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The Effectiveness of Progressive Muscle Relaxation (PMR) Against Anxiety in Breast Cancer Patients Undergoing Chemotherapy at Dr Wahidin Sudirohusodo Hospital Makassar

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ABSTRACT
Breast cancer is a malignant disease that most commonly attacks women. One pharmacological therapy for breast cancer is chemotherapy, but this treatment can cause anxiety due to the side effects it causes. Non-pharmacological treatment is really needed, one of which is Progressive Muscle Relaxation (PMR) which can reduce anxiety. The aim of the research was to determine the effectiveness of Progressive Muscle Relaxation (PMR) on anxiety in breast cancer patients. Sampling used purposive sampling technique. The total sample was 30 respondents (15 respondents were given PMR therapy) and (15 respondents were given deep breathing). Anxiety measurement uses the State Trait Anxiety Inventory (STAI) questionnaire. The test used to correlate PMR with disease duration is the Pearson test. Differences in cancer stage and mean anxiety score independent t-test. One-way anova test chemotherapy cycle. Meanwhile, the difference between pre and post PMR and control used the paired t-test. The results of the study showed no significant values for the duration of suffering from total anxiety p = 0.476, state anxiety p = 0.424, trait anxiety p = 0.464. At stage 3 it showed significant values for total anxiety p = 0.004, state anxiety p = 0.003, trait anxiety p = 0.018, at stage 4 total anxiety p = 0.009, state anxiety p = 0.009, trait anxiety p = 0.020. The chemotherapy cycle was not significant for total anxiety p = 0.084, and state anxiety p = 0.177, while trait anxiety showed a significant value of p = 0.026. Pre and post PMR showed significant values for total anxiety, state anxiety, and trait anxiety p = 0.001. The PMR and control groups showed significant values for PMR total anxiety, state anxiety, and trait anxiety p = 0.001 and the control was significant for total anxiety p = 0.028 and state anxiety p = 0.026, while trait anxiety was not significant p = 0.100. The mean anxiety scores (mean difference) of PMR and controls showed significant values for total anxiety p = 0.042, state anxiety p = 0.027 and trait anxiety p = 0.033. Conclusion Progressive Muscle Relaxation (PMR) exercise therapy is effective in reducing anxiety in breast cancer patients undergoing chemotherapy.

Keywords**:** *Breast cancer, Chemotherapy, Progressive Muscle Relaxation (PMR)*

INTRODUCTION

Breast cancer is a disturbance in the growth of normal breast cells where abnormal cells arise from normal cells, multiply and infiltrate the lymphatic tissue and blood vessels (Nurarif, Amin & Kusuma, 2015). Breast cancer is a malignant disease that most commonly attacks women and is the second largest cause of death after lung cancer (Black & Hawks, 2014). By looking at this, it can be said that breast cancer is a disease that has a fairly high prevalence.

Based on data from GLOBOCAN, the International Agency for Research on Cancer (IARC), it is known that throughout the world in 2012 there were 14,067,894 new cases of cancer and 8,201,575 deaths due to cancer. Specifically for breast cancer, 43.1% of new cases and 12.9% of deaths due to breast cancer. In Indonesia, there were 61,682 cases diagnosed with breast cancer, and in South Sulawesi Province there were 2,975 cases (Pusdatin, 2016). Data obtained from RSUP DR Wahidin Sudirohusodo Makassar, the number of breast cancer sufferers undergoing

chemotherapy in 2017 was 814 people, while in the period January to April 2018 there were 375 people (RSWS Medical Records, 2018).

The stage of breast cancer must be confirmed before diagnosis is completed and treatment chosen, as this process can determine whether the cancer has spread from the breast to other parts of the body. The most commonly used system is the American Joint Committee on Cancer TNM system. In the staging system, cancer is classified based on the extent of the primary tumor (T), lymph nodes (N), and metastases (M). The extent of the cancer at the time of diagnosis is the primary factor used for treatment and to assess the likelihood of a successful treatment outcome. This is very important to do to determine the choice of therapy that will be given to the patient. There are several ways to treat breast cancer, the application of which depends on the clinical stage of the cancer, one of which is chemotherapy (Ramli, 2015).

Chemotherapy is a medical therapy used in the treatment of cancer, especially against systemic cancer and cancer with clinical or subclinical metastases. In advanced stages of cancer, chemotherapy is the only method of choice that is very effective (Syarif & Putra, 2014). However, chemotherapy can cause side effects from chemotherapy such as alopecia, nausea, vomiting, gastrointestinal disorders, electrolyte fluid balance disorders and stomatitis (Herizchi, Asvadi, Piri, & Golchin, 2012). Due to the side effects that often occur during chemotherapy, patients become anxious so they choose to stop the therapy cycle which can affect their quality of life in the future (Syarif & Putra, 2014).

