







Quality of life of women with breast cancer undergoing radiotherapy*

Qualidade de vida de mulheres com câncer de mama submetidas à radioterapia

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ABSTRACT

Objective: to analyze the relationship between quality of life and sociodemographic and health characteristics of women with breast cancer undergoing radiotherapy. **Methods:** a cross-sectional study of 101 women with breast cancer undergoing radiotherapy. Questionnaires were used to characterize the profile, and scales were used to assess quality of life. Descriptive and inferential analyses were carried out. **Results:** the women evaluated had a good overall health status/quality of life (81.3 ± 18.3). There was a correlation between age and breast symptoms ($r = -0.202$; $p = 0.050$) and sexual function ($r = -0.484$; $p = 0.050$); weight and breast symptoms ($r = 0.256$; $p = 0.050$); total radiation dose with sexual function ($r = 0.214$; $p = 0.050$) and future outlook ($r = 0.267$; $p = 0.010$); daily radiation dose with sexual function ($r = 0.204$; $p = 0.05$); and between radiotherapy sessions with sexual function ($r = 0.214$; $p = 0.050$) and future outlook ($r = 0.259$; $p = 0.010$). **Conclusion:** it was found that age, weight, radiation dose, and number of radiotherapy sessions have an impact on the quality of life of women with breast cancer. **Contributions to practice:** predictors were found that could help plan preventive or supportive interventions, especially multi-professional ones, aimed at providing more personalized care for women with breast cancer undergoing radiotherapy.

Descriptors: Quality of Life; Breast Neoplasms; Radiotherapy; Women; Nursing.

RESUMO

Objetivo: analisar a relação entre qualidade de vida e características sociodemográficas e de saúde de mulheres com câncer de mama em radioterapia. **Métodos:** estudo transversal, realizado com 101 mulheres com câncer de mama em radioterapia. Aplicaram-se questionários para caracterização do perfil e escalas de avaliação da qualidade de vida. As análises, descritiva e inferencial, foram realizadas. **Resultados:** as mulheres avaliadas apresentaram bom estado de saúde global/qualidade de vida ($81,3 \pm 18,3$). Verificou-se correlação entre idade com sintomas da mama ($r = -0,202$; $p = 0,050$) e função sexual ($r = -0,484$; $p = 0,050$); peso e sintomas na mama ($r = 0,256$; $p = 0,050$); dose total de radiação com função sexual ($r = 0,214$; $p = 0,050$) e perspectiva futura ($r = 0,267$; $p = 0,010$); dose diária de radiação com função sexual ($r = 0,204$; $p = 0,05$); e entre sessões de radioterapia com função sexual ($r = 0,214$; $p = 0,050$) e perspectiva futura ($r = 0,259$; $p = 0,010$). **Conclusão:** constatou-se que a idade, peso, dose de radiação e número de sessões de radioterapia impactam na qualidade de vida de mulheres com câncer de mama. **Contribuições para a prática:** evidenciaram-se fatores preditores que podem favorecer o planejamento de intervenções preventivas ou de suporte, principalmente multiprofissionais, direcionadas a um cuidado mais personalizado para mulheres com câncer de mama em radioterapia.

Descritores: Qualidade de Vida; Neoplasias de Mama; Radioterapia; Mulheres; Enfermagem.

Introduction

Breast cancer is the type of cancer with the highest incidence among women worldwide. In the United States, the estimate for 2024 was that the number of new cancer cases would exceed 2 million, resulting in 5,500 new diagnoses of the disease per day in the country⁽¹⁾. In Brazil, breast cancer is the most common cancer among women (30.1%) and the leading cause of death in this segment of the population. The South and Southeast regions have the highest mortality rates (13.60 and 13.16 deaths per 100,000 women, respectively)⁽²⁾.

It is a disease that affects the breasts of both sexes, with heterogeneous characteristics in its clinical presentation, natural history, prognosis, and response to treatment. The risk factors that favor the occurrence of breast cancer are age, gender, ethnicity, lifestyle and eating habits, reproductive and hormonal factors, genetics, and the environment, among others⁽³⁾.

Breast cancer treatment is carried out according to the anatomopathological characteristics of the disease and the individual, such as age, menopause, and comorbidities. It is divided into local treatment (through surgery and radiotherapy) and systemic treatment (with chemotherapy, hormone therapy, and biological therapy)⁽⁴⁾.

Radiotherapy is used in more than 50% of patients and can be administered either neoadjuvant or adjuvant. It consists of applying ionizing radiation to the site of the disease to destroy or prevent the growth of residual tumor cells while preserving adjacent healthy tissues⁽³⁾. The most common adverse reaction caused by radiotherapy is radiodermatitis, and research shows that between 85 and 100% of patients undergoing such therapy will have some degree of the lesion⁽⁵⁾.

