



Application of hipno-breathing exercise on dyspnea and hemodynamic status of congestive heart failure patient

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Abstract

Dyspnea is a clinical manifestation of congestive heart failure due to pulmonary function failure. The accumulation of fluid in the alveoli makes the heart unable to pump. Changes that occur in the respiratory muscles make an increase in the sensation of dyspnea. This has an impact on respiratory rate, blood pressure, means arterial pressure, heart rate as well as decreased oxygen saturation. Hypno-breathing exercises one of the interventions to reduce the symptoms of dyspnea with minimal side effects and improve hemodynamic status: BP, MAP, HR, Sa O₂. Goals: Analyze application hipno-breathing exercise to dyspnea and hemodynamic status of congestive patients. Method: This research uses design true experimental pre-posttest control group design. Subjects studied a total of 42 respondents in Soewondo Pati hospital, Indonesia with stratified random sampling. Research instruments used sphygmomanometer digital, wristwatch, calculator, pulse oximetry. Data analysis applied the t-test, Wilcoxon signed ranks and Mann-Whitney test. The results obtained p-value on each variable that is: dyspnea=0.108, systole=0.201, diastole=0.248, MAP=0.680, HR=0.003, SaO₂=0.017. Intervention hypno-breathing exercise can decrease dyspnea, systole, diastole, MAP as well as improving HR and SaO₂ in congestive high failure patients. Hipno-breathing exercise effectively decreases dyspnea and increase heart rate, oxygen saturation.

Keywords: hipno-breathing exercise, dyspnea, hemodynamic status

1. Introduction

Heart failure is a progressive health problem with high mortality and morbidity in both developed and developing countries including Indonesia ^[1]. Data on deaths from non-communicable diseases are expected to increase throughout the world; the most significant increase will occur in middle and developing countries. More than two thirds (70%) of the global population will die from non-communicable diseases such as heart disease. In 2030 it is predicted that there will be 52 million mortality each year due to non-communicable diseases ^[2]. One of the deadliest heart diseases is congestive heart failure (CHF), where the heart fails to pump the blood supply that the body needs. This occurs because of abnormalities in the heart muscles so that they cannot work usually. During this time, heart failure is described as the condition of a person's heart that stops working, in this case, it is stopped beating. Heart failure means the inability of the heart to pump blood or the failure of the heart to meet the regular blood quota that the body needs to cause breathing problems or *dyspnea* ^[5]. *Dyspnea* is a clinical manifestation of CHF that results from pulmonary function failure. The accumulation of fluid in the alveoli makes the heart unable to pump maximally. If this condition lasts a long time, it will give fatigue to the respiratory muscles. Changes that occur in the respiratory muscles make an increase in the sensation of dyspnea. This has an impact on respiratory rate, blood pressure, means arterial pressure, heart rate, and decreased oxygen saturation. Current nursing services indicate that the provision of nursing care in CHF patients is not following existing standards. Based on the phenomenon at Soewondo

Hospital, Pati shows that breathing exercise has no SOP and is very rarely used. In addition to the late arrival of patients to the hospital to get help, treatment in the ward has not shown good results for patients who have dyspnea. There is still little nursing research, which specializes in hypnosis therapy combined with a breathing exercise to reduce dyspnea and improve hemodynamic status; BP, MAP, HR, SaO₂ especially in CHF patients in hospitals/treatment rooms. In connection with the above, researchers are interested in researching hypno-breathing exercise on dyspnea and hemodynamic status in CHF patients in Soewondo Hospital, Pati. In addition to the high incidence of heart failure, which is ranked 4th out of the top ten ranks of patients suffering from disease, Soewondo Pati Hospital is a type B five-star accreditation, helping to provide facilities to carry out educational activities. The findings of this study expectedly can further improve nursing services in the hospital in general and more specifically can be applied in the handling of CHF patients.

2. Materials and methods

The design of this study uses true experiment with pre-posttest control group design which is research in two groups which aims to reveal the causal relationship by involving the treatment group. The population in this study were CHF patients with 42 people undergoing treatment at Soewondo general hospital in Pati, Central Java. The sampling technique used in this study is probability sampling with the stratified random sampling method where the researcher considers the stratification or strata contained in the population included in the population so that each level is represented in determining

sample. This research was randomized based on the classification of CHF II and III grades, by dividing the number of samples by the name of stratifications based on symptoms so that each case classification would have the same proportion of respondents.

