Systematic Review Therapeutic Positions Are Able To Improve The Hemodynamic Status Of Acute Decompensated Heart Failure (Adhf) Patients

Ikrima Rahmasari[1*], Ady Irawan. AM[2], Ahmad Najib Hassan[3], Andita Febriana[4]
Universitas Duta Bangsa Surakarta[124]
Institue of Medical Science Technology, University Kuala Lumpur, Kuala[3]
*Correspondence Email : ikrima_rahmasari@udb.ac.id

ABSTRACT

Background: Acute Decompensated Heart Failure (ADHF) is acute heart failure which is defined as a rapid onset of symptoms due to abnormal heart function. These dysfunctions include systolic and diastolic dysfunction, heart rhythm abnormalities, or preload and afterload imbalances. ADHF is a new attack without previous heart defects, or is decompensation of chronic heart failure (Chronic Heart Failure) that has been experienced previously. ADHF occurs when cardiac output cannot meet the body's metabolic needs. Objective: in this study, namely to determine the results of a literature review of the effect of therapeutic positions on hemodynamic status in ADHF patients. The method in this research is a literature review method using a literature search strategy through online media which includes searching on Google Scholar, PubMed, Research Gate, Elsevier, NCBI. Results: Based on the results of the literature review, all studies (4 studies) reviewed showed results of improvement in hemodynamic status, namely respiratory frequency, oxygen saturation (SaO2), blood pressure, heat rate, and CRT in ADHF patients who were given therapeutic position intervention: semi fowlershows increased oxygen saturation, decreased shortness of breath, stable blood pressure, hate rate, and respiratory rate. Conclusion: The therapeutic position, namely the semi fowler position, has an effect on improving the hemodynamic status of ADHF patients

KEYWORDS Therapeutic position, hemodynamic status, Acute Decompensated Heart Failure (ADHF)

INTRODUCTION

Heart disease is one of the main health problems in developed and developing countries. This disease is the number one cause of death in the world every year. Acute Decompensated Heart Failure (ADHF) or acute decompensated heart failure is acute heart failure which is defined as a rapid onset of symptoms or signs due to abnormal heart function. Acute Decompensated Heart Failure (ADHF), can also be a new attack without previously having heart disease or it can be decompensation of chronic heart failure (Chronic Heart Failure) that has been experienced previously (Kusuma & Kurniawan, 2020). According to Rocha & Falcao (2016) the proposed definition for Acute Decompensated Heart Failure (ADHF) is sudden ("de novo") or Heart Failure or heart failure that worsens progressively (over several days or weeks), characterized by signs and typical symptoms, which often lead to hospitalization.

Heart disease remains one of the most common causes of death worldwide. According to the World Health Organization (WHO), more than 17 million people worldwide die from heart and blood vessel disease. According to Basic Health Research (Riskesdas) data, in 2018 there were 15 out of every 1000 people, or around 2,784,064 people, who suffered from heart disease, which increased from 0.5% in 2013 to 1.5% in 2018 (Ministry of Health, 2022). The most common type of cardiovascular disease is heart failure. One type of heart failure, namely acute decompensated heart failure, which is the most common type of heart failure, can occur due to a molecular disorder called myocardial infarction. Myocardial Infarction is a quick way to prevent heart muscle necrosis caused by an imbalance between oxygen supply and demand. According to the Acute Decompensated Heart Failure National Registry (ADHERE) organization, three-quarters (75%) of hospitalized patients with heart failure are Acute Decompensated Heart Failure (ADHF) patients. In 75% of cases, Acute Decompensated Heart Failure (ADHF) occurs in people with known chronic heart failure, while in 25% of cases, it occurs in people with newly discovered heart failure (Ainanur & Halimuddin, 2016).

Hemodynamic monitoring can be done indirectly (non-invasively) through examination of consciousness, blood pressure (palpation method, auscultation method, flush method, oscillotonometry method, plethysmograph method, arterial tonometry method, and Doppler probe method), and changes in bioimpedance chest wall electricity. Meanwhile, direct (invasive) hemodynamic monitoring can be done by checking arterial pressure using a cannula inserted into the artery, central venous pressure (CVP), and pulmonary artery catheterization (Nuraeni et al, 2022).

