The Effect of Progressive Muscle Relaxation Technique on Emotional Status among Cervical Cancer Women undergoing Chemotherapy

(1) Shymaa Aly Hamed, (2) Hemmat Moustafa Abdel Mageed, (3) Samah Mohamed EL sayed sayed Ahmed, (4) Manal Ahmed Mohamed Ismail

(1) Lecturer of Psychiatric Mental Health Nursing, Faculty of Nursing, Cairo University
(2) School of Nursing Badr University in Cairo
(3) Lecturer of Psychiatric and Mental Health Nursing, Faculty of Nursing _ Damietta University
(4) Lecturer at Psychiatric Nursing and Mental Health, Faculty of Nursing, Sohag University

Abstract:

Background: Cervical cancer patients treated by chemotherapy are influenced by several concurrent factors that impact patients' physical and psychological health after treatment such as depression, anxiety, and stress. Therefore, **the current study aimed** to determine the effect of progressive muscle relaxation techniques on emotional status among cervical cancer women undergoing chemotherapy. **Design**: A quasi-experimental design was used to conduct this study. **Setting:** The study was conducted at the inpatient and outpatient clinics in Sohag Oncology institution. **Subject**: A purposive sampling technique was used to select a sample of 100 cervical cancer women undergoing chemotherapy who were randomly assigned into two equal groups, with 50 cervical cancer women undergoing chemotherapy in each group (the experimental and control groups). **Tools:** Two tools were *used* (I) demographic data of cervical cancer women undergoing chemotherapy sheet, and (II) and Depression, Anxiety, and Stress Scale (DASS). **Results:** The present study revealed that cervical cancer women undergoing chemotherapy emotional status (stress, depression, and anxiety levels) in both experimental groups were severe before the implementation of the progressive muscle relaxation technique while these levels became low after implementation. There were highly statistically significant differences and improvements between cervical cancer women undergoing chemotherapy **such as** depression, anxiety, and stress levels in both experimental and control groups pre and post-implementation progressive muscle relaxation technique at (P= <0.05). **Conclusion:** The progressive muscle relaxation technique achieved significant improvements in the emotional status of depression, anxiety, and stress among cervical cancer women undergoing chemotherapy. **Recommendations**: Cervical cancer women undergoing chemotherapy should understand the progressive muscle relaxation approach as a straightforward and practical strategy. to improve their emotional status.

Keywords: Cervical cancer women undergoing chemotherapy, Emotional status, Progressive muscle relaxation technique

Introduction:

All across the world, cancer is a serious issue for public health. In 2020, there will be 10.3 million cancer-related deaths worldwide, according to the International Agency for Research on Cancer **(Sung et al., 2020)**. According to estimates, there will be 604,000 new cases and 342,000 fatalities from cervical cancer among women globally in 2020. With 2165 new cases and 1199 fatalities in 2020, cervical cancer will rank second among female cancers behind breast cancer **(Bhatla et al., 2019)**. The availability of cervical cancer treatment improved survival rates. There are various cervical cancer treatment options, which are influenced by the patient's age, stage at diagnosis, health, and emotional state **(Kim. et al., 2018)**.

According to **Serkies K. & Jassem (2018)**, up to one-third of cancer patients experience depression and/or anxiety disorders. According to **Brodersen et al. (2018),** there is a significant correlation between the quantity and seriousness of patients' concerns following a diagnosis and the later emergence of anxiety and depression. High degrees of emotional distress have also been connected to the quantity of patient complaints **(Jassim et al., 2018; Melnikow et al., 2018).** Accurate worry identification is crucial if nurses are to effectively serve patients' emotional needs and encourage emotional adjustment **(Sah et al., 2018).**

Chemotherapy has a well-established history of causing significant physical and mental morbidity **(Kori M. and Yalcin, 2018).** However, little study has been done on how much patients receiving chemotherapy tell their nursing carers about their worries, and even less has been done on how well nurses can spot these worries **(Liu et al., 2018).** While earlier studies have examined the psychological side effects of chemotherapy, a connection between worries and morbidity at this stage of the illness has not been proven. of worry levels and the possible connection between depression and anxiety **(He et al., 2018).**

It is typical to have a variety of challenging thoughts and emotions that may alter, disappear, and reappear throughout time since receiving a cervical cancer diagnosis and undergoing treatment can be a life-changing experience. According to study, a cervical cancer diagnosis and treatment can cause a wide range of emotions, including fear and anxiety, worry, loneliness or isolation, sadness or melancholy, anger or irritability, guilt, humiliation or self-consciousness, and grief or loss **(Dehkordi et al., 2019).**

These are a few typical emotional triggers. Being told that you have cancer can bring all kinds of emotions and sentiments to arise because you are dealing with a serious condition that you did not anticipate. A cervical cancer diagnosis for certain people may also rule out the possibility of becoming a parent. It can be intimidating to begin treatment for the first time. Depending on the treatments used, receiving cancer therapy may have an affect on appearance. Starting to change their appearance may make some people worry about what others will think of them and how they might respond. Some people may feel self-conscious and may find these changes disturbing because the way others look plays a significant role in who these patients are. Our daily lives and routines might be affected by the cancer diagnostic process, treatment's adverse effects, and recovery. Women with cervical cancer undergoing chemotherapy might not be

able to engage in some of their pre-cancer activities, such as employment, exercise, or other activities indoors or outside. Women with cervical cancer who are receiving chemotherapy could also require assistance from others **(Kori & Yalcin, 2018).**

Jackson created the progressive muscle relaxation technique (PMRT) in 1929. It involves sequentially progressively contracting and relaxing the major muscle groups for a certain amount of time. Its benefits include lowering stress levels, improving sleep quality, relieving pain and muscle tension, and using PMR therapy as an alternative form of treatment for lowering stress and anxiety levels **(Dehkordi et al., 2019).**

It can be highly confusing to have many emotions at various times. Understanding the causes of your feelings can help you identify coping mechanisms. The progressive muscle relaxation technique is one of the non-pharmaceutical remedies for these conditions, which eases stress by having an impact on both mental and physical health **(Frederiksen et al. 2017)**. The simplest treatment to teach patients and deliver is (PMRT) because it is cheap, alwaysavailable, self-initiated by the patient, and doesn't have any negative side effects. Through the release of endorphins, it can improve the body's defenses and general health **(Krupinska and Kulmatycki, 2014)**.

