

The Effect Of Semi-Fowler Position On Oxygen Saturation In Patients With Chronic Heart Failure In West Kalimantan

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ABSTRACT

Heart disease is the number one cause of death in the world every year. CHF patients can show various clinical symptoms in the respiratory and cardiovascular systems. Monitoring oxygen saturation values and respiration rate is essential. Appropriate management for patients with CHF can improve and stabilize the patient's respiratory status. This research aims to analyze the effect of the semi-fowler position on oxygen saturation. This research was quasi-experimental research with Non Equivalent Control Group Pre-Post. The population in this study were patients with CHF undergoing treatment at RSUD dr. Soedarso Pontianak. A purposive sampling method was employed in this study. Variables were semi-fowler position and oxygen saturation. Data collection used a field data observation checklist. The result of this study was analyzed using a paired T-test. Statistical tests showed a difference in oxygen saturation before and after semifowler positioning in patients with CHF. The P value proved it was 0,0004. The effect of the semi-Fowler position can provide breathing comfort and improve sleep quality for patients with CHF.

Keywords: Chronic Heart Failure, Oxygen Saturation, Semi-fowler position

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INTRODUCTION

Heart disease is the number one cause of death in the world every year and is the most common disease suffered by people in the world (1). Heart disease is divided into several types, including coronary heart disease, heart rhythm disorders, congenital heart disease, heart failure, and heart valve disease. One of the most common cardiovascular disorders is Congestive Heart Failure (CHF), often called Congestive Heart Failure. Congestive Heart Failure (CHF) is a syndrome characterized by shortness of breath and fatigue (at rest or during activity). The etiology of CHF can be caused by disorders that result in reduced ventricular filling

(diastolic dysfunction) and myocardial contractility. CHF is a physiological condition when the heart cannot pump enough blood to meet the body's metabolic needs for nutrients and oxygen (systolic dysfunction) (1).

Heart failure continues to increase throughout the world (2). National Heart, Lung, and Blood Institute (NHLBI) states that there are 825,000 new cases of heart failure every year. In 2010, number of deaths due to heart failure was 279,098 people (AHA, 2013 (3). According to The Global Burden of Heart Failure, there are 26 million people in the world who suffer from heart failure. In America, the prevalence of heart failure is 1.9% of the

total number (3). In ASEAN countries, the highest prevalence of heart failure is in Malaysia, namely 676,000 patients (Cowie, 2015 dalam (3). The prevalence of heart failure in Indonesia in 2013 was 0.13%, or estimated for about 530,068 people (4). Meanwhile, data from the Indonesian Ministry of Health's Basic Health Research (RISKESDAS) in 2018 based on doctors' diagnoses, the prevalence of heart failure in Indonesia in 2018 was 1.5% or estimated at around 1,017,290 people. The prevalence of heart failure in West Kalimantan is estimated at 1.3% (5). Sukainah Shahab et al. (2016) stated that 6,473 people with heart disease went to hospitals in West Kalimantan, both outpatient and inpatient, and 0.2% of them were diagnosed with heart failure.

CHF patients can show various clinical symptoms, including dyspnea, dyspnea d'effort, orthopnea, Paroxysmal Nocturnal Dyspnea (PND), pulmonary edema, weight gain, pitting edema, ascites, and even cardiogenic shock may appear (7,8). Monitoring oxygen saturation values and respiration rate is important because it can indicate the adequacy of oxygenation or tissue perfusion and prevent failure in oxygen transportation. (9,10). Appropriate management for patients with CHF can improve and stabilize the patient's respiratory status. Management that can be done includes improving rest to reduce oxygen consumption, monitoring vital signs, educating about the situation to avoid anxiety, and arranging a comfortable sleeping position. (11).

