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ORIGINAL ARTICLE

Physical activity and physiotherapy: perception of women breast cancer survivors

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Abstract

Background Physical activity levels seem to play an important role on musculoskeletal disorders in women diagnosed with breast cancer. However, the effects of physical activity after diagnosis are not fully understood. Our purpose was to understand the importance of physical activity and physiotherapy on musculoskeletal disorders as a sequela of treatment in breast cancer survivor women.

Methods For this cross-sectional study, a sample of 94 breast cancer survivor women fulfilled a self-completed questionnaire with questions on clinical and functional variables, and levels of physical activity before and after breast cancer diagnosis.

Results All 94 women, aged between 23 and 72 years, reported at least one or more post-cancer musculoskeletal disorders. More active women reported fewer changes than the less active women ($p < 0.05$). For the majority of women who underwent physiotherapy after breast cancer, this intervention was perceived as helpful in the treatment of post-cancer disorders.

Conclusions Physical activity habits and physiotherapy treatments contributed for the perception of lower number of musculoskeletal disorders. This practice should be advocated among women with breast cancer.

Keywords Physical activity · Breast cancer · Survivor · Perception · Physiotherapy

Introduction

Life expectancy in women with breast cancer has increased significantly due to a number of factors, extending from the best prevention to the best intervention [1]. In Portugal, according to the Cancer Registry of the Northern Region, in 2010 the incidence rate of breast cancer in women was 118.5 while in Europe it was 93.2 for every 100,000 inhabitants [2]. Portugal has one of the lowest mortality rates in the European Union, according to the General Health Direction report of 2015 [3].

The high survival rate for female breast cancer is encouraging; however, it may also mean that many of these women may be living with chronic complications of treatment, particularly at the trunk and upper limb (pain, movement disorders, among others) [4].

There are numerous articles supporting the practice of physical activity during breast cancer treatment as a way to reduce fatigue and fatigue caused by cancer treatment, to minimize possible sequels of treatment and even to prevent recurrence of cancer [5–7].

In the past, physical activity was not recommended for cancer patients [7]. However, recent studies increasingly encourage women with breast cancer to practice at least 30 min of moderate physical activity on most days of the week, during and after treatment. Aerobic activities such as walking, cycling, and strength exercise or the combination of both are recommended before and after treatment [8].

The aim of this study was to understand the importance of physical activity and physiotherapy intervention from the perspective of breast cancer survivor women.

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Methodology

This is a descriptive cross-sectional study. 94 Portuguese breast cancer survivor women volunteered to participate in the study. Inclusion criteria were: having undergone a mastectomy or conservative breast surgery and having completed the active breast cancer treatment stage. Participants were excluded if they had trauma to the trunk and upper limb, important structural deformities in the spine such as kyphosis or scoliosis, history of fractures and orthopedic surgeries, namely at the vertebral column or scapular girdle, as they may influence musculoskeletal disorders beyond those related to the treatment of breast cancer.

Data were collected with an anonymous self-completed inquiry containing sample characterization questions (area of residence, age, professional status) and specific questions on clinical and functional variables (time after diagnosis of breast cancer, affected side, type of surgery, potential complications after surgery such as lymphedema, difficulty in raising the arm, arm pain, shoulder pain and neck pain). Issues related to physical activity habits before and after breast cancer and the perception of the importance of physical therapy in the process of breast cancer treatment were also included. Data collection took place between November and December 2013.

Written informed consent was obtained before participation, and the rights of the participants were provided in verbal and written form following the Helsinki declaration [9].

Data analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences version 22 (SPSS Inc., Chicago, Illinois), considering the significance level of $p < 0.05$. Categorical variables were expressed by frequency and proportions and were analyzed by the chi-square test.

Results

Ninety-four breast cancer survivor female, aged between 23 and 72 years old, participated in this study (Table 1).

All participants reported one or more post-cancer musculoskeletal disorders and about 79% also reported a decrease in their quality of life (Table 2).

Physical activity in women with breast cancer

Regarding the participants' physical activity habits before and after breast cancer, including type and weekly duration of exercise, results showed that although 45% of the

Table 1 Sample characterization ($n = 94$)

Characteristics	*n* (%)
Age (years)	
20–49	45 (48)
≥ 50	49 (52)
Residence	
North	23 (24)
Center	14 (15)
Lisbon and Vale do Tejo	38 (40)
Alentejo	9 (10)
Algarve	10 (11)
Professional occupation	
Employee	34 (37)
Reformed	34 (37)
Medical discharge	12 (13)
Unemployed	12 (13)
Time post-diagnosis (years)	
< 5	50 (53)
5–10	25 (27)
> 10	19 (20)
Surgery	
Mastectomy	61 (65)
Conservative	33 (35)
Lymphadenectomy	45 (48)
Maintain lymph nodes	49 (52)
Breast side	
Left	42 (45)
Right	39 (42)
Both	12 (13)
Adjuvant therapy	
Chemotherapy	66 (71)
Radiotherapy	73 (80)
Physical activity before breast cancer (BBC)	
Yes	42 (45)
No	47 (50)
Physical activity after breast cancer (ABC)	
Yes	21 (22)
No	70 (75)