When the feeling of threat is not balanced with the feeling of support and the ability to face difficult situations, psychological reactions such as anxiety will occur which will hamper the patient's psychological health (Tsitsi, Charalambous, & Papastavrou, 2017). Anxiety experienced by breast cancer patients can arise due to feelings of uncertainty about the disease, the length of time the disease has been suffered, treatment, and prognosis (Syarif & Putra, 2014).

The stimulus for stress/anxiety involves the activation of the sympathetic nervous system and the release of various hormones and peptides, including the hypothalamic–pituitary–adrenal (HPA) axis, the endogenous opioid system, arginine vasopressin, and oxytocin (Corwin, 2008). For patients undergoing chemotherapy, psychological support is very necessary to help patients overcome their disease status, reduce anxiety, pain, and strengthen their psychological status (Lee, Bhattacharya, Sohn, & Verres, 2012). Apart from that, patients can also be given behavioral therapy such as relaxation therapy which is a therapeutic method using muscle relaxation procedures, so that patients consciously control physical and psychological activities, so they can stabilize emotions and overcome the symptoms of the disease, especially anxiety due to chemotherapy.

Many cancer patients use a variety of techniques to improve their physical and mental well-being, including relaxation therapy in particular, Progressive Muscle Relaxation (PMR). The efficacy of PMR was found to be nearly equivalent to receiving 0.5 mg of the triazolobenzodiazepine alprazolam three times daily (Lee et al., 2012).

Progressive Muscle Relaxation (PMR) training is a continuous and systematic technique to overcome stretching and relax the muscles (Zhou et al., 2014). When doing PMR, two main movement components occur in the body, namely tensing the muscles and relaxing them. There are several goals of this PMR movement, including: reducing pain, lowering blood pressure, reducing anxiety and stress (Conrad & Roth, 2007).

The results of research conducted by (Tsitsi et al., 2017), aimed to assess the effects of Progressive Muscle Relaxation (PMR) and Guide Imagery (GI), in reducing anxiety levels among parents of children diagnosed with all types of malignancies who received treatment active in the Pediatric Oncology Unit in the Republic of Cyprus. The total sample was 54 parents of children hospitalized with malignancies who were selected randomly. The results of the study showed that there was a significant difference in anxiety between the control group and the intervention group (2.63 vs 2.19) with a value of (p= 0.031). So, it can be concluded that PMR and GI can reduce anxiety and improve mood in parents and children with malignancy cases.

Another study conducted by (Syarif & Putra, 2014), aimed to identify the effect of PMR on reducing anxiety in cancer patients undergoing chemotherapy at BLU RSUDZA. The sample studied was 30 respondents who underwent chemotherapy in the Mamplam III BLU RSUDZA room. The results showed that there was a significant difference in anxiety scores in the second measurement between the intervention and control groups with a value (p value = 0.003).

From the above background, researchers are interested in conducting research to determine the effectiveness of Progressive Muscle Relaxation (PMR) on anxiety in breast cancer patients undergoing chemotherapy at RSUP DR Wahidin Sudirohusodo Makassar.

METHODS

The design of this research is Quasi experimental because in this research the sample group was not chosen randomly and the control group cannot function fully to control external variables that influence the implementation of the experiment. This research was carried out at DR Wahidin Sudirohusodo Hospital, Makassar, in October 2018. The population in this study was breast cancer patients who underwent chemotherapy at DR Wahidin Sudirohusodo Hospital, Makassar in March 2018, namely 94 people. The samples in this study were breast cancer patients who underwent chemotherapy at DR Wahidin Sudirohusodo Makassar Hospital and met the inclusion criteria set by the researchers. The sampling technique in research uses a purposive sampling technique, namely a technique for determining samples with certain considerations. The selection of a group of subjects in purposive sampling is based on certain characteristics which are considered to be closely related to previously known characteristics of the population, in other words the sample units used are adjusted to certain criteria based on the research objectives.