3. Results & discussion

Discussion of the results of this study is by the initial research plan and is related to the relevant literature including previous research. CHF patients with dyspnea will experience breathing problems. These symptoms are complaints that must get maximum care. Self-care management with non-pharmacological measures is critical in the management of CHF to have a positive impact on patients. Hypno-breathing exercise intervention is a non-pharmacological intervention by developing the theory of Watson. Patients with changes in basic needs, especially respiratory problems, namely dyspnea must be facilitated and fulfilled so that they can be free from these conditions. The results of this study will describe the application of hypno-breathing exercise to dyspnea and hemodynamic status of CHF patients.

Table 1: Characteristics and equality test of respondents in the intervention and control group

Characteristic	Intervention	Control	P Value		
	f (%)	f (%)			
Gender					
Man	11 (52.4)	9 (42.9)	0.537*		
Woman	10 (47.6)	12 (57.1)			
Co-morbidities					
Hypertension	10 (47.6)	7 (33.3)	0.877*		
Diabetes mellitus	1 (4.8)	1 (4.8)			
Kidney Failure	1 (4.8)	1 (4.8)			
Anemia	1 (4.8)	2 (9.5)			
Gastritis	2 (9.5)	1 (4.8)			
Others	6 (28.6)	9 (42.9)			
Pharmacological Therapy					
Diuretics	4 (19.0)	5 (23.8)	0.921*		
Vasodilator	7 (33.3)	7 (33.3)			
Diuretics and vasodilator	10 (47.6)	9 (42.9)			
Liquid intake					
Fluid restriction	21 (100)	8 (38.1)	0.000*		
No fluid restriction	0 (0.0)	13 (61.9)			
Smoking habit					
Yes	11 (52.4)	8 (38.1)	0.352*		
No	10 (47.6)	13 (61.9)			
Stress					
Yes	19 (90.5)	8 (38.1)	0.000*		
No	2 (9.5)	13 (61.9)			
Variable	Mean	SD	Mean	SD	Sig.
Age	59.86	5.808	57.38	6.801	0.212**

Based on the research that has been done, the results obtained about the mean age of respondents in the intervention group were 59.86 while the mean age in the control group was 57.38. Elderly conditions will cause many anatomical and physiological changes that can affect the entire anatomy of the body, the function of cells and tissues or organs. These changes also occur in the respiratory and cardiovascular systems. Supporting factors such as diseases, changes in the role of the respiratory and cardiovascular systems will affect

the overall purpose of the elderly. Increasing age will increase the risk of heart attack. This is because the aging process will cause atherosclerosis, so that blood flow and tissue nutrients are inhibited. Atherosclerosis appears to interfere with tissue perfusion to increase peripheral vascular.

The results showed that the distribution of respondents was mostly women with a percentage of 52.4%, with a p value > 0.05 indicating there was no difference in respondents based on gender between the intervention group and the control group. Older women generally experience menopause, causing LDL cholesterol to increase.

Hypertension is the most common disease suffered by Respondents in addition to CHF which is owned by a percentage of 40.5%. P value > 0.05 showed no difference based on comorbidities between the intervention group and the control group. Hypertension causes congestive heart failure through several mechanisms including the mechanism of systolic and diastolic dysfunction of the left ventricle. Left ventricular hypertrophy is associated with left systolic and diastolic ventricular dysfunction. This predisposes to myocardial infarction, atrial and ventricular arrhythmias which will lead to congestive heart failure. Chronic increase in blood pressure makes the heart pump too stiff to push blood into the arteries so that the heart muscles thicken and enlarge. This causes the heart rhythm to become stiff so that the rhythm of the pulse is irregular. This ineffective pumping can lead to heart failure [4].

This study states that as many as 21.4% of respondents get diuretics and who get both as much as 45.2%. The p value > 0.05 showed no difference between the intervention group and the control group. Also, this study states that as many as 69% of respondents did fluid restriction and who did not do fluid limitation as much as 31%. The value of p < 0.05 indicates that there is a difference between the intervention group and the control group. Most of the 54.8% of respondents said they did not smoke, and 45.2% did smoking. The p value > 0.05 showed no difference between the intervention group and the control group. Further, most of the 64.3% of respondents said they were stressed, and 35.7% were not stressed. The value of p < 0.05 indicates that there is a difference between the intervention group and the control group.

