

The Effect of Slow Deep Breathing on Dyspnea Reduction in Heart Failure Patients

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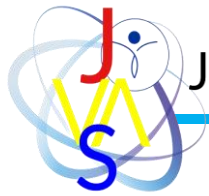
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Keywords : *Deep breathing exercises; Chronic heart failure; Out of breath; Oxygen Saturation; Breathing Frequency*

Abstract

The heart is one of the most important organs/vital organs for the human body which has a role in circulating the supply of oxygen and nutrients to all body tissues and organs needed in metabolism. The World Health Organization (2021) reports that an estimated 17.9 million people died from cardiovascular disease in 2019, representing 32% of all global deaths. The prevalence in Indonesia also has a high number of people with heart disease. **Purpose:** Knowing whether there is an effect of deep breathing exercise on the level of dyspnea in heart failure. **Methods:** The protocol and evaluation of the literature review will use the PRISMA checklist to determine the selection of studies that have been found and adapted to the objectives of the literature review (Nursalam, 2020). The literature search was carried out on August 1 – 26, 2022. **Results:** The data used in this study is secondary data obtained not from direct observation, but obtained from the results of research that has been carried out by previous researchers. The literature search in this literature review uses five databases with high and medium-quality criteria. The effect of deep breathing exercises in reducing dyspnea in heart failure patients. **Conclusion:** The results of the literature review prove that deep breathing exercises can affect the reduction of dyspnea in heart failure patients.



1. INTRODUCTION

Heart disease is one of the most common non-communicable diseases (NCDs) experienced by both the world's and Indonesia's population, every year more than 41 million people die from non-communicable diseases (NCD) (71% of all deaths) (American Heart Association, 2015). Deep breathing relaxation can increase oxygen saturation in heart failure patients. Optimal oxygen saturation in patients with heart failure is very useful in the process of cell metabolism because patients with heart failure will experience a decrease in heart muscle contractility which will cause a decrease in the speed of blood transportation throughout the body's tissues (Yuliansyah et al., 2016). Based on the description above, it can be seen that Symptoms of dyspnea in patients with congestive heart failure are symptoms that often occur, and to find out how much influence deep breathing has on these patients, the researchers compiled a report from the results of a literature review on the effect of deep breathing exercise on the level of dyspnea in heart failure.

2. METHODS

2.1 *Study Design*

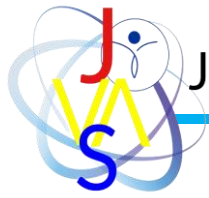
In a study entitled the effect of deep breathing on dyspnea in heart failure patients, the literature review/systematic review method was used.

2.2 *Setting*

The literature search in this literature review uses five databases with high and medium-quality criteria, namely ProQuest, Pubmed, Google Scholar, Scient Direct, and Digital Referral Guard. The literature search was carried out on August 1 – 26, 2022. The data used in this study is secondary data obtained not from direct observation, but obtained from the results of research that has been carried out by previous researchers. Sources of secondary data were obtained from articles and journals of national and international repute with a predetermined theme.

2.3 *Research Subject*

Contributing influence in the study of CHF, deep breathing, dyspnea is mostly Quasi-Experimental, Descriptive, and Literature Review. The average number of participants overall was more than 100, with each study discussing the effect of deep breathing exercises on dyspnea on heart failure. the highest study quality was for the CHF study, the effect of deep breathing and the lowest for dyspnea. According to this systematic review, studies were conducted in Indonesia with an average of nine studies; the other three were conducted in Turkey, and one in Taiwan. Inclusion data to determine the criteria for literature review materials, namely 1) Groups associated with dyspnea and having heart failure, 2) Using deep breathing exercises intervention, 3) There is an effect of using deep breathing exercises, 4) Using Quasi-experimental, random control and trial, systematic review, qualitative research



