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MOTOR RELAXATION OF BLOOD PRESSURE IN HEMODIALYSIS PATIENTS

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ABSTRACT

Background: Hemodialysis is one of the management measures for patients with chronic renal failure, apart from having benefits, on the other hand, it can generally cause physical, psychological stress to patients during and after hemodialysis, one of which is blood pressure instability. Motor relaxation is a physical exercise on the patient's upper and lower extremities during hemodialysis which can cause the patient's relaxation response during hemodialysis. **Objective:** To analyze the effect of motor relaxation on systolic and diastolic blood pressure. **Methods:** Used a *True Experimental* approaches *pre-post test design with control group*, research was conducted in RSU Anutapura Palu with the number of 40 respondents who met the inclusion criteria using the technique of *simple random sampling*. Respondents were divided into intervention groups (n = 20) and control groups (n = 20). Data analysis used *Repeated Measures ANOVA* test. **Results:** It shows that there is a significant difference in systolic blood pressure in the intervention group before and after the intervention with a *p value of* 0.000 *<0.05* and there is a significant difference in diastolic blood pressure in the intervention group before and after the intervention with *p value* 0.000 <0, 05 **Conclusion:** Relaxation motor effect on the blood pressure fitting ie n undergoing hemodialysis. It is suggested that this intervention could be used as an independent nursing measure in reducing complications of hemodialysis.

KEYWORD: *Motor Relaxation, Blood Pressure, Systolic, Diastolic.*

INTRODUCTION

Chronic kidney failure is one of the main causes of morbidity, mortality and high medical costs in the world, which is a global threat, especially developing countries such as Brazil, Mexico, Thailand, Indonesia and other developing countries because the therapy is expensive and takes a lifetime *Global Burden Disease* in 2018 around 956,200 people died due to chronic kidney disease.[1,2] Data from the *World Health Organization for* patients with kidney failure, both acute and chronic, reached 50%, whereas only 25% were known and received treatment and 12.5% were treated well.[3]

The prevalence of chronic kidney failure in Indonesia in 2013 based on a doctor's diagnosis in the population aged> 15 years was 0.2 %. Then the data is increased again in 2018 at 0, 38 %. With the highest prevalence in the province of North Kalimantan at 0.64% followed by North Maluku province at 0.66% and Central Sulawesi in the 3rd position with a prevalence of 0.52% and is one of the most common causes of death in Central Sulawesi.[4] D ata obtained from Reporting and Recording System Hospital (SP2RS), obtained a description that chronic kidney disease was ranked four out of ten non-communicable diseases that cause most deaths in hospital in Indonesia amounted to 3.16%, or about 3047 death rate.[4]

Patients with end-stage chronic renal failure or *ESRD*, there are two alternative treatment treatments, namely hemodialysis and kidney transplant.[5] in Indonesia in 2018 the prevalence of chronic kidney failure sufferers who have had or are on dialysis in people aged ≥ 15 years is 19.8% in Central Sulawesi Province, the proportion of hemodialysis is 14.5 %.[4]

The process of hemodialysis therapy itself, which takes 5 hours, will generally cause physical stress to the patient during and after hemodialysis.[5] Patients will feel fatigue, headaches, muscle cramps and cold sweat due to unstable blood pressure. During the hemodialysis period, it was found that patients with hypotension reached 30% and 10-15% had hypertension.[6] Physical symptoms of hemodialysis that often occur are changes in blood pressure stability. Changes the pressure of blood in hemodialysis patients occur due to chronic renal failure patients GFR of less than 15%. When GFR is less than 15% of patients will experience damage to the nephron arteries and result in uncontrolled blood pressure.[6,7] Blood pressure management is very important to improve clinical outcome and quality of life for patients undergoing hemodialysis. An area of concern for nurses

is related to non-pharmacological treatments to prevent blood pressure instability.[8]

Relaxation techniques are natural healing techniques and are part of a *holistic self-care* strategy to deal with complaints such as fatigue, pain, sleep disturbances, stress and anxiety. Physiologically, relaxation will stimulate the parasympathetic nervous system thereby increasing endorphin production, lowering the *heart rate* , increasing lung expansion so that it can develop optimally and the muscles relax.[9]

One of the relaxation techniques that can be used is motor relaxation, which is a relaxation technique in the form of stretching or stretching the muscles to reduce tension and anxiety so that a person returns to a relaxed state and restores physical and psychological functions. A study conducted by Stanley, et al. Applied relaxation techniques *holistic breathing* in 94 patients with terminal kidney disease who underwent hemodialysis for six weeks. The result was 53% of respondents said they felt relaxed and 27% said that fatigue was reduced and had increased energy levels.[10]

Specializing researching *relaxation motor* to the pressure of blood in hemodialysis patients has not been done considering the physical handling is necessary. In connection with this, it is necessary to conduct research on "motor relaxation has an effect on blood pressure in chronic renal failure patients undergoing *hemodialysis*".

