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Effect of mat pilates on fatigue level and quality of life in post-mastectomy women a case series

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ABSTRACT

Background and aims

The purpose of the study was to find out the effect of mat Pilates on fatigue level and quality of life in post-mastectomy women. Cancer itself and its treatment like surgery, chemotherapy and radiotherapy leads to fatigue which eventually deteriorates the quality of life of cancer patients. Pilates being a low-intensity exercise intervention has been known to improve stability and balance in muscles improve mood and rejuvenates body. Thus it helps to alleviate fatigue and hence improve quality of life.

Methods

An experimental study was carried on 5 cases selected by purposive random sampling. Mat Pilates was administered for 3 weeks, 6 days/week. Outcome measures used were Brief Fatigue Inventory and European Organization of Research and treatment for cancer Quality of life questionnaire. C-30.

Results

There was a decrease in fatigue level and improvement in every domain of quality of life in all the 5 post-mastectomy women.

Keywords: Pilates, Cancer related fatigue, Quality of life, Mastectomy.

INTRODUCTION

Breasts are private organs associated with feelings of femininity and womanhood. Being diagnosed with breast cancer, having a mastectomy and undergoing chemotherapy/radiotherapy sessions are emotionally devastating experiences. The common struggle for post-mastectomy patients undergoing chemotherapy are loss of hair, nausea,

fatigue, vomiting, loss of appetite, difficulty sleeping, shortness of breath, weight gain/loss, general aches and pain, constipation, feeling anxious or tense, difficulty concentrating, irritability etc [1]. Cancer treatment is so physically exhausting that it deteriorates the quality of life. 70% of cancer patients experience above

problems due to chemotherapy/radiotherapy/surgery.

Rather than an isolated complaint, Fatigue is considered as a syndrome, that is, a combination of symptoms, such as exertion, tiredness, lack of interest, or motivation, and an impairment of attention or concentration, and these are frequently associated with sleep disturbances (hyper or insomnia), anxiety and emotional reactivity. Fatigue is a severe and limiting problem for most of cancer patients. The impairment of physical and mental performance prevents from carrying out daily activities and hence results in a considerable decline in QOL [2]. Rest and decrease in all day activities is a general response to fatigue, but studies have claim that it leads to muscular catabolism and aggravate fatigue [3]. Fatigue may be a obstinate problem that continues for months after treatment.

Recent studies have shown a lack of pharmacological effect on treatment of cancer related fatigue [4].

Studies have claimed Exercises as a non-pharmacologic intervention for the treatment of cancer related fatigue [5].

Pilates is an outstanding way to strengthen core muscles without bulking up and it also teaches to control body's movements and increase flexibility. Joseph Pilates originally considered this to be a body/mind/spirit approach to movement founded on the integrative effect of six principles: centering, concentration, control, precision, breath and flow. King [6] indicates that Pilates exercises intends to find the neutral in the usual shape of body. Pilates is an exercise system that teaches body awareness, good posture and balance.

Since Pilates exercise is a simple, low risk intervention and is associated with positive effects on health. Therefore it could play a relevant role in rehabilitation and limitations associated with cancer and its treatment.

CASE PRESENTATION

Case 1

48 years, premenopausal lady, diagnosed with grade 2 infiltrating ductal carcinoma, took 3 cycles of chemotherapy pre-operatively. Right side MRM done 5 years back. She was subsequently taken up for adjuvant radiation therapy to the right chest

wall and right supraclavicular region. She tolerated therapy well with grade 2 skin reactions for which symptomatic treatment was done. Since then she is experiencing lack of appetite, fatigue, lack of interest in socializing and general household chores, hypersomnia. She preferred staying at home rather than attending social functions.

Case 2

53 years, post-menopausal lady, diagnosed with grade 2 infiltrating ductal carcinoma and right MRM done on 10th June 2011 i.e. 6 years back. Post operation 6 chemotherapy cycles were advised but only 4 chemotherapy cycles were completed. And later chemotherapy was discontinued by self and homeopathic medicinal course was started for the same for 3 years. Since then she complaining of fatigue, lack of interest in daily chores, radiates back and neck pain, heaviness in lower limbs, urinary incontinence, and lack of appetite, depressed mood, and uterine prolapse. She easily gets tired after returning home from short walks. And also avoids socializing as she feels uncomfortable.

