

# The Effect of Physical Activity Levels on Body Image, Self-esteem, and Quality of Life in Women after Breast Cancer Surgery

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## Abstract

**Introduction:** Based on many evidences, physical activity levels are one of the most important factors in maintaining personal and social health. The current study aimed to investigate the effect of physical activity (PA) on body image, self-esteem, and quality of life in women after breast cancer surgery. **Materials and Methods:** The participants of the present study were 252 women with breast cancer who had undergone breast cancer surgery at least once in the Mo'tamed hospital in Tehran. Assessment tools were the international Physical Activity questionnaire (IPAQ), self-administrated European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC-QLQ-C30), Multidimensional Body-Self Relations Questionnaire (MBSRQ), and Coopersmith self-esteem (SEI) questionnaires. To analyze the data, the ANOVA, and Tukey post hoc test were used respectively. **Results:** Results showed a significant difference between low and moderate, low and high, and moderate and high PA level on body image, self-esteem, and quality of life ( $P \leq 0.05$ ). The moderate level of PA had more effect compared to the low and high levels of PA. **Conclusion:** Our study suggested that physicians, Physical Therapists, Occupational Therapists, should be schedules more PA and sports plans for patients with breast cancer surgery and increase patients' awareness of PA benefits.

**Keywords:** Body Image; Breast Cancer; Physical Activity; Quality of life; Self-Esteem

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## Introduction

Being a woman is the most important risk factor for breast cancer (1). Although men get this cancer, the probability of it in women is more than one hundred times. Other symptoms of breast cancer can be a lump in the breast, a change in the shape of the breast, dimpling of the skin, fluid discharge from the nipple, or peeling of the skin (1, 2). Breast cancer is the most common malignant cancer of women in all around the world (3). Advance in therapeutic interventions has increased 5 years-survival rates by more than 85%. However, breast surgery is emphasized as one of the interventions to control this disease which could influence the patient's body image (4). Hence, the diagnosis could lead to both physical and mental health problems (5) such as decreased self-esteem, body image distortion, and eventually a significant reduction in quality of life (6-9).

Mental and physical health are closely associated with each

other. A considerable amount of evidence revealed that physical activity (PA) is a crucial factor contributing to personal and social health. physical activities have many physical and psychological benefits which impress anxiety, depression, self-esteem, mood, and mental health levels (10). Numerous studies have shown a positive association between PA and quality of life improvement (3,11-13). Interestingly, the relationship between PA and improvement in quality of life has received less attention in healthy people (14). Effect of physical activity has been demonstrated in various researches on the heart (15), kidney(13, 16), liver (17, 18) diseases and osteoporosis too (19, 20).

Self-esteem refers to a person's overall sense of his or her value or worth. researchers have found that self-esteem is closely associated with well-being and a number of other adaptive outcomes (21).

Quality of life (QOL) is an important goal of treatment in chronic illness. aspects of QOL are wellbeing, satisfaction with life,

happiness, realizing life potential, fulfillment of needs, and objective factors (22). Specifically, among women with breast cancer, the most common psychological symptoms in the adaptation to the disease include disturbance of mood, increased level of distress, distorted body image, and diminished self-esteem.

In this regard, body image refers to the perception, evaluation, and derived feelings about body appearance and physical functioning, considering it as part of self-concept. Body Image seems to be a predictor of psychological functioning in women with breast cancer, *i.e.*, high satisfaction with appearance and better body image levels predict better quality of life (23).

Self-esteem is linked to self-concept, and it concerns the attitudes or feelings of satisfaction with oneself, based on the evaluation of one's characteristics (23).

It has been observed that systemic treatments in women with breast cancer such as chemotherapy, hormonal treatment, and radiotherapy had negative effect on the quality of life of these patients. These adverse effects were physical, (*e.g.*, pain, vomiting, and sleep disorders) and psychological (poorly perceived body-image, depression, anxiety, etc.). These problems may persist for a long-term period after treatment completion. For example, when a woman with breast cancer starts chemotherapy, they face aspects such as hair loss, eyelashes, weight loss, and etc. These physical losses and changes produce cognitive, behavioral, and emotional alterations, which affect the well-being, self-esteem and quality of life of them. This is because, for many women, self-esteem is based exclusively on the perception of their own body, so that poor perception of this can lead to a decrease in self-esteem and, at the same time, negatively affect a person's quality of life (24).