Table 2 Musculoskeletal disorders and perceived quality of life (QOL) reported by participants ($n = 94$)

Musculoskeletal changes and quality of life perception (QOL)	Answers	*n* (%)
Lymphedema	87	29 (33)
Arm pain ipsilateral to surgery	89	43 (48)
Shoulder pain	87	41 (47)
Difficulty in raising the arm	90	31 (34)
Neck pain	90	53 (59)
Difficulties in the activities of daily living	91	33 (36)
Decreased quality of life	91	72 (79)

women in our sample reported regular physical activity before cancer, only 22% maintained this practice after breast cancer treatment (Table 3).

Physical activity before breast cancer

The percentage of women who reported pain in the arm ipsilateral to surgery was lower among those who practiced physical activity compared to those who did not practiced (37% vs 60%, $p=0.030$). Also, women who practiced physical activity before breast cancer had less difficulty in mobilizing the arm when compared to those who did not practiced physical activity (24% vs 44%, $p=0.043$). Women who practiced physical activity prior to breast cancer had less difficulty in performing daily life activities (ADL) compared to those who did not practiced physical activity (24% vs 47%, $p=0.029$) (Fig. 1).

Table 3 Characterization of the participants' physical activity before breast cancer ($n=42$) and after breast cancer ($n=21$)

	Before breast cancer *n* (%)	After breast cancer *n* (%)
Activity		
Handball	4 (10)	–
Ballet	1 (2)	–
Walking	4 (10)	6 (29)
Walk + bodybuilding	1 (2)	–
Dancing	–	1 (5)
Football	1 (2)	–
Futsal	1 (2)	–
Gym fitness	13 (31)	3 (14)
Specific gymnastics for breast cancer survivors	–	1 (5)
Hydro gym	4 (10)	–
Indoor cycle	1 (2)	1 (5)
Swimming	4 (10)	3 (14)
Walkway	–	2 (10)
Various activities	5 (12)	–
Yoga	–	2 (10)
Did not respond	3 (7)	2 (10)
Weekly time		
Less than 30 min	–	4 (10)
30–1 h	20 (48)	6 (14)
From 1 to 2 h	9 (21)	5 (12)
From 2 to 3 h	7 (17)	–
More than 3 h	4 (10)	5 (12)
Did not respond	2 (5)	1 (2)

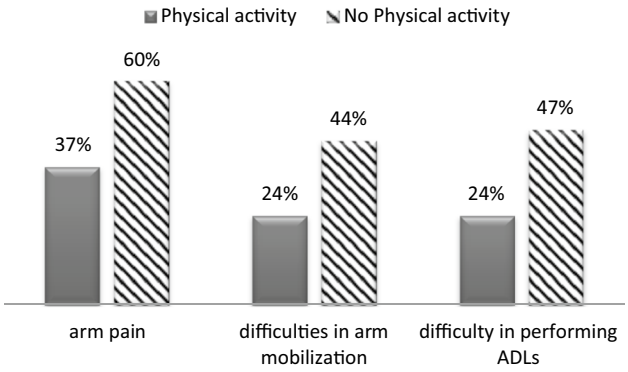

Fig. 1 Relationship between physical activity practice before breast cancer and musculoskeletal disorders

Physical activity practice after breast cancer

After breast cancer, it was found that women who continued to practice regular physical activity reported less difficulty in arm mobilization (5% vs 44%, $p=0.001$), as well as less pain in the ipsilateral arm (24% vs 56%, $p=0.010$), cervicalgia (38% vs 65%, $p=0.027$), difficulty in performing ADL (5% vs 44%, $p=0.001$) and decreased QOL after cancer (60% vs 84%, $p=0.019$) when compared to women who did not practiced physical activity (Fig. 2).

Importance of physiotherapy

Regarding physiotherapy intervention for musculoskeletal complications resulting from breast cancer treatment process, 48% of the participants ($n=45$) underwent physiotherapy while undergoing breast cancer treatment. Of these, the majority considered that physiotherapy was important in treating most of the reported musculoskeletal complications (Fig. 3). Majority of the participants who stated having lymphedema recognized the importance of physiotherapy in their treatment (63% vs 9%, $p=0.008$) as well as in the treatment of arm pain (72% vs 23%, $p=0.003$), ($p=0.002$), neck pain (91% vs 46%, $p=0.001$), difficulty in performing ADL (56% vs 8%, $p=0.003$), in shoulder pain (54% vs 5%, $p=0.002$) and in QOL after cancer (97% vs 77%, $p=0.027$).

