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THE EFFECTIVENESS OF EFFLEURAGE BACK MASSAGE ON VITAL SIGNS, OXYGEN SATURATION, AND ANXIETY OF PATIENTS WITH HYPERTENSION

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ABSTRACT

There have been numerous young people with hypertension and need treatment. The treatment measures experienced have side effects and are felt throughout life. Efforts to reduce side effects require non-pharmacological measures, incorporating effleurage back massage. The objective of this study was to assess the effectiveness of effleurage back massage on vital signs, oxygen saturation, and anxiety of patients with primary hypertension aged 45-54 years. The method in this study employed a quasi-experimental design with a non-randomized pretest-posttest control group design approach. The sample of this study were patients with primary hypertension aged 45-54 years who received regular treatment at UPTD Kesehatan (Health Unit) in the Blitar City area, with as many as 101 patients (51 treatment groups, 50 control groups). The inclusion criteria of patients were having a systolic blood pressure of 140-180 mmHg and diastolic 90-100 mmHg, obtaining a maximum of 2 standard antihypertensive treatments and not smoking. The analysis administered descriptive, time series, t-test and ANOVA. The results of this study presented that after the effleurage back massage, there was a decrease in systolic blood pressure of 13.88 mmHg, diastolic blood pressure of 10.08 mmHg, the pulse of 9.76 times per minute and respiration 0.67 times per minute. 1.8 points reduced anxiety, and oxygen saturation increased by 0.3 points. Effleurage back massage is effective if it is performed after 5 times, and it takes time for the next massage to pause. Back massage can be performed alone by patients with hypertension every week for 20 minutes each massage.

Keywords:
Anxiety, Effleurage back massage, Hypertension, Vital sign

BACKGROUND

Hypertension has become one of the major causes of disability and death in almost all countries. Hypertension is a cause of mortality and morbidity in Indonesia (PERKI, 2015). The prevalence of hypertension in Indonesia based on doctor's diagnosis and treatment is 8.84%, and in East Java, it reaches 8.59%, based on the 45-54 year age group as much as 13.3% (Kemenkes, 2018).

Management of hypertension encompasses medication and lifestyle modification (non-pharmacological). Side effects and the high cost of antihypertensive drugs that must be consumed for life encourage

the use of non-pharmacological management in hypertensive patients. Non-pharmacological management incorporates weight loss, meal planning, dietary sodium reduction, physical activity, smoking cessation, relaxation techniques, and stress management. One technique that can enhance relaxation is using back massage (Supa'At et al., 2013). The development of back massage action is effleurage back massage. Back massage for 10 minutes can decrease anxiety levels and vital signs except for body temperature (Yasayan et al., 2009). Back massage is also able to reduce systolic and diastolic blood pressure and mean arterial pressure in hypertensive patients (Lestari et al., 2018).

Hypertension management using pharmacological and non-pharmacological needs to be conducted to control blood pressure so that it is normal. Doing non-pharmacological measures of effleurage back massage can reduce blood pressure, pulse, respiration, and anxiety and increase oxygen saturation in primary hypertension patients. However, in Indonesia, it needs to be extensively identified. Based on the existing exposure, it is necessary to understand the effectiveness of effleurage back massage on vital signs, oxygen saturation, and anxiety of patients with primary hypertension aged 45-54. The research objective is to assess the effectiveness of effleurage back massage on vital signs, oxygen saturation, and anxiety of patients with primary hypertension aged 45-54 years.

METHOD

This study utilized a quasi-experimental design with a non-randomized pretest-posttest control group design approach. The sample of this study was patients with primary hypertension aged 45-54 years who received regular treatment at the Health Unit in Blitar City with a total of 101 patients. The treatment group was 51 patients with hypertension, and the control group was 50 patients with hypertension.

The inclusion criteria for patients were having systolic blood pressure of 140-180 mmHg and diastolic of 90-100 mmHg, receiving standard antihypertensive treatment of a maximum of 2 drugs (diuretics, ACE inhibitors/Calcium Channel Blockers), and not smoking.

The independent variable is effleurage back massage which is administered by physiotherapy for 21 minutes every 3 days for 6 massages. The dependent variables are blood pressure, pulse, respiration, oxygen saturation, and anxiety measured before and after the action by HARS (The Hamilton Anxiety Rating Scale).

The analysis used descriptive, times series, and the Mann-Whitney test.

RESULT

This section displays the findings of the characteristics of the respondents, and the results of measurements of blood pressure, pulse, respiration and oxygen saturation in patients with primary hypertension before and after being given effleurage back massage.