It depends on the principle that muscle tension is the physiological response of the human body to irritating thinking **(Cougle et al., 2020)** which helps the body and mind to relieve any tension. Progressive relaxation exercises help to balance the sympathetic nervous system by relaxing the body, lowering blood pressure, stimulating blood circulation, and ensuring muscle relaxation. it is a basic human need, functioning to maintain body energy and help regulate this process **(Aksu et al., 2018).**

Significance of the study:

Cervical cancer can be life-threatening as well. The morbidity rates of cancer cervix differ widely among studies due to many social, ethnic, and behavioral reasons. In

Egypt, Cervical cancer mortality rates are inconsistence. Early diagnosis of cancer cervix is crucial for its treatment and could improve the cure and survival rates. The widely-known Papanicolaou test (Pap smear test) is heavily used to screen for cancer (**Mohammed et al., 2018**). This test carries many pros such as low cost, effectiveness, and high sensitivity. Cervical cancer is of public health concern and despite the great benefits with low cost of screening procedures, their utilization remains very low due to women's lack of awareness which can further influence their screening behavior. And their emotional status (**Gernier et al., 2020 and Bülbül et al., 2018**).

Progressive muscle relaxation therapy is the simplest, least expensive, easilyaccessible, patient-initiated, and no side effects (**Ferendiuk et al., 2019**)

Aim of the study:

This study aimed to determine the effect of PMRT on emotional status among cervical cancer women undergoing chemotherapy through:

- Assessing the depression level among cervical cancer women undergoing chemotherapy.
- Assessing the anxiety level among cervical cancer women undergoing chemotherapy
- Assessing the stress level among cervical cancer women undergoing chemotherapy
- Evaluating the effect of PMRT on emotional status among cervical cancer women undergoing chemotherapy.

Research hypothesis:

Cervical cancer women undergoing chemotherapy who receive PMRT are expected to experience less depression, anxiety, and stress levels than those who will not.

Subjects and Methods:

Research design:

This investigation was conducted with a quasi-experimental approach. Patients participate in quasi-experimental studies to examine the actual efficacy and safety of non-randomized therapies. Patients can choose to participate or are randomly assigned to one of several treatment groups (**Maciejewski, 2020**).

Setting:

The study was applied in the inpatient and outpatient clinics in Sohag Oncology institution. It is located on the first floor. This setting was chosen because it serves the largest region of the population and has a high case flow rate.

Subjects:

A purposive sampling technique was used to select a sample of 100 cervical cancer women undergoing chemotherapy who were divided into two equal groups and randomly assigned, with 50 cervical cancer patients receiving chemotherapy in each group (the experimental and control groups).

Randomization:

The participants were chosen using a straightforward random sample method. Every woman was asked to choose one piece of paper as part of the randomization process. While the letter carrying the paper (C) represents the control group, the woman who chooses the letter carrying the paper (E) represents the experimental group. The experimental group receives progressive muscle relaxation therapy while the control group receives the standard of care.

Sample size calculation:

The sample size was determined using the level of significance for power analysis, 0.95(=1-0.95=0.5), at alpha. The significance level was set at 0.05 (one-sided), and the threshold of extreme significance was set at 0.001.

Inclusion criteria were:

- Cervical cancer women undergoing chemotherapy aged 21 years and more.
- Accept the study's invitation to participate.

Exclusion criteria were:

- Cervical cancer women undergoing chemotherapy had another chronic disease
- Refuse to participate in the study
- Patients with mental illnesses.

Tools of data collection:

Two tools were used:

Tool (I): Demographic data of cervical cancer women undergoing chemotherapy sheet: was created by the researchers following an assessment of relevant literature. It contains information on four topics:

age, educational level, occupation, and place of residence.

Tool (II): Tool II: Depression, Anxiety and Stress Scale (DASS-21):

The Depression, Anxiety, and Stress Scale was utilized by the researchers and was adapted from **Lovibond & Lovibond, (1995).** The scale, which had 21 items, was made up of three self-report ratings that were intended to measure the signs of depression, anxiety, and stress. Seven items make up each of the three DASS-21 subscales. The depression scale measures inertia, dysphoria, and devaluation of life, as well as a lack of interest or involvement, self-deprecation, anhedonia, and lack of interest in anything. The anxiety scale assesses situational anxiety, skeletal muscle symptoms, autonomic arousal, and subjective experiences of anxious affect. The chronic non-specific arousal levels are sensitive to the stress scale. It measures nervous arousal, inability to unwind, easiness to become disturbed or irritated, irritability/ overreactivity, and impatience. Responses on the rating scale varied from (3) applied to me very much or most of the time to (2) applied to me to a significant extent or a good portion of the time to (1) applied to me occasionally or to some extent, and (zero) did not apply to me at all.

Scoring system for Depression, Anxiety, and Stress Scale (DASS):

The cutoff point used by **Antony etal. (1998)** to classify stress, anxiety, and depression was used to classify the responses. As a result, the severity of the symptoms (very severe, severe, moderate, mild, and no symptoms) was as follows:

Levels of DASS symptoms	Depression	Anxiety	Stress
Normal (no symptoms)	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Validity of the tools:

The instruments' content validity, clarity, comprehensiveness, appro-priateness, and relevance were evaluated by five experts in the domains of obstetric nursing, mental health nursing, and medicine. No alterations were made, in the opinion of the panel, to ensure that the sentences were understandable and pertinent to the situation.

Reliability of the tools:

The reliability of the two scales was assessed in the current study using the internal consistency approach. Both demonstrated high reliability with Cronbach alpha coefficients of 0.96 for the first tool and 0.95 for the DAS scale.