RESULTS

Univariate Analysis

Based on the results of research conducted on 30 breast cancer respondents undergoing chemotherapy, the distribution of research variables is described in the following table:

Table 1. Frequency Distribution of Variables for Breast Cancer Patients Undergoing Chemotherapy at DR Wahidin Sudirohusodo Hospital Makassar (n=30)

Variable	PMR (n=15)		Control (n=15)		*p*
	M (SD)	n (%)	M (SD)	n (%)	
Age	46,33 (8,006)	-	47,40 (8,484)	-	0,257
Education					
Elementary School	-	6 (40,0)	-	4 (26,7)	0,412
Junior High School	-	3 (20,0)	-	3 (20,0)	
Senior High School	-	3 (20,0)	-	3 (20,0)	
College	-	3 (20,0)	-	5 (33,3)	
Work					
Civil servants/Private	-	2 (13,3)	-	7 (46,7)	0,023
Doesn't work	-	13 (86,7)	-	8 (53,3)	*
Marital status					
Marry	-	10 (66,7)	-	14 (93,3)	0,034
Not married yet	-	5 (33,3)	-	1 (6,7)	*
Suffering from illness for a long time	2,93 (1,534)	-	2,20 (1,373)	-	0,361

Cancer Stages					
Stage 3	-	9(60,0)	-	8 (53,3)	0,356
Stage 4	-	6(40,0)	-	7 (46,7)	
Chemotherapy Cycle					
1st cycle	-	4 (26,7)	-	3 (20,0)	0,159
2nd cycle	-	4 (26,7)	-	8 (53,3)	
3rd cycle	-	7 (46,7)	-	4 (26,7)	

*Note: M=Mean, SD=Standard Deviation, n=Number of Respondents, %=Percentage, *=Sign □ <0.05*

Table 1 shows the number of respondents was 30 people (15 respondents in the PMR group and 15 respondents in the control group). In the PMR group, the average age of respondents was 46 years with a standard deviation of 8.006, the most education was elementary school, namely 6 respondents (40.0%), the majority did not work, namely 13 respondents (86.7%), with married status, namely 10 respondents. (66.7%), on average had suffered from the disease for 3 years, most were at stage 3, namely 9 respondents (60.0%) with the majority of chemotherapy cycles being in the 3rd cycle, namely 7 respondents (46.7%). Meanwhile, in the control group, the average age of respondents was 47 years with a standard deviation of 8.484, the highest level of education was elementary school, namely 4 respondents (26.7%), the majority did not work, namely 8 respondents (53.3%), with married status, namely 14 respondents (93.3%), on average had suffered from the disease for 2 years, most were in stage 3, namely 8 respondents (53.3%) with the majority of chemotherapy cycles being in the 2nd cycle, namely 8 respondents (53.3%).

In this study there are two data variables that are not homogeneous, namely employment and marital status, this is important because random assignment was not carried out when collecting data.

Bivariate Analysis

Correlation Between Long Suffering from Disease and Anxiety After Being Given Progressive Muscle Relaxation (PMR) Exercise Therapy

Table 2. Correlation Between Length of Suffering from the Disease and Anxiety After Being Given Progressive Muscle Relaxation (PMR) Exercise Therapy in Breast Cancer Patients Undergoing Chemotherapy at DR Wahidin Sudirohusodo General Hospital Makassar (n=15)

Variable	Suffering from illness for a long time	
	r	***p***
Total Anxiety	0,017	0,476
State Anxiety	0,054	0,424
Trait Anxiety	0,025	0,464

Pearson test

The results of the Pearson test correlation between the length of suffering from the disease and anxiety after being given Progressive Muscle Relaxation (PMR) exercise therapy showed that the p value was not significant for both total anxiety, namely p = 0.476, state anxiety p = 0.424, and trait anxiety p = 0., 464. Likewise, based on the degree of correlation, it shows that the correlation relationship in the category is very weak for total anxiety r = 0.017, state anxiety r = 0.054, and trait anxiety r = 0.025. So, it is concluded that there is no correlation between the length of suffering from the disease on anxiety after being given Progressive Muscle Relaxation (PMR) exercise therapy.

Differences in the Effectiveness of Progressive Muscle Relaxation (PMR) Exercise Therapy for Anxiety Based on Cancer Stage

Table 3. Differences in the Effectiveness of Progressive Muscle Relaxation (PMR) Exercise Therapy on Anxiety Based on Cancer Stage in Breast Cancer Patients Undergoing Chemotherapy at DR Wahidin Sudirohusodo General Hospital Makassar (n=15)

Variable	Stage 3 M (SD)		*Mean Difference*	*p*	Stage 4 M (SD)		*Mean Difference*	*p*
	Pre	***Post***			***Pre***	***Post***		
Total Anxiety	80,00	58,11	↓ 21,89	0,004*	89,50	65,00	↓ 24,50	0,009*
State Anxiety	40,11	26,44	↓ 13,67	0,003*	46,17	32,83	↓ 13,34	0,009*
Trait Anxiety	39,89	31,67	↓ 8,22	0,018*	43,33	32,17	↓ 11,16	0,020*

