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Artigo

# EFFECTS OF WALKING ON QUALITY OF LIFE DURING CHEMOTHERAPY FOR BREAST CANCER

# EFEITOS DA CAMINHADA NA QUALIDADE DE VIDA DURANTE A QUIMIOTERAPIA NO CÂNCER DE MAMA

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**ABSTRACT** - Breast cancer is a systemic disease and a public health issue. Despite its effectiveness, chemotherapy is responsible for undesirable side-effects. To attenuate these effects, regular walking has been recommended during chemotherapy to promote patient well-being. **Objective**: To evaluate the effects of walking on myelosuppression, muscle fatigue and quality of life in women undergoing chemotherapy for postoperative treatment of breast cancer. **Method:** An experimental, prospective, longitudinal, randomized clinical trial was conducted with women undergoing adjuvant oncologic treatment in the chemotherapy cycle of the protocol for the use of antineoplastic drugs Doxorubicin and Cyclophosphamide. In the intervention group, the patients exercised for 30 minutes, walking continuously during 21 consecutive days. In the control group, women did not exercise (walk). All responded to the Functional Assessment of Cancer Therapy-Breast (FACT-B) Quality of Life questionnaire and the Piper Fatigue Scale before and after the 21 days. CBC was also tested in these women. **Results:** Quality of life was perceived as significantly higher in the intervention group. In the control group,

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Páginas 233 a 244

Temas em Saúde
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a significant worsening of muscle fatigue was observed. A higher level of monocytes was detected in the intervention group in the intergroup evaluation, as well as basophils in the intragroup evaluation. **Conclusion:** Walking avoided worsening of muscle fatigue and decreased levels of monocytes/basophils, improving quality of life in breast cancer ptients, during chemotherapy.

**Keywords:** Walking. Breast Cancer. Muscle Fatigue. Myelosuppression. Quality of Life.

**RESUMO -** O câncer de mama é uma doença sistêmica e questão de saúde pública. O tratamento quimioterápico, embora eficaz, é responsável por indesejáveis efeitos colaterais. Como forma de amenizá-los, sugere-se a prática regular da caminhada, durante a quimioterapia, a fim de promover o bem-estar da paciente. **Objetivo**: Avaliar os efeitos da caminhada na mielodepressão, fadiga muscular e qualidade de vida de mulheres submetidas à quimioterapia no pós-operatório de câncer de mama. **Método:**. No grupo de intervenção, as pacientes realizaram caminhada por 21 dias consecutivos, durante 30 minutos contínuos. No grupo controle, elas não realizaram a caminhada. Todas responderam ao questionário de Qualidade de Vida de Avaliação Funcional de Câncer de Mama FACT-B e a escala *Piper* de Fadiga Muscular antes e após os 21 dias. Analisou-se também o hemograma dessas mulheres. **Resultados:** A percepção da qualidade de vida foi significativamente maior no grupo de intervenção. No grupo controle, observou-se uma piora relevante da fadiga muscular. Detectou-se maior valor de monócitos no grupo de intervenção na avaliação intergrupo, assim como de basófilos na avaliação intragrupo. **Conclusão:** A realização da caminhada evitou a piora dos níveis de fadiga muscular e a queda de monócitos/basófilos, e melhorou a qualidade de vida em pacientes com câncer de mama, durante tratamento quimioterápico.

**Palavras-chave:** Caminhada. Câncer de Mama. Fadiga Muscular. Mielodepressão. Qualidade de Vida.

## INTRODUCTION

In 2016, 57,960 new cases of breast cancer were estimated. As early as 2018, it is expected to be 59,700, resulting in an incidence of 56.3 cases per 100,000 women (INCA,

Temas em Saúde
Volume 18, Número 3
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2018). Furthermore, according to data from the Brazilian Institute of Geography and Statistics, it has been estimated that in the near future (2020), around 78 million Brazilian females will be over 20 years of age. Of these women, more than 28 million will be at risk for breast cancer. It means that 13% of the total population of the country will be composed of women older than 50 years of age. An increased awareness of the diagnosis of breast cancer is required, in addition to the procedures used in all stages of treatment (IBGE, 2008).

