Effect of Aerobic Exercises on Fatigue Among Breast Cancer Patients Receiving Chemotherapy in Selected Hospitals

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ABSTRACT

Introduction: Physical exercise has been identified as a potential intervention to improve quality of life in women with breast cancer receiving chemotherapy. Fatigue is the most common side effect of breast cancer treatment with chemotherapy, selected biologic response modifiers.

Aim: To assess the effect of aerobic exercises on fatigue among breast cancer patients receiving chemotherapy in selected hospitals.

Method: Quasi-experimental with pre-test post-test control group design was adapted. The study was conducted among breast cancer patients receiving chemotherapy. 60 samples were selected using non-probability purposive sampling and data collection was done using demographic variables, Clinical Profile, and Modified Fatigue Assessment Scale. The interventional group received an aerobic exercise programme with low to moderate intensity, two times a day, lasting for 20 minutes for 2 weeks.

Results: Aerobic exercises were significantly effective in reducing the level of fatigue among experimental breast cancer patients receiving chemotherapy.

Conclusion: This study concludes that an aerobic exercise program of precisely defined intensity, duration, and frequency can be prescribed as therapy for primary fatigue in breast cancer patients.

Key Words: Assess, Aerobic exercises, Breast cancer, Chemotherapy, Effect, Fatigue

INTRODUCTION

The International Agency for Research on Cancer (IARC) predicts that the total number of breast cancer cases will reach 22.2 million by 2030. Furthermore, the average age of breast cancer patients has been decreasing over the past 20 years. ¹

Breast cancer is the most common cancer among women in both developed and developing regions of the world, represents 25% of new cancer cases in women and is the second cause of death in developed after lung cancer. ²

Cancer incidence is growing, with an incidence rate of 14.1 million in 2012. In 2018, breast cancer statistics recorded 1, 62, 468 new registered cases and 87,090 reported deaths. Cancer-related fatigue is the most prevalent and stressful sequelae of cancer treatment. ³

Patients reported that fatigue is a combination of symptoms such as inability to carry out physical exertion, tiredness, lack of interest or motivation, and impairment of short-term memory, attention, or concentration. These complaints are usually associated with sleep disturbances (hyper- or insomnia), anxiety, and emotional reactivity. ⁴

Activity and exercise may reduce the physical effects and psychological stress connected with cancer treatments, improve mood, reduce anxiety and fear in breast cancer patients. ⁵

When exercise is carried out during chemotherapy, it reduces the impairment of performance status related to treatment. It shows that exercise programs improve the quality of life in women treated with breast cancer. ⁶

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Therefore, this study aimed to assess the effect of aerobic exercises on fatigue among breast cancer patients receiving chemotherapy in selected hospitals.

Hypothesis was that there is no significant effect of aerobic exercises on the level of fatigue in breast cancer patients receiving chemotherapy.

Aim

To assess the effect of aerobic exercises on fatigue among breast cancer patients receiving chemotherapy in selected hospitals.

Objectives

1. To assess the fatigue level among breast cancer patients receiving chemotherapy.
2. To identify the effect of aerobic exercises on fatigue among breast cancer patients receiving chemotherapy.
3. To find the association of fatigue with selected demographic variable.

MATERIAL AND METHODS

Research Design

In this study Quasi-experimental, pre-test post-test control group design was used to assess the effect of aerobic exercises on fatigue among breast cancer patients receiving chemotherapy in selected hospitals.

Setting

The setting of the study was Indrayani Cancer Hospital.

Sample

The sample selected for present study comprised of the breast cancer patients receiving chemotherapy from 30 to 70 years of age admitted in Indrayani Cancer Hospital.

Instrument

In this study, the tool consisted of following: -

- Demographic Variables: This includes information regarding demographic data such as age, educational status, occupation.
- Clinical Profile: This includes BMI, haemoglobin, platelets, oxygen level, blood pressure, recent surgery (within one year), stage of cancer, cycle of chemotherapy, any co-morbidity.
- Modified Fatigue Assessment Scale (MFAS): The Modified Fatigue Assessment Scale has 10 elements. Each item of the MFAS answered using a five-point, ranging from 1 (never) to 5 (always).

The score indicates to rate their fatigue intensity.

