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EFFECTIVENESS OF SITTING POSITION WITH DANGLING-LEG ON DYSPNEA IN CHRONIC HEART FAILURE

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ABSTRACT
Chronic Heart Failure (CHF) is one of the leading causes of morbidity and mortality worldwide, with dyspnea being the most common symptom resulting from increased pulmonary venous pressure and pulmonary edema. Non-pharmacological interventions such as positioning, particularly the sitting position with legs hanging down, have been reported to effectively reduce dyspnea in patients with CHF. This manuscript aims to analyze the effectiveness of the sitting position with legs hanging down in reducing dyspnea perception and improving vital parameters. The research method used a single case study design with interventions applied to one CHF patient. Data were collected through interviews, observations, physical examinations, and medical documentation studies. Pain intensity was measured using a Visual Analog Scale (VAS), while respiratory and oxygenation parameters were assessed descriptively. The intervention results showed a decrease in respiratory rate from 24 to 18 breaths per minute and an increase in oxygen saturation from 96% to 98% within three days, accompanied by reduced dyspnea scores and improved breathing comfort. These findings indicate that the sitting position with legs hanging down is a simple, effective intervention that can be integrated into evidence-based nursing practices for patients with CHF.

Keywords: chronic heart failure; dyspnea; sitting position with dangling-leg

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INTRODUCTION

Chronic Heart Failure (CHF) is a condition when the heart fails to pump blood adequately, causing pulmonary congestion and a decrease in the body's functional capacity. CHF is one of the leading causes of hospitalization and death from cardiovascular disease globally (American Heart Association, 2022). Its prevalence continues to increase as the population ages and high comorbidities such as hypertension and coronary artery disease (Rahimi et al., 2022). Clinically, CHF is characterized by a progressive course of disease with recurrent episodes of acute decompensation, thus requiring comprehensive and ongoing management to prevent worsening of cardiopulmonary symptoms and complications (Ponikowski et al., 2021).

Dyspnea is the most frequent symptom of CHF and occurs due to increased pulmonary venous pressure, interstitial edema, as well as decreased lung elasticity, which ultimately improves respiratory function and reduces the patient's quality of life (Katz & Balady, 2021). These symptoms of tightness often worsen in a lying position, requiring quick and effective intervention. In addition, dyspnea in CHF patients is often an early indicator of the occurrence of acute decompensation that requires immediate treatment to prevent worsening of the patient's hemodynamic and respiratory conditions (Ponikowski et al., 2021).

Non-pharmacological interventions, especially position management, have been shown to help reduce respiratory load and improve lung expansion (Alonso et al., 2021). One of the positions that shows significant results is the sitting position with dangling legs, which physiologically helps to lower the preload through the effect of gravity. In nursing practice, positioning is an important part

of self-intervention aimed at optimizing ventilation and pulmonary perfusion in CHF patients. Sitting position with dangling legs provides physiological advantages through redistribution of blood volume to the lower extremities due to the effects of gravity, thereby reducing venous return to the heart and lowering the preload of the left ventricle (Guyton & Hall, 2020). This decrease in preload contributes to reduced pulmonary capillary pressure, which ultimately reduces pulmonary congestion and the sensation of shortness of breath.

The sitting position also increases the thoracic expansion and functional residual capacity of the lungs, thereby improving gas exchange and lowering the work of the respiratory muscles (West, 2021). This condition is especially important because respiratory muscle fatigue often occurs due to increased lung resistance and compensatory hyperventilation in CHF patients. The diaphragm can move more optimally through sitting position with dangling legs intervention, so that alveolar ventilation becomes more effective and the perception of dyspnea decreases (McIlroy et al., 2022).

