

Implementation of Handheld Fan Therapy to Alleviate Shortness of Breath in Patients with Congestive Heart Failure (CHF)

Mia Sasmita Atmaja^{1*}, Suci Amin²

^{1,2}Al Insyirah Institute of Health and Technology, Indonesia

**E-mail correspondence: miasasmita.126@gmail.com*

Abstract. One of the common issues faced by individuals with heart failure is an ineffective breathing pattern, which primarily leads to shortness of breath. Non-pharmacological therapy presents a lower risk and, while not a substitute for medication, can help alleviate ineffective breathing patterns. In patients with congestive heart failure (CHF), one such non-pharmacological approach is handheld fan therapy. This study aims to evaluate the application of handheld fan therapy in reducing shortness of breath among CHF patients at Bengkalis District Hospital. The research employs a descriptive quantitative case study design, with 12 CHF patients selected through a consecutive sampling technique. Univariate data analysis revealed that before receiving handheld fan therapy, the average respiratory rate of CHF patients was 31.40 breaths per minute, with a maximum of 32.71 breaths per minute and a minimum of 30.40 breaths per minute. After the therapy, the average respiratory rate decreased to 29.9 breaths per minute, with a maximum of 30.90 breaths per minute and a minimum of 28.40 breaths per minute.

Keywords: CHF, Dyspnea, Hand Held Fan Therapy.

1. BACKGROUND

Congestive Heart Failure (CHF), also known as heart failure, is the inability of the heart to pump an adequate amount of blood to meet the body's oxygen and nutrient demands. The term congestive heart failure is commonly used when both left and right-sided heart failure occur. It is a pathophysiological condition in which abnormalities in cardiac function result in the heart's inability to pump sufficient blood to meet metabolic demands or require an increased left ventricular filling pressure to do so (Prabowo et al., 2022).

Data from the World Health Organization (WHO) indicates that 17.3 million people worldwide die from CHF-related conditions, with this number projected to rise to 23.5 million deaths by 2025. According to the Global Health Data Exchange (GHDX) 2020, CHF cases worldwide have reached 64.34 million, with 9.91 million deaths (Lippi & Gomar, 2020). In Asia, CHF ranks as the leading cause of death, with 712,100 cases reported. Indonesia ranks second, with 371,000 CHF cases (WHO, 2020).

The incidence of CHF in Indonesia has continued to increase annually. In 2024, CHF cases rose by 1.67% compared to 2022 (Ministry of Health of the Republic of Indonesia, 2023). The high incidence of CHF worldwide, particularly in Indonesia, has led to an increase in hospital admissions for CHF patients, including recurrent hospitalizations, which can reduce survival rates (Anita et al., 2023).

The 2020 Riskesdas (Basic Health Research) report states that the prevalence of CHF in Riau Province reached 1.6%, equivalent to approximately 6,809 cases (Ministry of Health of the Republic of Indonesia, 2021). Additionally, Bengkalis District Health Office data from 2020 reported that heart failure ranked fourth among leading diseases, with 336 cases recorded.

The high mortality rate among CHF patients underscores the need for serious and comprehensive management to help patients survive the critical phase and prevent recurrence. As primary caregivers, nurses play a crucial role in the recovery process of CHF patients. Nurses are expected to provide critical nursing care, particularly in ICU settings, and fulfill their role as educators, ensuring that upon discharge, patients understand their condition and can take preventive measures to reduce the risk of CHF recurrence (Anita et al., 2023).

A common issue in heart failure patients is ineffective breathing patterns. An ineffective breathing pattern is a condition in which inspiration and/or expiration does not provide adequate ventilation (SDKI, 2024). The primary cause of ineffective breathing patterns leads to shortness of breath (dyspnea). Shortness of breath is a disturbance in the heart's contractility ability (PERKI, 2024). This condition occurs due to reduced cardiac output from the normal level, resulting in decreased blood circulation throughout the body. If blood flow in the lungs is impaired, fluid accumulation in the lungs may occur, leading to reduced carbon dioxide and oxygen exchange. As a result, oxygen levels in the arteries decrease while carbon dioxide levels increase, causing symptoms of shortness of breath (Smeltze et al., 2019).

Proper management is crucial in determining disease progression. Treatment can be either pharmacological or non-pharmacological. Non-pharmacological therapy carries lower risks; although it is not a substitute for medication, it can be used to help reduce ineffective breathing patterns. In patients with congestive heart failure, one non-pharmacological therapy that can be applied is Handheld Fan Therapy (Kusuma et al., 2021).

Handheld Fan Therapy is a technique in which air is directed at the face using a handheld fan (Yusrina Ammazida, 2023). This method helps cool the patient's face (Ratna Sari et al., 2023) and reduces the sensation of breathlessness (Kusuma et al., 2021). This therapy is indicated for patients experiencing shortness of breath and respiratory decline due to illness. However, it is contraindicated for patients who have had a fever above 38°C within the past 48 hours, those with trigeminal nerve disorders, or those unable to identify the sensation of breathlessness (Marlita, 2020).