Structured physical activity interventions, in pediatric obesity treatment, ameliorated their self-esteem and body image (25). It was found that water therapy was more effective for improving emotional well-being and decreasing negative symptoms associated with breast cancer treatment compared with Pilates and yoga interventions, while yoga was more effective in improving social/family well-being (26). A meta-analysis of randomized controlled trials have shown that exercise had beneficial effects on quality of life (QoL) in patients with breast cancer. However, these effects were often small (27). As mentioned, physical activity can have good effect on body image, self-esteem, and quality of life, but researchers could not find a study that show how different levels of physical activity affect these variables on women after breast cancer surgery. Therefore, researchers were looking for answer to the question of the correlation of different level of physical activity with body image, self-esteem, and quality of life in women after breast cancer surgery?

## Materials and Methods

This cross-sectional descriptive-analytic study's aim was to investigate the correlation of physical activity levels with body image, self-esteem, and quality of life in women after breast cancer surgery. This study was approved by the Ethics Committee of Sport Sciences Research Institute (Code: IR.SSRI.REC.1401.1601). The statistical population of this study were all women with breast cancer who had at least once undergone breast cancer surgery in the Mo'tamed hospital in Tehran. Considering the statistical method, effect size (0.25),  $\alpha$  error probability (0.05) and Power ( $1-\beta$  error probability) (0.80), the sample size was estimated to be 269. According to the inclusion and exclusion criteria and problem of accessibility to samples because of Coronavirus pandemic situation and disagreement of some samples to answer the questionnaires only 252 questionnaires were analyzed. Participants were purposefully selected. Inclusion criteria included women who were between the ages of 25 and 60yr and who have breast cancer surgery at least once, no diseases that affect physical activity. Exclusion criteria included no response to questionnaires. Participants participated in the study who signed an informed consent form in 2022. Participants were assured that their information would be kept confidential by the researcher in 2022. The participants completed the International Physical Activity Questionnaire (IPAQ) (28, 29), Self-administrated European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC-QLQ-C30) (30, 31), Multidimensional Body-Self Relations Questionnaire (MBSRQ) (32, 33), and Cooper smith self-esteem (SEI) questionnaires(34). They were used to assess physical activity, quality of life, self-body image, and self-esteem respectively. By visiting the hospital and meeting the patients, they were asked to answer the questions of IPAQ. Sub scores of IPAQ can be calculated for low intensity activity, moderate intensity activity and vigorous intensity activity. Base on amount of physical activity, patients categorized in 3 categories: low, moderate and high intensity level of physical activities. The low/inactive group was people who did not have physical activity in the past 6 months or didn't meet criteria for categorized in moderate or high level of physical activities(35). Based on collected data from IPAQ, the participants were categorized into three groups of High ( $n=72$ ), moderate ( $n=125$ ), and low ( $n=55$ ) levels of physical activities. All three sample groups (which had unequal sample size) answered to three other questionnaires of EORTC-QLQ-C30, MBSR, and Coopersmith self-esteem (SEI).

**Table 1.** Demographic characteristics

Number of samples	Age	Duration of illness								
		≤ 30 years	31-40	41-50 years	≥50 years	≤1 year	1-2 years	2-3 years	3-4 years	≥4 years
252	Frequency (n)	17	44	76	115	63	69	74	25	21
patients	Percent (%)	6.7	17.5	30.2	45.6	25	27.4	29.3	10	8.3

**Table 2.** The mean (SD) of body image, self-esteem, and quality of life versus physical activity levels in groups with results of one-way ANOVA (\* $P \leq 0.01$ )

Variable	Low level of physical activity (n=55)	Moderate level of physical activity (n=125)	High level of physical activity (n=72)	F	P-Value
Body Image	2.42 (0.87)	3.77 (0.93)	3.13 (0.76)	47.013	0.001*
Self-esteem	21.98 (3.9)	33.70(3.9)	27.13 (2.12)	232.870	0.001*
Quality of life	2.01 (0.69)	3.56 (0.82)	3.07 (0.84)	71.684	0.001*