Positioning is one of the factors that have to be appraised in maintaining adequate systemic circulation because it has an impact on the hemodynamic system. One position that can be given to CHF patients is the semi-Fowler position (12). The influence of changing the body position is

a change in hemodynamics such as blood pressure, heart rate, respiration rate, and also oxygen saturation (13). There are differences between respiration rate, oxygen saturation, and complaints of shortness of breath in the initial position with semi-fowler and Fowler in CHF patients treated in the ICCU. The results showed that the Fowler position is more beneficial in improving respiratory status in CHF patients (14).

CHF is also the disease that most often requires re-hospital treatment (readmission) even though outpatient treatment is given optimally (15). Hemodynamic monitoring has a major role in managing patients with heart failure. Hemodynamic changes such as respiration rate and oxygen saturation must always be monitored. Putting the patient in a semi-Fowler sleeping position will help minimize oxygen consumption. It will increase maximum lung expansion and overcome gas exchange defects associated with changes in the alveolar membrane. Giving a 45° semi-Fowler position to CHF patients is intended to reduce shortness of breath, reduce respiration rate within normal limits, and increase comfort (15). This statement was in line with research conducted by Singal et al. (2013) that shows that the breathing pattern of 64% of patients is better in the 30-45° position. This study aimed to analyze the effect of the semifowler position on the increase of oxygen saturation in patients with CHF.

Based on prior observations in ICCU, the nursing diagnoses that commonly emerged were ineffective breathing patterns and sleep deprivation. Most of the CHF patients we observed were complaining of dyspnea and could not sleep well cause of shortness of breath. Another patient had orthopnea and activity intolerance. So, to overcome those problems, a nursing intervention that

can be done is giving a semifowler position to improve the respiratory status. The study site already employs a positioning for CHF patients, like a semifowler or a Fowler position, to get better oxygenation. However, there was no clear guideline about how long they should give a certain position and which position offers better oxygenation to patients with dyspnea. To clarify this issue, this research aims to analyze the effect of the semi-fowler position on oxygen saturation.

METHODS

This research is a quasi-experimental research with Non Equivalent Control Group Pre-Post Design. The population in this study were patients with CHF undergoing treatment at RSUD dr. Soedarso Pontianak. A purposive sampling technique was employed in this study. The required number of subjects was met, namely 16 research participants who received semi-fowler position intervention and were undergoing treatment in the inpatient room at RSUD dr. Soedarso Pontianak. This research was carried out by taking initial measurements (pre-test) of oxygen saturation in the intervention group. Then, participants received treatment in the form of a semi-Fowler's position for 2 hours. After that, the researchers again carried out final measurements (post-test) of oxygen saturation after receiving treatment. The instrument used in this study was a field note for documentation of the patient's saturation oxygen. Oxymetry is also used to check the oxygen saturation.

Semi Fowler's position was given to the patient by lifting the bed on the head side up to 45 degrees. Patients were given semi-fowler positions and maintained positions for 2 hours. Oxygen saturation was recorded right away before and after

providing semi-fowler positions. All readings were taken three times, and an average of readings was considered. Before giving therapeutic positioning, the patient should be supine for two hours to eliminate bias in results. This intervention protocol was adapted from a prior study about the effect of the Fowler position and its impact on pulmonary function and oxygen saturation.

Data obtained from the collection results can be presented as frequency distribution tables, measures of central tendency, or graphs. The analysis carried out was univariate analysis to determine the difference in oxygen saturation before and after using the paired sample t-test parametric test. The null hypothesis will be rejected if the significance value in the T-test < 0.05 or the t value $> t$ table according to the degrees of freedom based on the population.

RESULTS AND DISCUSSION

Table 1 shows that most respondents were male, about 62,5%, while the female was 37,5%. Based on education, most of the respondent's last education was senior high school (46,8%). The average age of respondents was 54, with the youngest age 44 and the oldest being 67.

Table 2 shows the results of the sample paired t-test. Statistical tests showed a difference in oxygen saturation before and after Semifowler positioning in patients with CHF. It was proven by the P value, which was 0,0004, that it was below 0,05.