and cross-sectional, 5) Journal in 2015 or more, and 6) Using Indonesian and English. As for the exclusion data 1) In the group that does not have dyspnea and heart failure, 2) Does not use the intervention of deep breathing exercises, 3) There is no effect of deep breathing exercises, 4) Journals under 2015, and 5) Uses languages other than Indonesian and English. Because of the quality of the literature review, the authors refer to the ethical considerations of Wager & Wiffen, namely avoiding duplication of publications, avoiding plagiarism, transparency, and ensuring accuracy. Search articles using several sources from databases available on e-library and e-resources. The total articles obtained at the beginning of the search were in accordance with predetermined keywords, namely 102 articles, the total articles obtained contained 9 articles that were duplicated, and 13 articles that had inclusion criteria, so that the total number of articles was 93 articles.

2.4 Instruments

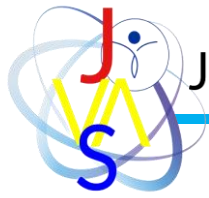
The evaluation used in this literature review uses the PRISMA checklist.

Tabel 1. Kata Kunci Literature Review

Deep breathing	Gagal jantung	Dyspnea
<i>Deep breathing exercises</i>	<i>CHF</i>	<i>Sesak nafas</i>
<i>OR</i>	<i>OR</i>	<i>OR</i>
<i>Breathing</i>	<i>Heart failure</i>	<i>Gagal nafas</i>
<i>OR</i>	<i>OR</i>	<i>OR</i>
<i>Exercise</i>	<i>Gagal jantung</i>	<i>Saturasi O2</i>
	<i>OR</i>	<i>OR</i>
	<i>Chronic heart failure</i>	<i>Frekuensi nafas</i>
	<i>OR</i>	
	<i>Jantung</i>	

Tabel 2. Format PICOS dalam *Literature Review*

Kriteria	Inklusi	Ekstensi
<i>Population</i>	<i>Studies comprised of people who had heart failure and experienced dyspnea</i>	<i>People who not had heart failure and experienced dyspnea</i>
<i>Intervention</i>	<i>Deep breathing exercise</i>	<i>Non- deep breathing exercise</i>
<i>Comparators</i>	<i>No comparator</i>	
<i>Outcomes</i>	<i>Effect of deep breathing on dyspnea in heart failure</i>	<i>Noneffect of deep on dyspnea in heart failure</i>



<i>Study Design and Publication type</i>	<i>Quasi-experimental studies, randomized control and trial, systematic review, qualitative research, cross-sectional studies</i>	<i>No exclusion</i>
<i>Publication year</i>	<i>Post-2015</i>	<i>Pre-2015</i>
<i>Language</i>	<i>English, Indonesian</i>	<i>Language other than English and Indonesia</i>

2.5 Data Analysis

The 12 articles that met the inclusion criteria (figure 1) were divided into 3 sub-discussions based on the topic of the literature review, namely the effect of deep breathing exercise on dyspnea on heart failure associated with CHF (13), deep breathing (13), dyspnea (4) and 12 studies of the three. The results of the study characteristics from 5 databases are depicted in the following table:

Table 3. Study Search Results Based on Research Database.

Source: Language	Year	Database	N	Type of Study Research/article				
				Literature Review	Descriptive	Quasi Experiment	Systematic Review	Experiment
Indonesian	2015-2022	Google Scholar	78	3	3	3	0	0
	2015-2022	Research gate	5	0	0	1	0	2
English	2015-2022	PubMed	7	0	0	0	1	0
	2015-2022	International Journal Of Nursing and Health Services	1	0	0	0	0	0
	2015-2022	Cross Mark	2	0	0	0	0	0
Results			13	3	3	4	1	2

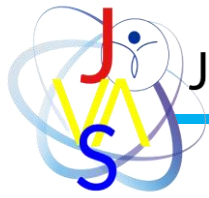
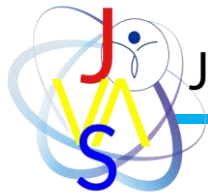
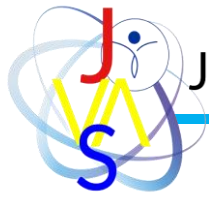


