



Reducing Depression, Anxiety, and Fatigue Level in Cervical Cancer through Physical Exercise Intervention

Fatwa Imelda^{1*}, Heru Santosa², Sarma Nursani L. Raja³, Namora Lumongga Lubis²

¹Department of Maternity and Child, Faculty of Nursing, Universitas Sumatera Utara, Medan, Indonesia; ²Department of Demography and Biostatistics, Faculty of Public Health, Universitas Sumatera Utara, Medan, Indonesia; ³Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Sumatera Utara, Medan, Indonesia

Abstract

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***Correspondence:** Fatwa Imelda, Faculty of Nursing, Universitas Sumatera Utara, Jl. Prof. T. Maas No.3, Padang Bulan, Kec. Medan Baru, Kota Medan, Sumatera Utara 20155, Indonesia. E-mail: fatwa.imelda@usu.ac.id
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AIM: The objectives of the study were to identify the effect of physical exercise on depression, anxiety, and fatigue in cervical cancer patients.

METHODS: A quasi-experimental study With a pretest-posttest with control group design was used. Thirty respondents were selected using purposive sampling. The data were gathered by a focus group discussion. The Piper Fatigue Scale was used to measure fatigue levels. Hospital Anxiety and Depression Scale were used to measure anxiety and depression level. Paired t-test was used for data analysis.

RESULTS: There was a significant difference between depression level after physical exercise with $t = 3.552$ ($p < 0.05$). There was a significant difference between anxiety level after physical exercise with $t = 11.297$ ($p < 0.05$). There was a significant difference between fatigue level after physical exercise with $t = 17.457$ ($p < 0.05$).

CONCLUSION: Physical exercise reduces anxiety, depression, and fatigue in patients with cervical cancer that will improve the quality of life of patients.

Introduction

Abnormal cells in the cervix, which are almost 90% caused by the human papillomavirus, are characterized by cervical cancer (HPV). Socioeconomic status, age at first sexual intercourse, number of partners, multiparity, smoking, and a history of venereal disease are some factors that are considered to be risk factors for precancerous cervical lesions [1]. With a better diagnosis of cancer, the number of new cancer cases will increase [2].

Based on the cancer sub directorate (Subdit) of the Directorate of Non-Communicable Disease Control of the Republic of Indonesia as of January 20, 2014, The prevalence of cancer in Indonesia are 36,761,000 women aged 30–50 years; the incidence of cervical cancer is 1.3 per 1000 population or around 850 individual [3]. Patients with cervical cancer often experience psychological symptoms, including depression and anxiety, compared to the general population. The prevalence of depression in the general population in the United States is around 17–25%. Anxiety and depression in cervical cancer patients can be caused by the cancer diagnosis, treatment

side effects, age, education, socioeconomic status, stage of cancer, duration of cancer, and social support [4].

More than 80% of people with cancer feel exhaustion [5]. There will be one or more forms of treatment for each cancer patient, such as chemotherapy, surgery, radiation, and others. Cancer patients feel exhaustion with cancer: before, during, and after chemotherapy [6]. Nearly 30-99% of people with cancer experience extreme fatigue [7].

Chemical factors and cancer therapy that is thought to play a role in fatigue, especially tumor necrosis factor- α , interleukin-1, and levels of 17-hydroxyl corticosteroid [8]. Conditions that further aggravate cancer fatigue include anemia, pain, depression and anxiety, circadian rhythm/sleep disorders, nutritional problems, low physical activity and use of alcohol/other free drugs, hormonal changes related to the pituitary-hypothalamic axis, early menopause in women and androgen deficiency in men and hypothyroidism and persistent activation of the immune system [9].

Anxiety, depression, and fatigue due to cervical cancer still receive less attention in handling than pain, nausea, vomiting, and other symptoms. Therapy given by the health team, 95% is given to reduce pain and

only 5% to reduce cancer fatigue [10]. Causes of fatigue, including the diagnosis of cancer itself, the level of anxiety and depression, lack of physical activity or excessive, comorbidity, type of malignancy, the pattern of therapy undertaken and the long-term effects of therapy, a function of normal cells, resulting in reduced energy to meet body needs [11].