Methods:

The Sohag Faculty of Nursing's Ethical Research Committee had to approve the study before it could be carried out. The directors of the previously selected setting were asked in a letter by the dean faculty of nursing at Sohag University for their consent to conduct this study. The study's goal was to obtain permission for data collecting.

A pilot study

A pilot study was conducted on 10% (5 Cervical cancer women receiving chemotherapy from each group) of the all sample to evaluate the clarity and viability of the research methodology. There were no modifications done to the tools before they took their final shape. The study comprised cervical cancer patients who were receiving treatment from the pilot study.

Ethical considerations:

The obstetric directors of the chosen setting were contacted before the study began to ensure their participation and to explain its goals. Women with cervical cancer receiving chemotherapy provided their oral consent in exchange for their cooperation. Women with cervical cancer who were receiving chemotherapy were made aware of the goals of the trial. Women who were receiving treatment for cervical cancer were informed that participation in the study was fully voluntary and that they could withdraw their permission at any time, without having to give a reason. Women receiving chemotherapy for cervical cancer were

advised that their data were private and used only for research.

The procedure of data collection:

From 9 a.m. to 1 p.m., the researchers went to the locations they had previously chosen twice a week. Starting with of April to the end of July 2023, data were collected during four months. About 50 to 60 minutes were needed to complete each interview tool. The researchers met one-on-one with cervical cancer patients receiving chemotherapy, introduced themselves, and then explained the objectives. The researchers conducted face-to-face interviews with the cervical cancer patients who were receiving chemotherapy, and they also read the survey questions and possible responses to them to help them complete it.

Implementation of the study included three phases

Assessment phase:

The researcher originally built strong relationships with the cervical cancer patients taking treatment by having brief chats with them. The demographic data sheet and DASS scale questions were answered by the researchers. The aim of the research were described.

Implementation Phase:

In the experimental group:

The researchers introduced themselves and described the study's objectives to each cervical cancer woman receiving treatment in the experimental group. Demographic information was subsequently gathered using the PMR approach, and using the DASS (tool 2), the researchers evaluated the depression, anxiety, and stress levels of cervical cancer women receiving chemotherapy. Depending on the comfort and understanding of the chemotherapy-undergoing cervical cancer women, each interview lasted around an hour.

50 cervical cancer women who were receiving chemotherapy in the experimental group also received standard care and progressive muscle relaxation. The gradual muscle relaxation approach was taught using demonstrations, pictures, and group discussions. Women followed the

researcher's oral instructions at home. The exercise session continued after a call.

The PMR approach was then demonstrated to cervical cancer patients receiving chemotherapy after the administration of relaxation, with each phase being repeated. The participants were then given instructions to do the PMR three to four times until they were proficient, going over each step once more.

A progressive muscle relaxation technique

Before beginning the PMR technique, participants in the experimental group were instructed to empty their bladders and choose a comfortable position (laying or sitting). The Jacobson method was used to gradually relax the muscles until complete relaxation was reached by contracting and relaxing certain muscle groups.

- For 30 minutes, the women relaxed using the Jacobson technique in a well-lit, noise-free environment by lying on their sides with their legs slightly flexed. By separating the body's muscles into eight divisions, the Jacobson approach employed a 5-second active muscle contraction then followed by a 30-second muscle relaxation (tension/rest).

- The right foot, left foot, right hand, left hand, stomach and back, chest and shoulders, face, head, and scalp muscles were first tense, then released. This procedure was carried out in front of the researcher by playing a CD that had recordings and preparations made specifically for each member of the experimental group. The volunteers were instructed by the researchers to use the approach three times daily during the morning, evening, and night shifts. The researcher went to the clinics to finish the last phase of the questionnaire when the study participants saw them after 15 days (for evaluation).

For the control group:

In the control group, every cervical cancer woman receiving chemotherapy underwent a face-to-face discussion with the researchers for around 30 minutes during which they introduced themselves, discussed the objectives, and obtained their oral consent. After that, without having the women practice the PMR technique, the

researchers used DASS to gather data from the women on their demographics, levels of depression, anxiety, and stress. They only received the routine care such as taking medication as prescribed.

Evaluation phase:

After four weeks of applying the PMR technique, the researchers reassessed depression, anxiety, and stress levels in both experimental and control groups by using the DASS.

Statistical analysis:

SPSS statistical software, version 20, was used to analyze the data. The mean and standard deviation (SD) of three days' worth of continuous data were calculated before and after the massage. Categorical data were reported using percentages and numbers. The outcomes of each group were compared before and after the intervention using the paired t-test and the independent t-test, respectively. Changes in pain and fatigue levels were examined using the one-way repeated-measures analysis of variance (ANOVA). Variables that did not meet the parametric assumptions were examined using the Mann-Whitney test. The outcomes were examined using chi-square analysis. The connection between two variables was assessed using the chi-square test in the case of noncontiguous data. The association between two variables was evaluated using the chi-square test. A lower P value than 0.05 was used to determine statistical significance

Results:

According to Table 1, the average age of cervical cancer patients receiving chemotherapy in the experimental group was 45.33± 12.45 years, whereas it was 46.23± 5.33 years in the control group. Education-wise, it was discovered that cervical cancer patients receiving chemotherapy in the experimental group had a higher percentage of secondary education (58%) than those in the control group (54%). In the experimental group, 66 percent of the women with cervical cancer receiving chemotherapy were housewives, compared to 62% in the control group, according to the same data. Both the experimental group's (78%) and the control group's (74%), cervical cancer patients

receiving chemotherapy, resided in metropolitan areas. There was no statistically significant difference between the two groups in terms of demographic data.

Concerning cervical cancer women undergoing chemotherapy' total scores of DASS levels, it was observed from **Table (2)** that, there was a highly statistically significant improvement observed in cervical cancer women undergoing chemotherapy ' total scores of depression, anxiety, and stress scores (P<0.001) after the PMR intervention.

