

© 2017 The Author(s)

This is an Open Access article distributed under the terms of the [Creative Commons Attribution 4.0 International License](#) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ORIGINAL RESEARCH

ISSN: 2477-4073

## EFFECT OF PROGRESSIVE MUSCULAR RELAXATION ON ANXIETY LEVELS IN PATIENTS WITH CHRONIC KIDNEY DISEASE UNDERGOING HEMODIALYSIS IN THE GENERAL HOSPITAL OF TUGUREJO SEMARANG, INDONESIA

Ary Astuti<sup>1\*</sup>, Anggorowati<sup>2</sup>, Andrew Johan<sup>2</sup>

<sup>1</sup>Master of Nursing, Faculty of Medicine, Diponegoro University, Semarang, Indonesia

<sup>2</sup>Faculty of Medicine, Diponegoro University, Semarang, Indonesia

\*Corresponding author:

Ary Astuti

Faculty of Medicine, Diponegoro University. Jl. Prof. Soedarto, Tembalang, Kec. Tembalang, Kota Semarang, Jawa Tengah 50275, Indonesia. E-mail : nersary83@yahoo.com

### ABSTRACT

**Background:** Patients with chronic kidney disease undergoing hemodialysis suffer changes in lifestyle, which cause physical and psychosocial problems, particularly anxiety. Progressive muscular relaxation is considered as an intervention to reduce anxiety.

**Objective:** This study aims to examine the effect of progressive muscular relaxation in reducing anxiety in patients with chronic kidney disease undergoing hemodialysis.

**Methods:** This study used a quasi-experimental design involved 78 respondents, with 38 randomly assigned in the intervention and control group. The progressive muscular relaxation was performed on 14 muscle groups for 4-week period. Hamilton anxiety rating scale was used to measure anxiety. Univariate, bivariate and multivariate analyses were performed for data analyses.

**Results:** The results showed a statistically significant difference in anxiety values between the intervention and control group with p-value 0.000 (<0.05).

**Conclusion:** There was a significant effect of progressive muscular relaxation in reducing anxiety in patients with chronic kidney disease undergoing hemodialysis. The results of this study is expected to be one reference in making the progressive muscular relaxation as a nursing intervention in reducing anxiety in patients undergoing hemodialysis.

**Keywords:** anxiety, progressive muscular relaxation, hemodialysis, chronic kidney disease

### INTRODUCTION

Chronic Kidney Disease (CKD) is an abnormality of renal structure or function for more than 3 months progressive to terminal renal failure with Glomerular filtration rate (GFR) less than 15 ml /

minute / 1.73 m<sup>2</sup>, and needs to initiate hemodialysis or renal transplant.<sup>1</sup> Patients undergoing hemodialysis experience lifestyle changes in the family. The patients will experience a sense of loss

because their normal lives are disrupted by hemodialysis activity and this can lead to psychological problems in CKD patients and unspecified anger will be projected into self and cause despair.<sup>2,3</sup>

Chronic kidney disease was the 27th leading cause of death in the world in 1990 and increased to 18th in 2010. While in Indonesia, the treatment of kidney disease is the second rank of largest funding by BPJS health after cardiac disease, and data on the distribution of cases and cost of claims in Advanced Outpatient Ward of BPJS health are until the third quarter of 2015.<sup>4</sup> In addition, the case of urinary system amounted to 3,094,915, as the third highest rank with the cost is more than 3 trillion rupiah.<sup>4</sup>

The mortality rate of patients with chronic kidney disease was 27 (62.8%) of 43 patients, and other studies indicated that all of the patients with CKD reported physiological and psychosocial stress.<sup>5</sup> The prevalence of depression in patients with hemodialysis was 20-30% until 47%,<sup>6</sup> while those who have severe depression was approximately 1.1- 15% in men and 1.8-23% in women. Prevalence of patients who had anxiety with hemodialysis was 24 (35.82%).<sup>7</sup>

