

EFFECT OF AEROBIC EXERCISE AND RESISTED EXERCISE AMONG POST-OPERATIVE BREAST CANCER WOMENS

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ABSTRACT--Breast cancer is a common condition worldwide. It requires an intense and prolonged treatment. No woman is truly at low risk of developing a breast cancer. Breast cancer is a malignant tumor where the group of cancer cells grow into (invade) the surrounding tissues and spread (metastasize) to distant areas of the body. India's incidence is 100,000 women per year and death rate is 90,659 (as per 2010). Physical exercise has been defined as a good intervention to overcome the compromised quality of life and aerobic capacity. Recent evidence also suggests that it decreases the chances of morbidity and mortality. The objective was to determine the effect of Aerobic Exercise and Resisted Exercise on Exercise tolerance and QOL among breast cancer females. A Quasi Experimental Study was done in our Cardio- Pulmonary OPD, the outcome measures being Six Minute Walk Distance, Quality Of Life. 11 subjects with breast cancer who are receiving chemotherapy, radiotherapy and hormone therapy aged between 40 to 65 years were recruited. All the subjects were clinically assessed for Exercise Tolerance and QOL. Subjects who fulfill the selection criteria receive Aerobic Exercises and Resisted Exercises for 4 times a week for 6 weeks. Changes in all the outcomes noted. Improvement is seen more in QOL and Exercise Tolerance with Aerobic and Resisted exercise $p < 0.00$. The study concludes that aerobic exercise and resisted exercise is effective and it has been proved that Aerobic Exercise and Resisted exercise improves QOL and Exercise Tolerance and thereby aerobic exercise and resisted exercise can be recommended in treating Breast cancer females.

KEYWORDS-- Aerobic Exercise in Breast Cancer, Resisted exercise among Breast Cancer females, cardiorespiratory fitness among breast cancer survivors.

I. INTRODUCTION

Cancer is a class of diseases characterized by abnormal cell growth which has the capacity to invade and metastasize to different parts of the body. Breast cancer is the most prevalent cancer among women and second most often occurring among cancers worldwide¹. It is also one of the commonly diagnosed worse invading cancers². As per the statistics of our country, Indian medical council research data reported that breast cancer is found to be the most common type of cancer in women with an incidence of about 50-60% cases. In 2011 77,843 new cancer cases were recorded in Tamilnadu of that 7,931 women were diagnosed with breast cancer.⁴ The sudden uncontrolled growth is due to mutation of certain cells due to various predisposing factors like genetic acquisition,

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lifestyle changes, and environmental factors. Poor diet and sedentary lifestyle are major risk factors contributing to this, apart from inheritance. Although recent medical advances have aided in early detection of the disease, the women who have recovered from it are vulnerable to an aftermath of detrimental health problems both physically and mentally. General weaknesses, emaciation, hair fall due to adjuvant therapies, depression, anxiety, feeling inferior are the most common problem. All of these affect the Quality Of Life (QOL). The QOL depends on the physical, functional, emotional and social well-being. Exercise plays an essential role in improving the QOL. Exercise augments the physical and mental health. Exercise acts as a stress reliever, reduces tiredness and increases energy level. The increased energy level in turn increases the endurance of the women. According to Physical Activity Guidelines Advisory Committee Report there is evidence for an association between improved QOL and physical fitness in breast cancer survivors. Exercise intervention studies have found that exercise training may increase muscle formation and protein synthesis, enhance energy production, improve appetite, stimulate red and white cell production and improve immune function.

Aerobic exercises benefit the individuals post treatment. It can also be advantageous in preventing the cardio toxic effects of doxorubicin and trastuzumab given during treatment. Aerobic exercises recommend an exquisite series of musculoskeletal adaptations which help the breast cancer survivors. It also aids in enhancing body image and sexual function. It benefits the patient by reducing the side effects of the treatment. Performance of the women improves. In addition to all this, aerobic exercise enhances the cardiovascular function along with blood and hemoglobin and decreases fatigue.