Management of acute heart failure patients is carried out using pharmacological and non-pharmacological methods. Pharmacological administration can be given by administering vasodilator deuretics and beta-andrenergic antagonists (beta blockers). Deuretics are the first choice to reduce the work of the heart muscle. This therapy is given to stimulate the excretion of sodium and water through the kidneys (Smeltzer, 2016). Meanwhile, non-pharmacological methods can be provided with independent intervention carried out by nurses. One of them is the therapeutic position with the semi fowlerposition. Semi fowlerposition is an action that uses a semi fowler position, namely a sleeping position elevated 30°–45°. So it can reduce oxygen consumption and increase maximum lung expansion, as well as overcome damage to gas exchange associated with changes in the alveolar capillary membrane (Iyonu, Zees & Kasim, 2014 in Isrofah et al., 2020). Position is one of the factors that must be considered in maintaining adequate systemic circulation because it can affect the hemodynamic system. Giving the Fowler position can have an effect on hemodynamics such as decreasing cerebral perfusion,

decreasing MAP and central venous pressure (CVP) due to decreasing preload on the heart (preload) and lungs.

On average, heart failure patients are hospitalized in the CVCU room with problems changing hemodynamic status. Hemodynamic monitoring is very necessary to assess cardiovascular conditions because it is related to circulation in the blood vessel system with the heart as the only organ that functions to pump blood throughout the body (Zhang et al., 2021). Monitoring hemodynamic status is indicated by decreased respiratory frequency, decreased oxygen saturation (SaO2), decreased blood pressure, decreased heat reat, and decreased CRT. The implementation of the semi fowlertherapeutic position has not been fully implemented in hospitals. Usually monitoring hemodynamic status through a simple setting mechanism is that the required pressure is recorded by a pressure transducer and corresponds to the actual arterial pressure waveform (vascular release technique or the so-called heat principle). The arterial pressure signal originating from the finger cuff is calibrated to the aceillometric arterial pressure value.

In addition, measurements are only taken through one of the two sets at a time, so they can be changed to avoid complications, such as ischemia. This technique is available with automatic calibration derived from the patient's biometric data (age, residence, weight, gender) and with calibration to previously measured cardiac output values. Hemodynamic parameters that can be measured with this tool are cardiac output (CO), cardiac index (CI), stroke volume (SV) and system vascular restante (SVR) (Rorth, et al. 2018). In line with research conducted by Haslinda et all (2023) which obtained results that there was an influence on the patient's hemodynamic status which could increase patient comfort, maintain the airway so that the oxygen supply entering the lungs was adequate so that the need for oxygen in the blood could be met.

Based on the description above, the problem of this research can be formulated as "how does the therapeutic position influence the hemodynamic status of Acute Decompensated Heart Failure (ADHF) patients?".

RESEARCH METHOD

The research method used is the Literature review method. The literature review method is a form of research by searching existing research and literature. Research was carried out by reviewing the literature to obtain references appropriate to the research topic. This method is used to carry out critical studies, ideas, findings, and knowledge to draw theoretical conclusions to be used as a reference in further research. This literature review method will be summarized in a descriptive analysis according to the researcher's needs based on the findings in each piece of literature obtained. The results of the study are arranged in such a way and presented to readers in a form that is easy to understand.

Search using boolen AND, OR NOT, AND NOT and research keywords, namely, "semi fowler" AND "Acute Decompensated Heart Failure (ADHF)" AND "hemodynamics". The keywords in English are “semi fowler” AND “Acute Decompensated Heart Failure” AND “hemodynamic”. This research uses a literature search strategy through online media which includes searches on Google Scholar, PubMed, Research Gate, Elsevier, NCBI. The keywords that will be used as alternative searches are keywords that are adapted to the title of the research, namely semi fowler and hemodynamic status in Acute Decompensated Heart Failure patients. Appropriate articles were taken for further analysis. The following are the inclusion and exclusion criteria for research articles that have been reviewed using PICOS analysis.