Heart failure causes various clinical symptoms, the most noticeable of which is shortness of breath at night and often appears suddenly, causing the patient to wake up (13,16). CHF results from abnormalities of the structure or function

Table 1. Characteristics of the Respondents

Characteristics	f (%)	Mean (min – max)
Sex		
Female	12 (37.5%)	
Male	20 (62.5%)	
Education Level		
Elementary School	2 (6.25%)	
Junior High School	1 (3.2%)	
Senior High School	15 (46.8%)	
Bachelor	14 (43.75%)	
Age (year)		53.8 (44 – 67)_

disorder of the heart that have clinical consequences, such as a collection of symptoms potentially caused by arrhythmias, like palpitations, fatigue, severe dyspnea, or gradual decompensation consistent with premature beats, short-term ventricular or supraventricular tachycardia (SVT), and atrial fibrillation. So, it is typical for patients to complain of shortness of breath; apart from that, the effect of heart failure in pumping blood causes body cells not to get adequate nutrients and oxygen (8,12).

Table 2. Result of Statistic Test

Variables	Parameters	Mean	P Value
Semifowler Positioning	Pre	96.94	0.0004
	Post	98.38	
Control Group	Pre	97.125	0.0103
		98.125	

Respiration rate disorders caused by CHF can be corrected by changing positions (Positioning) (13). One of the benefits of changing positions is reducing blood circulation problems in the heart (9). The study results showed significant differences in respiratory frequency changes in patients in the semi-Fowler position. It was in line with a previous study by Wirawan (17) that said there is a significant difference between before the

pre-test and after giving the semi-Fowler position 45°.

The findings also support the theory that giving the semi-Fowler position elevates the back of the shoulders and head, allowing the chest cavity to expand widely and lung expansion to increase. Slow return flow means the increase in the amount of fluid entering the lungs is reduced so that the air in the alveoli can absorb oxygen. This condition will cause oxygen intake to improve so that respiration returns to normal (7). The semi-Fowler position should also have a good effect in enhancing respiratory frequency in CHF patients. Putting the patient in a semi-Fowler sleeping position will help minimize oxygen consumption. It will increase maximum lung expansion and overcome gas exchange defects associated with changes in the alveolar membrane. In addition, the semi-fowler position can reduce symptoms like shortness of breath, decrease the respiration rate to normal limits, and increase the patient's comfort (11,12).

The effect of the semi-Fowler position can provide breathing comfort and improve sleep quality for CHF sufferers. CHF sufferers choose this position because it is more comfortable. They do not experience problems such as back pain when they

wake up and are not short of breath(11). Good quality sleep positively affects patients' psychology, meaning sufferers will not feel pressure or stress due to the disease they face. Apart from that, good psychology will influence the hemodynamics of heart function so that heart problems can be reduced or improved (8).

The semi-fowler position given in this study was maintained for two hours. It was longer than the previous study by Patel (18), who gave a semifowler position to the patient for only 15 minutes. The finding showed that the semifowler position could improve respiratory status. Our respondents also said they felt better rested in the semifowler position. The findings were in line with a study by Amalia (19) that the percentage of oxygen saturation in patients who always rested in a semi-Fowler's position was above 94%. So, our study assumes that the longer the semi-fowler position was given to CHF patients, the better oxygen saturation would be achieved.

LIMITATION

The limitations of this research are the lack of appropriate controls or consideration of confounding factors that might impact the study outcomes. Limited sample size or non-representative sampling may compromise the generalizability of the results.

ETHICAL CLEARANCE

This research has gone through ethical approval at the Health Research Ethics Committee of RSUD, Dr. Soedarso, with an ethical clearance certificate number of 47/RSD/KEPK/V2023.

CONFLICT OF INTEREST

No potential conflicts of interest related to this article were reported.

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CONCLUSION

Semifowler positioning shows significant changes in oxygen saturation values. It is hoped that future researchers can determine a larger sample so that the results can be more generalized. In addition, researchers can set inclusion criteria related to history of CHF, history of smoking, history of medications used, and comorbidities, which can influence the results of measuring respiratory frequency and oxygen saturation, so these can be confounding factors in the study.

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