Discussion

Treatment of breast cancer involves surgical intervention and antineoplastic therapies to increase disease-free survival by preventing metastases and tumor recurrences. Nevertheless there are side effects associated with treatment. Radiotherapy can reduce tissue elasticity, strength and mobility in the upper limb, increase fatigue levels, and cause edema, superficial lymphatic thrombosis and lymphedema among

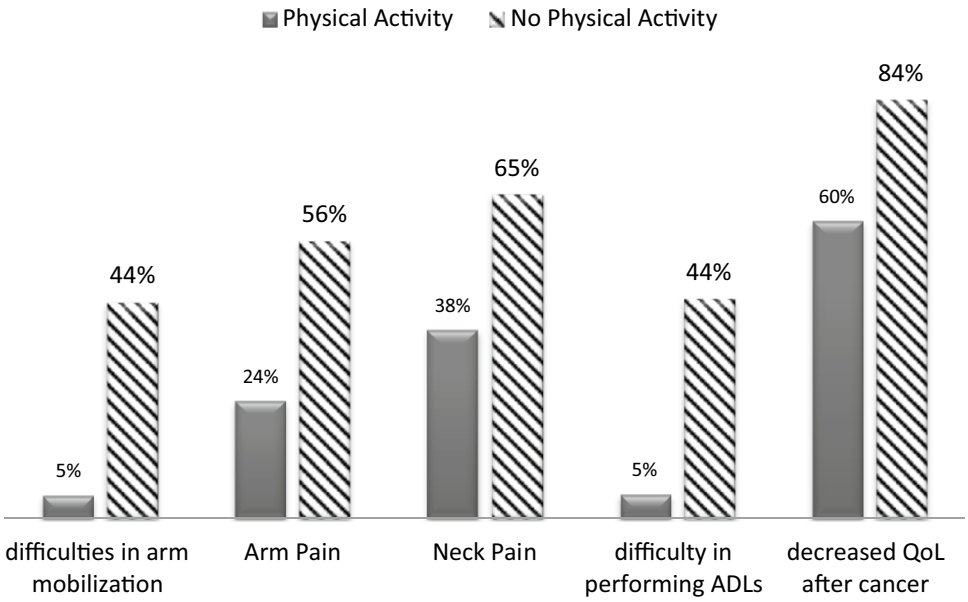

Fig. 2 Relationship between the practice of physical activity after breast cancer and musculoskeletal complications

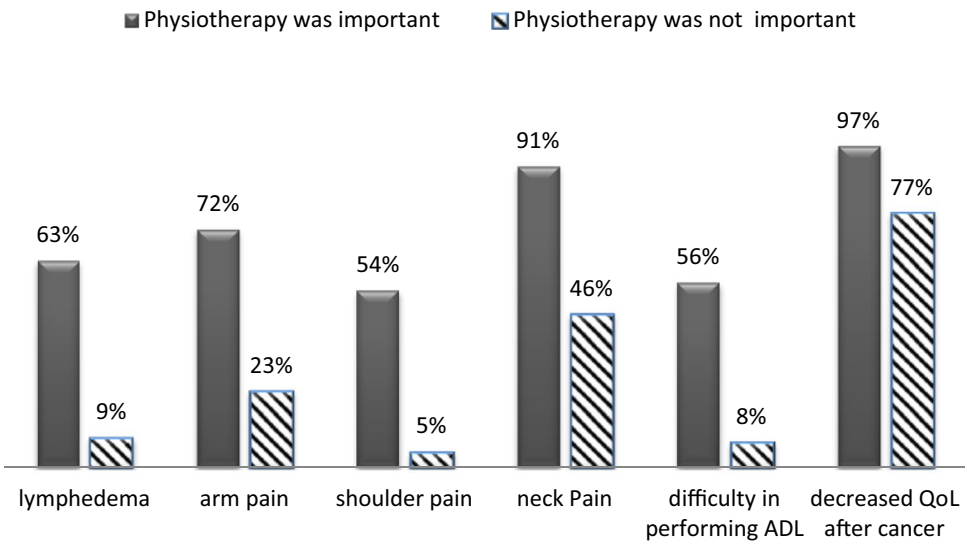

Fig. 3 Perception of the importance of physiotherapy intervention for musculoskeletal complications

other complications [10]. Additionally, chemotherapy shows increased levels of fatigue as one of the main negative effects. Hormone therapy, among other side effects, leads to weight gain and fat accumulation at the trunk [11, 12].

Generally, fatigue in cancer patients is chronic. This state of extreme fatigue contributes to a decrease in performance, resulting in a decrease in the quality of life [13] and in physical activity levels [10].