Research Methods

Research design

This research is quantitative with *True experimental design* using the *Randomized Pre-test Post-test design with Control Group Design*, which is to reveal the possibility of motor relaxation having an effect on blood pressure stability by involving the control group and the experimental group.

Population and Sample

The reference population in this study were all patients with stage V chronic renal failure (*ESRD*) undergoing hemodialysis. and the population in this study were patients with end-stage renal failure who underwent hemodialysis twice a week in Anutapura Hospital, Palu.

This study used a *simple random sampling technique* for 60 patients divided into 3 groups, namely the intervention group (n = 20), control group I (n = 20) and control group II (n = 20). This technique is performed by identifying patients according to inclusion and exclusion criteria.

The analysis used to determine the effect of motor relaxation on blood pressure was using *the Repeated Measures ANOVA test*.

RESEARCH RESULT

Characteristics of Hemodialysis Patients

Table 1: Characteristics of respondents based on age, gender, level of education at Anutapura Hospital, Palu.

Variable	Intervention (n = 20)		Control (n = 20)		Total		*p*
	F	%	F	%	N	%	
Age							
22-41	7	35	7	35	14	35	
42-61	12	60	13	65	25	62.2	0.139
> 61	1	5	0	0	1	2.5	
Gender							
Male	15	75	15	75	30	75	1,000
Women	5	25	5	25	10	25	
Level of education							
SD	2	10	2	10	4	10	
Junior High	3	15	4	20	7	17	
High school	10	50	7	35	17	42.5	0.057
S1	5	25	5	25	10	25	
S2	0	0	2	10	2	5	

Table 1 based on the characteristics of respondents shows that the largest age is in the range 42-61 years, namely 32 respondents (53.3%), male gender as many as 45 respondents (75%) and female gender as much as 15 respondents (25%), high school education level. as many as 21 respondents (35%).

Changes in systolic blood pressure in hemodialysis patients in the control group and the intervention group before and after being given motor relaxation intervention.

Table 2: Changes in systolic blood pressure of hemodialysis patients in the control group and the intervention group before and after the motor relaxation intervention.

Group	Variable	*Mean* ± SD	Δ	*P*
Intervention (Motor Relaxation *)*	Pre systolic TD	160.90 ± 8,065	5.35	0.000
	TD Systolic Post Measures	155.55 ± 7.508		
	Pre systolic BP	160.90 ± 8,065	21.5	0.000
	Systolic BP follow-up 3.5 hours post HD	139.40 ± 6,984		
Control	Pre systolic BP	160.60 ± 7,493	4.1	0.000
	Post-action systolic BP	156.50 ± 7,688		
	Pre systolic BP	160.60 ± 7,493	4	0.000
	Systolic BP follow-up 3.5 hours post HD	156.60 ± 7,323		

Table 2, based on the *Repeated Measures Anova* test, there is a significant difference in systolic blood pressure in the 8th *pre* and *post-* action intervention group for 4 weeks *(p = 0.001)* and there is a significant difference at *follow-up* 3.5 hours post HD action 8 for 4 weeks *(p = 0,000*).

Changes in Diastolic Blood Pressure in Hemodialysis Patients in the Control Group and the Intervention Group Before and After being given the Motor Relaxation Intervention.

Table 3: Changes in Diastolic Blood Pressure of Hemodialysis Patients in the Control and Intervention Groups Before and After Motor Relaxation Intervention.

Group	Variable	*Mean* ± SD	Δ	*P*
Intervention (Motor Relaxation *)*	Pre. Diastolic BP	103.40 ± 10,081	9	0.000
	Post Action Diastolic TD	94.40 ± 7,619		
	Pre diastolic BP	103.40 ± 10,081	20.8	0.000
	Diastolic BP *Follow-up* 3.5 hours post HD	82.60 ± 4,558		
Control	Pre. Diastolic BP	99.40 ± 10,440	3.65	0.000
	Post Action Diastolic TD	95.75 ± 7,412		
	Pre diastolic BP	99.40 ± 10,440	7.15	0.000
	Diastolic BP *Follow-up* 3.5 hours post HD	92.25 ± 5,600		

Table 3, based on the *Repeated Measures Anova* test, there is a significant difference in post-8th action diastolic blood pressure for 4 weeks (*p* = 0.000) and there is a significant difference at follow-up 3.5 hours post HD action 8 for 4 weeks (*p.* = 0.000).

