Effect of Hydro-Aromatherapy on Heart Rate in Heart Failure Patients

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Abstract

Objects: to determine the effect of hydro-aromatherapy on heart rate in patients with heart failure.

Methods: This study was a quasi-experiment pretest-posttest with two groups. Thirty-two respondents were selected by consecutive sampling with inclusion and exclusion criteria. The intervention was given a warm feet soak with aromatherapy, while the control only had a warm feet soak. Pulse oximetry was used to measure heart rate. Data were analyzed using a dependent t-test and independent t-test.

Results: there was a statistically significant heart rate difference before and after in intervention ($p<0.000$), and also there was a statistically significant heart rate difference before and after in the control group ($p<0.0005$). In the study in the intervention group after the treatment, a warm feet soak with aromatherapy was decreased heart rate by an average of 78.69 (SD=14.63). Whereas in the control group after the treatment a warm feet soak was also decreased heart rate by an average of 85.31 (SD=5.12).

Conclusion: Both treatments a warm feet soak with and without aromatherapy were decreased the heart rate, but perhaps with aromatherapy will be improved patients' comfort.

Keywords: *Hydro-aromatherapy; Heart failure; Heart rate*

Introduction

Heart failure (HF) is a pathophysiological condition where the heart's function as a pump is no longer able to meet the needs of blood throughout the body for tissue metabolism[(1)]. Heart disease ranks the third-highest number of patients in hospitals in Indonesia. While the number of new patients with inpatient heart failure in one of the North Sumatra has increased in recent years, with 238 patients in 2014, 248 patients in 2015, and 295 patients in 2016[(2)].

HF results in a decrease in cardiac output which can be a serious problem in cardiovascular function related to the entire body system[(3)]. Therefore, a decrease in pathophysiological cardiac output can cause dangerous physiological effects including cardiogenic shock, stopping breathing until death[(4)]. HF results in various problems include heart rhythm disorders, blood pressure, heart rate, discomfort, peripheral tissue perfusion disorders that occur due to systemic dams that affect the functioning of the heart[(3)].

In this case, there are two kinds of management of cardiovascular diseases, namely pharmacological and non-pharmacological. Pharmacological management is with drugs and medical therapy, and non-pharmacological management without medical drugs such as hydrotherapy and aromatherapy. Hydrotherapy is a therapy using water as a medium. One type of hydrotherapy is to soak feet with warm water. Warm water scientifically has physiological effects on the body, namely in blood vessels where the warm water temperature makes the circulation of blood vessels smooth because of the vasodilation of blood vessels[(5)].

Wulandari said that hydrotherapy by soaking feet with warm water is beneficial to reduce blood pressure, heart rate, increase circulation, reduce edema, increase muscle relaxation, and increase comfort[(6)]. Koike et

al. found that there was a significant decrease in blood pressure, heart rate as physiological indicators after warm water foot bath therapy[7]. Nauman et al. obtained the result that foot bath therapy with warm water affects the heart rate[8]. Based on the description above, the researchers are interested in determining the effect of hydro-aroma therapy on heart rate in heart failure patients.

Methods

This study was a quasi-experiment pretest-posttest with two groups. Thirty-two respondents were selected by consecutive sampling with inclusion and exclusion criteria. Inclusion criteria, namely: 1) respondents with the medical diagnosis of heart failure in the inpatient room at Medan City Hospital with NYHA II and III classification; 2) willing to participate in research, 3) in a conscious condition and able to communicate well; 4) able to sit; 5) there is not a history of peripheral vascular disease or neuropathy disorders due to diabetes; 6) there are no wounds and inflammation in the leg area; 7) not sensitive to warm water; 8) no disturbance in the smell, and 9) no history of allergies to aromatherapy. Exclusion criteria, namely: 1) unilateral reasons for stopping participation in the study; and 2) respondents who died or did not continue treatment until completion of therapy. For the hydro-aromatherapy group (intervention), the intervention was to soak feet with warm water mixed with rose aromatherapy essential oil in a bucket with a water temperature of 35-45^{0}C for 10 minutes, while the hydrotherapy group (control) was given the intervention to soak feet in warm water only without mixing with rose aromatherapy essential oil in a bucket with water temperature 35-45^{0}C for 10 minutes. The heart rate observation sheet was a pre-intervention note sheet and post-intervention heart rate values per minute from the measurement results of the pulse oximeter (Operating Manual of Fingertip Pulse Oximeter Version 02) to respondents both in the intervention group and the control group. Data were analyzed using a dependent t-test and independent t-test.