Table 2: Identification of dyspnea and hemodynamic status

Variable	Intervention		Control	
	mean for 4 days	SD	mean for 4 days	SD
dyspnea	0.83	0.208	0.56	0.368
systole	0.45	0.413	1.91	1.993
diastole	0.73	1.230	1.39	0.507
MAP	1.85	0.341	1.33	1.028
HR	1.21	0.175	0.52	0.235
SaO ²	1.09	0.319	0.74	0.075

The data in the table above shows that in the hypno-breathing exercise intervention group it is not effective to reduce dyspnea p value > 0.05; systole p value > 0.05; diastole p value > 0.05; MAP p value > 0.05 while HR p-value < 0.05 and SaO₂ p-value < 0.05 experienced an increase more effective when compared to the control group. Hypno-breathing intervention for 4 days can reduce dyspnea, systole, diastole, MAP while the hemodynamic status variables: HR and SaO₂

experienced a significant increase.

Hypno-breathing exercise intervention can improve the ability of the inspiratory muscles, increase ventilation and oxygenation. This exercise will also increase muscle relaxation, relieve anxiety, get rid of patterns of activity of respiratory muscles that are useless and uncoordinated, slowing down the respiratory frequency and reducing breathing work. Clients who experience dyspnea will be helped by a combination of hypno and breathing exercise, motivated, relaxed and rhythmic [6].

Hypno-breathing exercise intervention can improve cardiac autonomic regulation, decrease the sensitivity of chemoreceptors, increase left ventricular ejection fraction, reduce pulmonary pressure, and reduce pulmonary edema. This can be caused by an increase in ventilation mechanisms due to regulation or modulation of cardiopulmonary reflexes. This exercise can also affect blood pressure because the work efficiency of the heart or the ability of the heart to increase following changes that occur in the form of heart frequency, contents of the heart and cardiac output. In chronic heart failure evidence based on guidelines for exercise that provides exercise therapy for patients with heart failure, 3-5 days per week, duration short 10-20 minutes, 30-40 minutes long duration once exercise can reduce blood pressure. Blood pressure occurs partly because blood vessels experience dilation and relaxation [7]. Hypno-breathing exercise performed will affect the modulation of the cardiovascular system by increasing fluctuations of the respiratory rate interval. Fluctuations in the respiratory rate increase the changes in blood pressure and MAP. This causes an increase in bar reflex effectiveness so that it can help lower blood pressure and MAP. When bar reflex is activated, sympathetic activity decreases, increasing central inhibitory rhythms which affect blood pressure and MAP. When hypno-breathing exercise is carried out, the volume cannot increase, thus activating the bleeding culture which results in a decrease in chemo reflex activity which will increase bar reflex sensitivity thereby reducing sympathetic activity, blood pressure, and MAP [8].

The frequency of the heart rate varies according to the respiratory phase, increases during inspiration and decreases during expiration, especially when the depth of breathing increases. In the study conducted by researchers, 59.5% of respondents had a history of hemodynamic disorders, namely heart rate below 60 times per minute (bradycardia) and a condition lack of fluid volume or hypervolemia, the body's compensation mechanism by increasing the heart rate which has an impact on the pulse. Then the pulse will control to maximize blood to the heart, brain, and lungs [10].

Hypno-breathing exercise intervention will increase oxygenation requirements. Hypno-breathing exercise will stimulate the release of surfactants which are secreted by type II alveolar cells Surfing out will cause the surface tension of the alveoli to be lowered to improve lung function. The need for oxygenation in the network is fulfilled so that it can increase SaO₂ [9].

The results of the Whitney test of Hypno-breathing exercise are shown in the table below:

Table 3: The Influence of Hypno-Breathing Exercise on Dyspnea and Hemodynamic Status

Variable	Intervention		Control		P
	mean	SD	mean	SD	
dyspnea	0.83	0.208	0.56	0.368	0.108
systole	0.45	0.413	1.91	1.993	0.201
diastole	0.73	1.230	1.39	0.507	0.248
MAP	1.85	0.341	1.33	1.028	0.680
HR	1.21	0.175	0.52	0.235	0.003
SaO ₂	1.09	0.319	0.74	0.075	0.017

From the table above, hypno-breathing exercise intervention is not effective in reducing dyspnea as p value > 0.05; systole p value > 0.05; diastole p value > 0.05; MAP p value > 0.05 while HR value p < 0.05 and SaO₂ p-value < 0.05 has increased more effectively when compared to the control group.