Case 3

45 years, pre-menopausal lady, diagnosed with grade 2 infiltrating ductal carcinoma 1 year back, Right MRM done. 5 cycles of chemotherapy completed and subsequently undergoing 6th cycle. Post chemotherapy left forearm cellulitis was seen. Since then she is complaining of pain in back while walking long distance and stair climbing, constipation, irritability, lack of interest in doing household chores and leisure activities, hypersomnia.

Case 4

57 years, post-menopausal women, diagnosed with grade 2 invasive lobular carcinoma, Left MRM done on 8/10/2016. She was subsequently taken up for adjuvant chemotherapy. 6 cycles of chemotherapy completed. There was no lymphedema or cellulitis post chemotherapy. Since then she complained of weakness of shoulder girdle muscles, inability to lift heavy weights, tiredness, depressed mood, tensed feeling, lack of appetite and sleep.

Case 5

66 years, post-menopausal women, diagnosed with right breast fibro adenoma, cytology positive for malignancy, operated on 4/1/2018, Right MRM done. Chemotherapy not yet started. Complaints of inability to elevate Right upper limb, fatigue, lack of appetite, irritability, pain in right shoulder and scapular region, difficulty carrying heavy weights and doing strenuous activity.

METHODOLOGY

- STUDY DESIGN – Experimental study.
- STUDY PLACE – Talegaon, Dabhade
- SAMPLE SIZE – 5
- SAMPLE TYPE – Purposive sampling.

MATERIALS

Mat, wedge, pillow, Brief fatigue inventory scale for measuring fatigue level, EORTC QLQ-30 for measuring Quality of life, pen, paper.

CRITERIA OF STUDY

Inclusion

- Modified radical mastectomy for neoplasm (solid tumor or hematological malignancy), with or without axillary lymphadenectomy.
- A score of 3 or more on the Brief Fatigue Inventory indicating moderate, or severe fatigue syndrome.

Exclusion

- A score of less than 3 on the Brief Fatigue Inventory.
- Women involved in some physical activity like gym, yoga etc.
- Fatigue related to other conditions (i.e. autoimmune disease, chronic renal failure).
- Neurologic or muscular impairment precluding participation in an exercise program.