Table 1. Inclusion and exclusion criteria use the PICOS format

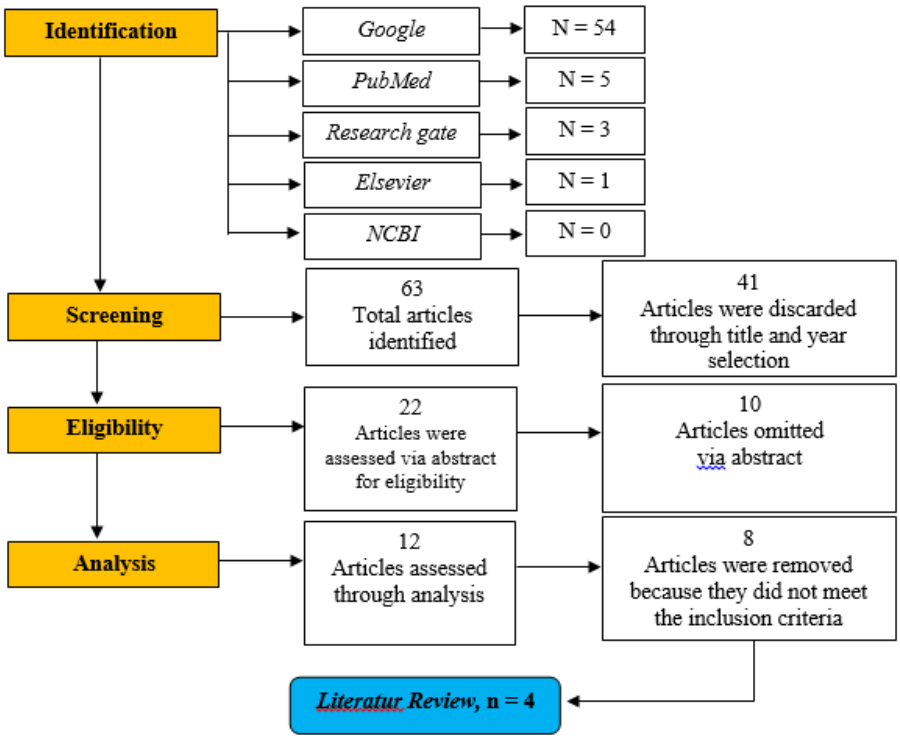
Kriteria	Inklusi	Eksklusi
Population/ problem	National and international journals that discuss the effect of the semi fowler position to improve hemodynamic status in Acute Decompensated Heart Failure (ADHF) patients.	National and international journals that have nothing to do with the research theme
Intervention	The effect of the semi fowler's position on increasing oxygen saturation in asthma sufferers	There is no effect of the semi fowler position to improve hemodynamic status in Acute Decompensated Heart Failure (ADHF) patients
Comparation	There is no comparison	There is no comparison
Outcome	To determine the effect of the semi fowler position to improve hemodynamic status in Acute Decompensated Heart Failure (ADHF) patients.	There is no effect of the semi fowler position on improving hemodynamic status in Acute Decompensated Heart Failure (ADHF) patients.
Study design	*Study eksperimental, Pre eksperimental, Quasi Eksperiment*	*Systematic / Literature Review*
Publication Year	Journals or articles published in 2019-2024	Journals or articles published before 2019
Language	English and Indonesian	Apart from English and Indonesian

RESULT AND DISCUSSION

This research uses a literature review method by grouping articles according to the data related to the problem formulation in the research. Data obtained from various databases is collected in one document which is used to answer the problems that have been formulated. The initial step taken is to choose a topic and determine the objectives of the research. By using the PRISMA (Preferred Reporting Item for Systematic Review and Meta Analysis) diagram as research used to search for articles to be reviewed.

