

Original article

Reducing the hemodialysis patient stress level through progressive relaxation

Warih Andan Puspitosari^{1*}, Hanif Habibur Rohman², Arlina Dewi³

Abstract

Background: Hemodialysis is an effective treatment carried out for patients with chronic kidney failure to improve the quality of life. 80% of hemodialysis patients experience physical stress disorder and psychosocial stress related to treatment. When faced with stress, the body muscles become tense as the abdomen becomes tense and cramped, the chest feels tight, which impacts physical and psychosocial health, so it is necessary to have stress management training through relaxation techniques. This study aimed to determine the effect of progressive relaxation on stress levels in patients with hemodialysis. **Method:** This quasi-experimental pre-test and post-test study with a control group design. There were 58 respondents divided into two groups (intervention and control), and each group consisted of 29 people selected by random sampling. Measurement of stress levels using questionnaire Depression Anxiety Stress Scale 42 (DASS 42). **Results:** The Mann Whitney U Test showed a difference in the decrease in stress levels which was statistically significant ($p < 0.05$). **Conclusion:** The audio-visual progressive relaxation training conducted at least two times a week for three weeks effectively reduces stress levels in patients undergoing hemodialysis therapy for at least one month.

Keywords: Progressive Relaxation; Hemodialysis; Audiovisual.

*Bangladesh Journal of Medical Science Vol. 21 No. 03 July'22 Page : 540-546
DOI: <https://doi.org/10.3329/bjms.v21i3.59566>*

Introduction

Chronic kidney failure is a health problem for people worldwide that has increased significantly in the last ten years and continues to increase¹. 15% of the 30 million Americans suffer from chronic kidney failure². In Indonesia, chronic kidney failure is one of the ten most non-communicable diseases, which is 0.2% of those aged ≥ 15 years suffering from chronic renal failure³.

Changes in treatments for patients with renal failure, adherence to dialysis schedules, length of treatment, special diet, fluid restriction, adequate treatment, changes in attitudes, behaviors, and lifestyle have a significant effect on the prognosis of patients with

chronic renal failure⁴. Treatment of hemodialysis in patients with renal failure can affect psychological, social, and physiological aspects, such as fatigue, pain at their access points during venipuncture, nausea, vomiting, cramping, itching, and stiff joints⁵.

There is a connection between stress and chronic diseases, which illustrates how endocrine-immune interactions appear to mediate these relationships and illustrate how psychosocial stressors affect mental and physical health⁶. Chronic disease is a primary or secondary stressor for individuals and their families⁵. When dealing with stress, the body muscles become tense, the stomach hard and cramps, and tightness in the chest which affects physical and

1. Warih Andan Puspitosari^{1*}, Department of Psychiatry Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, Indonesia
2. Hanif Habibur Rohman
3. Arlina Dewi
Master Of Hospital Administration, Postgraduate Study, Universitas Muhammadiyah Yogyakarta, Indonesia.

Correspondence: Dr. Warih Andan Puspitosari, M.Sc, SpKJ(K), Department of Psychiatry, Universitas Muhammadiyah Yogyakarta. Email: warihandan@gmail.com

psychological health. Therefore stress management training is needed through relaxation techniques such as the cue-controlled relaxation method, relaxation techniques autogenic, muscle relaxation (relaxation via tension relaxation) techniques, and sensory awareness relaxation⁷.

Muscle relaxation methods are successful in all hemodialysis patients due to their ability to relieve stress, anxiety, pain, exhaustion and improve sleep. Muscle relaxation methods are effective in all hemodialysis patients, reducing stress, anxiety, pain, fatigue, and improving sleep^{8,9}. Stress levels can be calculated using scores related to stress symptoms⁷.

Research methodology

This quantitative study using quasi-experimental with a pre-test and post-test with a control group design. This study tries to reveal a causal relationship involving the control group that did not get treatment and the intervention group that received treatment in progressive relaxation training for three weeks. Both groups were subjected to pre-test and post-test

This research was conducted from November to December 2018 to determine implementing progressive relaxation training on hemodialysis patients' stress levels at the hemodialysis clinic in Bantul, Indonesia. The sampling technique was carried out using a simple random sampling technique through random sampling without regard to the population's strata. The samples must meet certain criteria (inclusion and exclusion) because they are part of the target population to be studied.