Differences in systolic blood pressure of hemodialysis patients in the control group and the intervention group before and after being given motoric relaxation intervention.

Table 4: Differences in systolic blood pressure of hemodialysis patients in the control group and the intervention group before and after being given motoric relaxation intervention.

Group	*Type III Sum of Squares*	*D f*	*Mean Square*	F	*P*
Between Group	3246,700	2	1623,350	20,972	0.000

** Repeated Measures ANOVA test*

Table 4 is based on the *Test of Beetwen Subject Effect ANOVA* test, there is a significant difference in the results of systolic blood pressure with a value of F = 20,972 and *p value* <0.05 (*p = 0.000)*. indicates that the F value for the factor "systolic blood pressure between groups" has a statistically significant difference. it can be concluded that there is a significant difference in systolic blood pressure between the control group and the intervention group.

Differences in Diastolic Blood Pressure in Hemodialysis Patients in the Control Group and the Intervention Group Before and After Motoric Relaxation Intervention.

Table 5: Differences in Diastolic Blood Pressure of Hemodialysis Patients in the Control and Intervention Groups Before and After Motoric Relaxation Intervention.

Group	*Type III Sum of Squares*	*Df*	*Mean Square*	F	*p*
Between Group	1121,233	2	560,617	14,267	0.000

** Repeated Measures ANOVA test*

Table 5 is based on the *Test of Beetwen Subject Effect ANOVA* test, there is a significant difference in the results of systolic blood pressure with a value of F = 14,267 and *p value* <0.05 (*p = 0.000)*. showed that the F value for the factor "diastolic blood pressure between groups" was statistically significant. it can be concluded that there is a significant difference in systolic blood pressure between the control group and the intervention group.

DISCUSSION

Respondent Characteristics

The results based on the characteristics of the age of the respondents showed most patients who undergo hemodialysis at kelomp ok aged 41-61 years as many as 25 respondents (62, 2 %). The results of this study are consistent with Sakitri's research that the age of most respondents with chronic kidney disease was an average of 46.8 years.[15] Dewi's research results also stated that the average age of the respondents was 46.97 years.[16]

Age is a factor that can describe the condition and affect one's health. As a person gets older, his body system also decreases in function **.** Renal and urinary tract function will change with age. Increasing the age above 40 years, there will be a progressive decrease in the glomerular filtration rate (GFR) until the age of 70 years, approximately 50% of normal. Tubular function, including the ability to reabsorb and concentrate, also decreases with increasing age.[17,18]

The results of the study based on the gender characteristics of the respondents showed that the most respondents were male, namely 30 respondents (75%). The results of the same study were also conducted by S akitri as 56.25% of respondents were male.[15] Research conducted by Sulistyaningsih also states that 60% of patients undergoing hemodialysis are male.[19]

Chronic kidney disease itself is not influenced by gender, however, there are several trends why men get chronic kidney disease more often, this can be influenced by several factors. The biggest factor is that men tend to smoke and consume alcohol. In the long term this habit can lead to hypertension and diabetes mellitus, which if this disease occurs continuously can cause risk factors for chronic kidney disease.[20]

The results of the study were based on the characteristics of the education level of the most respondents with high school education (42, 5 %). The education level of respondents from the intervention group and control group, the majority of respondents' education is senior high school (SMA). Education is obtained through a formal level and is an effort to acquire knowledge.

