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The Effect of Progressive Muscle Relaxation Technique on Anxiety Levels in Chronic Kidney Failure Patients Undergoing Hemodialysis at RSPAD Gatot Soebroto

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Abstract

Bacground: Patients with chronic kidney disease undergoing hemodialysis frequently experience anxiety duet o the continuous nature of the therapy. Progressive muscle relaxation techniques are used to help reduce anxiety by controlling muscle tension and regulating patients emotional responses. **Objective:** To determine the effect of progressive muscle relaxation techniques on anxiety levels among patients with chronic kidney disease undergoing hemodialysis at RSPAD Gatot Soebroto. **Methods:** This study employed a *pre experimental one group pretest-posttest design*, total sampling was used, involving 21 respondents who met the inclusion and exclusion criteria. The *Hamilton Anxiety Rating Scale* (HARS) was utilized to measure anxiety levels during the pretest and posttest. Data analysis was performed using the *Wilcoxon Signed Rank Test*. **Results:** A reduction in anxiety levels was observed. During the pretest, 16 respondents experienced mild anxiety and 5 respondents experienced moderate anxiety. After the intervention, anxiety levels decreased, with 19 respondents experiencing no anxiety and 2 respondents experiencing mild anxiety. **Conclusion:** Progressive muscle relaxation techniques significantly reduced anxiety levels in patients undergoing hemodialysis, with a p-value of 0.00 ($p < 0.05$). **Recommendation**: This study provides evidence that progressive muscle relaxation is an effective, safe, and simple non-pharmacological intervention for reducing anxiety in patients with chronic kidney disease undergoing hemodialysis, and may serve as a reference for clinical practice, patient self-management, and future research.

Keyword : *Anxiety, Chronic Kidney Disease, Hemodialysis, Progressive Muscle Relaxation*

INTRODUCTION

Chronic kidney disease is a progressive and irreversible decline on kidney function, resulting the inability of the kidneys to maintain fluid balance and excrete metabolic waste products through urine [1]. Chronic kidney disease is characterized by the impaired ability of the kidneys to maintain homeostatic functions, including the excretion of metabolic waste, regulation of fluid balance, electrolyte balance, and acid–base balance [2]. This condition persists for more than three months and defined by a glomerular filtration rate of <60 mL/min/1.73m² accompanied by albuminuria [3]. Chronic kidney disease can be triggered by many factors, including hypertension, diabetes mellitus, obesity, and unhealthy lifestyles; if not optimally managed, it may progress to complications and ultimately lead to death [4].

Renal replacement therapy in patients with chronic kidney disease includes conservative therapy, hemodialysis, and kidney transplantation [5]. Hemodialysis is the most commonly used to maintain physiological body functions by removing metabolic waste products and excess fluid from the blood, this therapy is generally performed one to three times per week over a long-term period or for a lifetime until the patient receives a kidney transplant [6].

Globally, the prevalence of chronic kidney disease is increasing, according to [7] chronic kidney disease ranks as the 11th leading cause of death in the world. Reference [8] reported that in 2020 there were 1.2 million deaths due to chronic kidney disease, followed by 254,028 deaths in 2021 and 843.6 million deaths in 2022,

with mortality projected to increase by up to 41.5% by 2040. In Indonesia, the prevalence of chronic kidney disease is estimated to be approximately 2% of the total population, with the highest number of cases reported in Maluku, with 4,351 cases [9]. This is followed by West Java with 114,619 cases, East Java with 98,774 cases, Central Java with 88,180 cases, North Sumatra with 33,884 cases, and DKI Jakarta with 24,981 cases diagnosed with chronic kidney disease [10]. RSPAD Gatot Soebroto indicate that the number of chronic kidney disease patients undergoing hemodialysis continues to increase, accompanied by a relatively high mortality rate.

Patients with chronic kidney disease who have recently initiated hemodialysis (≤6 months) are vulnerable to experiencing anxiety due to dependence on hemodialysis machines, lifestyle changes, and uncertainty regarding future health conditions. If left unaddressed, anxiety may reduce quality of life and increase the risk of depression, particularly among patients who are newly undergoing therapy and experiencing various complications [11].