Concerning the cervical cancer women undergoing chemotherapy's total scores of depression, anxiety, and stress, it was noticed from **Table (3)** that, the total cervical cancer women undergoing chemotherapy's depression, anxiety, and stress scores were higher pre-intervention in both groups which reduced in the experimental group post-intervention. Also, there were highly statistically significant improvements and differences observed in the cervical cancer women undergoing chemotherapy's total scores of depression, anxiety, and stress scores in the experimental and control groups pre and post-PMR intervention at (P<0.001).

Figure (1) presents that 72% of the studied cervical cancer women undergoing chemotherapy pre-PMR implementation had a severe level of stress, (60 %) of them had severe anxiety, and (54%) had severe depression Moreover these percentages decreased to moderate among more than half of the studied cervical cancer women undergoing chemotherapy post-PMR implementation which reflected the positive effects of PMR implementation.

It was clear from **Table (4)** that, there was a highly statistically significant difference between the socio-demographic characteristics especially the age and the residence, and the total mean scores of depression, anxiety, and stress among the studied cervical cancer women undergoing chemotherapy pre and post the PMR implementation. Additionally, before the PMR's adoption, the levels of stress, anxiety, and stress among women with cervical cancer receiving chemotherapy who were between the ages of 30 and 40, had only secondary education, were working, and were from rural areas increased; however, these levels fell following the PMR's implementation.

Table (1): Demographic data of the studied cervical cancer women undergoing chemotherapy (N=50 in each group)

Demographic data	The experimental group (n=50)		Control group (n=50)		X2	p-value
	No.	%	No.	%		
Cervical cancer women undergoing chemotherapy's age						
- 21 < 30	13	26.0	11	22	3	0.15[NS]
- 30 <40	19	38.0	18	36		
- 40 ≤ 60	17	34	19	38		
Mean ±Stander deviation	45.33 ± 12.45		46.23 ± 5.33			
Cervical cancer women undergoing chemotherapy's education						
-Primary education	15	30.0	13	26	4	0.15[NS]
-Secondary education	29	58.0	27	54		
-University education	11	22.0	12	24		
Cervical cancer women undergoing chemotherapy's occupation:						
-Working	17	34	19	38		
-Housewives	33	66	31	62	3	3.32[NS]
Cervical cancer women undergoing chemotherapy's residence:						
-Urban	39	78	37	74	2	1.23[NS]
-Rural	11	22	13	26		

NS-non-significant

Table (2): Pre and post intervention DASS levels among the studied cervical cancer women undergoing chemotherapy (n=50 in each group)

DASS levels	Control group (n=50)	Experimental group (n=50)	T-test	P-value
Depression	24.33 ± 3.22	13.60 ± 1.36	25.65	<0.001*
Anxiety	19.34 ± 1.21	12.84 ± 1.25	124.77	<0.001*
Stress	32.55 ± 3.65	23.30 ± 3.45	88.34	<0.001*

NS=Non-significant, *= significant at p<0.05 level

Table (3): Comparison of total mean scores of cervical cancer women undergoing chemotherapy's emotional status (DASS levels) in the experimental and control groups pre and post-PMR intervention

DASS	Control group (n=50)		Experimental group (n=50)		T-test	P-value
	Pre- PMR intervention	Post- PMR intervention	Pre- PMR intervention	Post- PMR intervention		
Depression	26.60 ± 2.52	26.60 ± 2.52	26.60 ± 2.52	13.45 ± 1.43	23.319	<0.001*
Anxiety	17.72 ± 1.14	17.72 ± 1.14	17.72 ± 1.14	10.75 ± 1.13	111.834	<0.001*
Stress	32.60 ± 2.73	32.60 ± 2.73	32.60 ± 2.73	21.34 ± 3.68	94.145	<0.001*

P: **: Highly statistically significant at p<0.001 t: paired sample t-test

Figure (1): Depression, anxiety, and stress levels pre and post-PMR implementation among the studied cervical cancer women undergoing chemotherapy
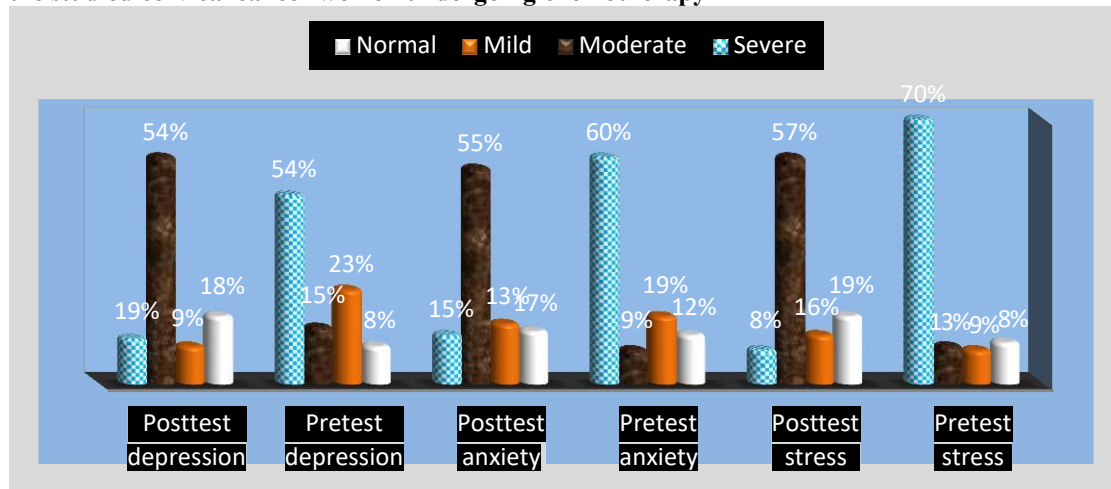

Table (4) Association between socio-demographic data of the studied cervical cancer women undergoing chemotherapy and their mean scores of DASS pre and post-PMR implementation