Characteristics of Hypertensive Patients

The results of the analysis revealed that more than half (53.3%) of hypertension patients were female, almost half (40.6%) possessed senior high school education, most (91.0%) received one antihypertensive drug and more than half (51.5%) routine control at the Puskesmas (Primary Health Center).

Measurement of Vital Signs in the Treatment Group at First to the Sixth Visit

The analysis results illustrated that there was a change in systolic and diastolic blood pressure in the treatment group. It presents changes in systolic blood pressure, diastolic blood pressure, pulse, respiration, and oxygen saturation in the fifth week. In the sixth week of measurement, only blood pressure changes.

Results of t-test of Vital Signs-Free Samples between Groups

The results of the analysis displayed that in the fifth week, there was a change in temperature, diastolic blood pressure and respiration. The massage process should be performed up to 5 times then, followed by a rest phase.

ANOVA test Results (F-Test) Vital Signs after Effleurage Back Massage

The results of the analysis unveiled changes in vital signs effectively after effleurage back massage at the fifth meeting. Vital signs will rise at the sixth meeting. There is a need for rest activities after an effleurage back massage for 5 meetings.

The results of the Free Sample t-test and ANOVA Anxiety after Treatment between Groups

The analysis results demonstrated a difference in the anxiety scores between the group giving effleurage back massages and the group not receiving effleurage back massages. Effleurage back massage

Table 1. Characteristics of Primary Hypertensive Patients Aged 45-54 Years in Blitar City

Variable	Treatment		Control		Total	
	f	%	f	%	f	%
Gender:						
Male	18	17.82	17	16.83	35	34.65
Female	33	32.67	33	32.67	66	65.35
Education:						
Elementary School	13	12.87	11	10.89	24	23.76
Junior High School	12	11.88	13	12.87	25	24.75
Senior High School	20	19.80	21	20.79	41	40.59
University	6	5.94	5	4.95	11	10.89
Anti-Hypertension Drugs:						
One kind	46	45.54	46	45.54	92	91.09
Two kinds	5	4.95	4	3.96	9	8.91
Health Control:						
Routine	30	29.70	22	21.78	52	51.49
Never	21	20.79	28	27.72	49	48.51

does not affect anxiety levels in hypertensive patients.

DISCUSSION

The results of this study are in accordance with research by (Azmy et al., 2021), which demonstrates that 70.8% of hypertensive patients are female. Other supporting research by (Ni Luh Seri Astuti et al., 2022) states that 66.7% of hypertensive patients are female. These sex differences are associated with vascular tone and the possible protective effect of the female hormones estrogen and progesterone. In menopausal conditions, there is a decrease in the hormones estrogen and progesterone, hence, the protective function of blood vessel tone decreases, causing an increase in vascular resistance, which impacts increasing blood pressure and the risk of cardiovascular disease. The study's results illustrating the use of one type of antihypertensive drug are also corroborated by the study's results (Darmayanti, 2020). All hypertensive patients performed a single antihypertensive drug. Hypertension treatment is given to achieve the target blood pressure. A combination of single pills can be provided to enhance patient compliance with medication (Perhimpunan Dokter Hipertensi Indonesia (PERHI), 2019).

The analysis showed that in the control group, given the prone position on the bed for 21 minutes, there were changes in temperature, systolic blood pressure and diastolic blood pressure. In the prone position, there is no change in pulse, respiration and oxygen saturation.

The results of this study, which present a change in blood pressure with the prone position on the bed, are in accordance with the study's results (Meftahi et al., 2014). Systolic blood pressure decreased with the prone position for approximately 15 minutes. The prone position can cause increased nerve activity in the front part of the brain, the amygdala and the posterior part, particularly the precuneus tissue. This response can cause an increase in parasympathetic tone in the brain, resulting in relaxation and a decrease in blood pressure.

The results of the analysis presented that there was a change in systolic and diastolic blood pressure in the treatment group. It demonstrates changes in systolic blood pressure, diastolic blood pressure, pulse, respiration and oxygen saturation in the fifth week. In the sixth week of measurement, only blood pressure changed.