Resisted exercises also have their own role to play in boosting the quality of life and endurance of breast cancer survivors. Resisted exercises mainly focus on strengthening the patient physically to carry on their daily activities in a near to normal manner. When Activities of Daily Life (ADL) are achieved without much difficulty, the individuals are self-satisfied and self-empowered which also heals their psychosocial system. These exercises are easy to perform, do not need any continual guidance and can be performed even at home which also makes it simple for the women. Strengthening of the upper limb muscles is the quintessential part in any breast cancer woman. The shoulder and upper back muscles are those which are mostly involved and needed in the women's activities. Resistance training also significantly improves body composition, overall muscular fitness and strength⁶. Breast cancer survivors have a compromised cardiorespiratory function, exercise tolerance, muscle mass and upper limb strength. In order to refine their way of life, aerobic and resisted exercises are given; the effects of which has already been discussed. The purpose of this study is to revamp the quality of life and endurance of breast cancer women with the exercises.

II. MATERIALS AND METHODS

A quasi experimental study was conducted at Saveetha Medical College and Hospital, Chennai. 11 individuals who were breast cancer females were conveniently selected under the following criteria. Women who were treated for stage I, II, III breast cancer, aged 40-65 years, who had been treated for localized breast cancer 12 to 36 months previously and who had been receiving or received chemotherapy, radiotherapy, or hormonal therapy. Eligible individuals were excluded if they were patients with existing cardiac problems, thyroid disease, diabetes, mental illness, infection, immune or endocrine abnormality, and any musculoskeletal condition which interferes with the

exercise, women with metastases or inoperable tumors, major physical or mental co-morbidity and if they were non-co-operative.

Following the institutional ethical clearance, prior to the inception of the study, information was provided to the individuals, on the details of the study procedure and a written consent form was obtained. Following the selection criteria individuals were assessed for Exercise Tolerance using 6 Minute Walk Test (6MWT) and QOL by using the FACT-B scale (Functional Assessment of Cancer Therapy questionnaire). The same tests are repeated post-test following 6 weeks of treatment protocol.

III. TREATMENT PROTOCOL

Aerobic exercise was given in accordance with FITT principle where Frequency consisted of 4 sessions per week for 6 weeks, Intensity prescribed for each individual based on Karvonen's formula.

$HR_{\max} = 220 - \text{age}$

$HRR = [(HR_{\max} - RHR) \times \%INTENSITY] + RHR$ (HRR-Heart Rate Reserve; RHR- Resting Heart Rate)¹⁰

Each session consisted of a total of 45 minute training period. The aerobic training consisted of a warm up and cool down period for 5 minutes. The warm up was followed by 10 minutes of cycling and 10 minutes of treadmill. The intensity was fixed to 40% to 50% of $HR_{\max}$. An interval was provided between the periods of aerobic and resisted training.

Resisted training comprised of a warm up for 5 minutes in which static resistive exercises were given followed by rotator cuff strengthening, trapezius, rhomboids strengthening; bicep curls with dumbbells, for 10 minutes with 10 Reps followed by cool down for 5 mins involving stretching of all the major upper and lower limb muscles. The rotator cuff strengthening is given by a series of exercises like pendulum exercise, shoulder flexion with weights (example: ball), and external rotation of shoulder with weights.

PENDULUM EXERCISE: The individuals are asked to bend forward keeping the lower limbs apart while one arm is placed on the couch for support and the other arm is let loose as much as possible. A swinging motion is created when the legs placed apart are moved front and back or sideways changing the weight from one limb to another. The individuals are carefully observed and advised not to move the arm actively. The swinging is brought about passively only through the movement of the lower limbs. **SHOULDER FLEXION:** The individuals are made to stand erect and asked to flex the shoulders as much as possible with weight in the hand (example: ball). **SHOULDER EXTERNAL ROTATION:** The individuals are made to lie down in side-lying and external rotation of the shoulders is taught with dumbbells.¹² **TRAPEZIUS AND RHOMBOID STRENGTHENING:** The individuals are made to stand and asked to perform backward shoulder shrugging exercise with dumbbells (such that the shoulder blades come closer posteriorly). **BICEPS CURLS WITH WEIGHTS:** The individuals are seated or made to stand and asked to flex the elbow with the dumbbells in both hands without moving elbows away from hip.