The management of anxiety in patients with chronic kidney disease can be achieved through pharmacological and non-pharmacological approaches. Non-pharmacological interventions, particularly progressive muscle relaxation techniques, are considered safe, easy to implement, and effective in reducing anxiety without causing adverse effects [12]. This technique involves the systematic tensing and relaxing of muscle groups, thereby activating the parasympathetic nervous system, which plays a role in inducing relaxation and reducing stress hormone levels [13].

These statement are in line with previous studies, study [14] demonstrated that among 36 patients with chronic kidney disease at RSUD Dr. R. S. Bratanata Jambi, the intervention group experienced a greater reduction in anxiety levels compared to the control group. Research by [15] conducted at UNS Hospital showed a decrease in anxiety levels from moderate to mild following the application of progressive muscle relaxation techniques. In addition, study [16] reported a reduction in anxiety among patients with chronic kidney disease undergoing hemodialysis at Harapan dan Doa Hospital, Bengkulu City, after receiving progressive muscle relaxation interventions. reported a reduction in anxiety among patients with chronic kidney disease undergoing hemodialysis at Harapan dan Doa Hospital, Bengkulu City, after receiving progressive muscle relaxation interventions.

Based on a preliminary study conducted through interviews with 10 hemodialysis patients at RSPAD Gatot Soebroto, it was found that most patients who had been undergoing hemodialysis for ≤6 months experienced anxiety due to limited experience, insufficient understanding of hemodialysis procedures, and difficulty in controlling physical and emotional responses. This anxiety was characterized by feelings of restlessness, tension, fear, sleep disturbances, and somatic complaints during treatment. In addition, nurses in the hemodialysis unit had not implemented specific relaxation techniques as non-pharmacological interventions to reduce patient anxiety. Patients generally relied on self-directed distraction methods, such as using mobile phones or watching videos; however, these methods were considered less effective due to the noisy environment of the hemodialysis unit, limited patient concentration, and the lack of optimal physiological relaxation effects. Therefore, the researcher was interested in conducting a study entitled "The Effect of Progressive Muscle Relaxation Techniques on Anxiety Levels in Chronic Kidney Disease Patients Undergoing Hemodialysis at RSPAD Gatot Soebroto."

RESEARCH METHODOLOGY

This study employed a pre-experimental design using a one-group pretest–posttest

approach to analyze the effect of progressive muscle relaxation techniques on anxiety levels among patients with chronic kidney disease undergoing hemodialysis at RSPAD Gatot Soebroto. The study was conducted in the Hemodialysis Unit of RSPAD Gatot Soebroto from November 23 to November 29, 2025.

The sample in this study was determined using a total sampling technique, involving all members of the population who met the study criteria during the data collection period. Initially, researchers identified all patients with stage V chronic kidney disease (CKD) undergoing hemodialysis therapy in the hemodialysis unit of the hospital where the study was conducted.

Next, a screening process was conducted based on predetermined inclusion and exclusion criteria. Inclusion criteria included patients with stage V CKD who had undergone regular hemodialysis twice weekly for ≤6 months, were aged 45–74 years, and experienced mild to severe anxiety as measured using the Hamilton Anxiety Rating Scale (HARS). Furthermore, respondents were required to have vital signs within normal limits, be able to communicate effectively, cooperate in following instructions for progressive muscle relaxation techniques, and be willing to participate in the study by signing an informed consent. Conversely, patients who had been undergoing hemodialysis for >6 months, did not experience anxiety, were aged ≤45 years or ≥74 years, had decreased consciousness, acute complaints (such as nausea, vomiting, or shortness of breath), acute injuries or severe musculoskeletal disorders, uncontrolled severe heart disease, acute neurological disorders, physical limitations, were pregnant, or refused to sign informed consent were excluded from the study. Based on the screening results, a total of 21 patients met the inclusion criteria. Because this study used a total sampling technique, all eligible patients were included as respondents, resulting in a final sample size of 21 respondents. Hamilton Anxiety Rating Scale (HARS) was used as the instrument to measure the anxiety levels, which consists of 14 items and has been declared valid and reliable, with a Cronbach's alpha value of 0.793.

