



EFFECT OF PILATES BREATHING ON FUNCTIONAL CAPACITY IN PATIENTS WITH BREAST CANCER: AN EXPERIMENTAL STUDY

¹Dr. Simran Amarendra Singh, ²Dr. Abhijit Diliprao. Diwate, ³Dr. Arijit kumar Das

¹Post graduate student, ²Professor and HOD, ³Professor

¹Department of Cardiovascular and Respiratory Physiotherapy,

¹DVVPF's College of Physiotherapy, Ahilyanagar, India.

ABSTRACT : BACKGROUND

Typically, in the human body formation of new cells takes place through the cell division and they replace the older or damaged cells. In our body there are various regions where cancerous cells can grow like the Breast, Lungs, Brain, Head & Neck, etc.

OBJECTIVE

To evaluate the effect of Pilates Breathing on Functional Capacity in Breast Cancer Patients

MATERIALS AND METHOD

The study was conducted with 10 Breast Cancer Patients who met the inclusion criteria. After approval of ethical clearance, informed consent from participation was obtained. Demographic data and baseline measures were recorded before starting the exercise. Pilates Breathing Exercise was Performed. The collected data were measured using the open Epi Instat version for Windows statistical software.

RESULT

In the present study of 10 Breast Cancer Patients, the mean age group was 42.4 ± 1.64 , Before intervention we found Vo_{2max} was 11.83 ± 1.11 mL/kg per minute and post intervention it was 12.73 ± 1.44 mL/kg per minute. P Value was 0.0047 and was found very significant result.

CONCLUSION

Pilates Breathing exercise program for 4 weeks have proven effective in increasing functional capacity in Breast Cancer Patients.

IndexTerms – Breast Cancer, Functional Capacity, Pilates Breathing Exercise

INTRODUCTION

GLOBOCAN 2022 reports that, with a prediction of 2.3 million new cases—or 11.6% of all cancer cases. The illness ranks as the fourth most common reason of cancer mortality worldwide. Almost one in four cancer cases and one in six cancer-related deaths among female population globally are caused by breast carcinoma¹. The increased frequency of various reproductive and lifestyle risk factors, such as early menarche, later menopause, advanced age at first birth, fewer children, less breastfeeding, hormone replacement treatment, oral contraceptives, alcoholism, obesity, and physical inactivity, may account for India's higher incidence of breast cancer.

Breast cancer being the most common cancer in females, it can be treated by chemotherapy depending on the stage of cancer². Chemotherapy has several side effects such as fatigue, hair loss, breathing problem, decreased appetite, nausea, vomiting, and frequent episodes of hiccups³. Cancer related treatment cause several complications. In that one major impairment is breathlessness which is also called as dyspnea. Sometimes you can become short of breath quickly, and it can be quite frightening⁴. The effect of normal breathing exercise on breathlessness leads to better airway patency and alveolar gas exchange⁵. The effect of normal breathing exercise on breathlessness in breast cancer has improved ventilation, functional capacity and has also strengthen the inspiratory Muscle⁶. Whereas, pilates breathing exercise strengthen the inspiratory Muscle, and also improve Functional Capacity in breathless Patient Pilates breathing if proved effective can be of great benefit in curing and rehabilitating respiratory conditions who present diaphragmatic muscle dysfunction, where it can be of maximum utility⁷. Aim of this study is to check the effect of Pilates Breathing on Functional capacity in breast cancer patients.

MATERIALS AND METHODOLOGY

We Conducted an Experimental Study at Tertiary Medical College & Hospital. The Duration Of the study was from 2024-25. Ethical Clearance Was Obtained and Signed Informed Consent Form the institutional Ethics Committee Was acquired, Our Study Included Sample size of 10 Breast Cancer patients Aged 40-60 years. Patient who are operated for breast cancer, Patients with any anatomical & physiological problems which will alter the outcome measures, any surgical condition which will enhance or suppress the outcome measures were Excluded. The Outcome measure include assessing Functional Capacity by 6-minute walk test(6MWT).

THE PROCEDURE OF PILATES BREATHING EXERCISE

- Sit down with your legs comfortably crossed in front of you.
- Sit as upright as possible, as if your lower back were being supported by a wall, with no gaps between your tailbone and the wall. Do not lean into the wall.
- Place your hands just below your navel. Without hunching the shoulders, take a five-second breath in through the nose and let out a five-second sigh from the mouth. You may notice that on the breath in you felt the stomach move outward, and on the breath out it went down. (If five seconds is too long for the breath in, attempt four seconds.)
- Now repeat the same exercise, except before you breathe in, press your hands very firmly on the B-Line below the navel, against your lower abdominals and towards your spine, and keep them there. Now breathe into your chest.
- Same Breathing exercise protocol is in Standing Position.

Treatment time and Duration: -25 min per week, thrice a week for period of 4 weeks

STATISTICAL ANALYSIS

Open Epi software instat version 3.06 was used to evaluate the data. The mean and standard deviation were used to convey quantitative data. Two variables were correlated using the Pearson correlation test. Statistical significance was defined as a p-value of less than 0.05.