Knowledge or cognitive is one of the most important domains in shaping one's actions.[21] The higher the level of education of a person will raise awareness to seek treatment and care for health problems faced, including patients, it will be easier and more understanding to be given information about an effort to program therapy and rehabilitation for patients with chronic kidney disease undergoing hemodialysis by doing physical exercise and others.[22]

Blood pressure

Intradialysis blood pressure is a sign that must be monitored and observed every hour during hemodialysis because one of the most common complications of hemodialysis is intradialytic hypotension and interdialytic hypertension which occurs between the third and fourth hours of intradialysis.[23]

The results showed the mean changes in systolic blood pressure before and after the motor relaxation intervention in the intervention group 160.90 to 139, 40 at 3.5 hours post HD *follow-up*. The results of statistical tests using *Repeated Measures ANOVA* analysis showed that in the intervention group there was a significant difference p < 0.05 (*p value* 0, 000) compared to the control group *p value* = 0.000 . Clinically, the results of the measurement of systolic blood pressure showed that the *mean* change in the intervention group was 139, 40, the decrease in blood pressure did not reach the hypotension condition. Relaxation motor can help lower systolic blood pressure significantly for 8 weeks in a row.

The results showed the mean change in diastolic blood pressure before and after motor relaxation intervention in the intervention group 103.40 to 82.60 at 3.5 hours of follow-up post HD. The results of statistical tests using the Repeated Measures ANOVA analysis showed that in the intervention group there was a significant difference p <0.05 (p value = 0.000) compared to the control group p value = 0.000 . Clinically, the results of measuring systolic blood pressure showed that the mean change in the intervention group was 82.60, the decrease in blood pressure did not reach the hypotension condition. Motor relaxation can help lower diastolic blood pressure significantly for 8 consecutive weeks. In line with the research conducted by Astuti , there was an effect of exercise on blood pressure regulation (p value = 0.004).[24]

One of the adequate hemodialysis processes can be demonstrated in the absence of complications that occur during intradialysis. Various studies have been developed to determine the benefits of *exercise* during dialysis and the types of exercise that are safe to do during the hemodialysis process, Chan and Lim Wong explain that low and moderate activity levels can reduce complaints of hemodialysis complications.[25] intervention can improve heart pumping efficiency and lowers the heart rate at rest. In the second *post test* condition, a distance of 3.5 hours for the patient to feel relaxation and rest after the action is carried out, so

that it can reduce systolic and diastolic blood pressure in hemodialysis patients.

Previous research has been conducted to provide useful activities while patients undergoing hemodialysis, namely research conducted by Astuti on exercise during hemodialysis also has a significant effect on systolic and diastolic blood pressure with p value = 0.000.[20] Research conducted by Girija on physical activity during hemodialysis can provide benefits for hemodialysis patients, such as reducing the risk of complications that can lead to death, and can provide benefits in improving the patient's quality of life.[26]

Regular motor relaxation has the advantage of improving muscle health. Exercises carried out stimulate the growth of small blood vessels in the muscles, this will help to efficiently deliver oxygen to the muscles, can improve overall circulation and lower blood pressure and remove irritating metabolic waste products such as lactic acid. The results of Ganik's research are that relaxation conditions can reduce vascular resistance so that it can lower or stabilize blood pressure.[15,18]

Relaxation motor give significant results meaningful to changes in systolic blood pressure d a n diastolic in patients on hemodialysis. Intervention provide improvements to the physical effects of the patient, the physical effects generated that is able to increase the energy of the heart muscle in performing the function of pumping that occurs stimulus to the muscle fibers covering the response of the sympathetic nervous occur vasoconstriction of peripheral blood vessels and increase heart rate and increased pressure blood so that it will increase back cardiac output resulting from increased contractility of the heart muscle, heart rate and blood flow along the working muscle. Changes that occur during rest include a decrease in heart rate with a decrease in sympathetic dominance and levels of epinephrine and nonepinephrine, as well as being able to increase energy to all cells thereby reducing peripheral resistance, if cardiac output and peripheral resistance are reduced, blood pressure is also reduced.

This Intervention cause a relaxation response that is able to strongly influence the blood pressure systolic and diastolic, if done regularly can improve the cardiovascular system that is, increases *cardiac output*, improve *venous return* and improve myocardial contraction. This condition will have an effect on the adequacy of the cardiovascular system and blood vessels so that during hehodialysis, the system is able to adapt and compensate positively. The result is a stable blood pressure, i.e. no hypotension and hypertension during dialysis. It can be interpreted that these two interventions when combined will be able to strengthen and enlarge the heart muscle so that circulation will improve so that it can reduce systolic blood pressure.

CONCLUSION

The results showed that motor relaxation was proven to affect systolic blood pressure and diastolic blood pressure values. So in an effort quality of life for hemodialysis patients is by way of providing services or the patient is taught relaxation motor and audio to be heard when the Islamic tausiyah hemodialysis patients at a dose that can be used according the research that is 2 times a week every hemodialysis.

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