Mothers' characteristics	DASS						p-value
	Depression		Anxiety		Stress		
	Pre	Post	Pre	Post	Pre	Post	
1-Age(years):							
- 21 < 30	22.55 ± 3.60	11.45 ± 2.60	15.55± 3.60	10.12± 1.60	30.40± 3.60	23.25 ± 3.60	**<0.001***
- 30 – 40	23.70 ± 3.60	13.60 ± 1.40	16.60± 3.60	12.83 ± 1.13	31.50± 2.60	22.30± 3.60	
- 40 ≥ 60	24.70 ± 3.60	12.60 ± 1.40	17.80± 1.12	11.83 ± 1.13	32.70± 3.60	24.40 ± 3.70	
2-Educational level:							
- Illiterate	23.70 ± 3.60	13.60 ± 1.40	16.80± 1.12	12.83 ± 1.13	33.70± 3.60	24.40 ± 3.70	**0.004**
- Read and write	22.55± 3.60	11.45 ± 2.60	15.55± 3.60	10.12± 1.60	30.45± 3.60	21.25 ± 3.60	
- Primary education	21.60 ± 2.60	12.50± 2.60	16.60± 3.60	10.12± 1.60	31.50± 2.60	22.30± 3.60	
- Secondary education	24.70 ± 3.60	12.60 ± 1.40	17.80± 1.12	11.83 ± 1.13	32.70± 3.60	23.40 ± 3.70	
- University education	20.50± 3.20	12.60 ± 1.40	15.30± 1.10	11.43 ± 1.12	30.50± 3.50	23.30 ± 3.60	
3- Working status:							
- Housewives	21.60 ± 2.60	12.50± 2.60	16.60± 3.60	10.12± 1.60	31.50± 2.60	22.30± 3.60	**0.003**
- Working	24.70 ± 3.60	12.60 ± 1.40	17.80 ± 1.12	11.83 ± 1.13	32.70± 3.60	23.40 ± 3.70	
4- Residence							
- Urban	22.60 ± 3.33	11.50± 2.60	15.60± 3.60	10.12± 2.60	30.50± 3.60	21.30± 3.60	**<0.001***
- Rural	24.70 ± 3.32	12.60 ± 1.40	17.80± 1.12	11.83 ± 1.13	32.70± 3.60	23.40 ± 3.70	

Discussion:

There are many different relaxation techniques, such as Jacobson's progressive muscular relaxation. This technique, which is one of the best complementary therapies, doesn't need any additional equipment, making it easy to learn and use. After some easy and quick training, relaxation techniques like progressive muscle relaxation are useful tools for managing stress and anxiety. It is a complementary therapies that are inexpensive, simple to learn, and doesn't need specialized equipment is the Jacobson progressive muscle relaxation technique (**Alwan et al., 2018**). Therefore, the objective of the current study was to determine the effect of progressive muscle relaxation techniques on emotional status among cervical cancer women undergoing chemotherapy.

According to the investigation's findings, the two groups' demographics did not significantly differ from one another. According to the researchers, this result demonstrates that the two groups' initial levels of sadness, anxiety, and stress were comparable.

According to the study's findings, cervical cancer women are prone to depression; therefore, exercise is necessary to lessen depression in these patients. Exercises that incorporate both core movement exercises and relaxation techniques are

beneficial for treating sadness and anxiety. The relaxation movement is an intervention that employs a variety of techniques to support the mind's ability to influence physical symptoms and bodily functions that produce harmony in the body and mind, which is believed to facilitate healing for both physical and psychological disorders like anxiety and depression **(LeMone &Burke et al., 2018).**

According to several studies, relaxing motions during physical activity can lessen chemotherapy's adverse effects as nausea, vomiting, anxiety, and depression (Kartika et al., 2021). This is feasible since there are things that are connected among psychological elements (such as anxiety and depression). The effects of exercise on mood, depression, and fitness are all positive. Regular exercise also promotes a quicker recovery from stressors, which reduces the severity of depressive symptoms. According to the study by Midtgaard et al., the exercise intervention group's degree of depression was dramatically reduced **(Midtgaard et al., 2019).**

Generalized anxiety—which includes feelings of concern, apprehension, and dread—can more frequently determine a patient's quality of life and may be less changed by exercise than depression, which is frequently linked to cancer patients **(Chambers et al., 2019).** In cervical cancer patients, exercise has been shown to reduce depression, according to the findings of statistical testing. Since relaxation exercises compare how a person feels when their muscles are relaxed to how they feel when they are tense, they can help people with depression. Patients with cervical cancer who exercise report less stress, despair, and exhaustion. To help patients enhance their quality of life, a nurse or other healthcare professional should use this intervention **(Fatwa et al., 2021).**

By showing how well PMR intervention reduces women's anxiety levels, the results of the current study confirmed the study's goals and hypotheses. This result is also in line with **(Song et al., 2020),** who conducted a study with 50 intervention and 50 control patients who had been diagnosed with cancer and engaged in progressive relaxation exercises, and who concluded that the PMR reduced the anxiety level among the patients with breast and colorectal cancers.

The findings of our long-term follow-up for cervical cancer women showed that although improvements in treatment have greatly extended patient survival periods, patients frequently experience significant psychological stress following surgery. Young and middle-aged cervical cancer patients may experience infertility as a result of the illness, which can disrupt their family or social lives and lower their quality of life **(Li et al., 2019).** Another study on cervical cancer patients revealed that some will have major changes in their sense of self and their ability to recognize their roles after having a hysterectomy. According to **Khalil et al. (2018),** several patients claimed that they experienced considerable unpleasant feelings, felt as though their social or professional status had been negatively impacted by the sickness, and that they had experienced discrimination from others.

Similar to the findings of this study, some researchers have looked into the psychological health status of patients with middle and advanced cervical cancer. Their findings indicate that these patients' somatization, compulsion, interpersonal sensitivity, anxiety, hostility, and other factor scores were significantly reduced, with significant differences before and after the intervention (Gernier et al., 2021). In conclusion, Muzi et al. (2021) found that implementing psychological intervention can help cervical cancer patients undergoing postoperative chemotherapy feel better both immediately and later.