Protocol

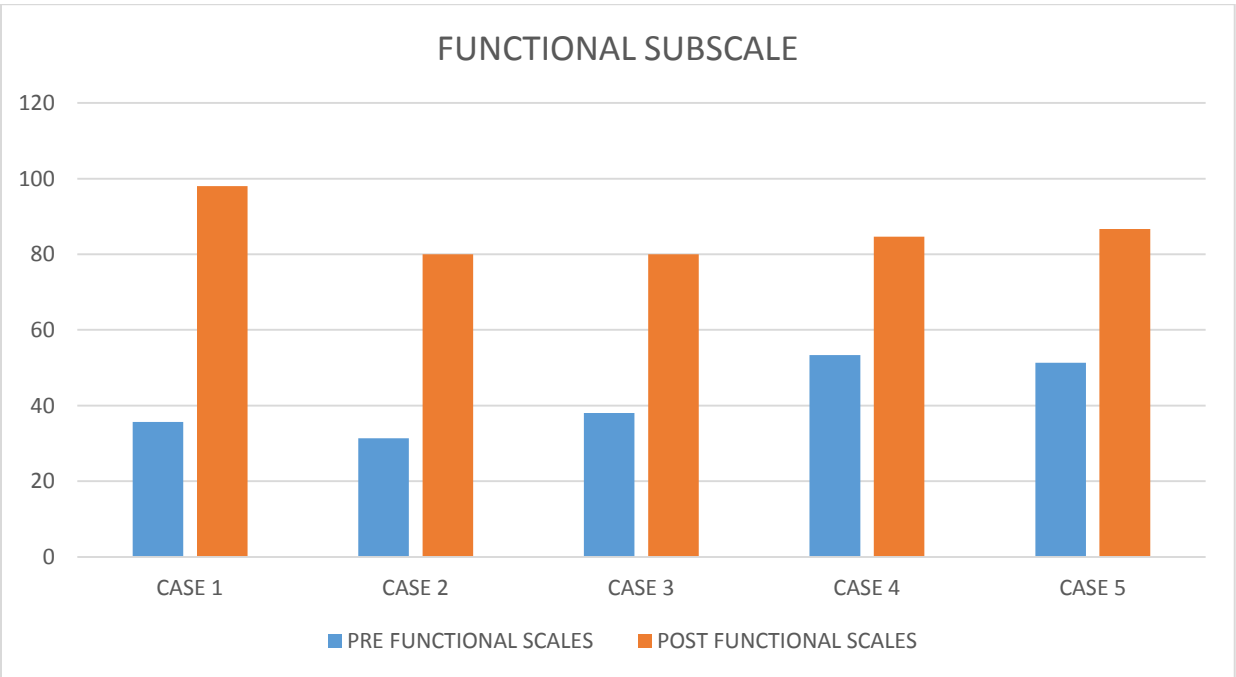
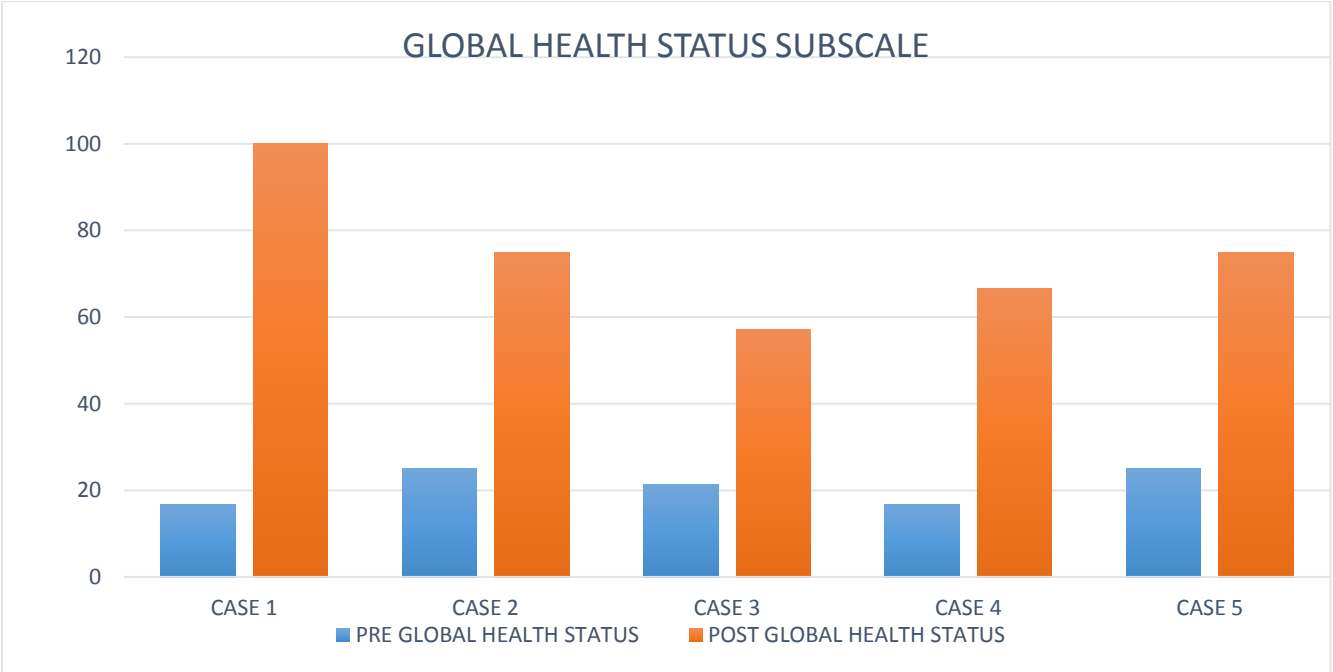
- Subjects according to inclusion criteria were taken. They were initially assessed on Brief fatigue inventory [7] and EORTC QLQ C-30 [8] for their level of fatigue level and Quality of life.
- An informed written consent was taken before the start of treatment.
- Mat Pilates exercise program was administered for 3 weeks, 6 days/week [9].