Chemotherapy is a form of treatment employed to combat breast cancer. Despite a satisfactory increase in efficacy, combined with attenuation of damage, the major side-effect of chemotherapy is still myelosuppression, i. e. suppression of blood cell production by the bone marrow. A decrease in bone marrow activity at different levels, increases the risks of septic shock, infections, anemia, hemorrhage and, in extreme cases, death. In general, death occurs as a result of infections caused by neutropenia (EDWARDS, 2003; schwenkglenks, 2006). Another major side-effect is fatigue. The recurrence rate varies widely and 40 to 100% of patients undergoing chemotherapy experience fatigue (IRVINE, 1994; RICHARDSON. 1998). Symptoms of fatigue include reduced functional capacity and inability to interact with family and friends (CIMPRICH; SKALA, 1992). As a result, many patients suffering from myelosuppression and fatigue caused by the side effects of chemotherapy, decrease their physical activity, resulting in increased immobility, physical inability and muscle fatigue. There is also a higher probability of compromised immune system and susceptibility to infections, which taken together lead to hospitalizations. In more severe cases, death occurs, as already mentioned.

Therefore, the purpose of this research study was to analyze the effects of walking on myelosuppression and muscle fatigue during adjuvant chemotherapy for breast cancer, as well as the rate of performance of this type of exercise to enhance quality of life and general well-being in women undergoing treatment.

## METHODS

This is a randomized controlled clinical trial using a quantitative approach. Research was conducted in the chemotherapy unit of the Radium Institute of São João da Boa Vista, from March to October 2015.


DOI: 10.29327/213319.18.3-13
Páginas 233 a 244

Temas em Saúde
Volume 18, Número 3
ISSN 2447-2131
João Pessoa, 2018

Artigo

Inclusion criteria were: women undergoing adjuvant chemotherapy; patients undergoing the second, third or fourth cycle of chemotherapy; and those undergoing a cycle of doxorubicin and cyclophosphamide. Exclusion criteria were: patients managed with radiotherapy or hormone therapy; those managed with a cycle of placlitaxel or FEC (fluorouracil, epirubicin and cyclophosphamide); women with a high-risk cardiac condition diagnosed by echocardiogram; those older than 75 years of age; those incapable of responding to questionnaires; patients with distant metastasis; and those unable to walk.

Thirty-six (36) women receiving adjuvant oncologic treatment were evaluated. All were undergoing the second, third, or fourth cycle of a chemotherapy protocol that used doxorubicin and cyclophosphamide as antineoplastic agents. Patients were divided into two groups. In one group, 18 women engaged in a walking program of low intensity on level ground, during 21 consecutive days, for 30 minutes a day, continuously. In the other group (control), the remaining 18 patients did not exercise (walk) after the proposed intervention. All responded to the Functional Assessment of Cancer Therapy-Breast (FACT-B) quality of life instrument and Piper Fatigue Scale before and after 21 days. The CBC of these women was also analyzed.

The study was conducted after approval by the Research Ethics Committee, according to CAEE report nº 37420114.1.0000.5382. All women participating in the research study signed a free, written and informed consent term.

Data were analyzed by the mean, standard deviation and minimum/maximum median. Parametric statistical tests were used. The main instrument of data analysis was the ANOVA technique for a comparison between means by using the variance. Student's t-test was used to assess the difference between groups and also test whether they were equal, normal and independent. The level of significance was 0.05 (5%), constructed with 95% statistical confidence. The sample was calculated with a 95% confidence interval and a sampling error of 20%. Software used for analysis were SPSS V17, Minitab 16 and Excel Office 2010.

## RESULTS

In the sample studied, age and body mass index (BMI) showed no difference between groups. The mean age of the patients was 58.2 years, with a standard deviation of 7.8. Regarding BMI, the mean was 27.9 with a standard deviation of 5.8. Of the 21

Temas em Saúde
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days of exercise proposed, patients walked for a mean of 16 days (76%). In the control group, levels of fatigue worsened significantly (Figure 1), shown in behavioral domains (p=0.008) and fatigue/behavioral level (p=0.008).

The use of analgesics did not vary between groups (p=0.735), and 38.9% of women used analgesics, at a mean dose of 18.6 tablets/cycle, in the control group; while in the experimental group, 44.4% used analgesics at a mean dose of 14.4 tablets/cycle (p-value=0.290).

In the experimental group, a better general quality of life was observed (total FACT-B). The FACT B consists of the following domains: physical, social, emotional, functional well-being plus the breast cancer sub-scale. There was no significant difference in the domains alone. However, the total sum of rates per group, obtained at the end of the intervention or control (Figure 2), expressed that general quality of life scored higher in the experimental group (p=0.042).