Table 4. Literature Search Results

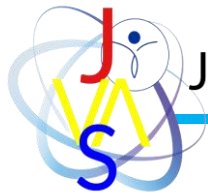
No	Name Title/Book	Author	Year	Name of Journal	Keyword
1.	Deep Breathing Exercises And Gradual Activities In Reducing Dyspnea In Congestive Heart Failure Patients	Dewi Nurviana Suharto	2021	PANNMED Scientific Journal (Pharmacist, Analyst, Nurse, Nutrition, Midwifery, Environment, Dentist)	<i>CHF, Deep Breathing Exercise, Gradual Activity, Dyspnea</i> <i>Resume:</i> <i>Based on the analysis and discussion results, it can be concluded that the provision of deep breathing exercises and gradual activities can overcome the dyspnea problem in CHF patients. This is evidenced by several previous studies where deep breathing exercises can increase lung volume, increase and redistribution of ventilation, keep the alveoli inflated, increase oxygenation, help clear secretions, mobilize the thorax and increase the strength and endurance, and efficiency of the respiratory muscles. (Putri & Margareta, 2021)(Suharto, 2021).</i>
2.	Case Study of Fulfilling Oxygenation Needs With	Lermiana Purba, Deni Susyanti, Pamungkas	2016	Hesti Medan Research Journal	<i>Congestive Heart Failure (CHF), Fulfillment of Oxygen Needs, Deep Breathing Relaxation Techniques</i> <i>Resume:</i> <i>According to the results of case study research, deep breathing exercise interventions are effective in increasing oxygen supply so as to reduce shortness of breath (dyspnea) and chest pain (Purba et al., 2016)</i>



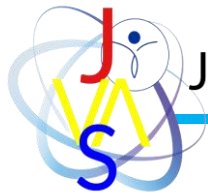
3.	Deep Breathing Relaxation Techniques in Congestive Patients	Novita Nirmalasari, Mardiyono, Edi Dharmana	2019	Indonesia Jurnal of nursing and midwifery	<p>Deep Breathing Exercises Active Range of Motion Oxygen Saturation</p> <p>Resume: According to the results of the study, exercise is a method to increase oxygen saturation in patients with CHF. This study recommends that deep breathing exercises and active range of motion interventions can be used as independent interventions and can be collaborated with physiotherapists (Nirmalasari et al., 2019).</p>
4.	<i>Deep Breathing Exercise and Active Range of Motion Effectively Reduce Dyspnea in Congestive Heart Failure Patients</i>	Novita Nirmalasari	2017	<i>NurseLine Journal</i>	<p><i>Active range of motion congestive heart failure, deep breathing exercise, Dyspnea</i></p> <p>Resume: <i>The results of the research conducted showed that deep breathing exercises and active range of motion interventions were more effective than a standard hospital or semi-Fowler interventions in reducing dyspnea (Nirmalasari, 2017).</i></p>
5.	<i>The Effectiveness of Deep Breathing Exercise and Recitation Al-Qur'an Intervention on Improving Vital Signs and Pain Level among Congestive Heart Failure (CHF) Patients</i>	Yudi Herdiana, Ta'adi, Masrifan Djamil	2020	<i>International Journal of Nursing and Health Services (IJNHS)</i>	<p><i>Deep breathing, vital signs, oxygen saturation, anxiety level, congestive heart failure</i></p> <p>Resumes: <i>Interventions in the recitation of the Qur'an and deep breathing exercises are useful for increasing oxygen saturation and reducing anxiety levels in patients with congestive heart failure (CHF) (Herdiana et al., 2020).</i></p>