Confirming findings from earlier research that were comparable.(Pardini et al., 2018; Touch, S., and Oh, 2018). Additionally, as reported by Khalil et al., we discovered that "social functioning" was the cervical cancer symptom that had the least of an impact. However, **Yang et al. (2018)** demonstrated that cervical cancer has a major impact on social functioning because of differences in national cultures and spiritual traditions **(Liao et al., 2018).** The research revealed that anxiety and despair in cervical

cancer patients ranged from mild to severe. Furthermore, the presence of Anxiety and health-related quality of life were found to be significantly correlated.

The results of the current study showed that after the use of the progressive muscle relaxation technique, there were highly statistically significant improvements in the total scores of sadness, anxiety, and stress in cervical cancer women receiving chemotherapy. This can highlight how crucial it is to put the PMR into practice so that anxiety might be reduced.

The current study's findings showed that the studied cervical cancer women who were receiving chemotherapy before the PMR implementation had extremely high levels of stress, anxiety, and depression, but that after the PMR was put in place, these percentages diminished to moderate levels among more than half of them, with improvements in the combined scores of depression, anxiety, and stress that were highly statistically significant. According to the researchers, the results supported the claim that PMR is beneficial in reducing women with cervical cancer worry and tension while they are receiving chemotherapy. These conclusions are reinforced by a study conducted by Park et al. in 2019 concerning the use of progressive muscle relaxation to lessen dental anxiety, which found that it helped ease patients' tension and anxiety (Li et al., 2018). Similar to this, Xiao, et al., (2020) investigated the effects of a PMR intervention on patients' negative emotions and found that it reduced patients' anxiety.

The current study found that post-PMR implementation, stress, anxiety, and depression levels were decreased and moderate in more than half of the cervical cancer women who were also receiving chemotherapy. The coping component of PMR, which aims to assist women in choosing the best course of action to take to reduce their anxiety, may be responsible for the program's effectiveness.

This finding is in line with research by **De et al. (2019),** who investigated "The effectiveness of progressive muscle relaxation and interactive guided imagery as a pain-reducing intervention in advanced cancer patients" and discovered that the practice can lower anxiety levels. **Meyer et al. (2016)** discovered that the observation group scores were lower than those of the control group in their study titled "Progressive muscle relaxation reduces migraine frequency and normalizes amplitudes of contingent negative variation." This can be a sign of how crucial it is to use the progressive muscle relaxation approach to reduce anxiety.

After PMR intervention, anxiety levels may have decreased due to the balance between the anterior and hypothalamic nuclei, which reduces sympathetic nervous system activity and prevents the negative effects of stress and anxiety while increasing physical and mental relaxation **(Ferendiuk et al., 2018).** Additionally, other findings from the research indicate the advantages of progressive muscle relaxation concerning women's anxiety levels **(Wilczyska et al., 2019).** This is associated with gradual muscular relaxation, which can calm the body, effectively lessen and reduce anxiety, and improve the quality of sleep **(Liu et al., 2020).**

On the other hand, this finding conflicts with a study by **Masih et al. (2019)** that looked at the impact of a single, brief practice of progressive muscle relaxation after exposure to an acute stressor on a person's subsequent intake of energy and discovered no significant differences between the groups in terms of the practice of PMR. Additionally, **Hasanpour-Dehkordi et al. (2019)** discovered that neither approach reduced anxiety in surgical patients when they examined the effects of progressive muscle relaxation combined with an analgesic. The discrepancy can be caused by variations in the study group.

The results of the current study demonstrated a highly statistically significant correlation between socio-demographic characteristics and the total mean scores of depression, anxiety, and stress among the studied women before and after the implementation of the PMR. Before the establishment of the PMR, the investigated women's mean emotional disturbance scores

were much higher where they lived, particularly in rural areas. According to the researcher, rural areas differ in terms of culture, values, and beliefs, and women who live there are more stressed due to a lack of medical protective supplies, a lack of knowledge, and the difficulty of travelling to an urban hospital or health centre when complications are suspected. Also, a high level of women's stress was accompanied by working women. This may be explained by the fact that younger, less educated cervical cancer patients receiving chemotherapy had less knowledge of and difficulty understanding the progressive muscle relaxation technique than educated women, whereas educated women may have had an easier time understanding the information than uneducated women.

Conclusion:

The present study's findings and research hypothesis led researchers to the following conclusion that progressive muscle relaxation technique achieved significant improvements in the emotional status of depression, anxiety, and stress among those cervical cancer women undergoing chemotherapy.

Recommendations:

The following recommendations were suggested based on the results of the present study

- Cervical cancer women undergoing chemotherapy should understand the PMR as a applicable strategy to improve their emotional status.

- Psychological support should be carried out to help cervical cancer women undergoing chemotherapy become less stressed and anxious.
- Simple Arabic booklets and brochures containing sufficient knowledge about cervical cancer should be available to cervical cancer women undergoing chemotherapy, printed and given to them.
- For the results to be generalised, the current study must be replicated with a big sample of women in varied contexts.

References:

Aksu, N.T., Erdogan, A., and Ozgur, N. (2018): Effects of progressive muscle relaxation training on anxiety, sleep and quality of life in patients with pulmonary resection. Sleep Breath; 22:695-702. Doi: 10.1007/s11325-017-1614-2.

Alwan, M., Zakaria, A., Abdul Rahim, M., Abdul Hamid, N. and Fuad, M. (2018): Comparison between two relaxation methods on competitive state anxiety among college soccer teams during the pre-competition stage. Int J Adv Sport Sci Res; 1:90-104.

Alwan, M., Zakaria, A., Abdul Rahim, M., Abdul Hamid, N. and Fuad, M. (2018): Comparison between two relaxation methods on competitive state anxiety among college soccer teams during the pre-competition stage. Int J Adv Sport Sci Res; 1:90-104, 2018.