A positive impact on exhaustion and the function and strength of the muscles is seen in the physical self-management rehabilitation program. Physical activity is carried out by daily exercise to improve strength, energy, and fitness. A meta-analysis study of 44 studies of 3254 cancer patients with physical exercise that can reduce fatigue is moderate intensity, including physical resistance training in elderly cancer patients, were included in the study. Based on the ability of cancer patients to avoid the spread of cancer therapy toxicity, it is the results of individual exercise studies that can minimize cancer-induced cervical exercise fatigue (exercise) [12].

Looking at the above phenomena, researchers as professionals take a role in enabling cervical cancer patients. This research focuses on the impact of physical activity on anxiety, depression, and fatigue in North Sumatra field patients with cervical cancer.

Materials and Methods

Study design

This was a non-randomize control trial. This study was conducted from October 2017 to July 2018.

Participants

Thirty respondents were selected using purposive sampling with inclusion criteria: Stage I-III, good communication, and outpatients, in which 15 respondents were randomly assigned in the experiment and control group.

Experiment procedures

The first measured the level of depression, anxiety, and fatigue of the patient before being given an action. When fulfilling the requirements of the research patient, the researcher immediately gave a physical exercise in the group treated for 21 days with a distribution of treatment progressive muscle relaxation training for the 1st week, physical exercise the 2nd week, and physical exercise a combination of physical exercise progressive muscle relaxation and physical exercise for the 3rd week. Each physical training session was carried out for 30 min. Physical training was trained by professionals who were experts in the field of sports who have certificates in the field of sports.

Outcome measurements

Anxiety and depression questionnaires used Hospital Anxiety and Depression Scale. This questionnaire has been tested for validity and reliability in the Indonesian language and proven to be a valid and acceptable measuring scale and has a corrected item-total correlation greater than 0.3 and a reliable test of 0.706 for the anxiety subscale and 0.681 for the depression subscale. To measure the level of fatigue using a Piper Fatigue Scale measure to measure fatigue levels (Reeve *et al.*, 2010) with the value of the content validity index on this instrument is one and reliable test is 0.958.

Statistical analysis

In this study, for statistical analysis, the general characteristics of the subjects were analyzed with the mean, standard deviation, and frequency, using SPSS 20. The depression, anxiety, and fatigue level before and after physical exercises were compared and analyzed with a paired t-test, and all statistical significance levels were $p < 0.05$.

Ethical consideration

This study was approved by the Ethics Committee of the Faculty of Nursing University of Sumatera Utara Board of Health Research Ethics No. 1154/XII/SP/2017.

Results

Table 1 shows that the results of this study indicate that depression in the majority pre-intervention group in the moderate category seven respondents (46.7%) and after intervention after 3 weeks, the results of the post-intervention majority in the mild category were seven respondents (46.7%). Whereas the results of this study indicate that depression in the pre-test control group was the majority in the moderate category eight respondents (53.3%) and after 3 weeks without treatment, the results of the post-test did not change too much, the majority in the moderate category nine respondents (60%).

Table 1: Depression level in the experiment and control group (n = 30)

Depression level	Experiment				Control			
	Pre		Post		Pre		Post	
	f	%	f	%	f	%	f	%
Normal	3	20	4	26.7	3	20	1	6.7
Mild	4	26.7	7	46.7	3	20	3	20
Moderate	7	46.7	4	26.7	8	53.3	9	60
Severe	1	6.7	0	0	1	6.7	2	13.3
Total	15	100	15	100	15	100	15	100

Table 2 shows that the results of this study indicate that anxiety in the majority pre-intervention group

in the moderate category seven respondents (46.7%) and after intervention after 3 weeks, the results of the post-intervention majority in the normal category were six respondents (40%). Whereas the results of this study indicate that the anxiety in the pre-test control group majority in the moderate category nine respondents (60%) and post-test after 3 weeks without treatment found that the post-test results did not change that is the majority in the moderate category as many as eight respondents (53.3%).