The progressive muscle relaxation intervention was administered in accordance with the standard operating procedure for 25–30 minutes and was conducted twice, following the respondents' hemodialysis schedules. Data collection was carried out through structured interviews using the Hamilton Anxiety Rating Scale (HARS) during the pretest and posttest. Data analysis included univariate analysis to describe respondent characteristics and bivariate analysis to determine differences in anxiety levels before and after the intervention. Data normality was assessed using the Shapiro–Wilk test. Normally distributed data were analyzed using a paired t-test, while non-normally distributed data were analyzed using the Wilcoxon Signed Rank Test.

RESULTS AND DISCUSSION

Results

Table 1. Distribution of Respondents by Age Among Patients with Chronic Kidney Disease Undergoing Hemodialysis at RSPAD Gatot Soebroto (n=21)

Variable	Mean	Median	SD	Min-max	95%CI
Age	55,52	52,52	8,750	45-71	51,54-59,51

Source: Primary data, 2025

Table 1 shows that the mean age of the respondents was 55.52 years, with the youngest respondent aged 45 years and the oldest aged 71 years.

Table 2. Distribution of Respondents by Sex Among Patients with Chronic Kidney Disease Undergoing Hemodialysis at RSPAD Gatot Soebroto (n=21)

Gender	Frequency	Precentage

	(f)	(%)
Male	15	71,4
Female	6	28,6
Total	21	100,0

Source: Primary data, 2025

Table 2 indicates that the majority of respondents were male, accounting for 15 respondents (71.4%).

Table 3. Distribution of Respondents by Duration of Hemodialysis Therapy at RSPAD Gatot Soebroto (n=21)

Duration of Hemodialysis Therapy	Frequency (f)	Precentage (%)
1 month	6	28,6
2 month	4	19,0
3 month	4	19,0
4 month	3	14,3
5 month	4	19,0
Total	21	100,0

Source: Primary data, 2025

Table 3 shows that the majority of respondents had been undergoing hemodialysis therapy for ≤3 months, with 14 respondents (66.7%).

Table 4. Anxiety Levels Before and After the Administration of Progressive Muscle Relaxation Techniques Among Patients with Chronic Kidney Disease Undergoing Hemodialysis at RSPAD Gatot Soebroto, November 2025 (n =21)

Anxiety Level	Frequency (f)			95% CI
	No Anxiety	Mild Anxiety	Moderate Anxiety	
Pretest	-	16	5	2,04-2,44
Posttest	19	2	-	0,96-1,23

Source: Primary data, 2025

Table 4 shows that prior to the administration of progressive muscle relaxation intervention, among 21 respondents, 16 respondents were categorized as having mild anxiety and 5 respondents had moderate anxiety. After the intervention, a reduction in anxiety levels was observed in all respondents. A total of 19 respondents were recorded as having no anxiety, while 2 respondents remained in the mild anxiety category.

Table 5. Results of the Wilcoxon Signed Rank Test on the Effect of Progressive Muscle Relaxation Techniques on Anxiety Levels Among Patients with Chronic Kidney Disease Undergoing Hemodialysis at RSPAD Gatot Soebroto, November 2025 (n = 21)

	N	Mean Rank	Sum Of Ranks	*P- value*
Negative Ranks	21	11.00	231.00	0,00
Positive Ranks	0	0,00	0,00	
Ties	0			
Total	21			

Source: Primary data, 2025

Table 5 shows that the results of the Wilcoxon Signed Rank Test indicated that all respondents experienced a reduction in anxiety levels after receiving the progressive muscle relaxation intervention. The analysis demonstrated a statistically significant effect, with a p-value of 0.00 ($p < 0.05$), among the 21 respondents.