The IPAQ, comprises 8 items assessing all the moderate (mild physical activities which make breathing a little faster than normal) and vigorous (intense physical activities which make breathing much faster than normal) physical activities of a person in the previous 7 days. A meta-analysis revealed that assessment of moderate-to-vigorous (MVPA) is the most relevant level of physical activity outcome, since no publication bias in any of measurement properties was detected while test-retest reliability was moderately high ( $r=0.74$ ), moderate for the criterion ( $r=0.41$ ) and moderately-high for concurrent validity ( $r=0.72$ ) (28). Base on a study by Tomioka *et al.* the validity was adequate. Although there were some limitations with regard to repeatability and agreement in classification, the IPAQ was a useful tool for assessing physical activity among elderly adults (29). Mirzaei *et al.* evaluated concurrent validity ( $\rho=0.62$ ,  $P<0.001$ ). ICC and Cronbach's alpha were 0.59 and 0.7, respectively (36).

The EORTC Core Quality of Life questionnaire (EORTC QLQ-C30) was developed to measure physical, psychological and social functions of patients with cancer (31). The EORTC-QLQ-C30 includes 26 items that evaluates the global quality of life. This was modified in 1996 from the former 100-questions by WHO. It consists of 5 main scales including physical, emotional, social, environmental health, and a total score. Finally, a formula was used to transform the raw scores into standardized scores, ranging from 0 to 100. Satisfactory internal consistency (Cronbach's  $\alpha$  coefficients  $> 0.7$ ) was reported, except for cognitive function ( $\alpha = 0.516$ ) of EORTC QLQ-C30 (30).

The MBSRQ self-administered questionnaires contains 29 questions concerning various dimensions of body image structures (32). Cruzat-Mandic *et al.* reported good internal consistency in three factors ( $\alpha \geq 0.80$ ) and acceptable internal consistency in the other four (internal consistency  $\geq 0.70$ ) (32).

The Coopersmith Self-Esteem Inventory is one of the most commonly used self-report questionnaires developed to

measure attitudes toward the self in a variety of areas (family, peers, school, and general social activities) for adolescents and adults (34). The SEI questionnaires consist of 29 questions and evaluates self-esteem in 5 scales including global, family, social, academic, and false scales. In this study, construct validity and internal consistency reliability of the questionnaire were confirmed by 10 experts and Cronbach's alpha respectively

All Descriptive statistics results were revealed as Mean (SD). In addition, In the inferential statistics section, the Kolmogorov-Smirnov test used for data normalization, ANOVA test used for comparison between the three groups and Tukey post hoc test used for comparison between the two groups. For data analysis. SPSS version 23 was used and the significance level was considered as 0.05.

## Results

Table 1. showed demographic characteristics of the participants (Duration of illness and Age).

The mean and standard deviation of groups' body image, self-esteem, and quality of life and results of one-way ANOVA were shown Table 2. According to these results, it can be said that there was a significant difference in body image, self-esteem, and quality of life of women after breast surgery between the three groups (low level of physical activity, moderate and high level of physical activity).

The Tukey's post hoc test was used for multi-comparison of groups' mean. The results showed in Table 3.

It was shown that there was a significant difference between low and moderate, low and high, and moderate and high level of physical activity groups in body image, self-esteem, and quality of life ( $P \leq 0.01$ ). According to the descriptive findings of Tables 2 and 3, the body image, self-esteem and quality of life of moderate and high level of physical activity groups are better than the low level of physical activity group and the difference in

**Table 3.** The results of multi-comparison of Tukey's post hoc test (\*  $P \leq 0.01$ )

Variable	Groups		Difference in means	P-value
Body Image	Low level of physical activity	Moderate level of physical activity	-1.350	0.001*
		High level of physical activity	-0.707	0.001*
	Moderate level of physical activity	High level of physical activity	0.643	0.001*
Self-esteem	Low level of physical activity	Moderate level of physical activity	-11.722	0.001*
		High level of physical activity	-51.143	0.001*
	Moderate level of physical activity	High level of physical activity	6.579	0.001*
Quality of life	Low level of physical activity	Moderate level of physical activity	-1.560	0.001*
		High level of physical activity	-1.069	0.001*
	Moderate level of physical activity	High level of physical activity	0.491	0.001*

means between these groups is negative and significant, it can be said High and moderate level of physical activity had more effects on body image, self-esteem, and quality of life compared to a low level. Also, the body image, self-esteem and quality of life of moderate level of physical activity group is better than the High level of physical activity group and the difference in means between these groups is positive and significant, it can be concluded that moderate level of physical activity had more effect on them in comparison to a high level.

