

The effect of combined aerobic and resistance exercises on quality of life of women surviving breast cancer

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ABSTRACT

Background: Breast cancer is one of the most common cancers amongst women in developed and developing countries. It is associated with the highest mortality rate in low to average-income countries. Breast cancer investigation amongst Iranian women reveals that the number of its incidence is yet the highest in all cancer types. Despite recent longer survival time of women with breast cancer, most of the patients suffer from long term physical and mental distress due to combined treatments. Exercise interventions are among new approaches to promote the better quality of life of the patients, which has only recently been considered by researchers. This study aimed to investigate the effect of exercise intervention on the quality of life of breast cancer survivors.

Materials and Methods: This is a clinical trial conducted on 80 women with I-III breast cancer, at 18-55 years of age mostly two years after the completion of their treatment in Seyed al Shohada hospital in Isfahan. They were randomly divided into two groups of study and control. Exercise intervention went on for 8 weeks in the study group (three sessions a week, 60 minutes). Quality of life in both groups was measured a day before, and at the end of the eight weeks period by the instrument of the National Medical Center and Beckman Research Institute. The data were analyzed by descriptive and inferential statistical tests of X², t-test and Mac Hammer test.

Findings: Results showed that there was no significant difference in the mean score of the physical dimension of quality of life in the study group before and after intervention while the score of physical health was significantly better in the control group ($p < 0.00$). The mean score of mental dimension had increased in the study group, while it had decreased in the control group. The mean score of social health showed no significant difference before and after intervention. The mean score of spiritual health had significantly decreased in the control group, while it had significantly increased in the study group ($p = 0.004$). Generally, the total mean score of the quality of life showed no significant difference before and after intervention. However, the percentage of the quality of life score increased in the study group, but decreased in the control group.

Conclusions: The results of this study showed that exercise interventions can promote a better quality of life for the patients, and increase the total score of quality of life. Although, the total score of quality of life was not significantly different, it was concluded that exercise can promote the quality of life amongst patients with breast cancer.

Key words: Quality of life, breast cancer, exercise

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INTRODUCTION

Although brilliant advances have occurred in the prevention, early diagnosis and treatment of cancer in the 21st century, prevalence, mortality, and disability due to cancer still has an increasing pace all over the world. Breast cancer is the most prevalent cancer amongst women in developed and developing countries with its highest mortality rate reported in low-income countries.^[1] Investigations on Iranian women with breast cancer show it has the highest rate of incidence.^[2]

Despite the increase in survival duration of women with breast cancer, most of them suffer from long term physical and mental distress due to existing combined treatment methods.^[3] Sport is one of the new approaches

to promote the quality of life (QOL) for these patients and to decrease the signs and complications of treatment.^[4]

Milne et al. (2007), in their study about the effect of aerobic and resistance exercise programs on QOL of breast cancer survivors just after the end of treatment, reported that sport enhances the patients' QOL, melts away their fatigue and increases their aerobic balance and muscular strength in the first six weeks of exercise, and within 12 weeks.^[3]

Sprod et al. (2010) in their study on the effect of individual aerobic and resistance exercises on physiological and psychological parameters of breast cancer survivors between 3-6 months showed that aerobic exercise, programmed individually for a 3 month period, result in a better cardiac function, less fatigue and weakness, and fewer depression signs.^[5]

In the study of Chen et al. (2009) on the effect of regular exercise on QOL of 1829 women with breast cancer during 6, 18 and 30 months post diagnosis, results showed that regular exercises can promote patients' QOL in physical, mental and social dimensions.^[6]

Taleghani et al. (2009) in a study on the effect of exercise on QOL of the breast cancer patients undergoing chemotherapy reported that exercise intervention promoted patients' QOL.^[7]

Although, recent researches have been directed at organizing exercise protocols, the number of studies on the effect of exercise on QOL of breast cancer patients is very low. Despite the fact that numerous studies have declared the positive effects of exercise amongst cancer patients and especially breast cancer patients, these interventions have not been administrated as a part of the care and treatment process for these patients. On the one hand, culture is the main and most important determining factor in QOL,^[8] but the findings of the previous studies are for the countries with different socio-cultural characteristics. On the other hand, sport as one of the health related behaviors is influenced by many cultural factors.^[9] In a brief review of health related behaviors in Iran, since sport does not seem to have a major role among Iranian women, especially those with breast cancer and surviving this disease, this study was conducted to investigate the effect of exercise on QOL among patients surviving breast cancer.

