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THE IMPACT OF PHYSICAL THERAPY ON THE QUALITY OF LIFE OF WOMEN AFTER BREAST CANCER SURGERY

A influência da fisioterapia na qualidade de vida de mulheres após o tratamento cirúrgico do câncer de mama

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ABSTRACT

Objective: To evaluate the impact of physical therapy on the quality of life of patients after breast cancer surgery. **Methods:** We included 16 female patients who underwent breast cancer surgery in this clinical, longitudinal, prospective, and convenience sample study. The patients underwent a mastectomy or a quadrantectomy through an axillary approach and were evaluated before and after 20 sessions of physical therapy. Quality of life was assessed by the European Organization for Research and Quality of Life Questionnaire C-30 (EORTC QLQ C-30) and the Breast Cancer Module (EORTC QLQ BR-23) questionnaire. For the statistical analysis, we used the Shapiro-Wilk test to evaluate the distribution of quality of life data. The data from before and after physical therapy was compared through the Wilcoxon test. **Results:** After participating in physical therapy, there was a significant improvement in physical function (p=0.023), cognitive function (p=0.033), social function (p=0.013), pain (p=0.025), fatigue (p=0.001), financial difficulty (p=0.007), and body image (p<0.001). **Conclusion:** According to the data presented in this study, we suggest that a physiotherapeutic approach positively impacts the quality of life of patients after breast cancer surgery.

KEYWORDS: Breast Neoplasms; Medical Oncology; Quality of Life; Physical Therapy (Techniques); Women's Health.

RESUMO

Objetivo: Avaliar a influência da fisioterapia na qualidade de vida de pacientes após o tratamento cirúrgico do câncer de mama. **Metodologia:** Neste estudo clínico, longitudinal, prospectivo e de amostra por conveniência foram incluídas 16 pacientes que realizaram tratamento cirúrgico do câncer de mama, submetidas à mastectomia ou quadrantectomia, associada à abordagem axilar. Elas foram avaliadas antes e depois de 20 sessões de fisioterapia. A qualidade de vida foi examinada pelos questionários European Organization for Research and Treatment of Cancer Quality of Life Questionnaire C-30 (EORTC QLQ C-30) e Breast Cancer Module (EORTC QLQ BR-23). Para análise estatística, foi utilizado o teste de Shapiro-Wilk, para avaliação da distribuição dos dados sobre a qualidade de vida, sendo estes comparados antes e depois da fisioterapia por meio do teste de Wilcoxon. **Resultados:** Após a intervenção fisioterapêutica, houve melhora significativa em relação à qualidade de vida na função física (p=0,023), função cognitiva (p=0,033), função social (p=0,013), dor (p=0,025), fadiga (p=0,001), dificuldade financeira (p=0,007) e imagem corporal (p<0,001). **Conclusão:** De acordo com os dados apresentados no estudo, pode-se sugerir que a abordagem fisioterapêutica influencia positivamente na qualidade de vida de pacientes após o tratamento cirúrgico do câncer de mama.

DESCRITORES: Neoplasias da Mama; Oncologia; Qualidade de Vida; Fisioterapia; Saúde da Mulher.

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INTRODUCTION

Breast cancer is the type of cancer that most affects women around the world. In Brazil, there were around 57,960 new cases[1] in 2016, and the global burden estimate will increase to more than two million new cases in 2030[2].

Most of the treatments administered to fight cancer are prepared and directed at the disease. However, the negative impacts on the patient's subjective perceptions, among them the quality of life (QoL), have increasingly been the focus of treatment. The World Health Organization (WHO) defines QoL as: "An individual's perception of his or herself, of his/her position in life within the cultural context and system of values in which he/she lives, and of his/her goals, expectations, and social standards"[3].

The main surgical and clinical approaches included in breast cancer treatment are lumpectomy and mastectomy. They may or may not be associated with axillary lymph node dissection (LA), chemotherapy (QT), radiotherapy (RT), and hormone therapy (HT)[4,5]. These approaches may cause physical and emotional consequences that worsen a patient's life, such as: wound-healing complications, alterations in sensitivity, fibroses, pain patterns, a reduction or total loss in the range of motion, a decrease in muscular strength, depression, worsening of ones' body image, damage to respiratory capacity, reduction of functional capacity, as well as lymphedema of the ipsilateral arm of the breast involved.

