left heart (because the heart is more dominant on the left side) Since the dominant heart is on the left side of the thorax, tilting the patient to the right can lower the mechanical pressure on the left heart, thereby reducing the load and improving perfusion causes a smaller cardiac workload on respiratory function so that the right lateral position affects oxygen saturation (SaO2) and respiratory rate (Muti, 2020).

Supination Position on Increased Oxygen Saturation in ADHF Patients (Control Group) in the CVCU ROOM OF RSUD MM. Dunda Limboto

The results showed that the oxygen saturation value before and after being in the supination position with the help of oxygen was all within the normal limit between 95-99% saturation niali. This occurs because the

patient uses oxygen assistance so that the saturation is within normal limits, but the patient's oxygen saturation category appears to be the same but in the t-test results show a small but significant average increase (−1.533; p<0.001), This confirms that there is an improvement in oxygenation oxygen in stable CVCU patients but there is no significant increase due to the patient's poor position so that the circulated oxygen cannot be fully absorbed by the patient. The body that causes saturation retains its value and increases but is not significant. In CVCU patients, oxygen saturation that remained within the normal range when using oxygen-assisted mirrored the adequacy of tissue oxygenation in the midst of acute cardiovascular conditions. Supplemental oxygen maintains the partial pressure of alveolar oxygen and lowers the risk of hypoxemia, while standard care (positioning, airway care, monitoring) helps maintain the stability of ventilation– perfusion. When the device and the flow of oxygen are applied appropriately (e.g. an accurate nasal cannula), saturation is easier to maintain in the range of 95–100% as long as hemodynamics are relatively stable (Rahmah, 2024).

The Effect of Increasing Oxygen Saturation of ADHF Patients in Semi Fowler and Lateral Positions (Intervention Group) with Supination Positions (Control Group) in the CVCU Room of the Hospital MM. Dunda Limboto.

The results of the study through the paired sample test used showed that the p-value was 0.000< 0.05, it can be statistically concluded that there is an Effect of Semi Fowler and Right Lateral Positions on Oxygen Saturation of ADHF Patients in the CVCU Room of MM Hospital. Dunda Limboto. This happens because in Acute Decompensated Heart Failure (ADHF) patients treated at CVCU, the semi-fowler position is very helpful in increasing oxygen saturation because this position lowers the workload of the heart and lungs. With the head and chest raised about 30–45 degrees, the pressure on the diaphragm is reduced so that the lungs expand more easily. This reduces shortness of breath due to pulmonary congestion that is often experienced by ADHF patients. In addition, the semi-fowler position also decreases venous backflow to the heart (preload), thereby reducing fluid buildup in the lungs and improving oxygen exchange. Thus, even if the patient is already getting supplemental oxygen, the semi-fowler position still plays an important role in improving the respiratory mechanism and increasing oxygen saturation.

The right lateral position helps improve the distribution of ventilation and perfusion in the lungs. The right lung that is larger and has three lobes will get more optimal perfusion when it is down, so that oxygen exchange is more efficient. In ADHF patients, lung conditions often experience edema or congestion, so the right lateral position can reduce pressure on the left lung and give the right lung a chance to work more optimally. The combination of the semi fowler and right lateral positions makes the patient more comfortable, reduces tightness, and increases the effectiveness of oxygen therapy administered at CVCU. So, body positioning is an important part of the treatment of ADHF patients to support respiratory function and improve oxygen saturation.

The results of this study are in line with Hayati Kardina, et al. (2023) with the title "The Effect of the Combination of the Semi Fowler and Right Lateral Positions on Hemodynamic Changes in Heart Failure Patients in the CVCU Room" which shows a p value= 0.001, it can be concluded that there is an effect of the combination of the semi fowler position with the right lateral on changes in hemodynamic status in heart failure patients.

The results of the study also showed that through the paired sample test used showed that the p-value of 0.002 < 0.05 can be statistically concluded that there is an effect of oxygen therapy with the position of Supination Patients Against Oxygen Saturation of ADHF Patients in the CVCU Room of MM Hospital. Dunda Limboto. This happens because the oxygen therapy given is able to increase the concentration of oxygen in the alveolus so that the process of oxygen diffusion into the blood remains optimal. With an external oxygen supply, limited ventilation due to overcrowding can be compensated so that arterial oxygen saturation is maintained. In addition, in patients with relatively good lung function, supination positions do not necessarily cause significant disruption to gas exchange, so that oxygen levels in the blood remain stable. The supination position can indeed affect the mechanics of breathing, for example by decreasing the capacity of functional residues and increasing the pressure on the diaphragm. However, as long as the patient gets additional oxygen, the effect is not large enough to lower the oxygen saturation to below normal. Oxygen assistance ensures that despite the limitations of lung expansion due to body position, the amount of oxygen available for the respiration process remains sufficient. Thus, the combination of oxygen therapy and the ability of the lungs to still be able to perform gas exchange explains why the patient's saturation remains normal even in the supination position.

The researchers assume that this positional intervention provides significant because it improves lung expansion, and improves patient comfort when breathing, so that the patient is able to breathe more effective with lighter respiratory muscle work. The SpO2 response is also affected by the severity of the patient's heart failure.

CONCLUSION

Oxygen saturation of patients before the semi-fowler and right lateral positions was carried out within normal limits of 11 or 36.7% (95-97%) and abnormal 4 patients or 13.3% below 95% and after being given the semi-fowler and right lateral positions, all patient saturation was within the normal limit between 95-99% as many as 15 patients in the intervention group.

Oxygen saturation of patients of a control group of 15 patients with oxygen assistance with supination positions were all within normal limits between the saturation values of 95%-99%.

The results of the study through the paired sample test used that obtained a p-value of 0.000 < 0.05, it can be statistically concluded that there is an Effect of Semi Fowler and Right Lateral Positions on Oxygen Saturation of ADHF Patients in the CVCU ROOM OF MM HOSPITAL. Dunda Limboto.

ADVICE

This research is expected to be information to increase knowledge about the provision of non-pharmacological therapy, especially the provision of good body position to improve the normal value of oxygen saturation

Research can provide information to hospitals about the position of the semi fowler and right leteral to increase oxygen saturation in ADHF patients in the CVCU room to improve the quality of service for patients in the hospital.

Patients who have had the procedure for the semi-Fowler and right lateral positions are advised to continue to monitor oxygen saturation periodically to see consistency increased oxygenation. The patient is expected to remain in the designated position according to the research protocol, avoid sudden position changes, and report when there is discomfort or shortness of breath.

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