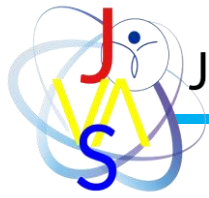
6.	<i>Optimal Diaphragmatic Breathing Patterns through Exercise Can Light Some Medical Problems</i>	Asmaul Lutfi Marufah, Hilmy Yafi Zuhair, Ulfi Qomariyah Hanum, Agus Rubiyanto, Astri Dewayani, Abdurachman Latief	2022	Respiration Journal	<p><i>Chronic respiratory diseases, Diaphragmatic breathing, Human and health, Medical problems.</i></p> <p><i>Resume:</i> Breathing exercises can relieve some of the symptoms of the disease, both physical and psychological. Most studies use deep breathing exercises as a treatment that gives positive results due to reduced disease problems. This includes CHF patients. In CHF patients, deep breathing exercises and an active range of motion reduce systolic significantly. Respiratory rehabilitation exercises are thought to have a positive effect on the respiratory muscles of stroke patients through DB exercises (Marufah et al., 2022)</p>
7.	<i>Ineffective Breathing Pattern Disorders in Congestive Heart Failure (CHF) Patients</i>	Wilantika Ida Wardani, Yuyun Setyorini, Akhmad Rifai	2018	Global Journal of Nursing	<p><i>Congestive Heart Failure (CHF), Ineffective Breathing Patterns, Nursing Care</i></p> <p><i>Resume:</i> This study shows that breathing exercises are effective in CHF patients with complaints of shortness of breath. Clients who were given deep breathing exercises, coupled with giving O₂ and a semi-Fowler's position, showed an increase in SPO₂ and a decrease in RR (Wardani et al., 2018)</p>
8.	<i>Influence of Breathing Exercise</i>	Oz Alkan H, Uysal H, Enç N, Yigit Z	2017	International Journal of Medical	<i>Heart failure, Dyspnoea, Sleep, Breathing exercises</i>



<i>Education Applied on Patients with Heart Failure on Dyspnoea and Quality of Sleep: A Randomized Controlled Study</i>			Research Health Sciences	&	<i>Resume:</i> <i>According to research that has been done, breathing exercises applied to heart failure patients improve the incidence of dyspnea and sleep quality (Alkan et al., 2017).</i>
9.	<i>Respiratory training interventions improve the health status of the heart failure patients: A systematic review and network meta-analysis of randomized controlled trials</i>	Mei-Hua Wang, Mei-Ling Yeh	2019	World Journal of Clinical Cases	<i>heart failure; Network meta-analysis; Respiratory training; Cardiac functions; Exercise capacity; Quality of life</i> <i>Resume:</i> <i>Breathing training interventions including inspiratory muscle training, tai chi, yoga, and breathing exercises are effective strategies to improve heart function and quality of life in heart failure patients. Breathing exercises (non-machine assisted respiratory training) without the help of machines such as tai chi, yoga, and breathing exercises are effective in lowering (improving) heart rate in heart failure patients (Wang & Yeh, 2019)</i>
10.	<i>Increasing Oxygen Saturation Through Deep Diaphragmatic Breathing Exercises in Heart Failure Patients</i>	Tri cahyo sepdianto, maria diah ciptaning tyas, tri anjaswarni	2013	Nursing and Midwifery	<i>Oxygen saturation, deep diaphragmatic breathing, heart failure</i> <i>Resume:</i> <i>Deep diaphragmatic breathing exercises in heart failure patients can increase oxygen saturation by 0.8%, reduce the degree of dyspnea by 2.14 points, systolic blood pressure of 3 mmHg, diastolic blood pressure of 6.2 mmHg,</i>