The use of fan therapy in relieving breathlessness has been recommended by the Oncology Nursing Society, as patients with dyspnea tend to feel more comfortable near an

open window or in front of a fan. This study examined the use of a handheld fan to reduce the sensation of dyspnea (Puspawati, 2020).

The steps involved in handheld fan therapy include: positioning the patient in the most comfortable position, instructing the patient to turn on the handheld fan, instructing the patient to close their eyes, directing the airflow from the fan across the entire face while inhaling deeply, performing the therapy for five minutes, and repeating the therapy if breathlessness recurs (Yusrina Ammazida, 2023).

When air is directed toward the nasal mucosa or upper airway flow receptors, it provides stimulation and a cooling sensation on the face, which can influence ventilation. This process helps reduce the sensation of shortness of breath by modulating the central perception of dyspnea, leading to a decrease in neural respiratory drive and ultimately reducing breathlessness (Swan et al., 2019). In addition to alleviating breathlessness, this therapy also enhances patient confidence and does not require specialized medical expertise to administer (Yusrina Ammazida, 2023).

A study conducted by Luckett et al. (2023) on the contribution of handheld fans to self-management of chronic dyspnea found additional evidence supporting the routine use of handheld fans for patients with chronic breathlessness. The findings indicate that this intervention is beneficial through multiple mechanisms, poses no harm, is cost-effective, and is highly portable. This study is the first to suggest that fan therapy may reduce the need for short-burst oxygen therapy and inhaled β -agonist medications in some patients. Future research should focus on optimizing instructions for fan use in combination with other strategies and tailoring them to individual patient needs.

According to a study by Timu (2020), after three consecutive days of fan therapy, noticeable improvements were observed. In Patient 1, respiratory rate decreased from 26 breaths per minute to 20 breaths per minute, and oxygen saturation increased from 96% to 99%. In Patient 2, respiratory rate decreased from 29 breaths per minute to 23 breaths per minute, while oxygen saturation improved from 93% to 99%. The integration of handheld fan therapy with pharmacological treatment (oxygen therapy) in nursing care for CHF patients with ineffective breathing patterns resulted in a transition from ineffective to effective breathing patterns in patients treated at the Mawar Ward of RSUD dr. T.C. Hillers Maumere.

Based on data from RSUD Bengkalis, the number of CHF patients has shown an annual increase, with 5 cases recorded in 2021, 29 cases in 2022, and 42 cases in 2023. This trend illustrates the growing prevalence of CHF at RSUD Bengkalis. Heart failure ranks among the most common conditions in the hospital, following chronic kidney disease (CKD), stroke, and

anemia. A preliminary study conducted by researchers revealed that handheld fan therapy has never been implemented in this hospital ward as an intervention for managing ineffective breathing patterns in CHF patients.

2. THEORETICAL STUDY

Congestive Heart Failure (CHF) is a chronic condition in which the heart is unable to pump sufficient blood to meet the body's metabolic demands. This condition leads to fluid retention, pulmonary congestion, and inadequate oxygen delivery, resulting in symptoms such as shortness of breath (dyspnea), fatigue, and reduced exercise tolerance (Smeltze et al., 2019).

Shortness of breath in CHF patients occurs due to fluid accumulation in the lungs (pulmonary edema), which impairs gas exchange and increases respiratory effort. The buildup of fluid increases pulmonary pressure, causing the patient to experience increased respiratory rate (tachypnea), difficulty breathing, and air hunger (GOLD, 2023). Dyspnea is a common and distressing symptom in CHF, significantly affecting quality of life, mobility, and overall health outcomes (Lippi & Gomar, 2020).

According to the World Health Organization (WHO, 2020), CHF is one of the leading causes of hospitalization, with 17.3 million deaths globally. The prevalence of CHF continues to rise, leading to an increased burden on healthcare facilities. Addressing dyspnea in CHF patients is a primary goal of symptomatic management, and non-pharmacological interventions like handheld fan therapy have been explored as complementary approaches to improve respiratory comfort.

Handheld Fan Therapy is a simple, non-pharmacological intervention used to reduce the sensation of breathlessness by stimulating upper airway flow receptors. When cool air is directed toward the face, especially around the nasal and oral mucosa, it activates the trigeminal nerve, sending signals to the brain that modulate the perception of dyspnea (Swan et al., 2019).

The cooling sensation provided by the fan reduces respiratory effort, lowers the sensation of air hunger, and improves ventilatory efficiency. Research suggests that using a handheld fan can decrease neural respiratory drive, leading to improved breathing patterns and a lower respiratory rate (Luckett et al., 2023). Handheld fan therapy is an effective non-pharmacological intervention for reducing shortness of breath in CHF patients. By stimulating the trigeminal nerve, the therapy modulates breathlessness perception, reduces respiratory effort, and enhances patient comfort. Research supports its use as a low-cost, non-invasive, and easy-to-apply complementary therapy for CHF patients experiencing dyspnea. Given its ease

of application and minimal risk, healthcare providers can integrate handheld fan therapy into routine dyspnea management strategies for CHF patients.