Despair will be felt by the patient with long-term hemodialysis. Patients often feel worried about the condition of the illness due to unpredictable illness conditions whether to recover completely or not, thus causing problems in his life. Patients usually experience financial problems, difficulty in keeping jobs, disappearing sexual urges and even impotence, depression caused by chronic pain and fear of death.<sup>2,8</sup>

The impact of anxiety is related to situational crisis, stress, changes in health status, death threats, self-concept changes, lack of knowledge and hospitalization. The impact of such anxiety can be

minimized by the role of nurses in overcoming anxiety. The role of the nurse is very important in the prevention of anxiety and makes the patient not to feel anxious through comprehensive biological, psychological, social and spiritual nursing care.<sup>9</sup> The anxiety symptoms of patients undergoing hemodialysis are helpless, desperate, loss of interest in day-to-day, sleep changes, energy loss, irritability and restlessness.<sup>2</sup> However, these symptoms can be reduced by doing relaxation techniques.<sup>9</sup>

Progressive Muscular Relaxation (PMR) is a form of nursing intervention that can be administered to the patients undergoing hemodialysis to reduce anxiety.<sup>10</sup> PMR is a relaxation technique focusing on slowly tensing and then relaxing each muscle group, and focusing on the difference between muscle tension and relaxation.<sup>11</sup> Literature indicated that PMR is effective in reducing biological stress levels.<sup>12</sup> PMR results in a change in facial expression as an indicator of psycho-physiological tension, and this technique is also recommended as one of the relaxations for students in the end of the study.<sup>13</sup> Therefore, this study aims to examine the effect of PMR in decreasing anxiety in patients with chronic kidney disease undergoing hemodialysis.

## METHODS

### *Study Design*

This was a quasi-experimental study with pretest-posttest with control group design.

### *Setting*

This research was conducted on 13 April to 13 May 2017 in the General Hospital of Tugurejo Semarang, Indonesia.

### *Population and Sample*

The population in this study were all patients in hemodialysis ward of the

General Hospital of Tugurejo amounted to 234 people. There were 78 samples selected using simple random sampling, with 39 assigned in the intervention and control group. The sample size was calculated using the average formula of two independent populations,<sup>14</sup> with drop out anticipation 10%. The researchers determined that patients receiving hemodialysis therapy in morning shift were the treatment group, and the patients in the afternoon shift were the control group. Respondents in both groups were patients in the same hospital. The inclusion criteria of the sample were patients with hemodialysis therapy twice a week, aged 18-65 years, able to read and write, patients with HARS > 14 score and full consciousness, good hearing function, able to read and write, no infection or inflammation, trauma, severe and acute heart disease, and with AV-shunt and double lumen access.

#### *Intervention*

Progressive Muscular Relaxation is a procedure to get relaxation on the muscles in two steps: 1) to give a tension to a muscle group, and 2) to stop the tension and focusing on how the muscles relax, and feeling the sensation. This intervention was performed on 14 muscle groups in 8 times for 4-week period with a duration of 15 minutes per session. While the control group received deep breathing relaxation techniques as a Standard Operational Procedure (SOP) at the General Hospital of Tugurejo Semarang.

#### *Instrument*

Anxiety levels were measured using the Hamilton Anxiety Rating Scale, adopted from previous study in Indonesian language.<sup>15</sup> The scale consisted of 14 symptom groups in which each group has

more specific symptoms. Each symptom group was assigned a score of 0-4, which means that 0 means no symptoms, 1 mild symptom, 2 moderate symptoms, 3 hemorrhagic symptoms, and 4 very severe symptoms. Each score of the 14 symptom groups is summed to know the degree of anxiety of a person as a total score, consisting of: <14 no anxiety, 14-20 mild anxiety, 21-27 moderate anxiety, 28-41 severe anxiety, and 42-56 very severe anxiety. The instrument has been translated in Indonesian language with the permission of the instrument developer. The HARS scale has been proven to have validity and reliability to measure anxiety with alpha Cronbach 0.93.

#### *Data Analysis*

Data were analyzed by univariate, bivariate and multivariate. In univariate analysis, data were presented in terms of mean, median, standard deviation, minimum, and maximum in the form of frequency distribution and percentage of each variable. While bivariate analysis used t-test and multivariate analysis used multiple linear regression test.