By using the PRISMA (Preferred Reporting Item for Systematic Review and Meta-Analysis) diagram, a total of 63 articles were obtained from various database sources. After combining them, there were 41 similar articles, so a total of 22 research articles were assessed based on the abstract for eligibility. There were 12 articles that matched the title of the abstract and met the inclusion criteria which were assessed through the analysis. After adjusting to the inclusion criteria, 8 articles were excluded. So the final total was 4 articles that met the literature review criteria.

Chart 1. PRISMA diagram



Based on the results of the literature review, all the studies (4 studies) reviewed showed results of an improvement in hemodynamic status including respiratory frequency, oxygen saturation (SaO2), blood pressure, heat rate, and CRT in Acute Decompensated Heart Failure (ADHF) patients who were given the therapeutic position intervention is the semi fowlerposition. Data obtained from articles, 3 out of 4 articles showed that the patient experienced a decrease in consciousness. This is because heart decompensation is a clinical syndrome of rapidly worsening signs and symptoms of heart failure. Heart decompensation can cause several complications in sufferers. The body's decompensation mechanism will result in failure of pulmonary function and result in shortness of breath (dyspnea), difficulty breathing when lying down (orthopnea), shortness of breath worsening at night (paroxysmal nocturnal dyspnea), and lead to a decrease in oxygen saturation in the patient's body (Matthay et al, 2019).

If this decompensation continues without appropriate intervention, it will result in decreased oxygen flow in the body from peripheral tissues to the brain. If there is less oxygen flow in the brain, then consciousness decreases. In addition, failure of pulmonary function can cause the oxygenation process in the body to become chaotic, so that the body is unable to expel carbon dioxide and respiratory failure occurs. Decreased consciousness and respiratory failure will affect other organs and cause multiorgan failure and even death (Matthay et al, 2019). Decreased hemodynamic status can occur due to potentially reversible hemodynamic instability, such as pulmonary embolism, cardiac tamponade, systolic heart failure, aortic dissection, hypovolemic shock, obstructive shock, or distributive shock (Backer, 2019). The patient in the article reviewed received nasal cannula therapy because he experienced shortness of breath. According to Muttaqin's theory (2020), the main complaints in clients with cardiovascular system

disorders in general include shortness of breath, shortness of breath, coughing, chest pain, fainting, palpitations, fatigue, extremity edema, and so on. A decrease in blood pressure is caused by a decrease in the heart's function to pump blood, slow respiration due to shortness of breath in heart failure sufferers caused by pulmonary congestion or fluid buildup in the interstitial cavities and pulmonary alveoli (sacs where oxygen and carbon dioxide are exchanged). This fluid will inhibit the expansion of the lungs, resulting in difficulty breathing, the patient's SPO2 is low because one of the signs of heart failure is experiencing hypoxemia.

Providing a therapeutic position with a semi fowlerposition of 30°-45° can help patients reduce shortness of breath. According to SIKI (2018) positioning is the act of placing body parts to improve physiological and/or psychological health. Kubota, 2013 in Pambudi and Widodo, 2020) states that the Fowler position is a position arrangement by elevating the head of the bed with the most frequently used angles being 30° and 60° to improve the quality of life for clients who do most of their activities in bed. . In line with research conducted by Isrofah (2020), entitled Effectiveness of Giving Sleep Position of 45° Semi fowleron Sleep Quality and Oxygen Saturation in Congestive Heart Failure Patients, stated that giving a semi fowlersleep position of 45° is effective on sleep quality and oxygen saturation in congestive heart failure patients. The mechanism used in the semi fowlerposition is to facilitate patients who are having difficulty breathing due to the gravitational force that pulls the diaphragm downwards so that lung expansion is much better in the semi fowlerposition, whereas in the fowler position the aim is to eliminate pressure on the diaphragm and allow greater volume exchange than air (Barbara, 2011 in Pambudi & Widodo, 2020).

CONCLUSION

The conclusion in this study is that the therapeutic position with the semi fowlerposition is able to improve the hemodynamic status of ADHF patients, including increased oxygen saturation, decreased shortness of breath, stable blood pressure, hate rate, and respiratory rate.

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