Table 6. Effect of Progressive Muscle Relaxation Techniques on the Reduction of Anxiety Levels Among Patients with Chronic Kidney Disease Undergoing Hemodialysis at RSPAD Gatot Soebroto Based on HARS (n = 21)

Anxiety Level	Mean	Beda Mean	SE	95% CI		*P-value*
				Lower	Upper	
Pretest	2,24	0,38	0,141	0,086	0,674	0,005
Posttest 1	1,86					
Pretest	2,24	1,14	0,116	0,898	1,382	0,000
Posttest 2	1,10					

Source: Primary data, 2025

Table 6 shows the differences in the mean anxiety scores measured using the Hamilton Anxiety Rating Scale (HARS) before and after the administration of progressive muscle relaxation. The mean difference in anxiety scores was 0.38 at the first posttest and 1.14 at the second posttest. The results of the Wilcoxon Signed Rank Test yielded a p-value of 0.00 ($p < 0.05$), indicating a significant effect of progressive muscle relaxation techniques on anxiety levels among hemodialysis patients as measured by HARS.

Discussion

1. Respondent Characteristics

a. Based on Age

The results of this study showed that the mean age of patients with chronic kidney disease undergoing hemodialysis at RSPAD Gatot Soebroto was 55.52 years, with the youngest patient aged 45 years and the oldest aged 71 years. These findings are consistent with a study [17] which reported that the majority of patients undergoing hemodialysis were aged 46–55 years, accounting for 40% of the study population.

In addition, study [18] reported that the majority of patients undergoing hemodialysis were aged 56–65 years (48%) and 46–55 years (25%). These findings are consistent with research [19] which showed that most patients undergoing hemodialysis at RSUD Ulin Banjarmasin were in the 46–55-year age range, totaling 41 respondents. This is in line with theoretical explanations suggesting that with increasing age, glomerular filtration rate and renal blood flow gradually decline, after the age of 40 years, the glomerular filtration rate progressively decreases, and by the age of 70 years it may reach approximately 50% of normal levels, resulting in the loss of nephrons and decreased renal function, which subsequently increases the risk of developing chronic kidney disease [11].

b. Based on gender

The results of this study indicate that the majority of patients with chronic kidney disease undergoing hemodialysis at RSPAD Gatot Soebroto were male, accounting for 15 respondents (71.4%). This finding is consistent with a study [20] which reported that the majority of hemodialysis patients were male, with 60 male respondents compared to 53 female respondents.

Furthermore, study [21] reported that the majority of patients undergoing hemodialysis were male, with 37 male respondents compared to 31 female respondents. Similarly, research [22] indicated that most patients undergoing hemodialysis at RSUD dr. Zainoel Abidin were male, totaling 44 respondents, while 27 respondents were female. These findings are consistent with theoretical explanations suggesting that males have a higher risk of developing chronic kidney disease due to lower health awareness, poor adherence to medical treatment and dietary recommendations, and unhealthy lifestyle behaviors such as smoking, excessive alcohol and coffee consumption, as well as a higher incidence of kidney stones that may impair renal function [23].

c. Based on the length of hemodialysis therapy

The results of this study indicate that the majority of respondents had been undergoing hemodialysis therapy for ≤3 months, accounting for 14 respondents (66.7%). This finding is consistent with a study [4] which reported that most patients undergoing hemodialysis had a treatment duration of ≤3 months, totaling 20 respondents.

In addition, study [24] reported that the majority of patients undergoing hemodialysis had a treatment duration of ≤6 months, totaling 16 respondents. Similarly, research [25] indicated that most patients undergoing hemodialysis had a duration of ≤6 months, with 28 respondents. These findings are consistent with theoretical explanations suggesting that patients who have been undergoing hemodialysis for ≤6 months tend to experience higher levels of anxiety. This is because patients have not yet fully adapted to the life-threatening nature of the disease, the need for long-term therapy, lifestyle changes affecting both patients and their families, feelings of loss of bodily function, and the occurrence of various complications, which make the hemodialysis process a psychologically challenging experience for patients with chronic kidney disease [26].