The inclusion criteria used were at least one month of hemodialysis therapy patients willing to become respondents of the study from the beginning to the end. The exclusion criteria used were patients who did not come/refused to be included as samples of the research or did not complete the instrument completely. Dropout criteria were those who did not arrive at the post-test or died before a post-test or did not conduct progressive relaxation training at least two times a week for three weeks.

According to the calculation results, the number of research samples is 27 people per group. To anticipate resignation during the study, the researcher added 10% of the total sample to 29 people for each group (intervention and control) so that the total was 58 people.

The questionnaire instrument used in this research was the Depression Anxiety Stress Scale 42 (DASS

42), which consisted of 14 stress level questions and an 8-minute via tension-relaxation training video containing ten steps of relaxation. Patients conduct audio-visual training by looking at the training movement, listening, and following the training steps according to instructions in the form of sound. The movements consist of the following: palms relaxation, arm, and finger relaxation, shoulder relaxation, forehead, and eyebrow relaxation, jaw muscle relaxation, relaxation of lip muscles, relaxation of neck muscles, relaxation of chest muscles, relaxation of abdominal muscles, and relaxation of the feet, and toes.

Subjects were selected from the hemodialysis clinic in Bantul Regency, Yogyakarta Province, Indonesia. A total of 58 subjects participated in the study, 29 in the control group and the other 29 in the intervention group. The characteristics of the subjects in this study are described in table 1.

Table 1 Distribution of Frequency of Characteristics of Subjects

Category	Intervention	Control	<i>p value</i>
	f	f	
Sex			
Men	17	16	0.791
Women	12	13	
Age			
18-44 years old	5	12	0.187
45-64 years old	20	15	
65-74 years old	3	2	
>75 years old	1	-	
Marital status			
Bereaved	3	1	0.313
Married	23	27	
Single	3	1	
Job status			
Working	10	14	0.286
Not working	19	15	
Duration of Dialysis therapy			
< 6 months	5	6	0.420
6-11 months	4	8	
1-4 years	18	12	
5-9 years	2	3	

Table 1 shows that the characteristics of the subjects in the intervention group and the control group were not significantly different (homogeneous). This can be seen from the results of the analysis using chi-square that all the characteristics of the subject (gender, age,

employment status, marital status, and length of time undergoing hemodialysis) have a p-value of more than 0.05.

Table 2. The Minimum and Maximum Value of the Intervention group and Control group

	Min score	Max score
Intervention group		
Pre test	10	23
Post Test	9	19
Control group		
Pre Test	11	26
Post Test	11	24

Table 2 describes the minimum and maximum stress levels of subjects in the intervention group and control group, before and after stress management training. The minimum stress level in the intervention group before being given stress management training (pre-test) was 10, while the maximum value was 23. After being given stress management training (post test), the minimum stress level in the intervention group was 9 and the maximum value was 19. In the control group subjects, the minimum stress level at the time of the pre-test was 11 and the maximum value was 26, while the minimum score for the post-test was 11 and the maximum value was 24.

Table3. Stress level distribution

Variable	Pre Test	Post Test
	f	f
Intrvention Group		
Normal	11	21
Mild	13	6
Moderate	5	2
Severe	-	-
Control Group		
Normal	15	15
Mild	9	8
Moderate	4	6
Severe	1	-

Table 3 shows the distribution of stress levels before stress management training (pre-test) and after stress management training (post-test) in the intervention and control groups. The table shows an improvement in stress levels in the intervention group subjects, and conversely there was no improvement in the control group subjects.

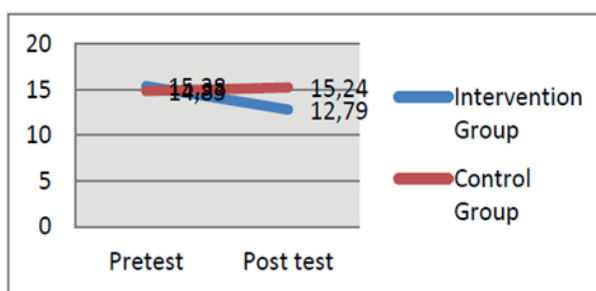


Figure 1

Table 4. Mean value on Stress Levels in the Intervention group and Control group

	Pre test	Post test	p value
Intervention group			
Mean value	15.38	12.79	0.000
Control group			
Mean value	14.83	15.24	0.098