IV. RESULTS

11 females who were breast cancer survivors were selected for the study based on the inclusion criteria. The collected data was tabulated and analyzed using Descriptive and Inferential statistics. The mean and standard

deviation (SD) was calculated for all parameters. A paired T test was done to analyze the changes in the pretest and posttest statistics within the groups. Statistical analysis of the data collected showed significant difference in the outcomes and within the groups. Table 1 shows the comparison of pretest and posttest scores of six minute walk distance and QOL. The pretest mean value of six minute walk distance is 310.82 (SD 39.86) and posttest mean value for the same is 384.64 (SD 61.70). The posttest value shows betterment with P value of 0.0001. The pretest mean value of QOL score is 94.27 (SD 9.65) and the posttest mean value is 108.18 (SD 8.35). The posttest value of Quality of Life score shows improvement with P value (0.0001).

TABLE 1: Comparison of pretest and post test scores of six minute walk distance and quality of life

TEST	MEAN		STANDARD DEVIATION(SD)		STANDARD ERROR OF MEAN (SEM)		t VALUE	P VALUE
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest		
6 Minute walk distance	310.82	384.64	39.86	61.70	12.02	18.60	6.9017	0.0001
Quality of life	94.27	108.18	9.65	8.35	2.91	2.52	7.3409	0.0001

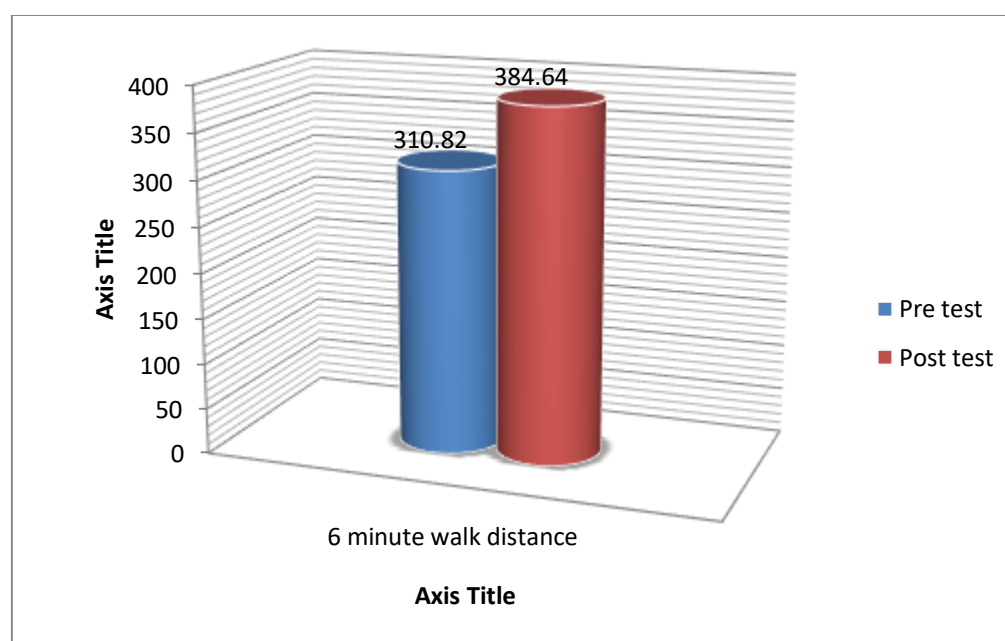


Figure 1: Comparison of pretest and posttest mean score of six minute walk distance