Scoring Key:

- Mild Fatigue Score: 1-17
 - Moderate Fatigue Score: 18-34
 - Severe Fatigue Score: 35-50
- Aerobic Exercises.

Intervention

The samples were selected considering inclusion & exclusion criteria. The researcher introduced herself to the subjects, assurance of confidentiality was given to the subjects and consent/assent was obtained from subjects. Socio-demographic data was collected from each subject. Pre-test was conducted for all the groups using Modified Fatigue Assessment Scale. On the same day the experimental group performs aerobic exercises - walking and stretching. It was two times a day, lasting for 20 minutes each time. It was before breakfast at 9 AM and before dinner at 6 PM. Post Test data collection done on day 7th and day 14th. Data collection from control group was also done.

Ethical consideration

The research study was conducted after the approvals from Sub Ethical Committee (DYPV/CON/523/2020), Research & Recognition Committee (DPU/ 656/-13/2020) of Dr. D. Y. Patil Vidyapeeth Pune.

Data Collection

After obtaining administrative permissions from hospital authorities the actual data was collected from 8.02.2021 to 10.03.2021.

Figure 1: Schematic diagram showing procedure for data collection

Figure no. 1 depicts the step-by-step procedure followed during the study for collection of data.

Data analysis

Descriptive and analytical statistics were done. The data is represented in mean and standard deviation. The association of the level of fatigue with selected socio-demographic variables and Clinical Profile was analysed by Fisher's exact test. The independent sample t-test and paired sample t-test were used to check to mean differences. The level of significance was kept at $p < 0.05$. The software used was R Software.

RESULTS

Description of samples based on their personal characteristics

Figure 2: Bar diagram showing description of samples based on their Age in terms of frequency and percentages.

Figure no. 2 shows that most of the participant in experimental group, 53.3% of them had age 41-50 years and in control group, 46.7% of them had age 41-50 years.

Figure 3: Bar diagram showing description of samples based on their educational status in terms of frequency and percentages.

Figure no. 3 shows that in experimental group, 26.7% of them were illiterate, 26.7% of them had primary education, and 26.7% of them had higher secondary education. In control group, 36.7% of them were illiterate.

Figure 4: Bar diagram showing description of samples based on their Occupation in terms of frequency and percentages.

Figure no. 4 shows that in experimental group, 36.7% of them were unemployed. In control group, 40% of them were unemployed.

Table 1: Description of samples (breast cancer patients receiving chemotherapy) based on their clinical profile.

Clinical profile	Experimental group		Control group	
	Freq	%	Freq	%
BMI				
Less than 18.5	2	6.7%	4	13.3%
18.5 to 24.9	22	73.3%	20	66.7%
25 to 29.9	6	20.0%	6	20.0%
Haemoglobin				
12 to 15.5gm/dl	9	30.0%	12	40.0%
10 to 11.9 gm/dl	13	43.3%	12	40.0%
Below 10gm/dl	8	26.7%	6	20.0%
Platelets				
Above 4,50,000	4	13.3%	6	20.0%
1,50,000 to 450,000	26	86.7%	22	73.3%
Below 1,50,000	0	0.0%	2	6.7%
Oxygen level				
95-100%	21	70.0%	13	43.3%
90-95%	9	30.0%	17	56.7%
Blood pressure				
>140/90 mm of Hg	3	10.0%	7	23.3%
130/80-139/89 mm of Hg	24	80.0%	22	73.3%
120-129 mm Hg systolic & diastolic < 80 mm Hg	3	10.0%	1	3.3%

Table 1: (Continued)

Clinical profile	Experimental group		Control group	
	Freq	%	Freq	%
Recent surgery				
Lumpectomy	5	16.7%	5	16.7%
Mastectomy	15	50.0%	14	46.7%
No surgery	10	33.3%	11	36.7%
Stage of cancer				
Stage I	10	33.3%	10	33.3%
Stage II	11	36.7%	10	33.3%
Stage III	8	26.7%	9	30.0%
Metastasis	1	3.3%	1	3.3%
Cycle of chemotherapy				
Cycle I	2	6.7%	2	6.7%
Cycle II	1	3.3%	2	6.7%
Cycle III	12	40.0%	11	36.7%
Cycle IV and above	15	50.0%	15	50.0%
Any co-morbidity				
Hypertension	2	6.7%	4	13.3%
Hypothyroidism	1	3.3%	0	0.0%
Diabetic, hypertension	0	0.0%	1	3.3%
Lung Mets	0	0.0%	1	3.3%
No	27	90.0%	24	80.0%

Table no. 1, describes the clinical profile details of the samples involved in the study in terms of frequencies & percentages.