*Paired T-Test, *Sign α = 0,05*

The results of the analysis of the effectiveness of pre and post Progressive Muscle Relaxation (PMR) exercise therapy on anxiety based on cancer stage using the independent t-test showed that in stage 3 respondents a significant p value was found for both total anxiety, namely p = 0.004, state anxiety p = 0.003, as well as trait anxiety p = 0.018. Likewise, for stage 4 respondents, the results of statistical tests showed significant p values for both total anxiety, namely p = 0.009, state anxiety p = 0.009, and trait anxiety p = 0.020. Even though statistically it shows a significant p value, for both stage 3 and stage 4 respondents, descriptively there is a difference in the effectiveness of reducing the average anxiety score. In stage 4 respondents, the average decrease in anxiety scores based on total anxiety was 24.50, state anxiety 13.34, and trait anxiety 11.16. Meanwhile, for stage 3 respondents, the average decrease in anxiety scores based on total anxiety was 21.89, state anxiety 13.67, and trait anxiety 8.22. So, it was concluded that Progressive Muscle Relaxation (PMR) exercise therapy was more effective in reducing anxiety in respondents who were at stage 4 compared to respondents who were at stage 3.

Differences in the Effectiveness of Progressive Muscle Relaxation (PMR) Exercise Therapy for Anxiety Based on the Chemotherapy Cycle

Table 4. Differences in the Effectiveness of Progressive Muscle Relaxation (PMR) Exercise Therapy for Anxiety Based on the Chemotherapy Cycle in Breast Cancer Patients Undergoing Chemotherapy at DR Wahidin Sudirohusodo General Hospital Makassar (n=15)

Variable	Chemotherapy Cycle			*p*
	Cycle 1 M (SD)	Cycle 2 M (SD)	Cycle 3 M (SD)	
Total Anxiety	74,00 (14,468)	57,75 (5,377)	55,14 (12,158)	0,084
State Anxiety	34,25 (9,845)	26,00 (2,708)	27,71 (7,994)	0,177
Trait Anxiety	39,75 (4,787)	31,75 (7,411)	27,43 (5,623)	0,026*

*One Way Anova Welch, *Sign α = 0,05*

The results of the analysis of the effectiveness of Progressive Muscle Relaxation (PMR) exercise therapy on anxiety in respondents undergoing the 1st, 2nd and 3rd cycles of chemotherapy using the one-way ANOVA Welsh test showed that the p value was not significant for total anxiety, namely p = 0.084, and state anxiety p = 0.177, while trait anxiety shows a significant p value, namely p = 0.026. Even though statistically the p value is not significant for total anxiety and state anxiety, descriptively it shows that there is a difference in the average anxiety score for total anxiety. Respondents who were in the 3rd cycle had a smaller average anxiety score, namely 55.14 (12.158) compared to respondents who were in the 1st and 2nd cycles. Likewise for state anxiety, the average anxiety score of respondents in the 2nd cycle was smaller, namely 26.00 (2.708) compared to respondents in the 1st and 3rd cycles, while for trait anxiety

the average anxiety score for respondents in the 3rd cycle was smaller, namely 27.43 (5.623) compared to respondents in the 1st and 2nd cycles. The results of the post hoc test showed that there were differences in each cycle, based on total anxiety for the 1st cycle, the value was p = 0.439, for the 2nd cycle p = 0.104, and for the 3rd cycle p = 0.078. In state anxiety for the 1st cycle, the value obtained was p = 0.432, for the 2nd cycle p = 0.176, and for the 3rd cycle p = 0.268. Meanwhile, based on trait anxiety for the 1st cycle, the value obtained was p = 0.301, for the 2nd cycle p = 0.127, and for the 3rd cycle p = 0.014. So it was concluded that there was a difference in the effectiveness of Progressive Muscle Relaxation (PMR) exercise therapy for anxiety. Based on total anxiety and trait anxiety, Progressive Muscle Relaxation (PMR) exercise therapy is more effective in reducing anxiety in respondents in the 3rd cycle compared to respondents in the 1st and 2nd cycles, whereas based on state anxiety Progressive Muscle Relaxation (PMR) exercise therapy) is more effective in reducing anxiety in respondents in the 2nd cycle compared to respondents in the 1st and 3rd cycles.