The results of this study are in accordance with research by (Adawiyah et al., 2020) which discovered that blood pressure has decreased in the elderly with hypertension after a Swedish massage. Another supporting research is (Moghadasi et al., 2021), which displays the results of primary hypertension patients experiencing a decrease in systolic blood pressure, diastolic blood pressure, pulse and respiration after Swedish back massage. Decreases in blood pressure, pulse and respiration after effleurage back massage can occur because manual massage/massage therapy induces the release of oxytocin and is associated with stress-reducing effects such as lowering blood pressure and pulse. Oxytocin is produced by the paraventricular nucleus (PVN) and the supraoptic nucleus (SON). Massage of oxytocinergic fibers from the PVN causes the release of endogenous oxytocin into other brain areas incorporating the nucleus of

Table 2. Measurement of Vital Signs in the Control Group before and after Being Provided a Prone Position on the Bed For 21 Minutes

No.	Variable	Treatment Time	Meeting / Intervention …																	
			1			2			3			4			5			6		
			Average	sd	sign	Average	sd	sign	Average	sd	sign	Average	sd	sign	Average	sd	sign	Average	sd	sign
1	Temperature (^{O}C)	Before	36.52	0.23	0.245	36.56	0.08	0.561	36.55	0.09	0.197	36.56	0.07	0.617	36.55	0.10	0.227	36.55	0.09	0.000
		After	36.56	0.08		36.55	0.08		36.56	0.07		36.59	0.05		36.56	0.07		36.60	0.08	
2	Systole (mmHg)	Before	139.60	16.03	0.000	138.80	18.99	0.000	142.10	7.57	0.000	146.56	14.44	0.000	144.90	12.96	0.000	145.98	15.32	0.000
		After	133.80	13.08		132.00	14.00		138.46	7.06		141.30	10.82		139.80	11.65		141.52	12.20	
3	Diastole (mmHg)	Before	97.92	10.98	0.139	92.40	10.98	0.976	97.40	8.47	0.000	95.40	7.88	0.087	98.80	8.66	0.001	96.80	9.68	0.000
		After	96.44	8.90		92.44	11.30		93.68	7.60		93.24	7.04		95.64	7.91		93.80	8.78	
4	Pulse (x/minute)	Before	78.34	9.68	0.076	81.92	10.47	0.212	78.54	8.80	0.313	82.50	16.32	0.128	77.40	8.63	0.488	82.04	16.49	0.485
		After	80.50	9.14		80.54	9.64		80.82	15.45		79.02	5.70		79.02	15.96		80.56	8.30	
5	RR (x/minute)	Before	20.00	1.46	0.699	20.16	1.06	0.402	20.04	1.48	0.267	20.00	1.34	0.261	19.84	1.33	0.933	19.88	1.10	0.096
		After	19.92	0.57		20.04	0.73		19.76	0.87		19.76	0.66		19.86	0.81		20.08	1.07	
6	SaO_2 (%)	Before	97.44	1.18	0.002	97.38	0.81	0.001	97.14	1.05	0.627	97.14	1.05	0.743	97.08	0.88	0.748	97.04	0.90	0.686
		After	96.88	1.02		96.78	0.93		97.04	0.86		97.08	0.80		97.14	0.93		97.09	0.90	

Note: OC: degrees Celsius; mmHg: millimeters of Hydrogenium; x: times; %: percent; sd: standard deviation; sign: significance (probability)

Table 3. Results of Vital Signs Measurement in the Treatment Group Before and After Effleurage Back Massage

No.	Variable	Treatment Time	Meeting / Intervention …																	
			1			2			3			4			5			6		
			Average	sd	sign	Average	sd	sign	Average	sd	sign	Average	sd	sign	Average	sd	sign	Average	sd	sign
1	Temperature (^{O}C)	Before	36.22	0.40	0.025	36.19	0.41	0.068	36.20	0.48	0.074	36.10	0.55	0.070	36.29	0.62	0.163	36.23	0.46	0.586
		After	36.06	0.51		36.02	0.52		36.04	0.65		36.10	0.55		36.20	0.56		36.19	0.44	
2	Systole (mmHg)	Before	159.43	19.33	0.000	151.67	18.09	0.000	151.80	18.91	0.000	148.04	17.50	0.000	148.41	16.80	0.000	143.65	16.35	0.000
		After	148.51	20.50		146.94	18.44		145.86	17.21		144.61	16.69		144.55	15.62		137.61	16.06	
3	Diastole (mmHg)	Before	97.06	15.00	0.000	92.63	12.72	0.000	92.69	14.03	0.453	91.51	11.17	0.004	91.20	11.13	0.000	89.08	10.59	0.003
		After	89.16	12.66		88.47	12.20		90.88	18.37		88.37	8.95		86.98	9.71		85.98	9.45	
4	Pulse (x/minute)	Before	85.39	11.58	0.005	82.02	9.52	0.009	79.98	9.61	0.079	80.35	8.70	0.171	77.96	9.66	0.006	78.84	9.03	0.307
		After	80.71	10.37		79.33	7.46		79.98	9.61		78.88	9.50		75.63	8.52		77.88	7.24	
5	RR (x/minute)	Before	22.10	2.74	0.081	21.53	2.25	0.443	21.51	2.30	0.283	21.33	2.07	1.000	21.16	1.86	0.029	21.22	1.85	0.814
		After	21.76	2.67		21.37	2.07		21.33	1.99		21.33	1.99		21.43	2.25		21.25	2.01	
6	SaO_2 (%)	Before	97.59	1.53	0.079	97.59	1.82	1.000	97.49	3.09	0.751	97.63	1.28	0.919	98.10	1.17	0.017	97.86	1.50	0.011
		After	97.20	1.47		97.59	1.36		97.63	1.48		97.61	1.40		97.65	1.78		97.25	1.86	