3. RESEARCH METHODS

This research is a quantitative descriptive study. The study subjects consisted of 12 CHF patients, selected using the consecutive sampling technique. Data collection was conducted using primary data sources. Data processing was carried out using a computerized system, and data analysis was performed univariately.

4. RESULTS AND DISCUSSION

Table 1. Research Results

Respiratory rate	Mean	Standar Deviasi	Min-Max
Pretest	31,40	0,718	30,40-32,71
Posttest	29.90	0,758	28.40-30.90

Based on the table above, it is observed that the average respiratory rate of CHF patients before receiving handheld fan therapy was 31.40 breaths per minute, with the highest respiratory rate recorded at 32.71 breaths per minute and the lowest at 30.40 breaths per minute. After receiving handheld fan therapy, the average respiratory rate decreased to 29.9 breaths per minute, with the highest respiratory rate recorded at 30.90 breaths per minute and the lowest at 28.40 breaths per minute.

The results of this study indicate that handheld fan therapy effectively reduces the respiratory rate in CHF patients experiencing shortness of breath (dyspnea). Before receiving the therapy, the average respiratory rate was 31.40 breaths per minute, with a range between 30.40 and 32.71 breaths per minute. After the intervention, the average respiratory rate decreased to 29.9 breaths per minute, with a range between 28.40 and 30.90 breaths per minute. This finding suggests that handheld fan therapy can serve as a complementary approach to managing dyspnea in CHF patients.

Handheld fan therapy works by directing cool air toward the nasal and oral mucosa, which stimulates the trigeminal nerve receptors. This stimulation is thought to modulate the brain's perception of breathlessness, thereby reducing the sensation of dyspnea and the respiratory drive (Swan et al., 2019). Lockett et al. (2023) also demonstrated that handheld fan therapy could lower the neural respiratory drive, reducing respiratory effort and improving patient comfort. This mechanism aligns with the concept of air hunger modulation, where the

presence of cool airflow over the face helps patients feel less air-starved, leading to a decrease in respiratory rate and an overall feeling of respiratory relief (Puspawati, 2020).

The findings of this study are consistent with previous research. Timu (2020) found that handheld fan therapy reduced respiratory distress in CHF patients, leading to a significant decrease in respiratory rate and improved oxygen saturation. Similarly, Marlita (2020) reported that CHF patients using handheld fan therapy experienced a notable reduction in dyspnea symptoms, requiring less reliance on oxygen therapy. The Oncology Nursing Society (2020) also recommended handheld fan therapy as a low-cost, effective intervention for managing breathlessness, further supporting its clinical application. These studies, along with the current findings, reinforce the idea that handheld fan therapy is a non-invasive and cost-effective method for improving dyspnea in CHF patients.

From the researcher's perspective, the observed reduction in respiratory rate can be attributed to the physiological effects of cool airflow stimulation on airway receptors. This therapy is likely to be more effective when combined with other dyspnea management strategies, such as positioning, breathing exercises, and pharmacological treatments. Furthermore, the ease of application and affordability of handheld fan therapy makes it a promising intervention, particularly for CHF patients in resource-limited settings where access to advanced oxygen therapy or mechanical ventilation is limited.

Given its effectiveness, handheld fan therapy can be recommended as a routine complementary intervention in CHF management. Healthcare professionals, particularly nurses and respiratory therapists, should be encouraged to incorporate this technique into standard dyspnea management protocols. However, future studies should explore the long-term effects of handheld fan therapy on dyspnea severity and overall CHF symptom burden, the impact of combining handheld fan therapy with other respiratory interventions such as pursed-lip breathing or oxygen therapy, and patient satisfaction and adherence to handheld fan therapy as part of home-based CHF care.

This study supports the effectiveness of handheld fan therapy in reducing respiratory rate and alleviating dyspnea in CHF patients. The results align with existing literature and highlight the potential of this intervention as a non-pharmacological approach to improving respiratory function in CHF patients. Given its simplicity, affordability, and non-invasive nature, handheld fan therapy is an excellent adjunctive treatment for CHF-related dyspnea.

5. CONCLUSION

The results of this study indicate that handheld fan therapy is effective in reducing respiratory rate and alleviating shortness of breath in patients with congestive heart failure (CHF). The decrease in respiratory rate after therapy suggests that the cool airflow directed at the face helps stimulate the trigeminal nerve, modulating the perception of breathlessness and reducing respiratory effort. This aligns with previous studies that support the use of handheld fan therapy as a non-pharmacological intervention for dyspnea management.

Given its simplicity, affordability, and non-invasive nature, handheld fan therapy can be considered a complementary approach to improving respiratory function and patient comfort in CHF management. Healthcare providers, especially nurses and respiratory therapists, are encouraged to integrate this therapy into dyspnea management protocols. Further research is recommended to explore its long-term effects, its combination with other respiratory interventions, and patient adherence in home-based CHF care.

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