Table 2: Anxiety level in the experiment and control group (n = 30)

Anxiety level	Experiment				Control			
	Pre		Post		Pre		Post	
	F	%	f	%	f	%	f	%
Normal	1	6.7	6	40	1	6.7	0	0
Mild	6	40	5	33.3	4	26.7	5	33.3
Moderate	7	46.7	4	26.7	9	60	8	53.3
Severe	1	6.7	0	0	1	6.7	2	13.3
Total	15	100	15	100	15	100	15	100

Table 3 shows that the results of this study indicate that fatigue in the majority pre-intervention group in the moderate category nine respondents (60%) and after intervention after 3 weeks found the post-intervention results in the majority in the mild category as many as 13 respondents (86.7%). Whereas the results of this study indicate that pre- and post-fatigue in the control group did not change after 3 weeks with the majority of fatigue in the moderate category nine respondents (60%).

Table 3: Fatigue level in the experiment and control group (n = 30)

Fatigue level	Experiment				Control			
	Pre		Post		Pre		Post	
	F	%	f	%	f	%	F	%
Mild	3	20	13	86.7	4	26.7	4	26.7
Moderate	9	60	2	13.3	9	60	9	60
Severe	3	20	0	0	2	13.3	2	13.3
Total	15	100	15	100	15	100	15	100

Table 4 shows that the results of this study with the paired T-test showed that the average depression level of patients with cervical cancer in the pre-test data was 9.93 (SD = 3.218). Whereas in the post-test data obtained, the mean value was 8.87 (SD = 2.642). Based on the statistical tests that have been done obtained the value of $t = 3.552$ with a value of $p = 0.000$ ($\alpha = 0.05$) which shows that there were significant differences between the pre and post in the Intervention group. Meanwhile, the results of this study with the paired T-test showed that the average depression rate of patients with cervical cancer in the pre-test data was 11.93 (SD = 3.173). Whereas in the post-test data obtained, the mean value was 10.53 (SD = 10.53). Based on the statistical tests that have been done obtained the value $t = 7.359$ with a value of $p = 0.014$ ($\alpha = 0.05$) which indicates that there was no difference between the mean values of pre and post in the control group.

Table 5 shows that the results of this study with the paired T-test showed that the average level of anxiety of cervical cancer patients in the pre-test data was 10.53 (SD = 2.503). Whereas in the post-test data obtained, the mean value was 8.67 (SD = 2.498). Based on the statistical tests that have been done obtained

the value $t = 11.297$ with a value of $p = 0.000$ ($\alpha = 0.05$) which showed that there were significant differences between the average pre-anxiety score and post in the intervention group. Meanwhile, the results of this study with the paired T-test showed that the average level of anxiety of patients with cervical cancer in the pre-test data was 12.07 (SD = 2.685), while the post-test data obtained a mean value of 11.13 (SD = 11.13). Based on the statistical tests that have been done, the value $t = 4.525$ with a value of $p = 0.007$ ($\alpha = 0.05$) shows that there was a significant difference between pre- and post-anxiety levels in the control group.

Table 4: Effect of physical exercise on depression level (n = 30)

Depression	Mean \pm SD	t	p-value
Experiment group			
Pre-test	9.93 \pm 3.218	3.552	0.000
Post-test	8.87 \pm 2.642		
Control group			
Pre-test	11.93 \pm 3.173	7.359	0.014
Post-test	10.53 \pm 3.603		

Table 5: Effect of physical exercise on anxiety level (n = 30)

Anxiety	Mean \pm SD	T	p-value
Experiment group			
Pre-test	10.53 \pm 2.503	11.297	0.000
Post-test	8.67 \pm 2.498		
Control group			
Pre-test	12.07 \pm 2.685	4.525	0.007
Post-test	11.13 \pm 2.503		

Table 6 shows that the results of this study indicate that the paired t-test statistical test obtained the results of the study that in the pre-test (before doing minimal physical exercise) the average fatigue rate of patients with cervical cancer was 104.67 (SD = 34.062). Whereas after the patient has done minimal physical exercise, the average value is 40.93 (SD = 23,484). Based on the statistical tests that have been done, it is obtained a value of 17.457 and based on the results of the analysis, there is a p-value of 0.000 ($\alpha = 0.05$), indicating that there were significant differences between the pre- and post-mean values in the intervention group. Meanwhile, the results of this study with the paired t-test showed that the average fatigue level of patients with cervical cancer in the pre-test data was 100.18 (SD = 41.116), while the post-test data obtained a mean value of 103.18 (SD = 6.563). Based on the statistical tests that have been carried out obtained the value $t = -2,732$ with a p-value of 0.142 ($\alpha = 0.05$) which indicates that there are no significant differences between pre- and post-fatigue mean values in the control group.