MATERIALS AND METHODS

This is a clinical trial conducted in Seyed al Shohadi

hospital in Isfahan. The inclusion criteria were: women with breast cancer stages I-III, aged 15-55 years and for whom two years had passed from the completion of their breast cancer related treatment (except for hormone therapy), and their performance status were 0-4. Performance status of the subjects was determined by ECOG scale of WHO (World Health Organization).^[10] The exclusion criteria were: evidences of disease recurrence, treatment with anticoagulants, signs of cardiac diseases, and the patients who underwent arrhythmia or MI, having dementia or other psychotic conditions, women who had regular exercise two to three sessions per week in the past 6 months.

In addition, if the patient answered positive to each question of the revised questions of the Physical Activity Readiness Questionnaire (PAR-Q), he/she would be excluded. Sampling started with convenient sampling and then, the subjects were divided into two groups of study and control by random sampling. The sample size was calculated for 40 subjects with CI of 95% and power of 80%. QOL of patients with breast cancer was measured by the Standard Instrument of Quality of Life Breast Cancer Survivors which belongs to the National Medical Center and Beckman Research Institute.

All subjects completed the data-collecting questionnaire in two steps (a day before intervention, and a day after completion of intervention at the end of the eight week in study group). The questionnaire was simultaneously completed by the control group after 8 weeks. Content validity and internal consistency were employed to insure the validity and reliability of the data collection tool. Cronbach's alpha was 80% for the data obtained from the subjects. After the researcher obtained an informed written consent from the subjects, demographic information was collected through the completing of the questionnaire by all the subjects.

Training on how to conduct the exercise sessions was given to a physical education expert and a nurse under supervision of a PhD of physical education (cooperating with the project). Based on the statement of American College of Exercise and Medicine, a 6-7 week sport program is essential to achieve remarkable effects. In addition, a 3-5 weekly sessions program is adequate for men and women.^[11] Courneya et al. recommend a protocol of 20-30 minutes of continuous exercise, 3-5 days a week for cancer patients.^[12] With regard to the intensity of the exercise, literature review revealed that exercise of low and moderate intensity (55-85% of max heart rate) is appropriate for cancer patients.^[13]

The researcher designed a structured and supervised

exercise protocol based on other studies and the protocol of American College of Sport and Medicine, and through consultation with the physical education expert. This protocol included three phases of warm up (containing warm up and ballistic exercises), heavy resistance training, and cooling down (containing cooling down and ballistic exercises). Exercise sessions were conducted under the supervision and guide of a coach to each subject individually in this study. In the first 5 minutes, ballistic and stretching exercises were done to warm up. In the next phase, first, the subjects slowly jogged on an electronic treadmill, which showed their heart rate and consumed calories, for seven minutes. Then, they pedaled a magnetic stationary bike, equipped with a LCD showing their heart rate and consumed calorie, for another seven minutes. The intensity of the patients' exercise was controlled by the maximum heart rate index. Therefore, the patients exercised at 55% of intensity rate for the first two weeks, 65% of intensity for weeks 3-5, and 75% of intensity for weeks 7-8. After doing aerobic exercises and taking a rest, heavy resistance training was done by a chest press machine.

The patients did the exercise in two sets of 8-12 repetitions. As soon as they could do the exercises comfortably and correctly, heavier weights were employed. In the third phase, a series of cooling down and stretching exercises, similar to the first phase, were done by the subjects for five minutes. Exercise intervention was conducted for at most 60 minutes of length each session, three sessions a week for 8 weeks in the study group. Finally, the QOL questionnaire was completed by the subjects a day after the completion of 8 weeks of exercises in the study group. The subjects in the control group completed the same questionnaire while referring to the research environment at the end of the eight week. The data were collected from September 2009 to February 2010.

FINDINGS

There was no significant difference in the mean score of physical health before and after intervention in the study

group, while it had significantly increased in the control group ($p = 0.003$). The percentage of physical health score decreased about 3.9% in the study group but increased 4.1% in the control group. The mean difference of physical health was significant in both groups of study and control ($p = 0.01$).

There was no significant difference in the score of mental health in the study and control groups before and after intervention. The mean score of mental health increased by 6.2% in the study group but decreased by 0.4% in the control group. The student's t-test showed no significant difference between the mean percentage differences of mental health score in both groups.

There was no significant difference in the mean score of social health before and after intervention in the study group, while it significantly decreased in the control group ($p = 0.03$). Social health decreased by 0.1% in the study group and 1.7% in the control group. The student's t-test showed no significant difference in mean percentage difference of social health in both groups.

For the spiritual health of the control group, the mean score difference had significantly decreased ($p = 0.02$), while it had significantly increased in the study group ($p = 0.04$).