In addition, breast cancer treatment may generate a combined impact on the QoL and functional capacity of a patient, resulting in his or her incapacity to perform daily-life activities. Hence, physical therapy through physical rehabilitation is of utmost importance due to the support it provides for the affected limb to recover and to begin a sense of independence, which also affects QoL[6].

Therefore, through this study, we sought to evaluate the impact of physical therapy on the QoL of patients after they underwent breast cancer surgery.

METHODS

The present research is a longitudinal and prospective clinical study of convenience sampling performed from July to December of 2015. Randomly, we included patients who had undergone breast cancer surgery. They had undergone a mastectomy or quadrantectomy using an axillary approach, and received treatment at the Physical Therapy and Occupational Therapy Teaching and Care Unit (*Unidade de Ensino e Assistência em Fisioterapia e Terapia Ocupacional*—UEAFTO), which is part of the Universidade do Estado do Pará (UEPA). The Research and Ethics Committee for Human Beings from the Hospital Universitário João de Barros Barreto (CAAE: 41730415.0.0000.0017/2015) and from the UEPA (CAAE: 1.198.709-2015) approved the study. All of the participants signed a free and informed consent form.

The inclusion criteria were: patients who went to the UEAFTO, had undergone surgery less than three years prior, were older than 18, had undergone a surgery by the axillary approach, were not using antidepressants or other similar medicines, and were not receiving psychologic assistance. The following were excluded: patients with locoregional disease or a distant active disease and those that, during the evaluation, presented functional alterations. Furthermore, patients who had undergone previous physiotherapeutic treatment in order to deal with complications from breast cancer, or others that did not fit in the inclusion criteria, were excluded.

The physiotherapeutic protocol was composed of 20 sessions that were divided into two weekly sessions, with an average duration of 45 minutes per session. Patients were examined at the beginning of the treatment and after 20 sessions, based on the service assessment protocol (anamnesis and functional assessment). Then, the QV European Organization for Research and Treatment of Cancer Quality of Life Questionnaire C-30 (EORTC QLQ C-30) and Breast Cancer Module (EORTC QLQ BR-23) questionnaires were administered[7].

The anamnesis included the patient's clinical history, such as data about the surgery, co-adjuvant treatments, and nutrition. A physical assessment was performed in which the surgical wound, the skin, the upper limb and the trunk (mass) were inspected. Each segment and possible dysfunctions were verified after surgery. The functional assessment of the scapular waist included measuring the range of motion (ROM) of both shoulders (homolateral and counter-lateral to surgery), using a goniometer in order to assess flexion, extension, abduction, adduction, and external rotation movements. The shoulder's internal rotation movements were assessed based on free active movements. We were concerned about the part of the dorsal region in which the limb positions itself: the thoracic region (without the ROM limitations), the lumbar region (mild ROM limitations) and the sacral region (severe ROM limitations). All of the movements were performed in the orthostatic position. We also performed perimetry in the upper limbs in order to verify the presence of lymphedema. The circumference was measured in six points: 14 and 7 cm above the elbow joint line; and at 7, 14 and 21 cm below the joint line, except for in the hand. The circumference was obtained when the patient sat with their shoulder flexed and their forearm extended. In addition, we also inspected and palpitated the wound-healing disorders and observed the lymphatic cords and sensorial alterations in the ipsilateral limb to surgery.

The QoL was assessed through the EORTC QLQ C-30 (appendix A) and through its specific module for breast cancer EORTC QLQ BR-23 (appendix B). Both questionnaires had already been translated and validated into Brazilian Portuguese, and their use in this study was authorized upon formal consent [7-9]. The EORTC QLQ C-30 is a questionnaire that covers specific cancer symptoms,

and includes 30 questions that are subdivided into three groups or scale domains:

- overall health condition and QoL;
- functional scales comprised of physical functioning, role function, emotional functioning, cognitive functioning, and social functioning;
- symptomatic items/scales were comprised of the following subscales: fatigue, nausea, vomiting, pain, shortness of breath, insomnia, loss of appetite, constipation, diarrhea, and financial difficulties[10].