Table 4 and figure 1 illustrate the average difference in the pre-test and post-test results in the intervention group. This is based on the Wilcoxon Signed Rank Test results with a p-value of 0.000 $\alpha (0.05)$. This means that there is a decrease in stress levels in hemodialysis intervention group patients, while the control group respondents do not indicate a difference in the results of the pre-test and post-test based on the Wilcoxon Signed Rank Test results with a p-value of 0.098 >

Analysis of the effect of progressive relaxation training on stress levels in hemodialysis patients is shown in table 5. Table 5 shows the results of statistical tests on the intervention group with the Mann Whitney U test showed that the p-value was 0.003. These results are less than

Table5. Results of Pre and Post Test Mean on Intervention and Control Group.

	Intervention	Control	p value
Pre Test	31.72	27.28	0.312
Post Test	22.97	36.03	0.003

Ethical clearance: This research has received ethical clearance from the postgraduate ethics committee of the University of Muhammadiyah Yogyakarta, and is declared not to conflict with the code of ethics.

Discussion

The relationship between Sex, Age, Marital status, Job status and Duration of Therapy Against Stress Levels

Acute stressors affect activity, interactions in the brain region in decoding and interpreting other people's facial expressions. Men and women have differences in dealing with stress. Men tend to withdraw while women seek social support socially. According to evidence, men and women react differently to stress. Women are more susceptible to feeling depression and anxiety, while men struggle with their desire/motivation¹⁰.

Characteristics of respondents based on age that the negative effect of exposure to stressors on older adults is lower than the effect of new stressors on younger adults, but the difference will disappear within 3 to 6 hours after that. Higher stress levels are predicted to be influenced by one's response to daily stress. There is no age difference in a person's response in the function of stressor severity¹¹.

Based on marital status, someone who is married and still lives with his partner will experience a lower level of stress than those who are not married or do not live with their partners because they do not get support from their partners¹².

Regarding respondents' work, work can stimulate stress, including demands for unrealistic work, unfair treatment, lack of appreciation, an imbalance between effort-reward, conflicting roles, lack of transparency, and poor communication¹³. Stress at work contributes to the increased risk of suicide in men. Suicide risk factors in women are influenced by inadequate work control and organizational systems¹⁴.

Depending on the length of therapy, the relationship between psychosocial stressors and diseases is often affected by the origin, duration, and prevalence of stressors due to individual biological vulnerabilities (i.e., genetics, constitutional factors), psychosocial tools, and learning habits. The psychosocial intervention is useful in treating stress-related conditions and may affect chronic diseases' progression⁶.

Stress Levels of Hemodialysis Patients Before and After Intervention

Stress is produced as a reaction when there are demands, pressures, and professional aspects that are not in accordance with individuals' level of knowledge and abilities¹⁵. Support from family,

medical personnel, similar patients, friends, and community can reduce stress in hemodialysis patients and the stresses and difficulties¹⁶. The study explained the relaxation method's effect by reducing metabolism and strengthening heart contractions, breathing, blood pressure, and epinephrine release in the sympathetic system from the patient's physiological conditions through training nurses to benefit patients. This requires a lower cost and can prevent problems because it can be used and taught to all patients¹⁷. Muscle relaxation can be used to minimize pain in patients with hemodialysis¹⁸.

Research using group analysis shows that the application of audio-visual programs can reduce anxiety and emotion processing bias, but not all of them can reduce the level of stress experienced¹⁹.

Research related to hemodialysis patients' quality of life by looking at physical function, physical role, social function, and mental health showed significant improvements in both the oral and video education groups following an intervention. The appropriate intervention can improve the quality of life of patients so that the use of video education as an effective, inexpensive, simple, and attractive method is recommended for hemodialysis patients²⁰.

Some ways that can be used to reduce stressors in hemodialysis patients are: find meaning in the situation they are experiencing, try various ways to solve problems and find the best way, determine specific goals to help solve problems, discuss problems with someone who has similar types/situations, pray, laugh and find out things that can get worse, actively try to change situations, think through different ways to handle situations and accept situations that are experienced²¹.