TABLE NO. 1

	WEEK 1	WEEK 2	WEEK 3
WARM UP	Imprint and release, Breathing.	Imprint and release. Breathing.	Imprint and release. Breathing.
CONDITIONING	Scapula elevation and depression. Scapula protraction and retraction. Bridging. Hip release. Shoulder circles. Cat and camel. Prone on elbows.	Side lying chest opener. Ab prep. Hundred, feet down. Hip clamp. Cat and Camel. SLR.	Ab prep. Hundred. Double leg kick. Breast stroke. Criss-cross, feet down.
COOL DOWN	Figure of 8. Lion stretch.	Figure of 8. Child position.	Mermaid. Child position.

Post treatment i.e. after 3 weeks their fatigue level and Quality of life was again assessed through Brief Fatigue Inventory and EORTC QLQ C-30 respectively.

RESULT AND ANALYSIS



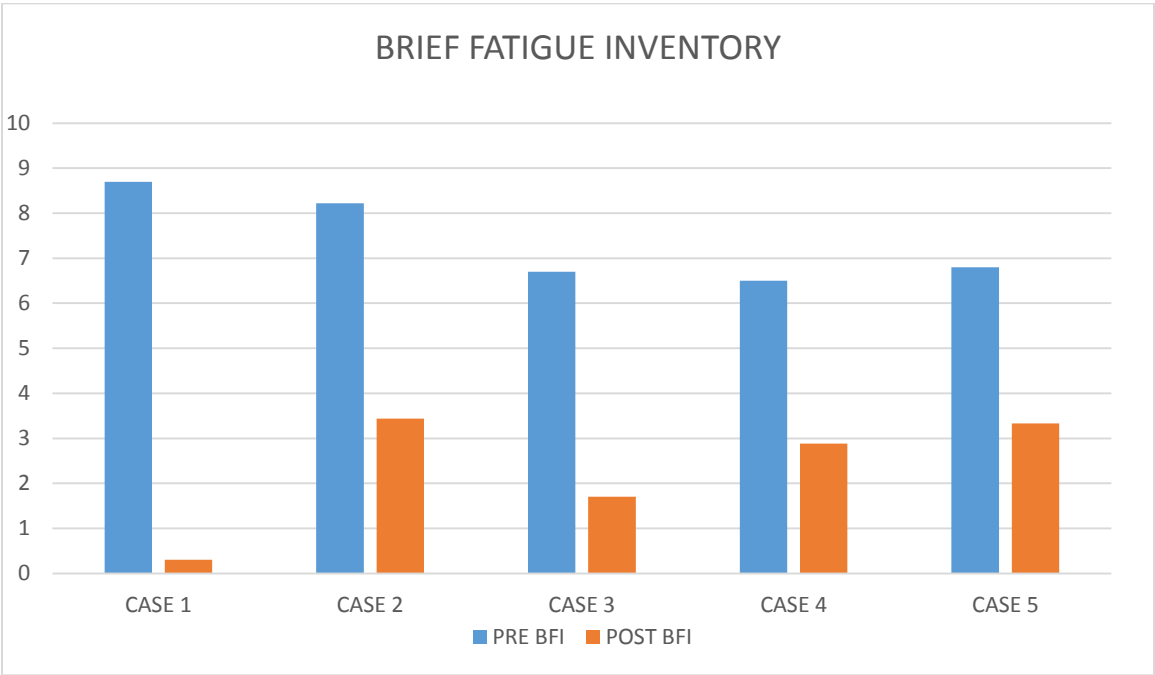
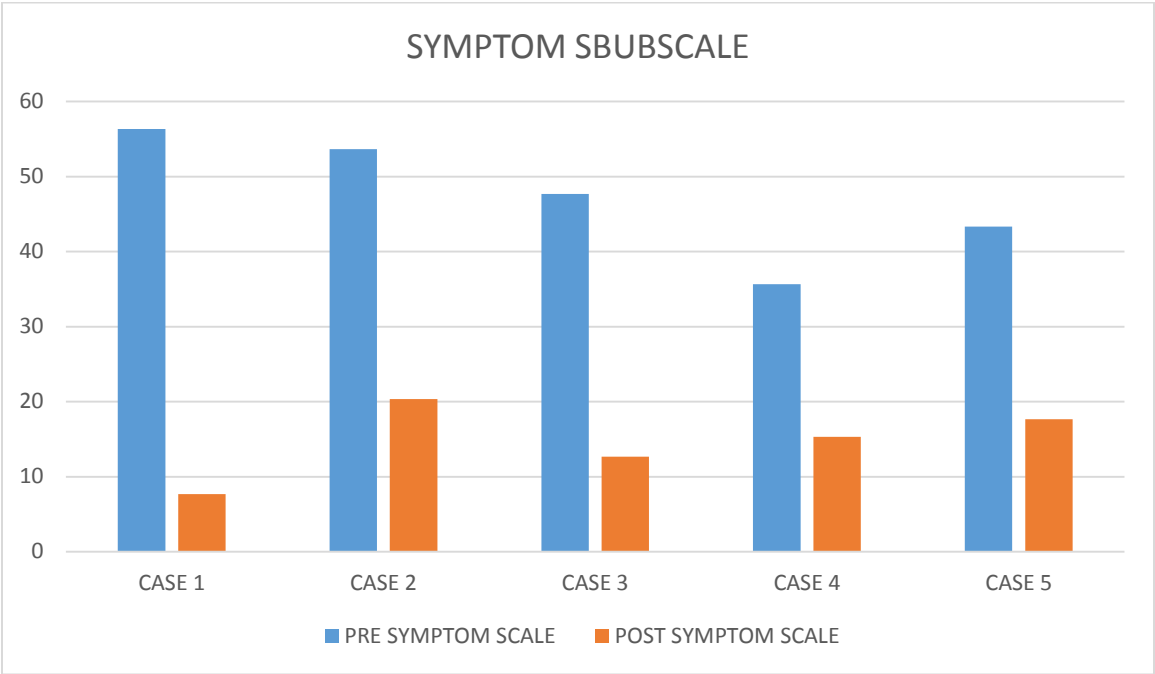