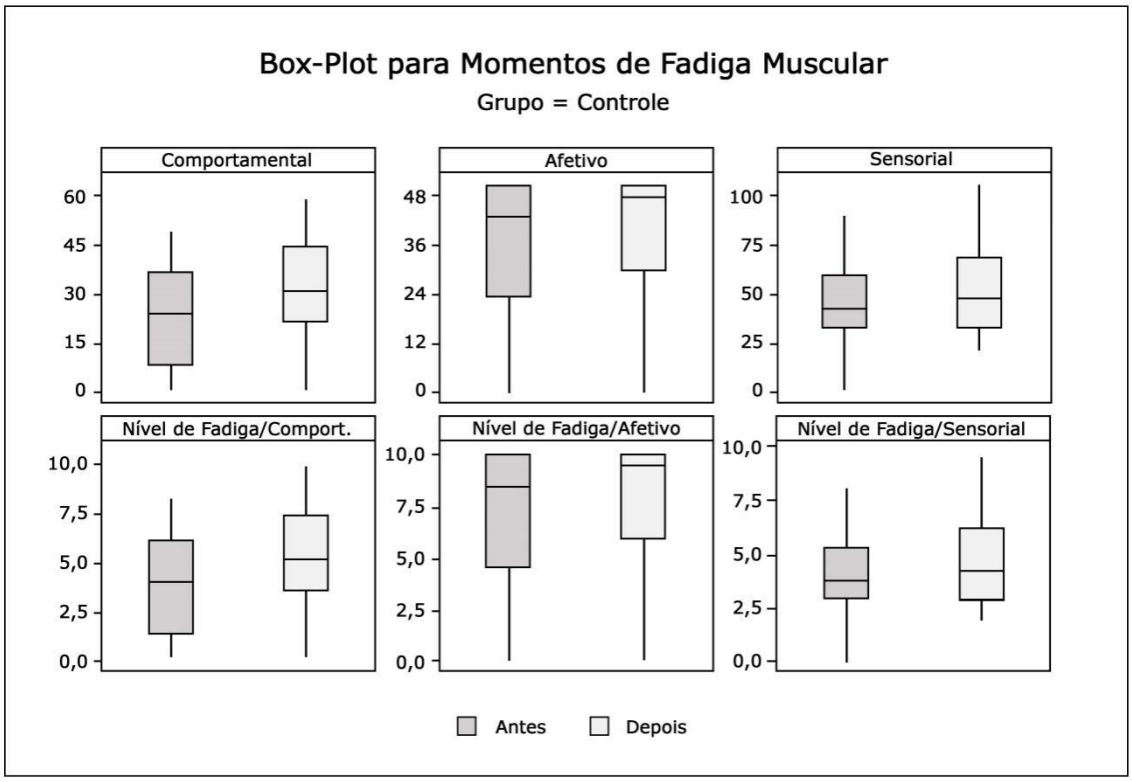
Infectious complications or hospital admissions did not occur in any of the groups. All women underwent the next cycle of chemotherapy at an interval of 21 days. None required antibiotic therapy. Complete blood count was evaluated in women from the beginning to the end of intervention. A significant increase in monocytes occurred in the experimental group, measured after walking, with a mean of 455.2, in comparison to the control group. In contrast, it was detected that controls had decreased numbers of monocytes, with a mean of 211.6 (p=0.004). Regarding basophil count, it was observed that the control group had a reduced number of basophils, with the mean value ranging from 5.65 to 5.17 between the initial and final period of the experiment, with a p-value<0.001 in the intragroup evaluation (Table 1). There was a significant difference in the remaining blood elements measured.