Percentage of spiritual health had increased by 0.1% in the study group but decreased by 1.7% in the control group. The t-test showed a significant difference in the spiritual health score of both groups ($p = 0.006$). Generally, total mean score of QOL had no significant difference in the study and control groups before and after intervention. (Table I)

There was no significant association between demographic variables such as age, education, marital status, spouse's education, employment status, family history, income, amount of exercise before and after cancer, and total score of QOL in both groups before and after intervention.

Table 1: Mean and SD of total scores of QOL before and after intervention in both groups

Group	Time Type	Before intervention		After intervention		P
		Mean	SD	Mean	SD	
Control	Rare score	209.2	41.8	210.1	41.5	0.4
	Obtained %	47.6	9.5	47.7	9.4	
	P					
Study	Rare score	223.6	35.5	217.5	36.3	0.29
	Obtained %	50.8	8.1	49.4	8.3	
	P					
Total	Rare score	216.4	39.2	213.8	39	0.4
	Obtained %	49.2	8.9	48.6	8.9	
	P					

DISCUSSION

In the present study, although QOL was expected to increase in the physical dimension of the study group, the score of QOL decreased in this dimension. Exercise had no effect on the physical aspect of QOL of the patients in the study group and even caused it to decrease in the study group, while it increased QOL in the control group. However, the differences between the two groups were not significant.

Milne et al. (2007) reported that sport could promote QOL in patients, decrease fatigue, and improve aerobic balance and muscular strength.^[3]

Clark et al. (2008) concluded that a life of regular physical activity resulted in a better QOL in the physical dimension compared to a sedentary life.^[14] Taleghani et al. (2009) in their study on the effects of exercise on QOL of patients with breast cancer during chemotherapy showed that exercise could improve the physical dimension of patients' QOL.^[7]

Although some researchers have emphasized the role of sports in improving patients' QOL, there might be two reasons for the insignificant difference, before and after the intervention, found in the present study. First, patients were generally categorized into two groups after treatment, one being those undergoing hormone therapy (Tamoxifen or Aromatase inhibitors, with various side effects such as early menopause, weakness, and etcetera) whose medication had not been controlled as a confounding variable in the present study so that possibly more patients took these medications in the study group compared to the control group and this caused a difference in the physical dimension of QOL of the patients between the two groups. The second factor, which may have made the significant difference in the physical dimension of score of QOL, can be the higher BMI of the subjects in the study group compared to the control group.

The results of the present study showed that the mean score of the mental dimension increased in the study group and decreased in the control group.

Adamsen (2003) showed that despite an increase in the score of the emotional dimension of QOL, this change has not been significant, which is consistent with the results of this study.^[15]

In Headley's study (2004) exercise intervention had very little effect on mental dimension of the patients.^[16]

Milne et al. (2007) reported that emotional dimension of QOL score is higher in the study group compared to the delayed exercise group.^[3] In Adamsen's study, in spite of an increase in the score of social dimension of QOL in the study group, there was no significant statistical difference between the control and study groups.^[15] Meanwhile, in the study of Ohira et al. (2006) the social and mental dimensions of QOL were improved in the study group.^[17] In a study by Monga et al. (2007), social and functional health aspects were different after the exercise intervention in the study group.^[18] Clark et al.^[14] (2008) showed that regular physical activity had a better effect on the spiritual dimension of QOL, while Taleghani et al. (2008)^[19] showed that the difference in the spiritual dimension of QOL score was not significant in both groups of study and control. The reason for such a difference can be the fact that in the present study, the patients' treatment had ended and what remained was its bitter memory and complications. Therefore, patients tried to sedate their emotional pain and escape thoughts related to the disease through thinking about spiritual and religious issues. On the other hand, various sport activities with several exercise devices were conducted in this study, as well as those exercises, which could cause a change in the thoughts of patients and lift their spirits. The results showed that exercise intervention generally increased QOL of patients in the study group. Monga et al. (2007) also obtained a higher total score of QOL in the study group compared to the control group.^[18] Sprod et al. (2010) showed that scheduled aerobic exercises, performed individually, result in a better cardiac function, and decrease of weakness, fatigue, and signs of depression among the patients.^[5]

Chen et al. (2009) concluded that regular exercises promoted QOL of the patients in physical, mental, and social dimensions.^[6]

Rebecca Ferrer et al. (2011) in their meta-analysis on exercise intervention among cancer survivors and their QOL showed that sport could generally promote patients' QOL.^[20]

With regard to these researches and the present study, it can be concluded that exercise intervention can promote QOL of cancer survivors.

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