The Effect of Stress Management Training on Stress Levels

Stress management training through cognitive-behavioral techniques involving patient and family programs can overcome the situation's stresses and act efficiently¹⁵. Stress management training has an important role in stress reduction and social adaptability through modification of irrelevant social information processing patterns in patients with chronic diseases²². Stress management training is an effective method to encourage someone to take a positive approach to deal with stress on workers²³. Cognitive/behavioral stress management training can also improve quality of life and reduce clinical symptoms of cardiac surgery patients²⁴.

Stress management training conducted by nurses on patients significantly increases hemodialysis patients' life expectancy. This low-cost intervention can be used to increase the life expectancy of hemodialysis patients²⁵. The study results stated that stress management training could be used to improve the psychological care of breast cancer patients²⁶.

Wellness education, such as relaxation strategies and vitamin supplementation, can improve patients' quality of life suffering from diabetes mellitus². Stress management reduces the tolerance level of danger, stress, anxiety, and anger in mothers with children with sensory-motor disabilities to improve affective control in these mothers²⁷.

The Effect of Progressive Relaxation Training On Stress Levels

Progressive relaxation techniques can reduce personal anxiety²⁸. Relaxation techniques can reduce stress levels among housewives²⁹. Progressive relaxation techniques effectively reduce stress and blood pressure³⁰. With only a few minutes of gradual relaxation, blood sugar levels can be lowered for patients who have type 2 diabetes mellitus³¹. Relaxation exercises can effectively improve vital signs and reduce anxiety levels in open-heart surgery patients after endotracheal extubation³². Progressive relaxation techniques can reduce pain, stress, and anxiety levels of hemodialysis patients, so they can provide calm³³. Colorectal cancer patients can use progressive relaxation methods to change their stress response and provide them with a great stress management source³⁴.

The study's findings are the basis for integrating progressive muscle relaxation into nursing care for patients undergoing hemodialysis³⁵. Progressive muscle relaxation for families of psychiatric patients may overcome family tension in mental patients' care³⁶.

Conclusions

1. Progressive relaxation training can significantly reduce the level of stress experienced by hemodialysis patients.
2. Intervention group showed significant differences in stress levels before and after progressive relaxation training.
3. There were no differences in stress levels both before and after progressive relaxation training in the control group.

Based on the conclusions above, the suggestions that can be submitted are as follows:

1. For clinics

Clinics should provide a particular room for training on progressive relaxation in patients with video media that is conducted at least 2 times a week.

2. For researcher

The next researcher can research with a mixed-method design to describe the stress levels that have been given progressive relaxation training.