Differences in Anxiety Scores Pre and Post Progressive Muscle Relaxation (PMR) Exercise Therapy

Table 5. Differences in Pre and Post Anxiety Scores given Progressive Muscle Relaxation (PMR) Exercise Therapy to Breast Cancer Patients Undergoing Chemotherapy at DR Wahidin Sudirohusodo General Hospital Makassar (n=15)

Variable	***Progressive Muscle Relaxation* (PMR)**		***Mean Difference***	***p***
	Pretest **M (SD)**	***Postest*** **M (SD)**		
Total Anxiety	83,80 (20,175)	60,87 (13,522)	↓ 22,93	0,001*
State Anxiety	42,53 (11,999)	29,00 (1199)	↓ 13,53	0,001*
Trait Anxiety	41,27 (9,177)	31,87 (7,605)	↓ 9,4	0,001*

*Paired Sample T-Test, *Sign α = 0,05*

The results of the analysis of differences in STAI scores using paired t-test pre and post PMR showed significant p values for both total anxiety p = 0.001, state anxiety p = 0.001 and trait anxiety p = 0.001. Based on total anxiety, there was a decrease in the average anxiety score of 22.93 after being given Progressive Muscle Relaxation (PMR) exercise therapy, state anxiety was 13.53 and trait anxiety was 9.4. So, it was concluded that Progressive Muscle Relaxation (PMR) exercise therapy can effectively reduce anxiety in breast cancer patients undergoing chemotherapy.

Differences in Anxiety Scores Between the PMR Group and the Control Group

Table 6. Differences in Anxiety Scores Between the PMR Group and the Control Group in Breast Cancer Patients Undergoing Chemotherapy at RSUP DR Wahidin Sudirohusodo Makassar (n=30)

Variable	**PMR M (SD)**		***Mean Difference***	***p***	**Kontrol M (SD)**		***Mean Difference***	***p***
	Pre	***Post***			***Pre***	***Post***		
Total Anxiety	83,80 (20,175)	60,87 (13,522)	↓ 22,93	0,001*	87,33 (25,836)	77,53 (19,179)	↓ 9,8	0,028*
State Anxiety	42,53 (11,999)	29,00 (7,810)	↓ 13,53	0,001*	42,67 (14,391)	36,13 (10,555)	↓ 6,54	0,026*
Trait Anxiety	41,27 (9,177)	31,87 (7,605)	↓ 9,4	0,001*	44,67 (12,799)	41,40 (9,455)	↓ 3,27	0,100

*Paired T-Test, *Sign α = 0,05*

The results of the analysis of differences in STAI scores between the PMR group and the control group using the paired t-test, showed a significant p value in the PMR group, both based on total anxiety, state anxiety, and trait anxiety with a p value = 0.001. Meanwhile, the control group showed a significant p value for total anxiety, p = 0.028 and state anxiety, p = 0.026, while trait anxiety showed an insignificant value, p = 0.100. In the PMR group, the average reduction in anxiety scores based on total anxiety after being given Progressive Muscle Relaxation (PMR) exercise therapy was 22.93, state anxiety 13.53, and trait anxiety 9.4. Meanwhile, in the control group, the decrease in the average anxiety score based on total anxiety after being given Progressive Muscle Relaxation (PMR) exercise therapy was 9.8, state anxiety 6.54, and trait anxiety 3.27. The results of the study concluded that both sample groups experienced a decrease in anxiety, both in the PMR group and in the control group, but statistically and descriptively in the PMR group the decrease in the average anxiety score was more effective than in the control group.

Table 7. Differences in Mean Anxiety Scores (Mean Difference) Between the PMR Group and the Control Group in Breast Cancer Patients Undergoing Chemotherapy at DR Wahidin Sudirohusodo Hospital Makassar (n=30)

Variable	***Mean Difference*** **(PMR – Kontrol)**	***p***
Total Anxiety	13,133	0,042*
State Anxiety	7,000	0,027*
Trait Anxiety	6,133	0,033*

*Independent T-Test, *Sign α = 0,05*

The results of the analysis of the difference in mean anxiety scores (mean difference) between the PMR group and the control group using the independent t-test showed a significant p value for both total anxiety p = 0.042 with a decrease in the mean anxiety score (mean difference) 13.133, for state anxiety p = 0.027 with a decrease in the average anxiety score (mean difference) of 7.000, while for trait anxiety p = 0.033 with a decrease in the average anxiety score (mean difference) of 6.133. This shows that both the PMR group who were given Progressive Muscle Relaxation (PMR) exercise therapy and the control group who were only given deep breathing were effective in reducing anxiety in breast cancer patients undergoing chemotherapy.

CONCLUSION

Referring to the results of the study, it was concluded that Progressive Muscle Relaxation (PMR) exercise therapy has no correlation with the duration of the disease and anxiety. Progressive Muscle Relaxation (PMR) exercise therapy can effectively reduce anxiety in breast cancer patients undergoing chemotherapy, especially at stage 4 and based on the 3rd cycle of chemotherapy.

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