					<i>pulse 2.98 beats per minute and respiration 4.76 times per minute (Sepdianto et al., 2013)</i>
11.	Effect of Breathing Exercise Education Applied in Heart Failure Patients on Dyspnoea and Sleep Quality: A Randomized Controlled Study	Oz Alkan H, Uysal H, Enç N1 and Yigit Z	2017	International Journal of Medical Research & Health Sciences	<i>Breathing exercises; Dyspnoea; Heart failure; Sleep; breathing exercises; dyspnoea; heart failure; sleep</i> Resume : This study was conducted to determine the effect of breathing exercise training on the level of dyspnoea and sleep quality in heart failure patients. A total of 70 patients with chronic heart failure were included in the study. Then the participants were divided into 35 people as the experimental group and 35 people as the control group. Research has proven that breathing training applied to heart failure patients improves dyspnoea and sleep quality. This information can motivate heart failure patients with dyspnoea and sleep deprivation to engage in breathing exercises and encourage greater referral for more established breathing exercise training programs by professionals. (Alkan et al., 2017)
12.	<i>An evidence-based approach in the management of fatigue due to heart failure:</i>	Aşkar SE, Ovayolu Ö	2021	<i>Health Science Breathing exercises program</i>	<i>Breathing exercises; fatigue; heart failure; nursing care</i>



*breathing
exercises*

Resume :

Breathing exercises are one of the integrative applications that can improve oxygen delivery because the functional connection of the heart and lungs provides relief from fatigue.

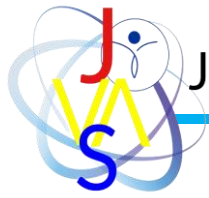
In the literature, breathing exercises have a variety of breathing techniques that create: changes in the shape and rate of breathing. Many studies have found that breathing exercises reduce fatigue, and can have a significant effect on patient care. Nurses have a major impact on patient care such as reducing fatigue in heart failure patients and improving health-related quality of life. For this reason, it is very important to include breathing exercises in nursing practice. (Se & Ovayolu, 2021)

2.7 Ethical Consideration

Research ethics is given by the Research Ethics Committee of Poltekkes Tanjung Karang in July 2022.

3. RESULT

Critical appraisal to assess eligible studies is carried out by researchers. If the research score of at least 50% meets the critical appraisal criteria with the cut-off point value agreed upon by the researcher, the study is included in the inclusion criteria. We excluded studies of low quality to avoid bias in the validity of the results and review recommendations. In the last screening, 85 studies achieved scores higher than 50% and were ready to synthesize data, however, due to the assessment of the risk of bias, two studies were excluded and 100 articles were used in the literature review.



Heart disease is one of the most common non-communicable diseases (NCDs) experienced by both the world's and Indonesia's population, every year more than 41 million people die from non-communicable diseases (NCD) (71% of all deaths) (American Heart Association, 2015).). The World Health Organization (2021) reports that an estimated 17.9 million people died from cardiovascular disease in 2019, representing 32% of all global deaths. The prevalence in Indonesia also has a high number of people with heart disease. In non-pharmacological action research, namely deep breathing exercises and also an active range of motion. The deep breathing technique is a nursing activity that functions to increase the ability of the respiratory muscles to increase lung compliance in improving ventilation function and improving oxygenation (Nirmalasari, 2017).

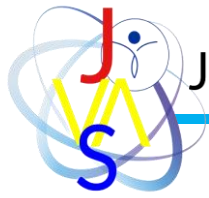
Deep breathing relaxation can increase oxygen saturation in heart failure patients. Optimal oxygen saturation in patients with heart failure is very beneficial in the process of cell metabolism because patients with heart failure will experience a decrease in heart muscle contractility which will cause a decrease in the speed of blood transport throughout the body's tissues.

4. CONCLUSION

One of the symptoms that arise in patients with congestive heart failure is shortness of breath or what is commonly referred to as dyspnea. Interventions that can be used to reduce dyspnea in CHF patients are deep breathing exercise techniques. Research has proven that this technique is able to reduce shortness of breath in CHF patients because it can increase the supply of more oxygen to the tissues and ensure body balance. For further research, it is hoped that this research can provide benefits and the authors recommend further research on the effect of other non-pharmacological interventions in an effort to overcome dyspnea symptoms in CHF patients.

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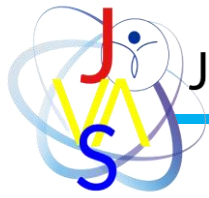
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