Results

Table 1 shows the distribution and presentation of the demographic characteristics of respondents and the factors related to this study.

Table1. demographic characteristics of respondents and related factors (n=32)

Variable	Intervention (n=16)		Control (n=16)	
	f	%	f	%
Age Early Adulthood 26-35 years old Late Adulthood 36-45 years old Early Elderly 46-55 years old Late Elderly 56-65 years old Old man >65 years old	0 4 3 8 1	0 25 18.80 50 6.20	1 1 3 10 1	6.30 6.30 18.80 62.50 6.30
Mean + SD min-max	55.06 + 11.34 41-84		55.06 ± 8.71 33-68	
Gender Male Female	11 5	68.80 31.20	10 6	62.50 37.50

Education			1	6.30
Primary School	4	25	1	6.30
Junior High School	3	18.80	10	62.50
Senior High Scholl	3	18.80	4	25
Diploma/ Bachelor	5	31.30	0	0
Magister	1	6.30		
Profession			2	12,50
Farmer	3	18,80	1	6,30
Driver	1	6,30	1	6,30
Trader	1	6,30	3	18,80
Government Employees	2	12,50	4	25
Entrepreneur	1	6,30	0	0
General Employees	3	18,80	5	31,30
Jobless/ Housewife/ Retired	5	31,30		
Long suffered			4	25
Acute <5 years (60 months)	6	37.50	12	75
Chronic >5 years (60 months)	10	62.50		
Mean + SD	47.94 + 65.98		31.44 ± 26.63	
min-max	1-216		1-96	
Family History			14	87.50
Yes	9	56.30	2	12.50
No	7	43.80		
History of Disease			8	50
Hypertension	6	37.50	0	0
Bronchopneumonia	1	6.30	1	6.30
Chronic Obstructive Pulmonary Disease	0	0	5	31.30
Hypertension + Diabetes Mellitus (DM)	2	12.50	1	6.30
Hypertension + Kidney Illness	0	0	1	6.30
Hypertension + COPD	0	0	0	0
DM + Pneumonia	1	6.30	0	0
Pneumonia	1	6.30	0	0
Hemorrhoid	1	6.30	0	0
No	4	25		

Lifestyle History			10	62.50
Smoke			6	37.50
Yes	13	81.30	4	25
No	3	18.80	12	75
Alcohol			0	0
Yes	2	12.50	16	100
No	14	87.50	7	43.80
Regular Exercise			9	56.30
Yes	0	0	7	43.80
No	16	100	9	56.30
Eat Regularly	12	75		
Yes	4	25		
No	6	37.50		
Enough Rest	10	62.50		
Yes				
No				
BMI			1	6.25
Underweight	0	0	15	93.75
Normal	14	87.50	0	0
Overweight	1	6.25	0	0
Obesity	1	6.25		
Pain Scale			15	93.80
Moderate	10	62.50	1	6.20
Severe	6	37.50		
Mean + SD	6.06+1.29		5.19+0.9	
min-max	4-8		4-7	
Pain Location			16	100
Chest	16	100		
Pain Metastases			9	56.20
Back	7	43.80	2	12.50
Neck	3	18.80	2	12.50
Chest	3	18.80	3	18.80
Stomach	1	6.30	0	0
Neck and Hand	1	6.30	0	0
Neck and Back	1	6.30		
Classification of CHF (NYHA)			5	31.30
Class II	7	43.80	11	68.80
Class III	9	56.30		

Table 2 shows that the study found that in the intervention group, research respondents in the pre-treatment stage had a heart rate with an average of 83.06 (SD=14.03). Whereas in the stage after the treatment of feet soaking with warm water mixed with aromatherapy it was found that the average heart rate decreased by an average of 78.69 (SD=14.63). Whereas in the control group, the average heart rate before treatment was 87.31 (SD=4.88), and after the treatment of feet soaking with warm water without aromatherapy mixed also decreased by an average of 85.31 (SD=5.12).