An experimental study by Alonso et al., (2021) found a significant decrease in dyspnea's Visual Analog Scale (VAS) score and breathing rate within 15–30 minutes after the sitting position with dangling legs intervention in patients with acute heart failure. These findings are reinforced by Akpınar & Topaçoğlu (2021) who stated that these interventions also contribute to subjectively increasing oxygen saturation and patient comfort. The application of evidence-based non-pharmacological interventions, particularly sitting positions with dangling legs, has not been consistently supported by local research data. Therefore, this study aims to analyze the effectiveness of sitting position with dangling legs on reducing dyspnea in CHF patients at Haji Adam Malik Hospital Medan.

METHOD

The method of this research is a single-case study design. Data sources were obtained from the patient and family through interviews, direct observation, physical examination, and review of medical records. Data analysis was conducted using univariate descriptive analysis, focusing on changes in dyspnea perception and physiological parameters, including respiratory rate and oxygen saturation, before and after the intervention. The results were presented in the form of numerical comparisons and narrative descriptions to illustrate the clinical response to the intervention.

The research was carried out in the Cardiac Care Room of Haji Adam Malik Hospital Medan from November 17 to November 19, 2025. The participant was one patient diagnosed with moderate CHF FC III ec Mitral Regurgitation (MR) due to Rheumatic Heart Disease (RHD)–Antiphospholipid Syndrome (APS) CCS III, with comorbid hyperthyroidism and atrial fibrillation with slow ventricular response (SVR). The inclusion criteria included a 47-year-old patient with a diagnosis of CHF, oriented to time, place, and person, able to communicate effectively, willing to participate in the study, undergoing treatment in the Cardiac Care Room of Haji Adam Malik Hospital Medan, hemodynamically stable, and in a compos mentis state.

The instrument used was the Visual Analog Scale (VAS) to measure changes in dyspnea perception before and after the intervention. Prior to implementation, the nurse explained the objectives and procedures to enhance patient comfort and cooperation. The patient was then assisted into an upright sitting position at the bedside with both legs hanging freely. The head and back were supported with pillows to maintain comfort and stability and to facilitate maximal chest expansion. The position was maintained for approximately 15–30 minutes according to the patient's tolerance.

RESULT

Patient Mrs. H, a 47-year-old female, was treated with a medical diagnosis of CHF Functional Class III with moderate mitral regurgitation etiology due to RHD. The patient also had comorbidities in the form of APS CCS III, hyperthyroidism, and atrial fibrillation with SVR. The history of hyperthyroidism has been known since 2018. Sociodemographically, the patient works as

self-employed, Muslim, Batak, educated at the end of high school, and domiciled in Kebayaken.

Table 1.
Monitoring of breathing frequency, oxygen saturation, pain intensity, and shortness of breath

Day	RR (x/min)	SpO2 (%)	Nyeri (VAS)	Shortness of breath	Condition summary
1	24	96	5	There	Rapid breathing pattern, moderate pain, shortness of breath
2	22	97	2	Reduced	Decreased breathing frequency, mild pain
3	19	98	1	None	Breathing pattern improves, stable condition

At the time of the initial assessment, the patient complained of shortness of breath that was felt to be getting heavier during activities, accompanied by a feeling of fatigue easily. The patient also reported complaints of heart palpitations and chest pain that appeared occasionally, with pain intensity rated on a scale of 5 based on NRS. Vital signs examination showed blood pressure of 110/60 mmHg, pulse rate of 56 x/min, breathing rate of 24 x/min, and oxygen saturation of 96% with room air. The level of awareness of the patient compos mentis. Physical examination showed no signs of anemia or jaundice. The heart sounds of S1 and S2 are heard regularly without murmurs or gallops. Vesicular breath is symmetrical in both lung fields, without ronki, rales, or wheezing. The extremities are warm and no peripheral edema is found.