The EORTC QLQ BR-23 is exclusively for breast cancer and includes 23 questions that are subdivided into two scales:

- functional scale comprised of the following subscales: body image, sexual functioning, sexual pleasure and future perspectives;
- symptomatic scale with the following subscales: effects of chemotherapy, symptoms in the breast, symptoms in the arm, and concern for hair loss[10].

All of the score averages were linearly transformed into a scale from 0 to 100 points, as described in the EORTC manual. The higher the score, the better the QoL in the function scales. In the symptom scales, the higher the score, the worse the QoL. As recommended, the questionnaires were applied as interviews before and after 20 physical therapy sessions, by different researchers. The calculation followed the EORTC[7] manual.

After the first assessment had been finished, the patients were divided into three levels of attention complexity: high complexity (four patients that had a considerable shoulder ROM deficit, or a high pattern of pain and had no lymphedema), middle complexity (five patients that had lymphedema, and did or did not have pain/ ROM limitations), and low complexity (seven patients with few ROM limitations and who had mild or no pain).

The activities were done in the physical therapy outpatient clinic of UEAFTO (twice a week) and included the following: kinesiotherapy (active exercise and stretching for all the groups), with or without the support of a rod, ball or hula hoop; manual therapy (massage, pompage, passive stretching, shoulder joint mobilization, among others, for the individual group); and physiotherapeutic decongestive complex therapy (compression bandaging, active exercises, skin care, and indication of an compression elastic clamp, only for the lymphedema group). In addition, the women were given advice about home exercises, self-drainage, self-bandaging, and desensitization exercises, as well as general care regarding the superior limb ipsilateral to surgery[11].

Data were analyzed through the GraphPad Prism 6.0 software. All of the statistical tests had a significance of 5% ($p<0.05$). For the statistical analysis, we used Shapiro-Wilk's test to assess the distribution of data regarding QoL. The variables presented a abnormal distribution and are expressed in medians and percentiles. We used Wilcoxon's test to make a comparison between before and after physical therapy.

RESULTS

Nineteen patients were included in the study, but only 16 were analyzed. Figure 1 presents the sample distribution. Regarding personal and clinical characteristics, our patients were 54.5 years old on average, and most were from the metropolitan region (15; 93.25%). Housewife was the most reported occupation (6/37.50%). Pre-treatment clinical staging was presented as follows:

- stage I B: two patients (12.50%);
- stage II A: six patients (37.50%);
- stage II B: four patients (25.00%);
- stage III A: four patients (25.00%).

Most of the patients had undergone a radical mastectomy (11/68.75%) by an axillary approach (11/68.75%). Patients who underwent RT only had it done in the mass. Other characteristics are found in Chart 1.

Regarding the QoL assessment scores, through the specific EORTC QLQ C-30 questionnaire, we observed, an improvement in the overall health scale domains after 20 sessions, with no statistically significant difference. Except for general function, all of the scores increased in the domain of function scales with a statistically significant difference in physical function ($p<0.023$), cognitive function ($p<0.033$), and social function ($p<0.013$). On the scale of the symptoms, all of the scores decreased or stayed the same, with a significant reduction in the pain ($p<0.025$), fatigue ($p<0.001$), and financial difficulty ($p<0.007$) subscales (Table 1).

In the specific questions regarding the EORTC QLQ BR-23 and the functional scale, we only obtained a statistically significant increase in the body image subscale ($p<0.001$). We did not include sexual pleasure or hair loss values, because most of the patients did not respond to either of the two scores. In the group of symptom scales, all of them decreased and had a statistically significant difference (Table 2).