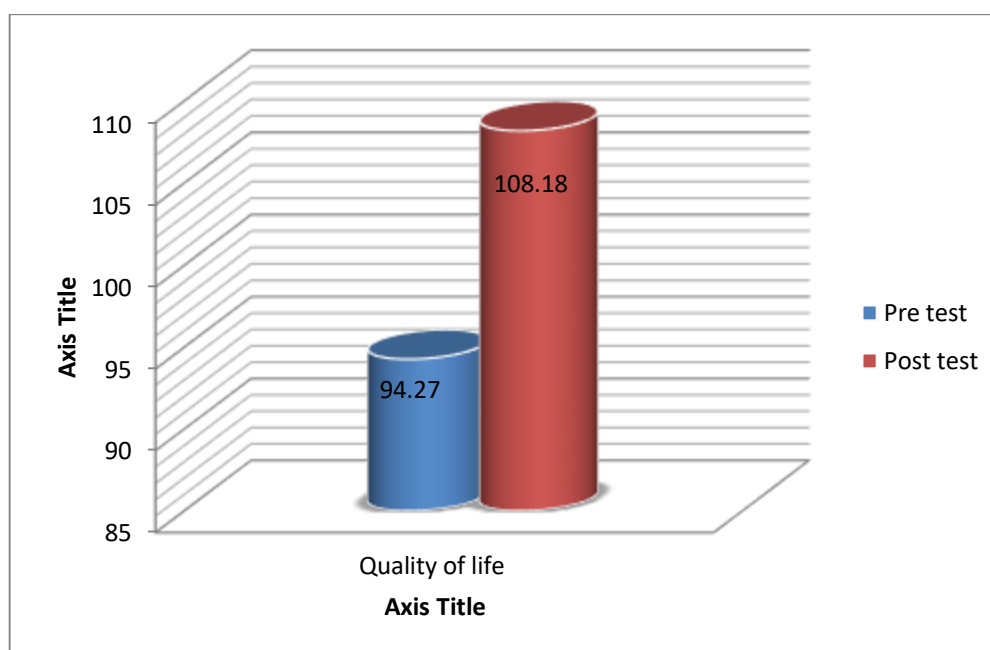


Figure 2: Comparison of pretest and posttest mean score of quality of life

V. DISCUSSION

Cancer incidence in India is projected to increase from 1.01 million in 2012 to 1.4 million by 2025. Breast, head and neck, cervix, lung, large bowel and stomach constitute the most common sites of cancer in India and account for more than 50 % of cancer burden. Significant advances in diagnosis and treatment of cancer has led to an increase in the proportion of cancer survivors.¹¹ Though the survival rate post a breast cancer has increased, the side effects after the treatment haven't decreased. The survived women are attacked by several side effects ranging from anxiety, opinions on the self body image to upper limb weakness and lymphedema. This is when exercises are brought into the picture to make the survivors feel better about themselves both functionally and mentally. Aerobic and resisted exercises are an emerging intervention in the rehabilitation of breast cancer survivors following surgery, chemotherapy, radiotherapy or hormonal therapy⁷. In this study, the subjects belong to the breast cancer population in whom quality of life and exercise tolerance have been undermined. Aerobic and resistance exercises play an integral part in the rehabilitation of breast cancer but only fewer studies are available where both aerobic and resistive exercises are combined together to produce a result.

This study is performed to emphasize the value of aerobic and resisted exercise on quality of life and endurance which is majorly affected due to the side effects of the treatment of breast cancer. The individuals are open to various problems like fatigue, depression, socializing, experiencing pain or discomfort during performing ADL, and many more. When both the physical and psychosocial systems are perturbed, it is difficult for the woman to continue her normal life. Through the exercises, the symptoms are relieved and the women gain confidence.

At the end of 6 weeks, this study shows good improvement in both outcomes. The quality of life has increased and the exercise tolerance has also developed. There are many studies which have included various other parameters like VO₂max, fatigue, shoulder stability etc. In this study we haven't included fatigue as a separate entity even though it is another important symptom to be considered. The FACT-B questionnaire used in our study has some sections which included fatigue as a part of it. Hence the exercises given also have a positive outcome

on the decrease in fatigue. The aerobic exercises prescribed increase oxygen consumption thereby increasing endurance which also explains the fact that $VO_2\text{max}$ isn't taken as another parameter. The resisted exercises also have their own effects, enabling the muscle to demand more oxygen from the blood, thus decreasing the depletion of glycogen storage leading to endurance and reduced fatigue of muscles⁸. The static resistance exercises are isometric in nature which aid to strengthening. The shoulder and upper back muscles strengthening enhance the functionality of the individual. The inter test comparisons show significant changes in both QOL and exercise tolerance. The present study of ours clearly discusses the beneficial effect of aerobic and resistive exercises on post-surgical breast cancer women.

VI. CONCLUSION

Thus the study concludes that Aerobic and Resisted exercises are effective in enhancing the exercise tolerance and Quality Of Life and thereby Aerobic exercises and Resisted exercises can be prescribed to post-surgical breast cancer woman.

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