Table 2: Fatigue level among breast cancer patients receiving chemotherapy.

N=30, 30

Fatigue	Experimental group		Control group	
	Pre-test		Pre-test	
	Freq	%	Freq	%
Mild (Score 10-23)	1	3.3%	3	10.0%
Moderate (Score 24-36)	18	60.0%	22	73.3%
Severe (Score 37-50)	11	36.7%	5	16.7%

Table no. 2 shows that, in pre-test, 3.3% of the breast cancer patients in experimental group had mild fatigue (score 10-23), 60% of them had moderate fatigue (score 24-36) and 36.7% of them had severe fatigue (Score 37-50). In pre-test, 10% of the breast cancer patients in control group had mild fatigue, 73.3% of them had moderate fatigue (score 24-36) and 16.7% of them had severe fatigue (Score 37-50).

Table 3: Effect of aerobic exercises on fatigue among breast cancer patients receiving chemotherapy.

N=30, 30

Fatigue	Experimental group				Control group			
	Pre-test		Post-test		Pre-test		Post-test	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Mild (Score 10-23)	1	3.3%	24	80.0%	3	10.0%	1	3.3%
Moderate (Score 24-36)	18	60.0%	6	20.0%	22	73.3%	13	43.3%
Severe (Score 37-50)	11	36.7%	0	0.0%	5	16.7%	16	53.3%

Table no. 3 shows that in pre-test, 60% of the breast cancer patients in experimental group had moderate fatigue (score 24-36) and in control group 73.3% of them had moderate fatigue (score 24-36).

Table 4: Paired t-test for the effect of aerobic exercises on fatigue among breast cancer patients receiving chemotherapy.

N=30

	Mean	SD	t	df	p-value
Pre-test	34.1	6.9	12.7	29	0.000
Post-test	19.9	4.2			

Table no. 4 shows that, paired t-test was used for analysing the effect of aerobic exercises on fatigue among breast cancer patients receiving chemotherapy.

Table 5: Two sample t-test for the comparison of change in fatigue score in experimental and control group. N=60

Group	Mean	SD	T	df	p-value
Experimental	14.3	6.2	13.5	58	0.000
Control	-5.2	5.0			

Table no. 5 shows that, two sample t-test was used for the comparison of change in fatigue score among breast cancer patients receiving chemotherapy in experimental and control group.

Table 6: Fisher's exact test for the association of fatigue with selected demographic variable and clinical profile.

Clinical profile		Fatigue			p-value
		Mild	Moderate	Severe	
Age in years	30-40 Years	0	11	3	0.800
	41 -50 Years	2	19	9	
	51- 60 years	2	8	3	
	61-70 years	0	2	1	
Educational status	Illiterate	2	10	7	0.453
	Primary	0	11	5	
	Secondary	0	8	2	
	Higher Secondary	2	9	1	
Occupation	Graduate and above	0	2	1	0.854
	Unemployed	2	13	8	
	Daily wages	1	12	5	
	Private employee	1	13	3	
BMI	Government employee	0	2	0	0.408
	Less than 18.5	0	5	1	
	18.5 to 24.9	3	25	14	
	25 to 29.9	1	10	1	
Haemoglobin	12 to 15.5gm/dl	3	14	4	0.157
	10 to 11.9 gm/dl	0	19	6	
	Below 10gm/dl	1	7	6	
Platelets	Above 4,50,000	0	7	3	1.000
	1,50,000 to 450,000	4	31	13	
	Below 1,50,000	0	2	0	
Oxygen level	95- 100%	3	19	12	0.118
	90- 95%	1	21	4	
Blood pressure	>140/90 mm of Hg	0	8	2	0.898
	130/80 – 139/89 mm of Hg	4	29	13	
	120 – 129 mm of Hg systolic and diastolic	0	3	1	
	< 80 mm of Hg				
Recent surgery	Lumpectomy	1	8	1	0.714
	Mastectomy	2	18	9	
	No surgery	1	14	6	