2. **Anxiety Level Before and After Progressive Muscle Relaxation Techniques Were Given to Chronic Kidney Failure Patients Undergoing Hemodialysis at RSPAD Gatot Soebroto**

The results of this study showed that prior to the intervention, 16 respondents were classified as mild anxiety and 5 respondents as moderate anxiety. After the intervention, anxiety levels decreased in all respondents; 19 respondents no longer exhibited anxiety, while 2 respondents remained in the mild anxiety. These findings are consistent with a study [17] which reported that before the intervention, 10 respondents had mild anxiety, 12 had moderate anxiety, and 2 had severe anxiety. After the intervention, 14 respondents were categorized as having no anxiety, 8 respondents had mild anxiety, and 2 respondents had moderate anxiety.

In addition, study [15] reported that prior to the intervention, 17 respondents were classified as having moderate anxiety and 1 respondent as having severe anxiety. After the intervention, 6 respondents were categorized as mild anxiety and 12 respondents as moderate anxiety. These findings are consistent with Sister Callista Roy's Adaptation Model, which explains that human adaptive responses are influenced by information received and processed through regulatory and cognitive mechanisms, including emotional responses. In this study, patients undergoing hemodialysis served as the focal stimulus, progressive muscle relaxation functioned as the input, and anxiety levels measured using the Hamilton Anxiety Rating Scale (HARS) represented the output [27]. Progressive muscle relaxation generates positive physiological signals that help patients achieve a relaxed state by reducing muscle tension. This process influences the hypothalamus and regulates autonomic nervous system activity, thereby contributing to a reduction in anxiety levels [28].

3. **The Effect of Progressive Muscle Relaxation Technique on Anxiety Levels in Chronic Kidney Failure Patients Undergoing Hemodialysis at RSPAD Gatot Soebroto**

This study began with participant screening and obtaining written consent as evidence of respondents' willingness to participate. Eligible respondents underwent an initial anxiety assessment (pretest) using the Hamilton Anxiety Rating Scale (HARS) administered through a structured interview. Next, respondents received a progressive muscle relaxation intervention according to established standard operating procedures. Anxiety levels were reassessed after the intervention (posttest) using the same instrument. The intervention and posttest

assessment were repeated during the next hemodialysis session. Analysis showed that all respondents experienced a decrease in anxiety levels after the progressive muscle relaxation intervention, with a p-value of 0.00 ($p<0.05$). These findings are consistent with a study [29] which reported that anxiety levels decreased following the application of progressive muscle relaxation techniques.

Furthermore, study [30] reported that the implementation of progressive muscle relaxation techniques effectively reduced anxiety among patients with chronic kidney disease. Similarly, research [31] stated that progressive muscle relaxation had a significant effect on reducing anxiety levels. These findings are consistent with theoretical explanations suggesting that progressive muscle relaxation helps release muscle tension by systematically tensing and then relaxing specific muscle groups, allowing individuals to perceive the contrast between tension and relaxation, thereby reducing anxiety [11]. When the body enters a relaxed state, physiological responses such as pulse rate, heart rate, and respiratory rate decrease, leading to improved blood circulation and a reduction in anxiety levels [32].

CONCLUSION

From the results of the research that has been carried out, it can be concluded that:

1. The characteristics of the respondents in this study indicate that:
   a. The average age of respondents was 55.52 years, with an age range of 45 to 71 years.
   b. The majority of respondents were male (15 respondents (71.4%).
   c. The majority of respondents had only been on hemodialysis for less than 3 months 14 respondents (66.7%).
2. Before the intervention, 16 respondents were categorized as mild anxiety and 5 respondents had moderate anxiety. After the intervention, anxiety levels decreased in all respondents; 19 respondents no longer exhibited anxiety symptoms, while 2 respondents remained in the mild anxiety category.
3. There was a significant effect of progressive muscle relaxation techniques in reducing anxiety levels among patients with chronic kidney disease undergoing hemodialysis at RSPAD Gatot Soebroto, with a p-value of 0.00 ($p < 0.05$).

RECOMMENDATION

Based on the results of this study, progressive muscle relaxation has been proven to be effective in reducing anxiety levels among hemodialysis patients. Therefore, it is recommended that this technique be routinely implemented as a non-pharmacological nursing intervention, either through education for patients and their families or by integrating it into standard nursing care in hemodialysis units. The implementation of this technique is expected to enhance patient comfort, support psychological well-being, and improve the overall quality of nursing care.

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