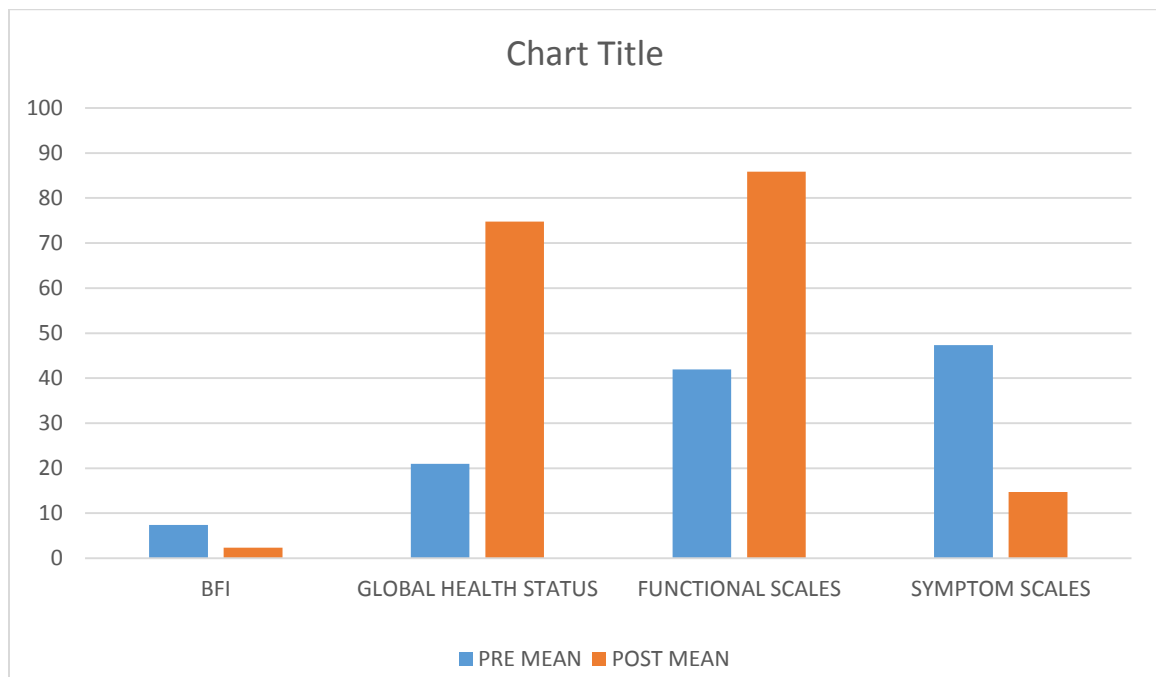
TABLE NO. 2
BRIEF FATIGUE INVENTORY

MEAN			P VALUE
PRE	POST	DIFFERENCE	

7.38	2.33	5.05	0.0313
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TABLE NO. 3
EORTC QLQ C-30