A supporting examination showed a picture of cardiomegaly accompanied by pulmonary congestion on the thoracic photo. Electrocardiography results show AF with SVR. Echocardiography examination showed a decrease in the systolic function of the left ventricle with an ejection fraction of 35%, accompanied by regional wall motion abnormality, left ventricular eccentric hypertrophy, moderate mitral regurgitation due to RHD, severe tricuspid regurgitation due to dilatation of the right ventricle with a moderate probability of pulmonary hypertension, mild aortic regurgitation due to non-coronary cusp calcification, and pulmonary regurgitation trivial. Cardiac catheterization examination shows the condition of the coronary arteries within normal limits without significant stenosis.

The results of the laboratory examination showed hemoglobin levels of 13.1 g/dL, hematocrit 39.3%, leukocytes 8,130/µL, and platelets 124,000/µL. During treatment, patients received pharmacological therapy in the form of intravenous liquid NaCl 0.9% at a rate of 10 drops/minute, bisoprolol 1.25 mg once a day, furosamide 40 mg once a day, spironolactone 25 mg once a day, and thiamazole 20 mg once a day.

Based on the results of these subjective and objective studies, it was established that the nursing diagnosis of ineffective breathing patterns was related to increased pulmonary venous pressure due to pulmonary congestion secondary to heart failure. Patients were positioned to sit with their legs hanging for ±15-30 minutes at their tolerance, with monitoring of vital signs and respiratory responses before and after the procedure, as part of an evidence-based nursing intervention.

DISCUSSION

In the case of Mrs. H with a medical diagnosis of CHF FC III with moderate MR etiology due to RHD and accompanied by APS, the main complaints were found in the form of easy fatigue and shortness of breath, especially during activity. Patients also have important comorbidities such as hyperthyroid and atrial fibrillation with SVR aggravating hemodynamic conditions. Physiologically, CHF causes the inability of the heart to pump blood adequately resulting in increased venous pressure and pulmonary congestion. This triggers dyspnea, fatigue, and intolerance to activities as experienced by the patient.

The assessment conducted showed vital signs within relatively stable limits, but the history and clinical picture still pointed to the presence of perfusion disorders and ineffective circulation.

Although at the first visit the results of lung and cardiac auscultation appear normal, the dynamics of CHF disease cause symptoms to change along with activity, body position, and fluctuations in body fluids. Objectively on follow-up evaluation, it was seen that there was an increase in pulse frequency, blood pressure, and an increase in breathing rate, which strengthened the nursing diagnosis of Ineffective Breathing Patterns associated with increased pulmonary venous pressure due to pulmonary congestion secondary to heart failure. This condition is in line with the patient's clinical manifestations in the form of fatigue, shortness of breath, cough, and the need for additional oxygen.

Evidence-based interventions are essential to reduce cardiac workload, increase ventilation capacity, and improve comfort in the nursing management of CHF patients. One of the non-pharmacological interventions that has been shown to be effective is the sitting position with dangling legs. This position works through a physiological mechanism that utilizes the effects of gravity to lower cardiac preload, reduce pulmonary congestion, and increase lung expansion. When the lower extremities are left hanging, there is a redistribution of blood volume to the periphery thereby reducing the pressure of the central veins. In patients with CHF, this helps reduce shortness of breath and improves activity tolerance.

The application of this intervention is carried out by the nurse helping the patient to be in an upright sitting position with support on the head and back to maintain comfort and maximize ventilation capacity. The intervention was conducted for 15–30 minutes, twice daily for three days, with monitoring of dyspnea levels before and after the intervention. The results of the observations showed a decrease in the level of shortness of breath after the position was applied, which showed a positive response to the intervention. In addition, the sitting position allows the diaphragm to move more freely and increase the tidal volume, thus improving gas exchange. Research (Akpınar & Topaçoğlu 2021) also found that body position adjustment, specifically sitting position with dangling legs, can help reduce venous backflow to the heart, facilitate lung expansion, and relieve shortness of breath in CHF patients.

CONCLUSION

The application of sitting position with dangling legs intervention for 3 consecutive days was proven to improve the level of dyspnea in patients. This position physiologically helps reduce cardiac preload, improve lung expansion, and improve patient comfort and ventilation capacity.

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