Table 2. effects of hydro-aromatherapy on heart rate before and after hydro-aromatherapy (n=32)

Variable	Intervention (n=16)		Control (n=16)	
	Mean + SD	min-max	Mean + SD	min-max
Heart rate Before	83.06+14.03	55-112	87.31+4.88	78-96
Heart Rate After	78.69+14.63	53-100	85.31+5.12	78-95

Table 3. shows that in the intervention group there were significant differences in heart rate between before and after the intervention (p=0.00). While in the control group, also found a significant difference in heart rate between before and after treatment (p=0.02). This shows that soaking the feet with warm water has a significant effect (p <0.05) can reduce heart rate in patients with heart failure with or without aromatherapy.

Tabel 3. differences in the effects of hydro-aromatherapy on heart rate

Variable	Intervention (n=16)		Control (n=16)	
	Mean Score Difference (SD)	t (sig)	Mean Score Difference (SD)	t (sig)
HR	4.37 (10.43)	1.67 (0.00)	2.00 (4.70)	1.70 (0.02)

Discussions

In the intervention group, based on the age of half the respondents (50%) were late elderly with age 56-65 years and the average age of respondents was 55.06 with a standard deviation of 11.34. The same was true for the control group, which was 62.5% who were late elderly with the average age of respondents being 55.06 + 8.71. Two-thirds of respondents (68.8%) from the intervention and control groups (62.5%) were male. More than half of the respondents in the intervention group (75%) and the control group (62.5%) included patients with chronic heart failure with a long history of suffering> 60 months (5 years). And most study respondents also had a history of comorbidities such as hypertension in the intervention group (37.5%) and control (50%).

This is in agreement with the results of Kao et al. study which found that from 91 samples of patients with heart failure the average age was 66.74 + 12.23 years[9]. The majority of participants were male (57.1%), married (62.6%), not working (73.6%), and not attending

school or only elementary school (60.5%). The largest proportion of participants was in NYHA Classification II (40.7%), comorbidities suffered by participants 71.4% hypertension, 50.5% coronary artery disease, and 31.9% diabetes.

This study found that in the intervention group, before treatment had a heart rate with an average of 83.06 (SD = 14.03). Whereas after treatment, the respondent's heart rate decreased by an average of 78.69 (SD = 14.63). Whereas in the control group, the average heart rate before treatment was 87.31 (SD = 4.88), and after the treatment of foot soaking with warm water without aromatherapy mixed also decreased by an average of 85.31 (SD = 5.12).

This is also by Wulandari's which states that hydrotherapy by soaking feet with warm water is beneficial for lowering blood pressure, increasing circulation, reducing edema, increasing muscle relaxation[6]. Based on the results of research Nauman et al. therapy soak feet with warm water effect on handling depression and heart rate in patients with depressive disorders[8].

This study shows that soaking feet with warm water can reduce heart rate in heart failure patients with or without aromatherapy. Similar to the results of Harada et al. said that soaking feet can be combined with herbs, salts, moisturizers, or other ingredients added to containers containing warm water and used to soak feet[10]. From the results of the study, it was found that soaking foot warm water mixed with salt can increase the temperature of the fingers and locally increase the temperature of the skin, but overall it warms the body, affects blood pressure, and besides it also has an effect on increasing peripheral blood circulation.

Aromatherapy is also beneficial for the patient's vital signs status. This is by the results of research by Taheri et al. Aromatherapy affects physiological parameters on the awareness of inpatients in the ICU hospital significantly reducing the patient's vital sign in the intervention group compared to the control group by measuring systolic and diastolic blood pressure, pulse rate, respiratory rate, and arterial blood oxygen saturation $p < 0.05$ using aromatherapy mint[11]. Matsumoto also explained that aromatherapy significantly reduced blood pressure, heart rate, and increased the frequency of strength from heart rate variability reflecting the activity of the parasympathetic nervous system by inhaling aromatherapy yuzu oranges[12]. Furthermore, Kenia and Taviyanda also found that aromatherapy for 10 minutes can significantly reduce systolic blood pressure and diastolic blood pressure, with a mean decrease in systolic and diastolic values of 10.63 mmHg and 10.18 mmHg and a maximum value for the systolic and diastolic blood pressure of 28.00 mmHg and 20.00 mmHg with aromatherapy[13].

Conclusions

The results of this study indicate that there was an effect of hydro-aroma therapy on decreasing heart rate in patients with heart failure.

Conflict of Interest: Nil

Source of Funding: No funding in this is a study

Ethical Consideration: This research has passed the test of ethics from the health research ethics committee of the Nursing Faculty of Universitas Sumatera Utara, with registration number 1562/VIII/SP/2018.

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