SUBSCALE	MEAN			
	PRE	POST	DIFFERENCE	P VALUE
GLOBAL HEALTH STATUS	20.94	74.76	53.82	0.0324
FUNCTIONAL SCALE	41.93	85.86	43.93	0.0313
SYMPTOM SCALE	47.32	14.72	32.6	0.0313



Pre and post analysis of BFI Scale and EORTC QLQ C-30 Questionnaire was done using Two tailed Wilcoxon matched-pairs signed Ranks test was applied. Statistically significant improvement is seen in the fatigue level ($p=0.0313$). All the subscales of EORTC QLQ C-30 questionnaire i.e. Global health status ($p=0.0324$), Functional scale ($p=0.0313$), and symptom scale ($p=0.0313$) also showed significant statistical differences.

DISCUSSION

The study was designed to find out the effect of Pilates on fatigue level and Quality of life in post-mastectomy women. The study was done on 5 post-mastectomy women which were selected according to the inclusion criteria. Mat Pilates exercise program was administered for 3 weeks,

6days/week. The outcome measure used was Brief Fatigue Inventory and European Organization for Research and Treatment Quality of Life questionnaire C-30 (version 3.0).

Fatigue is a common problem of cancer patients during and after chemotherapy/surgery/radiotherapy.

As shown in graph 4. , a Pilates program of limited duration considerably reduce fatigue ($p=0.0313$) on Brief Fatigue Inventory.

Cancer related fatigue is commonly related to reduce physical performance caused by the disease itself or by its treatment or due to psychosocial factor. The proposed pathophysiology of cancer related fatigue is increase pro-inflammatory cytokines, altered circadian rest-activity rhythms, decrease in brain serotonin level, reduced hypothalamus-pituitary-adrenal axis function,

anemia and defect in ATP regeneration and buildup of metabolic byproducts in neuromuscular junction and skeletal muscles [10]. This lead to symptoms like decrease strength and endurance of muscle, weakness, shortness of breath, nausea, vomiting, decrease in cardiopulmonary capacity, tiredness, exhaustion, anorexia, muscular pain etc.

Fatigue also occurs in the form of inability to concentrate, loss of memory, disinterest in work, tendency to avoid social life. Chemotherapy drugs that cross the blood-brain barrier may induce neurotoxicities that produce fatigue and may produce CNS related symptoms [11].

These differences in the pre and post values on Brief Fatigue Inventory for each case in this study are attributed to Pilates exercise program which consisted of continuous low intensity exercises [12].

Pilates exercise is a structured program wherein all the muscles in the body are taken into consideration as they work to move all the muscles simultaneously taking into account six principles i.e. Focus, control, breathing, control, precision, flow. Pilates helps to strengthen all the muscles in the body using body weight resistance. It helps to increase muscle tone. Kroos and Rothmaier [13] said that a person's ability to endure fatigue is increased as muscle strength, endurance and flexibility increases. Salama [14]. Indicates that consistent training leads to rises the ability of muscles to yield strength, which increases the speed of muscle contraction as well as improves endurance capacity. Karter [15] adds that Pilates training increases stamina and the possibility to continue the performance for a long time due to transfer of the largest amount of oxygen during the breathing process for each cell in the body to generate the necessary energy and disposal of combustion products that causes fatigue. Flexibility contributes to improved physical performance, thus reduced energy requirements for movement of the joint and therefore decreases the energy consumption and reduces fatigue.

Increase in muscle strength must have helped the case 4 and 5 to progressively lift heavy weights like shopping bags as per reduced score of question no. 1 in functional subscale of quality of life questionnaire.

The effect of physical activity on fatigue is not only due to improvement in cardiovascular or muscular function. Indeed, a higher activity level can increase the feeling of control, independence, and self-worth,

resulting in better group interface and less nervousness and distress. Therefore, increased physical performance can result in secondary benefits such as an improved mood and reduced psychological stress.