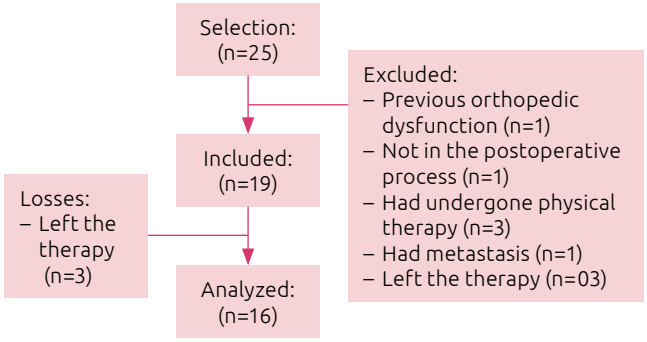

Figure 1. Flowchart of the patient selection

Chart 1. Personal and clinical-surgical characteristics.

Variable (unit)	(n=16)
Age (years)	54.5
Staging n (%)	
I B	2 (12.50)
II A	6 (37.50)
II B	4 (25.00)
III A	4 (25.00)
Origin n (%)	
Metropolitan area	15 (93.25)
Other places	1 (6.25)
Pregnancy n (%)	
Nulliparous	4 (25.00)
Pauciparous	6 (37.05)
Multiparous	6 (37.05)
Surgical procedure n (%)	
Radical mastectomy	11 (68.75)
Segmental resection	5 (31.25)
Axillary approach n (%)	
Lymph node dissection	15 (93.75)
Sentinel lymph node biopsy	1 (06.25)
Laterality n (%)	
Right breast	2 (12.50)
Left breast	14 (87.50)
Bilateral	0 (00.00)
Treatment n (%)	
Surgery+CT	6 (37.50)
Surgery+CT+RT	5 (31.25)
Surgery+CT+RT+HT	5 (31.25)
Time since surgery n (%)	
Up to 2 months	3 (18.75)
2 months to 1 year	5 (31.25)
> 1 year	8 (50.00)
Occupation n (%)	
Housewife	3 (18.75)
Maid	1 (06.25)
Farmer	1 (06.25)
Hairdresser	1 (06.25)
Fixed machinery worker	5 (31.25)
Secretary	3 (18.75)
Retired	2 (12.50)

Nulliparous: no pregnancy; pauciparous: up to two pregnancies; multiparous: more than two pregnancies; QT: chemotherapy; RT: radiotherapy; HT: hormone therapy.

DISCUSSION

A physiotherapeutic approach is currently the first choice for rehabilitation, as it is essential for the prevention and treatment of physical-functional complications[5]. This study aimed to assess the QoL of patients who had undergone breast cancer surgery, before and after their physiotherapeutic intervention. This was done through the application of two specific questionnaires (EORTC QLQ C-30 and EORTC QLQ BR-23). The results suggest that the physical therapy program improved the QoL of the patients.

The mean age of the present sample was 55 years old, which is in agreement with the estimates and findings from other studies, in which around four out of five cases occur after the age of 50[1,12].

Table 1. Comparison of the median scores of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire C-30 (EORTC QLQ C-30) between the 1st and 20th physical therapy sessions (n=16).

EORTC QLQ C-30	Pre (min.-max.)	Post (min.-max.)	p-value
Overall health condition	66.67 [52.08–97.92]	79.17 [66.67–100.00]	0.246
Function scale			
Physical function	66.67 [60.00–80.00]	76.67 [61.67–93.33]	0.023*
General function	66.67 [37.70–83.33]	66.67 [50.00–95.93]	0.093
Emotional function	83.33 [39.58–91.67]	91.67 [66.67–91.67]	0.151
Cognitive function	58.34 [37.50–83.33]	83.33 [66.67–100.00]	0.033*
Social function	83.34 [66.67–100.00]	100.00 [83.33–100.00]	0.013*
Symptom scales			
Fatigue	61.12 [33.33–91.67]	16.67 [00.00–33.33]	0.001*
Pain	33.33 [16.67–50.00]	16.67 [00.00–29.17]	0.025*
Dyspnea	00.00 [00.00–33.33]	00.00 [00.00–25.00]	0.656
Insomnia	00.00 [00.00–33.33]	00.00 [00.00–33.33]	0.617
Loss of appetite	00.00 [00.00–25.00]	00.00 [00.00–33.33]	0.812
Nausea/ vomiting	00.00 [00.00–16.67]	00.00 [00.00–16.67]	0.812
Constipation	16.67 [00.00–66.67]	00.00 [00.00–58.34]	0.343
Diarrhea	00.00 [00.00–25.00]	00.00 [00.00–00.00]	0.562
Financial difficulty	33.33 [00.00–100.00]	00.00 [00.00–33.33]	0.007*

*Wilcoxon test p<0.05.