There are several studies on the relationship between the practice of physical activity before breast cancer diagnosis and mortality attributed to breast cancer [6, 14, 15] as well as its influence on relapses and on the emergence of a new tumor [6, 15]. These studies show that the practice of physical activity is associated with a reduction in mortality rate, relapses and emergence of a new tumor.

An aspect of extreme importance in our study is the relationship between musculoskeletal disorders and physical activity levels of practice before breast cancer diagnosis. Our results seem to show that women who were active before breast cancer reported fewer complications than those who were not active, thus showing that women who practiced physical activity before diagnosis, managed to overcome with less consequences than sedentary women. These results reinforce the importance of regular physical activity practice.

In fact, a 2016 report on cancer diseases from the Portuguese Minister of Health recommends greater investment in cancer prevention and the promotion of healthy lifestyles [3].

It was not our purpose to conduct a research on the incidence of breast cancer. However, when this clinical

condition arises with the need for a more aggressive clinical treatment such as surgery or chemotherapy with hospital admission, an active lifestyle before cancer diagnosis seems to be extremely important in the progression of functional condition resulting from the treatment of this disease. These results are in line with the study of Courneya et al. [16], suggesting that physically active individuals before breast cancer diagnosis show a greater physical and psychological capacity to overcome the different stages of cancer treatment [5, 16].

According to our results, women who have active lifestyles after breast cancer diagnosis and treatment report fewer difficulties in mobilizing the arm as well as less arm pain, neck pain and difficulty in performing ADL, comparatively to women who do not practice physical activity. The latter also perceives a decrease in QoL after treatment when compared to women who are physically active. These results are in agreement with studies confirming that the practice of exercise after cancer diagnosis is important since it attenuates the adverse effects of treatment, improves general physical capacity, acts in the recovery mobility and range of motion, preventing or minimizing muscular atrophy and joint limitations and promoting the perception of well-being [5, 17–19].

American College of Sports Medicine (ACSM) guidelines [7] advise the practice of 150 min a week of moderate-intensity or 75 min a week of vigorous-intensity aerobic exercise. Additionally aerobic exercise must be complemented with 2 or 3 weekly sessions of strength exercise targeting major muscle groups.

Individuals with cancer diseases who are unable to reach recommended levels of physical activity should remain as active as their condition allows and, as soon as possible, avoid inactivity after diagnosis and/or treatment. These recommendations are valid even for those who have complications due to the disease [7]. Individuals who cannot reach the recommended minima of activity, nevertheless obtain benefits [5]. Levels of physical activity lower than the recommended levels are even better than being always sedentary.

Women with lymphedema, arm pain, shoulder pain, neck pain, those who experienced greater difficulty in performing ADL and those who reported a decrease in quality of life confirmed that physiotherapy was important to overcome the side effects of breast cancer treatment. These results are in agreement with studies confirming that physiotherapy has been responsible for the reduction of pain, fatigue and lymphedema and the improvement of muscle strength, shoulder range of motion, functional activity and quality of life in women undergoing treatment for breast cancer [20, 21]. Physiotherapy may play an important role in the post-operative period of breast cancer surgery [22–24] where it can be considered one of the main preventive agents for disorders after surgery.

Recall bias is one potential limitation to this study. Participants had to remember facts occurred several months prior to the study. Despite careful selection of the questions, having in consideration the target population, memories may have been influenced by other events leading to less accurate answers. Future studies should consider the possibility to use validated tests to assess musculoskeletal variables, such as pain, muscle strength, range of motion or functional capacity. Another limitation to our study is related to the questionnaire used to assess physical activity habits. Our purpose was to understand the perception of breast cancer survivor women having completed the active breast cancer treatment stage in relation to physical activity practice currently and prior to cancer diagnosis. Although there are validated questionnaires to assess physical activity habits, they do not allow to collect data regarding those habits more than 1 year prior to the study. Given that the recovery process since breast cancer diagnosis can take several months or years and that we wanted to understand the habits of physical activity before the diagnosis, we had to create a specific questionnaire for our study.

Conclusion

For survivors of breast cancer, being physically active prior to diagnosis contributes to a lower occurrence of musculoskeletal disorders associated with treatment, namely pain and limb functional limitation and difficulties in ADL. Being active and doing exercise after breast cancer diagnosis decreases neck and upper limb pain and improves functionality. Women who report higher number of disorders as side effects of cancer treatment claim that physical therapy was important at all stages of treatment and helped to overcome the side effects of this treatment.

Authors are aware of the extreme importance of advising behavioral change towards a healthier lifestyle, where the practice of exercise should be stimulated. Implementing physical activity intervention and prescription policies for breast cancer survivors, guided by appropriate health professionals is of higher importance.

Compliance with ethical standards

Conflict of interest The authors do not have any conflicts of interest to disclose.

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