Note: OC: degrees Celsius; mmHg: millimeters of Hydrogenium; x: times; %: percent; sd: standard deviation; sign: significance (probability)

Table 4. Vital Sign Independent t-Test Results between Groups

No.	Variable	Group	Meeting / Intervention …																	
			1			2			3			4			5			6		
			Average	sd	sign	Average	sd	sign	Average	sd	sign	Average	sd	sign	Average	sd	sign	Average	sd	sign
1	Temperature (^{O}C)	Control	36.56	0.08	0.000	36.55	0.08	0.000	36.56	0.08	0.000	36.58	0.09	0.000	36.56	0.07	0.005	36.60	0.08	0.000
		Treatment	36.06	0.51		36.02	0.52		36.04	0.65		36.10	0.55		36.20	0.56		36.19	0.44	
2	Systole (mmHg)	Control	133.80	13.08	0.000	132.00	14.00	0.000	138.46	7.06	0.006	141.30	10.82	0.241	139.80	11.65	0.087	141.52	12.20	0.172
		Treatment	148.51	20.50		146.94	18.44		145.86	17.21		144.61	16.69		144.55	15.62		137.61	16.06	
3	Diastole (mmHg)	Control	96.44	8.90	0.001	92.44	11.30	0.093	93.68	7.60	0.322	93.24	7.04	0.003	95.64	7.91	0.000	93.80	8.78	0.000
		Treatment	89.16	12.66		88.47	12.20		90.88	18.37		88.37	8.95		86.98	9.71		85.98	9.45	
4	Pulse (x/minute)	Control	80.50	9.14	0.916	80.54	9.64	0.483	80.82	15.45	0.743	79.02	5.70	0.930	79.02	15.96	0.184	80.56	8.30	0.087
		Treatment	80.71	10.37		79.33	7.46		79.98	9.61		78.88	9.50		75.63	8.52		77.88	7.24	
5	RR (x/minute)	Control	19.92	0.57	0.000	20.04	0.73	0.000	19.76	0.87	0.000	19.76	0.66	0.000	19.86	0.81	0.000	20.08	1.07	0.000
		Treatment	21.76	2.67		21.37	2.07		21.33	1.99		21.33	1.99		21.43	2.25		21.25	2.01	
6	SaO_2 (%)	Control	96.88	1.02	0.214	96.78	0.93	0.001	97.04	0.86	0.017	97.08	0.80	0.023	97.14	0.93	0.076	97.09	0.90	0.574
		Treatment	97.20	1.47		97.59	1.36		97.63	1.48		97.61	1.40		97.65	1.78		97.25	1.86	

Note: OC: degrees Celsius; mmHg: millimeters of Hydrogenium; x: times; %: percent; sd: standard deviation; sign: significance (probability)

Table 5. ANOVA Test Results (F-Test) Vital Signs after Effleurage Back Massage

No	Variable	Meeting / Intervention …											
		1		2		3		4		5		6	
		F-Value	sign	F-Value	sign	F-Value	sign	F-Value	sign	F-Value	sign	F-Value	Sign
1	Temperature (^{O}C)	47.011	0.000	50.317	0.000	31.045	0.000	35.812	0.000	20.607	0.000	41.078	0.000
2	Systole (mmHg)	18.397	0.000	20.973	0.000	7.938	0.006	1.391	0.241	2.991	0.087	1.895	0.172
3	Diastole (mmHg)	11.150	0.001	2.874	0.093	0.992	0.322	9.200	0.003	24.078	0.000	18.541	0.000
4	Pulse (x/minute)	0.011	0.916	0.496	0.483	0.108	0.743	0.008	0.930	1.786	0.184	2.986	0.087
5	RR (x/minute)	22.812	0.000	18.505	0.000	26.390	0.000	28.323	0.000	21.691	0.000	13.406	0.000
6	SaO_2 (%)	1.567	0.214	12.101	0.001	5.914	0.017	5.364	0.023	3.219	0.076	0.318	0.574