Conflict of interest

We have no conflicts of interest to disclose

Reference

1. Daugirdas JT, Depner TA, Inrig J, Mehrotra R, Rocco MV, Suri RS, dkk. KDOQI Clinical Practice Guideline for Hemodialysis Adequacy: 2015 Update. *Am J Kidney Dis*. 1 November 2015;66(5):884-930. <https://doi.org/10.1053/j.ajkd.2015.07.015>
2. National Center For Chronic Disease. Centers for Disease Control and Prevention And Health Promotion Divison Of Diabetes. Departement Health and Human USA. National Center For Chronic Disease Prevention And Health Promotion 2017;
3. Riskesdas. Riset Kesehatan Dasar. Badan Penelitian dan Pengembangan. Kementerian Kesehatan RI. 2013.
4. Günes FE. *Medical Nutrition Therapy for Hemodialysis Patients*. 2013 [dikutip 21 Desember 2017]; Tersedia pada: <http://www.intechopen.com/books/hemodialysis/medical-nutrition-therapy-for-hemodialysis-patients>
6. Kacaroglu Vicdan A, Gulseven Karabacak B. Effect of Treatment Education Based on the Roy Adaptation Model on Adjustment of Hemodialysis Patients. *Clin Nurse Spec CNS*. Agustus 2016;30(4):E1-13. <https://doi.org/10.1097/NUR.0000000000000215>
7. Schneiderman N, Ironson G, Siegel SD. STRESS AND HEALTH: Psychological, Behavioral, and Biological Determinants. *Annu Rev Clin Psychol*. 2005;1:607-28. <https://doi.org/10.1146/annurev.clinpsy.1.102803.144141>
8. Safaria T. Manajemen Emosi. Sebuah Pnaduan Cerdas Mengelola Emosi Positif Dalam Hidup. *PTBumi Aksara*; 2012.
9. Sangle* D, Mhatre** H, Mhase** A, Mahadik** V, Attarde ** I, Naik* A, dkk. A Cross sectional study to Assess Quality of Life (QOL) in Haemodialysis Patients -. *Natl J Integr Res Med*. 2013;4(5):81-5.
10. Purwanti, R., Yusuf, A., Nihayati, H., Qomariah, S., & Bakar, A. (2019). The Effect of Religious Relaxation Therapy on Improving Sleep Quality of Patients Chronic Kidney Failure: A Pilot Study in Surabaya. *Bangladesh Journal of Medical Science*, 19(1), 48-52. <https://doi.org/10.3329/bjms.v19i1.43872>
11. Chaplin TM, Hong K, Bergquist K, Sinha R. Gender Differences in Response to Emotional Stress: An Assessment Across Subjective, Behavioral, and Physiological Domains and Relations to Alcohol Craving. *Alcohol Clin Exp Res*. Juli 2008;32(7):1242-50. <https://doi.org/10.1111/j.1530-0277.2008.00679.x>
12. Scott SB, Sliwinski MJ, Blanchard Fields F. Age differences in emotional responses to daily stress: The role of timing, severity, and global perceived stress. *Psychol Aging [Internet]*. Desember 2013 [dikutip 4 Desember 2018];28(4). Tersedia pada: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3874135/>
13. 2018];28(4). Tersedia pada: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3874135/>
14. Nomaguchi KM. Marital Status, Gender, and Home-to-Job Conflict Among Employed Parents. *J Fam Issues*. Maret 2012;33(3):271- 94. <https://doi.org/10.1177/0192513X11415613>
15. Bhui K, Dinov S, Galant-Miecznikowska M, Jongh B de, Stansfeld S. Perceptions of work stress causes and effective interventions in employees working in public, private and non-governmental organisations: a qualitative study. *BJPsych Bull*. Desember 2016;40(6):318. <https://doi.org/10.1192/pb.bp.115.050823>
16. Kim S-Y, Shin D-W, Oh K-S, Kim E-J, Park Y-R, Shin Y-C, dkk. Gender Differences of Occupational Stress Associated with Suicidal Ideation among South Korean Employees: The Kangbuk Samsung Health Study. *Psychiatry Investig*. Februari 2018;15(2):156-63. <https://doi.org/10.30773/pi.2017.05.31.1>
17. Williams S. managing workplace stress: a best practice blueprint, Volume 1 of Fast track series, Publisher Wiley, Original from Cornell University, 2011;78-84.;
18. Naderifar M, Zagheri Tafreshi M, Ilkhani M, Kavousi A. The outcomes of stress exposure in hemodialysis patients. *J Ren Inj Prev*. 23 Juni 2017;6(4):275-81. <https://doi.org/10.15171/jrip.2017.52>
19. Mahdavi A, Gorji MAH, Gorji AMH, Yazdani J, Ardebil MD. Implementing Benson's Relaxation Training in Hemodialysis Patients: Changes in Perceived Stress, Anxiety, and Depression. *North Am J Med Sci*. September 2013;5(9):536-40. <https://doi.org/10.4103/1947-2714.118917>
20. Baykan H, Yargic I. Depression, anxiety disorders, quality of life and stress coping strategies in hemodialysis and continuous ambulatory peritoneal dialysis patients -. *Klin Psikofarmakol Bul-Bull Clin Psychopharmacol*. 2012;22(2):167-76. <https://doi.org/10.5455/bcp.20120412022430>
21. Trevino, Guadalupe Villarreal., Ramirez, Ernesto Octavio López, Martínez, Guadalupe Elizabeth Morales. The Effect of Audio Visual Entrainment on Pre-Attentive Dysfunctional Processing to Stressful Events in Anxious Individuals.
22. Baraz S, Zarea K, Dashtbozorgi B. Comparing the Effect of Two Educational Programs on the Quality of Life of Hemodialysis Patients in Iran. *Iran Red Crescent Med J [Internet]*. Agustus 2014 [dikutip 17 Desember 2018];16(8). <https://doi.org/10.5812/ircmj.19368>
23. Tersedia pada: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4222015/>
24. Parvan, Kobra et al. Coping methods to stress among patients on hemodialysis and peritoneal dialysis. - PubMed - NCBI [Internet]. 2015 [dikutip 20 Desember 2017]. Tersedia pada: <https://www.ncbi.nlm.nih.gov/pubmed/25758872>
25. Abbasian F, Najimi A, Meftagh SD, Ghasemi G, Afshar H. The effect of stress management training on stress and depression in women with depression disorders: Using cognitive-behavioral techniques. *J Educ Health Promot*. 2014;3:70.
26. Edimansyah B, Rusli B, Naing L. Effects of short