DOI: 10.29327/213319.18.3-13
Páginas 233 a 244

Temas em Saúde
Volume 18, Número 3
ISSN 2447-2131
João Pessoa, 2018

Artigo

**Figure 1**: Comparative of muscle fatigue dimensions




**Fonte:** elaboração própria

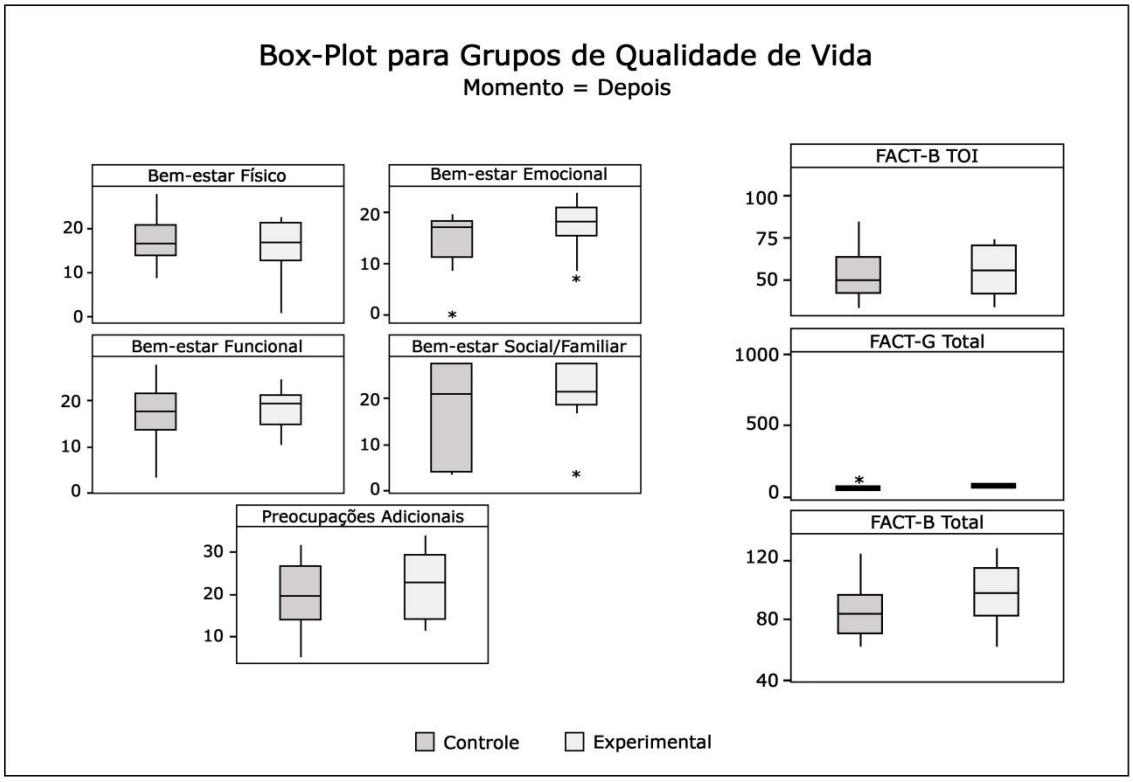
Box-plot for time points of muscle fatigue; Group=Control; Behavioral—Level of fatigue/Behavioral; Affective—Level of fatigue/Affective; Sensorial-Level of fatigue/Sensorial.


DOI: 10.29327/213319.18.3-13
Páginas 233 a 244

Temas em Saúde
Volume 18, Número 3
ISSN 2447-2131
João Pessoa, 2018

Artigo

**Figure 2**: Comparative of quality of life domain




**Fonte**: elaboração propria

Box-plot for quality of life groups; Time period=after; Physical well-being, functional well-being, emotional well-being, social/family well-being, additional concerns; Control; Experimental.


DOI: 10.29327/213319.18.3-13
Páginas 233 a 244

Temas em Saúde
Volume 18, Número 3
ISSN 2447-2131
João Pessoa, 2018

Artigo

**Table 1**: Intragroup comparison between monocytes and basophils

| CBC | | | Mean | Median | Standard Deviation | CV | Min | Max | N | CI | P-value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Monocytes | Experimental | Before | 365.2 | 314 | 227.9 | 62% | 61 | 968 | 18 | 105.3 | 0.563 |
| | | After | 455.2 | 452.5 | 235.8 | 52% | 68 | 1001 | 18 | 108.9 | |
| | Control | Before | 232.2 | 109 | 242 | 104% | 12 | 798 | 17 | 115 | 0.672 |
| | | After | 211.6 | 121.5 | 234.3 | 111% | 4.1 | 769 | 18 | 108.2 | |
| **Basophil** | **Experimental** | **Before** | **8.83** | **0** | **31.39** | **355%** | **0** | **132** | **18** | **14.5** | **0.722** |
| | | **After** | **5.33** | **0** | **20.27** | **380%** | **0** | **86** | **18** | **9.36** | |
| | **Control** | **Before** | **5.65** | **0** | **12.45** | **220%** | **0** | **37** | **17** | **5.92** | **<0.001** |
| | | **After** | **5.17** | **0** | **12.41** | **240%** | **0** | **37** | **18** | **5.73** | |

**Fonte:** elaboração própria
CV=coefficient of variation; Min= minimum value found in the sample; Max= maximum value found in the sample; N= number studied; CI= confidence interval; p-value= result of each comparison.