Beyond this age range, however, breast cancer cases tend to decrease, which reinforces the influence of female hormones in the disease's etiology. Most of the patients were from a metropolitan region, which makes access to health services easier. The result of a high prevalence of stay-at-home women is in agreement with studies performed by Mesquita[13] and Sousa et al.[14]. This is the case because they are probably under treatment, distant from or not able to return to their activities outside of the home.

As stated by Silva et al.[15] and Alegrance et al.[16], data from the present research shows that before beginning physical therapy, QoL was already altered. This was expected because the patient demonstrated fear of moving his/her upper limb, and pain and functional incapacity, which resulted in feelings of fragility and uselessness[17]. Problems like lymphedema, pain, paresthesia, muscle strength decrease, and ROM reduction of the involved limb are frequently observed and reported by women who have undergone breast surgery. These problems deserve attention because they interfere in the QoL of these women[4].

In a study developed by Figueiredo[18], the overall health scale improved after the physiotherapeutic intervention. However, similar to the present analysis, there was no statistically significant difference. This may be explained by the short time interval of this sample (20 sessions, around two months) and by the fact that we applied the questionnaires, and that there was a small sample. Researchers have demonstrated additional gains in up to six months of physiotherapeutic treatment. They have observed an improvement in shoulder function, in QoL and with regard to the pain of patients who had undergone LA[19].

Table 2. Comparison of median scores of the Breast Cancer Module (EORTC QLQ BR-23) questionnaire between the 1st and 20th physical therapy sessions (n=16).

EORTC QLQ BR-23	Pre (min.-max.)	Post (min.-max.)	p-value
Functional scale			
Body image	16.67 [08.33–29.17]	91.67 [61.67–100.00]	<0.001*
Sexual function	16.67 [00.00–33.33]	08.33 [00.00–33.33]	0.859
Future perspective	33.33 [08.33–66.67]	66.67 [33.33–100.00]	0.237
Symptom scales			
Systemic effects of the therapy	21.43 [5.95–37.01]	16.67 [09.52–30.95]	0.453
Arm symptoms	33.33 [22.22–80.56]	22.22 [02.77–44.00]	0.067
Breast symptoms	16.67 [10.42–31.25]	16.67 [00.00–22.92]	0.304

*Wilcoxon test p<0.05.

With regard to the function scales, all of the subscales presented an improvement, and the physical, cognitive and social functions had significant increases. Randomized and controlled studies have pointed to an improvement in ROM and functional performance of the shoulder after the completion of active exercises with free amplitude. Considering that physical function is assessed through statements like "carrying heavy shopping bags or suitcases" and "need help to eat, to dress, to wash or use the bathroom," we believe that it is related to ROM and strength improvement in addition to the fact that these women gradually return to their activities, such as getting dressed, buttoning their bras, preparing their meals, and other clothing and hygiene activities that also improve social function. Over time, women returned to their social and work activities by reinserting themselves into society[5-15].

Gradually, by returning to daily life inside the home and in the community, these patients require more physical effort to develop these basic activities. Therefore, they also require more effort to work on, not only on theses emotional and physical aspects, but also on cognitive ones, which results in the improvement of these functions and QoL[20].

With regard to the scale of symptoms, the following domains: nausea and vomit, pain, dyspnea, insomnia, weight loss, constipation and diarrhea, had low scores, indicating a good QoL. After 20 physical therapy sessions, the scores were even lower, which points to improvement in the QoL with regard to such symptoms. For these domains, the impact of physical therapy was only significant for pain.