#### *Ethical Consideration*

This research was approved by the Health Research Ethics Committee (KEPK) of Faculty of Medicine, Diponegoro University and the Hospital of Dr. Kariadi Semarang with No.106 / EC / FK-RSDK / III / 2017. The researchers confirmed that each respondent has obtained an appropriate informed consent.

## **RESULTS**

This study was conducted on 78 patients with chronic kidney disease who underwent hemodialysis, with 39 assigned in the intervention and control group.

**Table 1** Characteristics of the respondents

Variable	Group				<i>p-value</i>
	Intervention (n=39)		Control (n=39)		
	Σ	%	Σ	%	
Age (Year)					
Mean	48.64		50.07		0.752
Min-Max	22-65		27-64		
Gender					
Male	25	64.1	26	66.7	0.528
Female	14	35.9	13	33.3	
Education					
High	3	7.7	3	7.7	0.948
Low	36	92.3	36	92.3	
Employment					
Unemployed	19	48.7	20	51.3	0.825
Employed	20	51.3	19	48.7	
Marital status					
Single	5	12.8	6	15.4	0.209
Married	34	87.2	33	84.6	
Income					
> Rp.1.909.000,-	17	43.6	16	41.0	0.532
< Rp.1.909.000,-	22	56.4	23	59.0	
Length of hemodialysis treatment					
< 1 year	17	43.6	8	20.5	0.648
> 1 year	22	56.4	31	79.5	
Anxiety					
Mean	21.58		21.07		0.294
Min-Max	17-27		16-29		

The characteristics of the respondents as shown in the Table 1 indicated that the average age of respondents in this study was 49.35 years, with 65.4% of them were males. Majority of the respondents (92.3%) had low education levels, and 50% of them had no work. Most of them (55.9%) were married and the highest income (57.7%) was less

than 1.909.000 rupiah. It was 80.8% of respondents had long-term hemodialysis treatment. Table 1 also shows the statistical results of the equality test with  $p\text{-value} > 0.05$  in each variable, which indicated that there were no significant differences of the characteristics of respondents in both groups or homogeneous.

**Table 2** Difference in anxiety before and after intervention (progressive muscular relaxation) in the intervention and control group

Time of measurement	Anxiety value					
	Intervention group			Control group		
	Mean	SD	<i>p-value</i>	Mean	SD	<i>p-value</i>
Pretest	21.5897	2.74071	0.000	21.0769	3.04687	0.0463
Posttest	19.8718	2.34161		21.2051	2.80206	

Table 2 shows that there was a significant difference in anxiety value in the intervention group with p-value 0.000

and in the control group with p-value 0.0463

**Table 3** Analysis of difference on anxiety after given progressive muscular relaxation in the intervention and control group

Variable	Group	N	Mean	SD	SE	p-value
Anxiety	Intervention	39	19.8718	2.37480	0.38027	0.000
	Control	39	21.2051	2.68323	0.42966	

Table 3 shows the mean of anxiety in the control group was greater than the mean of anxiety in the intervention group with p-value 0.000, which indicated that

there were statistically significant differences in anxiety after PMR exercise in the intervention group and control group.

**Table 4** Factors contributing to anxiety

Characteristic	Anxiety					
	B	SE	Beta	p-value	R	R2
(Constant)	20.297	1.544		0.000	0.501	0.251
Length of hemodialysis treatment	-2.064	0.693	-0.298	0.004		
Group	2.152	0.547	0.394	0.000		

Table 4 shows a multivariate analysis of the factors that contribute to anxiety revealed that the length of hemodialysis treatment and the group had a significant association ( $p < 0.05$ ) with changes in anxiety, with the strong correlation ( $r = 0.501$ ). The magnitude of PMR odds for the change of anxiety was 25.1% ( $R = 0.251$ ), which indicated that the decrease in anxiety was more influenced by PMR exercises than the length of hemodialysis treatment.