The results of statistical analysis showed that the p > 0.05 with effect size 0.903 between the two groups showed that hypno-breathing exercise intervention was not effective in reducing dyspnea in CHF patients compared to breathing exercise in standard hospital interventions. Dyspnea, p-value < 0.05 and this is the same as the clinical outcome there is a decrease in dyspnea.

Statistical analysis on systole p > 0.05 between the two groups showed that hypno-breathing exercise intervention was not effective in reducing systole in CHF patients when compared with breathing exercise hospital standard intervention and in the intervention group itself showed p > 0.05, its mean there is no hypno-breathing exercise effect to reduce systole with effect size 1,014. This is different from the clinical results of a decrease in systole. The same results were obtained from the statistical analysis of diastole p > 0.05 between the two groups, indicating that hypno-breathing exercise intervention is not effective in reducing diastole in CHF patients when compared with breathing exercise standard home intervention. However, the intervention group showed p < 0.05 on day 2; it means that there is a hypno-breathing exercise effect of reducing diastole. Although in general and in the intervention group itself showed a p value > 0.05, it means that there is no hypno-breathing exercise effect to reduce diastole with an effect size of 0,000. This is different from the clinical results of a decrease in diastole.

The results of the statistical analysis showed that the p > 0.05 effect size was 0.002 between the two groups, indicating that hypno-breathing exercise intervention was not effective in reducing MAP. This is different from the clinical results of a decrease in the MAP. The statistical analysis p-value < 0.05 effect size 0.005 between the two groups, indicating that hypno-breathing exercise intervention effectively increases HR. This is in line with the results of statistical analysis but in contrast to the results of clinical observations that showed that breathing exercises were able to reduce heart rate decreased by 2.98 times/minute in patients with heart failure p < 0.05 and

the effect size 0.058.8. This was confirmed by 145 respondents who experienced ischemic heart disease with DM showed that breathing exercise was able to reduce heart rate variability with a value of $p < 0.05$.⁽¹¹⁾ The statistical analysis p -value < 0.05 effect size 0.005 between the two groups, indicating hypno-breathing exercise intervention effectively increases SaO₂. This is in line with the results of clinical observations that have increased the SaO₂.

Hypno-breathing exercise application effective can reduce dyspnea proved with $p < 0.05$ and effect size 0.903 but not effective in reducing hemodynamic status as systole p value > 0.05 effect size 1,014; diastole p value > 0.05 effect size 0,000; MAP p value > 0.05 effect size 0.002 and also effectively improve hemodynamic status: HR $p < 0.05$ effect size 0.005 and SaO₂ $p < 0.05$ effect size 0.005. Previous research carried out with a single intervention (breathing exercise, deep breathing exercise, etc.) against CHF patients. The results were significantly able to reduce dyspnea and improve hemodynamic status with an average time of more than 4 days. Research that combines or combines both hypnotherapy and breathing exercise interventions is an innovation with the hope of getting better results and maximum benefits. The results showed a significant reduction in dyspnea from RR indicator and improvement of hemodynamic status: systole, diastole, and MAP did not appear to be significant even though there was a decrease while in HR and SaO₂ there was an increase every day^[12].

4. Conclusions

Characteristics of respondents included: age, gender, comorbidities, pharmacological therapy, smoking habits, fluid and stress intake from the initial analysis on average p value > 0.05 meaning that there were no differences in the two groups, but the factors of fluid intake and stress p -value < 0.05 means that there is a difference. Then, in the final analysis, the average overall value of $p > 0.05$, meaning that there was no effect on dyspnea, systole, diastole, MAP, HR, SaO₂ in both groups. Hypno-breathing exercise for intervention group it is not effective to reduce dyspnea as p value > 0.05 ; systole p value > 0.05 ; diastole p value > 0.05 ; MAP p value > 0.05 while HR p -value < 0.05 and SaO₂ p -value < 0.05 experienced an increase more effective when compared to the control group.

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