Note: OC: degrees Celsius; mmHg: millimeters of Hydrogenium; x: times; %: percent; sd: standard deviation (standard deviation); sign: significance (probability)

Table 6. Independent test results and Anxiety ANOVA after Intergroup Treatment

No.	Measurement	Group	Score						
			Minimum	Maximum	Average	sd	Independent t-test sign	Analysis of Variance (Anava)	
								F-Value	Sign
1	1st anxiety	Control	.00	31.00	5.58	7.54	0.474	0.067	0.796
		Treatment	.00	21.00	5.22	5.66			
2	2nd anxiety	Control	.00	15.00	3.64	3.70	0.003	1.459	0.230
		Treatment	.00	18.00	4.90	5.44			
3	3rd anxiety	Control	.00	15.00	3.67	3.71	0.003	0.811	0.370
		Treatment	.00	17.00	4.59	5.28			
4	4th anxiety	Control	.00	15.00	3.69	3.68	0.003	0.418	0.520
		Treatment	.00	17.00	4.35	5.26			
5	5th anxiety	Control	.00	15.00	3.56	3.68	0.028	0.053	0.818
		Treatment	.00	17.00	3.78	5.06			
6	6th anxiety	Control	.00	15.00	3.53	3.74	0.055	0.026	0.873
		Treatment	.00	17.00	3.69	4.99			

Note: sd: standard deviation

the solitary tract (NTS) and locus coeruleus (LC), which play a pivotal role in blood pressure regulation and reactions to stress (Muller et al., 2016). Massage emphasizes the tissue; hence, there is an increase in the tissue. The increased tissue will advance the pressure gradient between the tissue and the blood vessels. This condition enhances the movement of fluid between tissues and blood vessels. Thus, it has an impact on blood pressure. Raising with the hands also facilitates comfort and relaxation, reducing stress and lowering blood pressure. Massage also allows a decrease in the hormone cortisol and facilitates the release of endorphins which possess an impact on dilating blood vessels, causing a decrease in blood pressure.

The massage process should be performed up to 5 times, followed by a rest phase. The results of this study are in accordance with (Moghadasi et al., 2021), which revealed that after the application of Swedish massage twice a week for 4 weeks, there was a decrease in systolic blood pressure of 6.44 mmHg, diastolic blood pressure of 4.77 mmHg, and respiration of 0.94 breaths per minute. Another research in line is (Supa'At et al., 2013), which illustrates the results after massage for one hour per week for 4 weeks that there is a decrease in systolic blood pressure of 12 mmHg and diastolic blood pressure of 5 mmHg. Effleurage back massage, which is part of Swedish massage, is an action that manipulates soft tissues and muscles, which will increase circulation, increase parasympathetic stimulation, increase the release of hormones and endorphins, which cause a decrease in heart rate, and blood pressure and respiration.

The results of the analysis uncovered a difference in the anxiety scores between the group who applied effleurage back massage and the group not receiving effleurage back massage. Effleurage back massage does not affect the level of anxiety in patients with hypertension. The results of this study are in accordance with the research by (Chen et al., 2013), which demonstrates that back massage can reduce anxiety levels in patients with heart failure. Back massage promotes relaxation and reduces tension and anxiety. Back massage decreases sympathetic activity and increases parasympathetic activity, which owns an impact on anxiety and stress levels (Supa'At et al., 2013).

CONCLUSION

Effleurage back massage performed for 21 minutes can reduce systolic blood pressure by 13.88 mmHg, diastolic blood pressure by 10.08 mmHg, pulse by 9.76 times per minute and respiration by 0.67 times per minute. Effleurage back massage is effective after 5 massages and should be given a time lag for the next massage. Effleurage back massage can be implemented as a nursing intervention to control blood pressure and prevent complications.

SUGGESTION

Primary hypertension patients should receive effleurage back massage for 21 minutes three times a day as a companion to pharmacological management to reduce blood pressure, respiration rate and increase

oxygen saturation. Primary hypertension patients still maintain a healthy lifestyle and routine control at health services and take medication regularly according to the instructions of health workers to control blood pressure and prevent complications.

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