- duration stress management training on self-perceived depression, anxiety and stress in male automotive assembly workers: a quasi-experimental study. *J Occup Med Toxicol Lond Engl*. 21 November 2008;3:28. <https://doi.org/10.1186/1745-6673-3-28>
27. Saleh S. The Effectiveness of Cognitive-Behavioral Stress Management Training on Quality of Life and Clinical Symptoms of Cardiovascular Patients. *Biomed Pharmacol J*. 25 Maret 2017;10(1):295-302. <https://doi.org/10.13005/bpj/1109>
 28. Poorgholami F, Abdollahifard S, Zamani M, Jahromi MK, Jahromi ZB. The Effect of Stress Management Training on Hope in Hemodialysis Patients. *Glob J Health Sci*. Juli 2016;8(7):165-71. <https://doi.org/10.5539/gjhs.v8n7p165>
 29. Naeini EE, Sanaei Zaker B. The Effectiveness of Stress Management Training on Hardiness in Patients with Breast Cancer. *Abnorm Behav Psychol [Internet]*. 2016 [dikutip 9 Desember 2018];2(2). Tersedia pada: <https://www.omicsgroup.org/journals/the-effectiveness-of-stress-management-training-on-hardiness-in-patients-with-breast-cancer-2472-0496-1000115.php?aid=75921>
 30. Khodabakhshi Koolae A, Moghimi Nargh S. Effectiveness of group stress management training on affective control and distress tolerance of mothers of children with sensory-motor disabilities. *Casp JPediatr*. 15 Maret 2016;2(1):100-6.
 31. ÖZDEMİR F, PASİNLÜ O, ÖLÜT. The Effects of Training and Progressive Relaxation Exercises On Anxiety Level After Hysterectomy. :6.
 32. Banerjee M. Effect of Relaxation Technique on Management of Stress among Housewives. *Int J Indian Psychol*.
 33. Student (MSN), College of Nursing, Sri Ramachandra University, Porur, Chennai, Tamil Nadu, India, V K, S DA, R P.
 34. Effectiveness of Progressive Muscle Relaxation Technique on Stress and Blood Pressure among Elderly with Hypertension. *IOSR J Nurs Health Sci*. 2014;3(4):01-6. <https://doi.org/10.9790/1959-03420106>
 35. Progressive Muscle Relaxation Effectiveness of the Blood Sugar Patients with Type 2 Diabetes [Internet]. [dikutip 12 Februari 2019].
 36. Tersedia pada: <https://www.scirp.org/journal/PaperInformation.aspx?PaperID=65196>
 37. İbrahimoglu Ö, Kanan N. The Effect of Progressive Muscle Relaxation Exercises After Endotracheal Extubation on Vital Signs and Anxiety Level in Open Heart Surgery Patients. *Türk Yoğun Bakım Derg* 20 November 2017;98-106. <https://doi.org/10.4274/tybd.04696>
 38. Heidari Gorji MA, Davanloo AA, Heidarigorji AM. The efficacy of relaxation training on stress, anxiety, and pain perception in hemodialysis patients. *Indian J Nephrol* 2014;24(6):356-61. <https://doi.org/10.4103/0971-4065.132998>
 39. Kim KJ, Na YK, Hong HS. Effects of Progressive Muscle Relaxation Therapy in Colorectal Cancer Patients. *West J Nurs Res*. 1 Agustus 2016;38(8):959-73. <https://doi.org/10.1177/0193945916635573>
 40. Essa RM, Ismail NIAA, Hassan NI. Effect of progressive muscle relaxation technique on stress, anxiety, and depression after hysterectomy. *J Nurs Educ Pract*. 20 Februari 2017;7(7):77. <https://doi.org/10.5430/jnep.v7n7p77>
 41. Ph L, Daulima NHC, Mustikasari, M. Relaksasi Otot Progresif Menurunkan Stres Keluarga Yang Merawat Pasien Gangguan Jiwa. *J. Keperawatan Indonesia*. 19 Maret 2018;21(1):51-9. <https://doi.org/10.7454/jki.v21i1.362>