Antony, M.M., Bieling, P.J., Cox, B.J., Enns, M.W. & Swinson, R.P. (1998): Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. Psychological assessment, 10(2), 176.

Bhatla, N., Berek, J.S., Cuello Fredes, M., et al. (2019): Revised FIGO staging for carcinoma of the cervix uteri. Int J Gynaecol Obstet. 2019;145(1):129–135. https://doi.org/10.1002/ ijgo.12749.

Brodersen, J., Siersma, V. and Thorsen H. (2018): Consequences of screening in cervical cancer: development and dimensionality of a questionnaire. BMC Psychol 2018; 6: 39.

Bülbül, Y., Ozlü ,¨ T., Arınç, S., et al. (2018): Sleep disturbances in patients with lung cancer in Turkey. Tuberk Toraks. 2018;66(4):297–303. https://doi. org/10.5578/tt.67689.

Chambers, S.K., Lynch, B.M., Aitken, J. and Baade, P. (2019): Relationship over time between psychological distress and physical activity in colorectal cancer survivors. J Clin Oncol. 2019;27(10):1600-6.https://doi.org/ 10.1200/ jco.2008.18.5157 PMid: 19255326

Cougle, J.R., Wilver, N.L. and Day, T.N., et al. (2020): Interpretation Bias Modification versus Progressive Muscle Relaxation for Social Anxiety Disorder: A Web-Based Controlled Trial. Behav Ther.; 51:99-112. DOI: 10.1016/j.beth.2019.05.009.

De Paolis, G., Naccarato, A. and Cibelli, F., et al. (2019): The effectiveness of progressive muscle relaxation and interactive guided imagery as an Anxiety and pain-reducing intervention in advanced cancer patients: a multicentre randomized controlled non-pharmacological trial. Complement Ther Clin Pract; 34:280–7.

Dehkordi, A., Hasanpour, K., Solati, S.S., & Tali. Effect of Progressive Muscle Relaxation with Analgesic on Anxiety Status and Pain in Surgical Patients, Br. J. Nurs. 28, 174–178. 2019.

Fatwa Imelda1*, Heru Santosa2, Sarma Nursani L. Raja3, Namora Lumongga Lubis. Reducing Depression, Anxiety, and Fatigue Level in Cervical Cancer through Physical Exercise Intervention, Journal of Medical Sciences. 2021 Jun 23; 9(T3):280 284.https://doi. org/10. 3889/oamjms.

Ferendiuk, E., Biegańska, J.M., Kazana,P., et al. (2019): Progressive muscle relaxation according to Jacobson in treatment of the patients with temporomandibular joint disorders. Folia Med Cracov; 59:113-122. Doi: 10.24425/fmc.2019.131140.

Ferendiuk, J.M. Bieganska, P. & Kazana (2019): Progressive Muscle Relaxation According to Jacobson in Treatment of The Patients with Temporomandibular Joint Disorders, Folia Med. Cracov. 59, 113–122, 2019.

Frederiksen, Y.., O'Toole, M.S. and Mehlsen M. (2017): The effect of expressive writing intervention for infertile couples: a randomized controlled trial. *Hum Reprod*; 32(2):391–402. [PubMed] [Google Scholar]

Gernier, F., Joly, F., Klein, D., Mercier,M., Velten, M. & Licaj, I. (2020): Cancer-related fatigue among long-term survivors of breast, cervical, and colorectal cancer: a French registry-based controlled study. Support Care Cancer.;28(12):5839–5849.

Hasanpour-Dehkordi, A., Solati, K., Tali, S.S., et al. (2019): Effect of progressive muscle relaxation with analgesic on anxiety status and pain in surgical patients, Br J Nurs. 2019; 28:174-178, Doi: 10.12968/bjon.28.3.174.

He, X., Li, J.P., Liu, X.H., Zhang, J.P., Zeng, Q.Y., Chen, H. and Chen, S.L. (2018): Prognostic value of C-reactive protein/albumin ratio in predicting overall survival of Chinese cervical cancer patients overall survival: comparison among various inflammation-based factors. J Cancer; 9: 1877- 1884.

Jassim, G., Obeid, A. and Al Nasheet, H.A. (2018): Knowledge, attitudes, and practices regarding cervical cancer and screening among women visiting primary health care Centres in Bahrain. BMC Public Health; 18: 128.

Kartika, T.D. Tingkat Depresi pada Pasien Kanker Serviks Di RSUP H. (2021): Adam Malik Medan; 2021. Available from: http://www.repository. usu.ac.id /bitstream/handle/123456789/14264/10E 00020.pdf;jsessionid =010157582C8E2C52955 F063DE99F28 C9?sequence=1. [Last accessed on 2021 Feb 10].

Khalil, J., Bellefqih, S., Sahli, N., et al. (2018): Impact of cervical cancer on quality of life: beyond the short term (Results from a single institution): quality of life in long-term cervical cancer survivors: results from a single institution. gynaecol oncol respract.;2(1): 7. ,https://doi.org/10.1186/ s40661-015-0011-4.

Kim, M.K., Sim, J.A., Yun, Y.H., et al. (2016): Health-related quality of life and sociodemographic characteristics as prognostic indicators of long-term survival in disease-free cervical cancer survivors. Int J Gynecol Cancer.; 26(4): 743–749.

Kori, M. and Yalcin, Arga, K. (2018): Potential biomarkers and therapeutic targets in cervical cancer: Insights from

the meta-analysis of transcriptomics data within network biomedicine perspective. PLoS One; 13: e0200717.

Krupinska, K. and Kulmatycki, L. (2014): Effectiveness of Progressive Muscle Relaxation (Pmr) In Alleviating Psychophysical Disorders-A Systematic Review (1982-2012). GJRA- Global Journal for Research Analysis; 3(10): 113-115.

LeMone, P. & Burke, K. (2018): Medical-Surgical Nursing: Critical Thinking in Client Care. 94th ed. New Jersey: Pearson Prentice Hall.