Both pain and fatigue are the most common manifestations found in oncological patients, however these scores did not have a high incidence among the patients under treatment in our study. The results showed only a small decrease in fatigue. This may be attributed to the peculiar profile of the population being studied. Most women have a low socioeconomic level, which means they must continue with their daily activities, including work. However, in the present research, the fatigue subscale showed a statistically significant improvement in the comparison of the moments before and after the physiotherapeutic intervention. In other studies[21,22], the importance of physical therapy when following-up with women undergoing radiotherapy treatment was also demonstrated. The exercises were important for decreasing pain and fatigue, as well as avoiding the previously mentioned alterations that may compromise the performance of daily life activities and social and family contact, which may cause labor damage[23].

We also found a decrease of financial difficulty, which is in agreement with the results found in the literature[15], suggesting that this finding occurs due to the fact that patients improved their physical function and reduced symptoms and pain in their arm. Due to this improvement, usually there are fewer expenses for surgical treatment and for analgesic medicine, despite the

fact that they are patients of the Brazilian Public Health System (*Sistema Único de Saúde*—SUS), and receive pensions and benefits.

Results of the EORTC QLQ BR-23 questionnaire from the present study show that for the body image and future perspectives domains on the functionality scale, the patients improved their scores after 20 sessions. The values of the domains related to "sexual pleasure" and "hair loss concerns" were not assessed, because some patients (more than 40%) did not answer these questions. According to the recommendations in the EORTC QLQ BR-23 manual, these domains do not apply if the patient has not been sexually active or had hair fall out in the last four weeks. The lack of responses among the participants might be due to the high mean age of the sample – some patients were elderly people and therefore did not have an active sexual life. We assumed that the lack of hair loss responses was due to the small number of patients undergoing chemotherapy (which could cause this effect) during the assessment period.

The only domain that presented a statistically significant improvement was "body image". The EORTC QLQ C-30 and the EORTC QLQ BR-23 questionnaires were administered to 51 women with breast cancer in a study. They sought to observe the relation between body image, function, sexual pleasure, health, and QoL. We were able to verify that body image influences the patients' perception of their own health and the QoL[24]. In our research, we found that if QoL improves (because of physiotherapeutic post-intervention, for example), the patient's self-perception of their health progresses, and as a consequence, so does their body. Quantitative studies may not provide a full understanding of body image issues, considering that it is a subjective perception of one's own body with individual meanings for each woman, who might feel physically invaded and exteriorized because of the alterations from the therapy[14].

On the symptoms scales from the EORTC QLQ BR-23 instrument, we observed that the side effect, breast symptom and arm symptom domains had scores below 50%, which also indicate that a small level of the QoL was compromised. After the physiotherapeutic intervention, these scores were even lower, but they did not have statistically significant differences.

A restriction of the present study is the small sample size due to the limited about of time available. This also limited the number of sessions and the number of times the patients visited the outpatient clinic. We could not form a control group, because the patients who were referred to the outpatient clinic were all attended to as soon as possible. As such, it would have been unethical to prevent services from being given to a patient with symptoms and functional alterations after her breast cancer had been diagnosed, because this would harm her recovery.

CONCLUSION

According to data presented in this study, we suggest that a physiotherapeutic approach positively influences the QoL of patients after breast cancer surgery. There was a significant improvement in the EORTC QLQ C-30 questionnaire, especially with regard to the function scale, the physical function, cognitive function and social function domains, and in the pain and fatigue scale of symptoms domains. In the EORTC QLQ BR-23, we observed an improvement regarding the functional scale in the body image domain.

There is no agreement in the literature regarding the right number of sessions, but long-term follow-ups may provide additional advantages. One of the research limitations was the lack of inclusion of data concerning physical and functional assessments (perimetry, ROM) before and after treatment, which could better show the relation between an improvement in functional condition and the QoL of the patients. Studies with designs that include this data, as well as a long-term follow-up, a control group, and a larger sampling size, might offer new information for professionals involved in oncology rehabilitation services, especially for those that assist these women.

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