## DISCUSSION

Findings showed that all patients with chronic kidney disease undergoing hemodialysis in this study experienced anxiety. This is in accordance with previous research revealed that the prevalence of patients with chronic kidney disease undergoing hemodialysis in the General Hospital of Soedarso Pontianak experienced moderate anxiety for 24 people (35.82%).<sup>16</sup> Anxiety becomes a

psychosocial problem that often arises in patients undergoing hemodialysis. Anxiety is a natural disorder of feeling characterized by a feeling of deep or sustained fear or anxiety, with uninterrupted in judging reality and not experiencing personality cracking.<sup>3</sup>

After the progressive muscular relaxation exercise in the treatment group, the anxiety of patients with CKD undergoing hemodialysis decreased significantly with the mean change of 21.58 to 19.87, from medium level of anxiety (55.26%) to low level of anxiety (31.58%). While in the control group, the mean of anxiety value of pretest was 21.07 and posttest 20.81. The anxiety level remains the same between pretest (50%) and posttest (47.37%).

Progressive muscle relaxation is a method that helps relive muscle tension in a sequential manner.<sup>17</sup> In this study, the PMR technique was performed for 15-30 minutes for 8 times in 4-weeks period.

The time of the implementation of PMR is different from previous studies that performed in 45 minutes for 5 days,<sup>13</sup> and also performed 2-3 times daily for 30 minutes in 10 weeks period.<sup>18</sup> However, the results were proven to be effective in decreasing anxiety.

The impact of PMR that can help an individual feel relaxed is supported by previous studies, revealed that progressive muscle relaxation was effective in lowering biological stress levels<sup>10</sup>; and it is better compared with diaphragmatic breathing exercise.<sup>13</sup>

Nurses are very important to provide support or counseling to decrease anxiety levels in patients, and they can perform self-care interventions to overcome anxiety experienced by patients. Interventions that can be implemented in patients with anxiety include environmental modification (according to individual preferences), using relaxation, building, coping with stress and anxiety, pharmacological interventions and additional strategies. This relaxation method aims to reduce muscle tension throughout the body and increase oxygen supply. In Nursing Intervention Classification (NIC),<sup>19</sup> nursing interventions conducted by nurses in overcoming anxiety is by instructing the client's ability to use relaxation techniques. On the other hand, the concept of self-care theory initiated by Orem can be applied as an optimal effort in performing patient care independently to meet the needs of the body,<sup>20</sup> especially to perform progressive muscular relaxation in this study.

## CONCLUSION

Based on the results of this study, it can be concluded that progressive muscle relaxation exercises significantly decrease anxiety in patients with chronic kidney

disease undergoing hemodialysis. Thus, this intervention can be applied as one of nursing interventions in the hospital.

## Declaration of Conflicting Interest

None declared

## Funding

This study was supported by Akper Pemkab Kotawaringin Timur Kalimantan Tengah, Indonesia.

## Author Contribution

All authors contributed equally in this study.

## References

1. Muttaqin A, Sari K. *Asuhan keperawatan gangguan sistem perkemihan [Nursing care in urinary disorder system]*. Jakarta, Salemba Medika; 2011.
2. Alam S, Hadibroto I. *Gagal ginjal [Kidney failure]*. Jakarta: Gramedia Pustaka Utama; 2007.
3. Hawari D. *Manajemen stress, cemas dan depresi [Management of stress, anxiety, and depression]*. Jakarta: Fakultas Kedokteran Universitas Indonesia; 2001.
4. Ministry of Health. *Hari ginjal sedunia [World kidney day]*. 2016. <http://www.depkes.go.id/article/print/16031000001/hari-ginjal-sedunia-2016>
5. Wahyudi IED, Pujo JL. *Angka kematian pasien end stage renal disease di ICU dan HCU RSUP dr. Kariadi [mortality rate of patients with end stage renal disease at ICU dan HCU RSUP dr. Kariadi]*. Semarang: Fakultas Kedokteran, Universitas Diponegoro; 2012.
6. Cheung YL, Molassiotis A, Chang AM. The effect of progressive muscle relaxation training on anxiety and quality of life after stoma surgery in colorectal cancer patients. *Psycho-Oncology*. 2003;12(3):254-266.
7. Amalia F, Azmi SA. Gambaran tingkat depresi pada pasien penyakit ginjal kronik yang menjalani hemodialisis di RSUP DR. M. Djamil Padang [Depression level of patients with