## DISCUSSION

Quality of life was perceived as significantly higher in the experimental group. Despite undergoing one more cycle of chemotherapy, women in the experimental group did not experience worse muscle fatigue. In contrast, in the control group, muscle fatigue worsened significantly, indicated by the behavioral domains and levels of fatigue. An increased number of monocytes was observed in the intervention group in the intergroup evaluation, as well as basophils in the intragroup evaluation, suggesting that the level of


DOI: 10.29327/213319.18.3-13
Páginas 233 a 244

Temas em Saúde
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these defense elements did not decrease in intervention group patients, in contrast to controls.

This study showed relevant results, since muscle fatigue may exert a negative impact on a patient's QOL. Walking is a viable option for keeping complaints under control. Exercise of prolonged duration and low intensity can increase the number of mitochondria and vascularity of the muscles, and reduce the level of muscle fatigue (GROSSER, 2000).

Another study of breast cancer patients undergoing chemotherapy, detected that women who performed physical activity of moderate intensity for 15 to 30 minutes a day, four times a week, during eight weeks, suffered from less severe fatigue. In addition, levels of fatigue diminished at each chemotherapy cycle, when compared to women who did not exercise (SCHWARTZ, 2000).

Similarly, assessment of the levels of fatigue and quality of life in 52 women (MOCK, 2001), in a home walking program, confirmed that those engaged in at least 90 minutes of physical activity a week, during three or more days a week, reported feeling less fatigue and a better quality of life than women who exercised a shorter amount of time. Another study also aimed at investigating the effects of exercise on levels of fatigue during breast cancer treatment, assessed 119 women who participated in a home walking program. It was observed that participants in the exercise program had reduced levels of muscle fatigue during treatment ($p=0.03$). This result was similar to findings in the current study. The group of women who walked did not perceive a worse muscle fatigue, despite undergoing one more cycle of chemotherapy, and reported an improved quality of life (MOCK, 2004).

The mechanisms that modulate the immune response to exercise may be stimulated by hormone groups, with the release of catecholamines and cortisol, or by metabolic and mechanical groups that involve glutamine (CURI, 1999). The results obtained in this study reinforce the observation that walking may modulate the immune response, since the numbers of monocytes in the intervention group (intergroup assessment) and basophils (intragroup assessment) did not worsen significantly.

The number of white blood cells increased during high-intensity exercise. Thirty minutes after the end of physical activity, a fall in leukocyte value was observed due to the secretion of catecholamines and cortisol, increasing the density of β2-adrenergic receptors. In this study, results corroborated findings of those authors. Both groups of women did not show any increase in the number of leukocytes, probably due to the form


DOI: 10.29327/213319.18.3-13
Páginas 233 a 244

Temas em Saúde
Volume 18, Número 3
ISSN 2447-2131
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of exercise done. Walking is considered a low-intensity activity (KHAN, 1986; MAISEL, 1990).

Lymphocytes also increase according to the intensity and duration of exercise. exercise (BROADBENT, 2006). Therefore, high-intensity exercise of long duration induces an immediate increase in the number of lymphocytes, which disappears shortly after. Those findings support the results of this study, in which lymphocyte count did not increase in the intervention group, most likely due to the low intensity and short duration of exercise (SANTOS, 2007).

Walking is considered an exercise of low to moderate intensity. It is associated with fewer episodes of infection, due to improved neutrophil and monocyte function. The results of this study strengthen this physiological response to walking in women undergoing chemotherapy, shown by increased numbers of monocytes and basophils in the experimental group (NIEMAN, 1997).

This research, therefore, confirms scientific evidence that physical activity is highly beneficial to alleviate the side-effects produced by chemotherapy. Exercise improves well-being in patients undergoing breast cancer treatment. Walking should be emphasized, recommended and indicated in healthcare networks. This form of exercise is efficient, accessible and free of charge. It improves quality of life and is completely feasible for the majority of patients.

## CONCLUSION

Walking has positive effects on the health of women undergoing adjuvant chemotherapy for breast cancer treatment. In this research, it was observed that physical activity helped decrease muscle fatigue and improved quality of life. Furthermore, it also resulted in improved immune function. Therefore, walking is recommended to reduce the side-effects of chemotherapy and promote patient well-being.

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Temas em Saúde
Volume 18, Número 3
ISSN 2447-2131
João Pessoa, 2018

Artigo

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DOI: 10.29327/213319.18.3-13
Páginas 233 a 244

Temas em Saúde
Volume 18, Número 3
ISSN 2447-2131
João Pessoa, 2018

Artigo

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DOI: 10.29327/213319.18.3-13
Páginas 233 a 244