Li, M.F., Ji, H.J, Liang, H.J. (2018): Effects of progressive muscle relaxation training on sleep in patients without convulsion. Chin Gen Pract Nurs; 16:1607–9.

Li, S., Hu, T., Chen, Y., et al. (2019): Adjuvant chemotherapy is a valuable alternative option in selected patients with cervical cancer. Samimi G. PLoS One.;8(9), e73837. https://doi.org/10.1371/journal.pone.0073837.

Liao, C.L., Chu, Y.L, Lin, H.Y., Chen, C.Y., Hsu, M.J., Liu, K.C., Lai, K.C., Huang, A.C. and Chung, J.G. (2018): Bisdemethoxycurcumin suppresses migration and invasion of Human cervical cancer HeLa cells via inhibition of NF-κB, MMP-2, and -9 pathways. Anticancer Res; 38: 3989- 3997.

Liu, G., Sharma, M., Tan, N. and Barnabas, R.V. (2018): HIV-positive women have a higher risk of human papillomavirus infection, precancerous lesions, and cervical cancer. AIDS 2018; 32: 795-808.

Liu, K., Chen, Y., Wu, D., Lin, R., Wang, Z. & Pan, L. (2020): Effects of progressive muscle relaxation on anxiety and sleep quality in patients with COVID-19, Complementary Therapies in Clinical Practice, DOI: https://doi.org/10.1016/j.ctcp.2020.101132.

Lovibond, P. F. & Lovibond, S. H. (1995): The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventory.

Behavior research and therapy, 33(3), 335-343.

Lovibond, P.F. & Lovibond, S.H. (1995): The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and AnxietyInventories, Behavior research and therapy, 33(3), 335-343.

Masih, T., Dimmock, J.A. & Guelfi, K.J. (2019): The effect of a single, brief practice of progressive muscle relaxation after exposure to an acute stressor on subsequent energy intake, Stress Health; 35:595-606. Doi: 10.1002/smi.2891.

Melnikow, J., Henderson, J.T., Burda,B.U., Senger, C.A., Durbin, S. and Weyrich, M.S. (2018): Screening for cervical cancer with high-risk human papillomavirus testing: updated evidence report and systematic review for the US preventive services task force. JAMA; 320: 687-705.

Meyer, B., Keller, A., Wöller, B., et al. (2016): Progressive muscle relaxation reduces migraine frequency and normalizes amplitudes of contingent negative variation (CNV), J Headache Pain; 17:37.

Midgaard, J., Stage, M., Møller, T., Andersen, C., Quist, M., Rørth, M., et al. (2019): Exercise may reduce depression but not anxiety in self-referred cancer patients undergoing chemotherapy. Post-hoc analysis of data from the "body and cancer" trial. Acta Oncol.;50(5):660-9. https://doi.org/10.3109/0284186x.2019.543145 PMid:21226544

Mohammed, F., Shahin, M., Youness, E., & Hassan, H. (2018): Survivorship in Women Undergoing Gynecological and Breast Cancer Treatment in Upper Egypt: The Impact of Quality of Life Improvement Educational Program. American Research Journal of Gynaecology, 2(1), 1-28. https://doi.org/10.21694/2577-5928.18001.

Muzi Liu, Jianli Guo, Hongwei Sun & Guifeng Liu. (2021): The effect of psychological nursing on the short- and long-term negative emotions and quality

of life of cervical cancer patients undergoing postoperative chemotherapy Are J Transl Res.;13(7):7952-7959.

Pardini, B., De Maria, D., Francavilla, A., Di Gaetano, C., Ronco, G. and Naccarati, A. (2018): MicroRNAs as markers of progression in cervical cancer: a systematic review. BMC Cancer; 18: 696.

Park, E.S., Yim, H.W., Lee, K.S. (2019): Progressive muscle relaxation therapy to relieve dental anxiety: a randomized controlled trial. Eur J Oral Sci; 127:45–51.

Sah SK, González JV, Shrestha S, Adhikari A, Manandhar KD, Yadav SB, Stein DA, Gupta BP and Picconi MA. Human papillomavirus genotype distribution in cervical cancer biopsies from Nepalese women. Infect Agent Cancer 2018; 13: 4.

Serkies, K. and Jassem, J. (2018): Systemic therapy for cervical carcinoma-current status. Chin J Cancer Res; 30: 209-221.

Song, Q., Xu, R. & Hai, Q. (2020): Relaxation Training During Chemotherapy for Breast Cancer Improves Mental Health and Lessens Adverse Events, Int J Clin Exp Med, 6, 979-4, 2020.

Song, Q., Xu, R. & Hai, Q. (2020): Relaxation Training During Chemotherapy for Breast Cancer Improves Mental Health and Lessens Adverse Events, Int J Clin Exp Med, 6, 979-4.

Sung, H., Ferlay, J., Siegel, R.L., et al. (2021): Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA A Cancer J Clin.; 71(3):209–249. https://doi.org/10. 3322/ caac.21660.2

Touch, S. and Oh, J.K. (2018): Knowledge, attitudes, and practices toward cervical cancer prevention among women in Kampong Speu Province, Cambodia. BMC Cancer 2018; 18: 294.

Wilczyńska, D., Łysak-Radomska, A., Podczarska-Głowacka, M., et al. (2019): Evaluation of the effectiveness of relaxation in lowering the level of anxiety in young adults - a pilot study, Int J Occup Med Environ Health; 32: 817-824. Doi: 10.13075/ijomeh. 1896.01457.

Xie, L.Q., Deng, Y.L., Zhang, J.P., et al. (2016): Effects of Progressive Muscle Relaxation Intervention in Extremity Fracture Surgery Patients. West J Nurs Res; 38:155-68, Doi: 10.1177/01939 45914551509.

Yang, M., Wang, M., Li, X., Xie, Y., Xia, X., Tian, J., Zhang, K. and Tang, A. (2018): Wnt signaling in cervical cancer? J Cancer; 9: 1277-1286.