## Discussion

According to the results, the level of physical activities had correlation with body image, self-esteem and quality of life of women after breast cancer surgery. The results showed that high and moderate physical level of physical activity had more effects on body image and self-esteem compared to a low level of physical activities. Also, moderate to level of physical activity had more effect on them incomparison to the high level of physical activity. This finding can be explained by the fact that intense exercises sometimes causes a person to have sleep disorders due to hormonal changes (37). By doing heavy exercises, the body needs more time to relax again, which can cause sleep disorders. heavy exercise affects a person's mental states and behavior by causing physical fatigue, and a person may become depressed and angry too (37). Also, heavy exercise makes the body's immune system weak, which leads to various diseases and infections (37, 38). Therefore, heavy exercise may have somewhat less effects than moderate exercise on quality of life and self-confidence. Physical and mental health increase through exercise, recreational activities, and self-esteem, the quality of life will improve as well (6, 39, 40).

Numerous studies have shown a positive correlation between level of physical activity and quality of life (3, 11-13). According to evidence, physical activities improves body fitness and abilities and finally can alleviate perceptual distortions about one's body

image (41, 42). Boosting self-confidence following physical activities leads to physical fitness, motor goals improvement, and a better feeling about physical condition (43). Consequently, it increases the sense of worthiness and improves health-related behaviors such as sleep, proper nutrition, useful social interaction for the patients, and finally more self-satisfied (3). Encouraging breast cancer patients to increase their physical activities after breast cancer surgery helps to improve their psychological status too (44, 45). physical activity can help individuals to achieve a positive self-concept and promote body image in adolescents through the improvement of physical perceptions and body image satisfaction (46). Findings of Awick *et al.* provide support for the role played by physical activity and self-efficacy in positive self-esteem. Highlighting successful physical activity experiences is likely to enhance self-efficacy and improve self-esteem in this population (47)

Results showed that moderate level of physical activity had more impact on women's quality of life in comparison to high and low level of physical activity. This result was in parallel with the Odyne (48), and Koltyn (49) *et al.* studies. The most important and effective factors in improving the quality of life of women with breast cancer was doing physical activity in moderate level. According to evidence, physical activity burns calories and fats, increases respiratory capacity, facilitates digestion and excretion, and also plays an important role in the treatment of depression and anxiety (50-52). Some studies have also reported a positive correlation between physical activity and QoL domains (53, 54). In fact, physical activity causes strengthen muscles and decrease joint pain. Furthermore, deep breathing caused by physical activity ameliorate sympathetic nerves action, so it could be very effective in mood and stress controlling (55).

According to the results of this research, Physicians, Physical Therapists and Occupational Therapists should also encourage women after breast cancer surgery to participate in physical activities and activities related to exercise. In addition, gyms should be designed and built in accordance with the needs of special people such as patients with different cancers and the



other individuals with different disabilities. The main limitations of the current study included the problem of access to much samples due to the Coronavirus pandemic situation, Failure to check for some diseases, including diabetes and kidney disease and unwilling to answer the questionnaires by some patient's. The present study was a comparative and descriptive-analytical study so its generalizability is limited so it is suggested to conduct experimental research in this topic.

## Conclusion

The results showed that moderate level of physical activities had positive relationship with body image, self-esteem and Quality of life compared to Low and high level. Our study suggests that physicians, Physical Therapists, and Occupational Therapists schedule more moderate physical activity and sports plans for patients with breast cancer surgery and increase patients' awareness about benefits of physical activities.

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### Ethical approval

The research was conducted with regard to the ethical principles (Ethic Code: IR.SSRI.REC.1401.1601).

### Informed consent

Informed consent was obtained from all participants.

### Conflict of interest

None.

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None.

### Authors' contributions

All authors made substantial contributions to the conception, design, analysis, and interpretation of data.

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