Table 6: Effect of physical exercise on fatigue level (n = 30)

Fatigue	Mean \pm SD	T	p-value
Experiment group			
Pre-test	104.67 \pm 34.062	17.457	0.000
Post-test	40.93 \pm 23.484		
Control group			
Pre-test	100.18 \pm 41.116	-2.732	0.142
Post-test	103.18 \pm 6.563		

Discussion

According to Kartika said that most of

the 38 cervical cancer patients did not experience depression as many as 20 patients (52.6%), and some showed mild depression eight patients (21.1%), moderate depression five patients (13.2%), and severe depression five patients (7.1%) [13]. The results of this study indicate that cervical cancer patients are prone to depression so that physical exercise is needed to reduce depression in cervical cancer patients. Physical exercises that have been combined from relaxation exercises and core movement exercises have benefits for anxiety and depression. The relaxation movement is an intervention that uses various techniques to facilitate the capacity of the mind to influence physical symptoms and bodily functions that produce harmony in the body and mind which is believed to facilitate healing not only in the physical but also in psychological disorders such as anxiety and depression [14]. Some studies show that relaxation movements in physical exercise can reduce side effects arising from chemotherapy such as nausea, vomiting, anxiety, and depression [15]. This is possible because it is theoretically stated that between psychological factors (anxiety, depression), physical (pain), sleep quality, and fatigue are things that are interrelated with each other. Physical exercise will improve mood, reduce depression, and improve fitness which in turn will improve sleep quality, in the end, the level of weakness becomes decreased.

Physical exercise can increase endorphin activity which is an enzyme that circulates in the body. Increasing endorphins can increase the immunity of the body and decrease the perception of pain that does not specifically improve mood and promote body activity [16]. Psychologically, during physical activity, the ability to show desired gestures can increase trust and self-esteem that influence the mood. The amount and consistency of sleep needs can be increased by physical workouts done daily so that it impacts the body's energy and activity better. Regular physical exercise also helps the faster recovery of the stressors to improve the symptoms of depression.

The study Midtgaard *et al.* said that the exercise intervention group significantly reduced their level of depression with a $p = 0.015$. The differentiation and discrimination between an anxiolytic and the antidepressant effect of exercise during cancer treatment are in accordance with own previous qualitative studies [17]. Phenomenological and narrative reviews of diaries of advanced disease patients who exercised during treatment showed that while the intervention offered situations for each individual to feel joy and excitement, enabling the person to achieve new hope, the intervention was less able to outweigh the uncertainty of the disease [18]. In addition, this thought is in line with our most recent publication showing that participants substantially decreased fatigue, there was no major impact on overall fatigue [19]. Together these findings support the assumption that patients with cancer tend to experience symptoms in clusters rather

than in isolation [20]. Depression is often associated with fatigue in cancer patients, while generalized anxiety can decide the quality of life more often (including feelings of worry, apprehension, and dread), which may be affected to a lesser degree by exercise [21].

The results of statistical tests show that there is an effect of physical exercise on decreasing fatigue in cervical cancer patients in the North Sumatra field. In physical exercise, there are relaxation exercises that can reduce the level of fatigue because relaxation exercises aim to distinguish feelings experienced when muscle groups are relaxed and compared when the muscles are in a tense condition. The term relaxation is often used for a fun activity that produces effects; feelings of pleasure in reducing tension are mainly related to the psychic. Almost all respondents experienced a decrease in fatigue after physical exercise. This is because the physical exercise movement will make the blood vessels smooth so that it can reduce the level of fatigue. Some meta-analyses and systemic reviews conclude that physical exercise is proven to be safe and effective in cancer patients.

Conclusion

Physical exercise reduces anxiety, depression, and fatigue in patients with cervical cancer. Health provider like a nurse should apply this intervention so that patients will improve their quality of life.

Recommendations

Physical exercises consisting of warm-up exercises and core exercises and relaxation exercises can be the basis for further research in nursing and need to consider incorporating physical training interventions with other interventions such as music therapy, guided imagery, and hypnosis.

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