- chronic kidney disease undergoing hemodialysis at RSUP DR. M. Djamil Padang. *Jurnal Kesehatan Andalas*. 2015;4(1).
8. Baradero M, Dayrit MW, Siswadi Y. *Klien gangguan ginjal: Seri asuhan keperawatan [Patients with kidney failure: Nursing care series]*. Jakarta: EGC; 2005.
  9. Setyoadi K. *Terapi modalitas keperawatan pada klien psikogeriatric [Nursing modality therapy in clients with psychogeriatric]*. Jakarta: Salemba Medika; 2011.
  10. Alfianti NE, Setyawan D, Kusuma MAB. Pengaruh relaksasi otot progresif terhadap tingkat depresi pada pasien gagal ginjal kronik yang menjalani hemodialisis di Unit Hemodialisa RS Telogorejo Semarang [Effect of progressive muscle relaxation on depression in patients with chronic kidney failure undergoing hemodialysis at Hemodialysis Unit at Telogorejo Hospital Semarang]. *Jurnal Ilmu Keperawatan dan Kebidanan*. 2016;2(4).
  11. Conrad A, Roth WT. Muscle relaxation therapy for anxiety disorders: It works but how? *Journal of Anxiety Disorders*. 2007;21(3):243-264.
  12. Blararu M, Bloch B, Vadas L, et al. The effects of music relaxation and muscle relaxation techniques on sleep quality and emotional measures among individuals with posttraumatic stress disorder. *Mental Illness*. 2012;4(2).
  13. Zargarzadeh M, Shirazi M. The effect of progressive muscle relaxation method on test anxiety in nursing students. *Iranian Journal of Nursing and Midwifery Research*. 2014;19(6):607.
  14. Sastroasmoro S, Ismael S. *Dasar-dasar metodologi penelitian klinis [Basic clinical research methodology]*. Jakarta: Binarupa Aksara; 1995.
  15. Luana NA, Panggabean S, Lengkong JVM, Christine I. Kecemasan pada penderita penyakit ginjal kronik yang menjalani hemodialisis di RS Universitas Kristen Indonesia [Anxiety in patients with chronic kidney disease undergoing hemodialysis at Universitas Kristen Hospital Indonesia]. *Media Medika Indonesiana*. 2012;46(3):151-156.
  16. Rustina. Gambaran tingkat depresi pada pasien gagal ginjal kronik yang menjalani hemodialisis di RSUD Dr. Soedarso Pontianak tahun 2012 [Depression level in patients with chronic kidney failure undergoing hemodialysis at RSUD Dr. Soedarso Pontianak in 2012]. *Jurnal Mahasiswa PSPD FK Universitas Tanjungpura*. 2013;1(1): 1-15.
  17. Jacobson E. *Progressive relaxation*. 1938. Chicago: University of Chicago Press.
  18. Kumar P, Nayak Rr, Devi SK. Effectiveness Jacobson's progressive muscle relaxation technique (PMRT) to relieve anxiety among alcoholic patients MHI, SCB, Cuttack, Odisha. *IOSR Journal of Nursing and Health Science* 2015;4(4).
  19. North American Nursing Diagnosis A. *NANDA nursing diagnoses*. United States: North American Nursing Diagnosis Association; 1996.
  20. Bağ E, Mollaoğlu M. The evaluation of self-care and self-efficacy in patients undergoing hemodialysis. *Journal of Evaluation in Clinical Practice*. 2010;16(3):605-610.

**Cite this article as:** Astuti A, Anggorowati, Johan A. Effect of progressive muscular relaxation on anxiety levels in patients with chronic kidney disease undergoing hemodialysis in the General Hospital of Tugurejo Semarang, Indonesia. *Belitung Nursing Journal*. 2017;3(4): 383-389. <https://doi.org/10.33546/bnj.88>