Decrease in cardiopulmonary capacity and muscular discomfort leads to decrease quality of life [16]. More energy is required to carry out work in patients with impaired physical performance. This increased energy consumption not only leads to fatigue but also to symptoms like cardiac and respiratory dyspnea, body aches, muscular discomfort, which patients consider as poor health status. All this has a negative impact on patient's quality of life.

In this study, Pilates exercise program led to a statistically significant increase in physical functioning and global health status on EORTC QLQ C-30 questionnaire as represented in graph 1 and 2 in each case.

Breathing is core of Pilate's exercises. Therefore, if breathing is ceased, muscles become strained and insufficient postures are aggravated that leads to more dyspnea. Muscles that are associated with breathing are diaphragm, transverse abdominis, pelvic floor, multifidus, intercostals, serratus anterior, scalene, upper trapezius becomes strained. Hence Pilates regimen includes Breathing as it increases one's concentration, ability to focus and relaxes and stretches stiff muscles to increase their lung capacity. It also helps to reduce the kinetic energy required to experience an increase in ventilator efficiency and thus movements [17].

Thus it helps reduce symptoms due to side effects of chemotherapy like dyspnea, fatigue, inability to concentrate. It enhances the score on functional subscale of EORTC QLQ C-30 questionnaire like ability to walk long and short distances, ability to carry out strenuous work. Hence increases the score on functional sub-scale and decreases the score on symptom sub-scale of EORTC QLQ C-30 in all cases in this study.

Pilates increases the maximal oxygen consumption rates [18]. Higher VO₂ max indicates improved ability to perform strenuous work. So it helps the breast cancer survivors to carry out their everyday activities and household chores with minimal discomfort.

Guimaraes et al [19], said that after exercise there is improvement in stroke volume, arteriovenous O₂ differences and an improvement

in muscular metabolic adaptation. Pilates also decreases blood pressure as it enhances parasympathetic tone and improve exercise capacity.

Improvement in cardiopulmonary and arteriovenous system leads to improvement in quality of life in an individual. A study conducted by Essam Abdel-Hamid Hassan et al showed positive effect Pilates exercises on greater concentration of serotonin hormone [20]. Role of serotonin hormone is to regulate sleep, temperature, appetite, behavior, depressions, moods etc. If level of serotonin hormone decreases in the body all this functions are affected. Pilates exercise regimen on women with depression with reduced serotonin hormone level showed an increase in its level at the end of study. So positive effect on mood, sleep pattern, appetite in current study might be because of serotonin hormone level variation.

Pilates also increases the body power level and gives the ability to relieve the body tension and stress. It helps the body to calm down and give a sense of rejuvenation. Pilates helps to strengthen the deep core muscles and work to lengthen the muscles around the spine to relieve pressure from it, which is suffering from arch in the back, rounded shoulders, forward neck. It helps to regain balance in the body structures.

A study of both Blum and Rydeard [21] shows that Pilates helps to correct posture, relieves pain from the joint occurring due to misalignment or faulty posture, reduces back ache, and improves the ability to walk more distances. Analgesic effect of exercise may also help break the vicious cycle of

pain-immobility-pain by encouraging the patients to participate in the exercise programs. Additionally, Pilates involves closed kinetic-chain exercises, which may provide the necessary compressive and decompressive forces to foster nutrition to joints and cartilage to reduce degenerative risk. Thus case 2 and 3 in current study who complained of back and neck pain during the start appreciated that pain level decreases after Pilates exercise regimen. Pilates increases the core strength and provide stability, hence it improves the strength of pelvic floor muscles and increases its ability to support the internal organs therefore reduces prolapse of uterus from vagina in case 2. Thus also improves quality of life.

The result of present study shows that Mat Pilates is an effective therapeutic approach for management of cancer related fatigue and to improve their quality of life.

CONCLUSION AND SUGGESTION

The above study concluded that Mat Pilates may be effective in improving the fatigue level and quality of life in post-mastectomy women.

SUGGESTION

Regular practice of Pilates exercise helps to decrease fatigue in post mastectomy patients and thus improves their quality of life. And therefore reducing the exhaustion caused by the all day activities and improving the concentration level helping them to focus on their work.

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