RESULT

Table 2 shows the parameters and sample

PARAMETER	Mean
Male %	0%
Female %	100%
Age (years)	42.4±1.64

PREDICTED, PRE- AND POST-TREATMENT COMPARISON

Table 3: Pre- and post-intervention comparison of functional capacity

Variable	Pre-intervention	Post-intervention	t value	p-value	Result
VO2 max	11.83±1.11	12.73±1.44	3.726	0.0047	Very significant

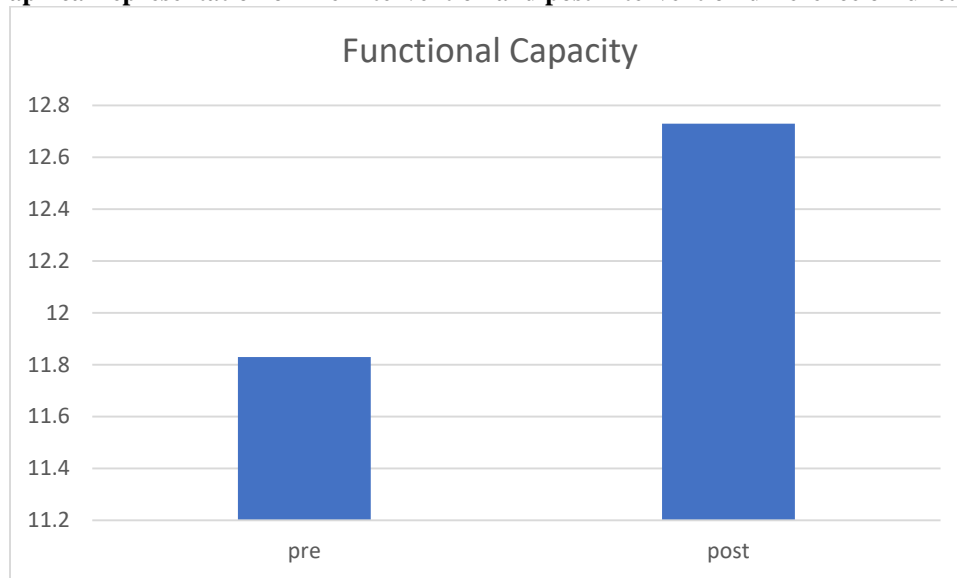
Graph 1: Graphical representation of Pre-intervention and post-intervention difference of functional capacity

Table 3 and Graph 1 represent pre-intervention and post-intervention mean \pm SD for VO_2 Max obtained by using Six-minute Walk test distance, computed using the paired test as it passed normality. 6 MWT is statistically significant as $p = 0.0047$.

DISCUSSION

In the study of 10 subjects, the mean age group was 42.4 ± 1.64 and Male/Female 0/10.

In our study, we found statistically significant changes in VO_2 max in functional capacity in Breast Cancer Patients.

Before the intervention, we evaluated functional capacity through a 6-minute walk test. The mean and SD for pre-intervention functional capacity were 11.83 ± 1.11 , and after the intervention, functional capacity was 12.73 ± 1.44 .

As Pilates Breathing Promotes Better Oxygenation and lung expansion, which may directly improve Functional Capacity and reduce Fatigue-a common symptom in cancer patients. According to study of Laura Ferreira de Rezende et.al. (2022)⁸ also found that the Pilates exercise program was clinically effective in reducing pain and improving functional capacity and quality of life, which is further supported by the results of the study by Stan et al. (2012), wherein a 12-week Pilates exercise program following breast cancer surgery improved survivors' quality of life.

Our Findings align with the study, of Eyigor et al. (2010), who found that functional capacity scores improved by 8% after implementation of a Pilates exercise program.⁹

CONCLUSION

A Pilates Breathing exercise program for four weeks has proven effective in increasing functional capacity in Breast Cancer Patients.

All the necessary equipment (PFT device) and patients were provided from the hospital and teaching institute

LIMITATION

The present study did not consider the effect of surgery on functional capacity

REFERENCES

1. Kim SH, Na S, Choi JS, Na SH, Shin S, Koh SO. An evaluation of diaphragmatic movement by M-mode sonography as a predictor of pulmonary dysfunction after upper abdominal surgery. *Anaesthesia & Analgesia*. 2010 May 1;110(5):1349-54.
2. Shah R, Rosso K, Nathanson SD. Pathogenesis, prevention, diagnosis and treatment of breast cancer. *World journal of clinical oncology*. 2014 Aug 8;5(3):283.
3. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, Jemal A. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*. 2024 May;74(3):229-63.
4. Feng Y, Spezia M, Huang S, Yuan C, Zeng Z, Zhang L, Ji X, Liu W, Huang B, Luo W, Liu B. Breast cancer development and progression: Risk factors, cancer stem cells, signalling pathways, genomics, and molecular pathogenesis. *Genes & diseases*. 2018 Jun 1;5(2):77-106.
5. Sathishkumar K, Chaturvedi M, Das P, Stephen S, Mathur P. Cancer incidence estimates for 2022 & projection for 2025: result from National Cancer Registry Programme, India. *Indian Journal of Medical Research*. 2022 Oct 1;156(4&5):598-607.

6. Kantarci F, Mihmanli I, Demirel MK, Harmanci K, Akman C, Aydogan F, Mihmanli A, Uysal O. Normal diaphragmatic motion and the effects of body composition: determination with M-mode sonography. *Journal of ultrasound in medicine*. 2004 Feb;23(2):255-60.
7. Smolarz B, Nowak AZ, Romanowicz H. Breast cancer—epidemiology, classification, pathogenesis and treatment (review of literature). *Cancers*. 2022 May 23;14(10):2569.
8. Ferreira de Rezende L, Thesolim BL, Dias de Souza S, Bellotto Leme Nagib A, Fonseca Vilas Boas V. The Effects of a Pilates Exercise Program on Pain, Functional Capacity, and Quality of Life in Breast Cancer Survivors One Year Postsurgery. *InOncology Nursing Forum* 2022 Mar 1 (Vol. 49, No. 2).
9. Eyigor S, Karapolat H, Yesil H, Uslu R, Durmaz B. Effects of pilates exercises on functional capacity, flexibility, fatigue, depression and quality of life in female breast cancer patients: a randomized controlled study. *Eur J Phys Rehabil Med*. 2010 Dec 1;46(4):481-7.