Table 6: (Continued)

Clinical profile		Fatigue			p-value
		Mild	Moderate	Severe	
Stage of cancer	Stage I	1	12	7	0.335
	Stage II	0	16	5	
	Stage III	3	11	3	
	Metastasis	0	1	1	
Cycle of chemotherapy	Cycle I	0	3	1	0.662
	Cycle II	1	1	1	
	Cycle III	1	16	6	
	Cycle IV and above	2	20	8	
Any co-morbidity	Hypertension	0	1	0	0.397
	Hypothyroidism	0	6	0	
	Diabetic, hypertension	0	0	1	
	Lung Metastases	0	1	0	
	No	4	32	15	

Table no. 6 shows that, all the p-values are large (greater than 0.05), therefore none of the demographic variables and clinical variables were found to have significant association with fatigue level among breast cancer patients receiving chemotherapy.

DISCUSSION

The study aimed to assess the effect of aerobic exercises on fatigue among breast cancer patients receiving chemotherapy.

Jonna K van Vulpen et al. (2016) conducted a study to investigate the effects of physical exercise during adjuvant breast cancer treatment on physical and psychosocial dimensions of fatigue. The pooled effect of 6 exercise programmes (including 784 patients) showed a significant beneficial exercise effect on general and physical fatigue. There was no effect found on cognitive and affective fatigue.⁷ In the present study, 60 patients were included. The intervention group received an aerobic exercise program which included a warm-up period, stretching, walking and deep breathing exercises without interruption in the 2 weeks with low to moderate intensity for 20 min/day for 2 weeks. The result showed that fatigue among experimental breast cancer patients reduced significantly after aerobic exercises.

Ellen Kissel et al. (2018) conducted a study to establish the effect of exercise interventions on cancer-related fatigue (CRF) in cancer survivors, compared to non-exercise intervention controls. Compared the effect of an exercise intervention on cancer-related fatigue (CRF) compared to non-exercise intervention controls. The result showed that

exercise affects cancer-related fatigue (CRF) in cancer survivors.⁸ In the present study, the result showed that fatigue among experimental breast cancer patients reduced significantly after aerobic exercises.

Anjali R Bhise et al. (2017), a study was done to evaluate the effects of aerobic exercise on cancer-related fatigue in patients of the solid tumour after chemotherapy and radiotherapy. After screening for breast cancer-related fatigue, there were 34 patients fulfilled the inclusive criteria. They were assigned into control group and interventional groups. The intervention group received 20–40 min/day for 5 days/week aerobic exercise program which included treadmill walking with low to moderate intensity (50%–70% of maximum heart rate). After 6-weeks outcome measures such as brief fatigue inventory (BFI) and 6-min walk test, and functional assessment of cancer therapy-general (FACT-G). The results showed that there was a significant reduction in cancer-related fatigue ($p < 0.0001$), and there was significant improvement in the physical performance ($p < 0.0001$) and quality of life, FACT-G score ($p = 0.0001$).⁹

Implications of this study: Nurses should always take in different educational programs to improve and update their knowledge. The students can change the trends in society by providing health education to patients on Aerobic Exercise on fatigue for improving the patients' fatigue level. Based on the findings, health education exercises, techniques can be provided to the patients related to Aerobic Exercise. The nursing administration department can conduct continuous nursing education programs on Aerobic Exercise. Nursing research brings a holistic perspective to studying individual families and communities.

The study can be undertaken in different settings and in different target population such as patients following colon cancer, cervical cancer, rectal cancer treatment. A comparative study can be done to assess the post-chemotherapy complications among the patients suffering from breast cancer or any other cancer, to help to look at the problems in a broader perspective.

CONCLUSION

Fatigue continues to be a problem for breast cancer patients for many years after cancer treatment. From the results of the study, it is evident that intervention was more powerful in reducing fatigue. Cancer related fatigue is distinctly different from simple fatigue in healthy individuals. The present study indicates a decrease in the nature and intensity of fatigue with aerobic exercise for 2 weeks in breast cancer patients receiving chemotherapy. Furthermore, there was a significant improvement in the Quality of Life of these patients post aerobic exercises.

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