Radiotherapy treatment is a therapeutic modality that can cause intense physical and emotional strain on women, as it is long (usually carried out from Monday to Friday for three to five weeks) and can require long journeys (when the institution offering the

treatment is far from the municipality of origin). It can also cause severe clinical reactions, such as pain and burn-like lesions in the treatment area. It can also have repercussions in terms of reduced performance of social and occupational roles. Thus, the therapeutic approaches used to treat breast cancer can hurt the quality of life of these women⁽⁶⁻⁷⁾.

Given the high incidence of breast cancer and the high number of women who undergo radiotherapy, as well as all the negative aspects that permeate the treatment, it is essential to identify factors that have an impact on the quality of life of these women, with a view to finding ways to reduce the impact of this condition. Although other studies with a similar purpose to this one have already been carried out, few have specifically assessed the quality of life of women with breast cancer during radiotherapy, like the one proposed in this study⁽⁶⁻⁸⁾. Thus, this research advances by highlighting specific predictors related to the effects of radiotherapy on women undergoing treatment, which informs personalized interventions, care strategies for patient well-being, and more humanized practices aimed at improving their quality of life.

Therefore, the question is, what is the relationship between quality of life and sociodemographic and health characteristics of women with breast cancer undergoing radiotherapy? The aim was to analyze the relationship between quality of life and sociodemographic and health characteristics of women with breast cancer undergoing radiotherapy.

Methods

This is a cross-sectional study, reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).

The research was conducted in the Radiotherapy Unit of a university hospital in the state of Rio Grande do Sul, characterized as a teaching, general, public, tertiary-level hospital with 100% of its care linked to the Unified Health System. It currently offers 380 inpatient beds, serving a population of 1.2 million

inhabitants, and is a reference center for urgent and emergency care in 45 municipalities. Since 2013, it has been managed by *Empresa Brasileira de Serviços Hospitalares*.

The radiotherapy unit provides medical and nursing consultations, therapeutic planning, and radiotherapy treatment for cancer patients referred by a Regional Health Coordination Office, as well as via interconsultation requested by the institution's own outpatient clinics. In 2023, a total of 482 patients were treated, with a wide range of diagnoses. Currently, in the scenario investigated, radiotherapy treatment for people with breast cancer is carried out in a conventional or hypofractionated manner using an Elekta Precise or Varian CX Linear Accelerator, with an energy of 6 MeV and a photon beam, and with 3D planning. An acrylic ramp is also used for positioning during treatment, according to the service's standard operating procedure.

The eligible population was made up of women aged 18 or over with breast cancer who had undergone radiotherapy and were treated at the institution above. Those undergoing palliative radiotherapy were excluded because of possible clinical complications such as pain and ulceration in the treatment area, and because the treatment protocol (radiation dose) was different from curative treatment.

The sample size was calculated using the G*Power program, version 3.1, resulting in 80 participants, with a power of 0.90 and an effect size of 0.150. To account for potential losses, 30% was added to the sample calculation, resulting in a sample of 104 participants.

The data collection team was made up of volunteer nurses from the radiotherapy unit and members of a research group (doctoral, master's, and undergraduate nursing students, with a scientific initiation scholarship) to which the authors of this research are linked. For the data collection process, the authors prepared a manual that contained all the instructions for acquiring the data, as well as guidance in the event of any problems (data not being collected, doubts

about the inclusion or exclusion of participants, and so on). In this way, the data collection team was previously trained by the study authors in the following stages: selecting participants, obtaining the Informed Consent Form (ICF), and completing the data collection form.

For the selection of participants, one of the team of collectors would call or visit the unit daily to identify the date and time when patients with the target diagnosis would undergo the planning CT scan. Thus, on the scheduled date and time, one of the researchers approached the patient and, if she met the inclusion criteria, explained the purpose of the study and invited her to participate. If they accepted, they were read the ICF, given two copies, and asked to sign the document. The participants were approached in the waiting room of the radiotherapy unit, with the utmost discretion, so as not to embarrass the women.

Data collection took place between March 2022 and July 2023 through individual interviews (lasting an average of one hour) in the nurse's office. The following instruments developed by the researchers were used: sociodemographic profile, health profile, and clinical profile. Independent variables were age, race, marital status, having children, origin, education, employment, benefits, weight and height for calculating body mass index, bra size, chest circumference, use of alcohol and cigarettes, physical activity, diagnosed health problems, type and stage of tumor, surgery, chemotherapy and concomitant treatment, and limb mobility parallel to the affected breast (Good = arm raised above the head, Limited = arm raised to shoulder height, No Mobility = no arm raise). This assessment was conducted in accordance with the routine of the radiotherapy unit itself. The dose of radiation and the number of sessions (these variables were considered because there is evidence⁽⁵⁻⁶⁾ that they can have a direct or indirect impact on the quality of life of these women) were also considered. These data were collected before the first radiotherapy session. The clinical profile data were obtained from the physical and/or electronic medical records.

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire - Core 30 (EORTC QLQ-C30) and the European Organization for Research and Treatment of Cancer Breast Cancer-Specific Quality of Life Questionnaire (EORTC QLQ-BR23) were used to collect quality of life data. Data from the EORTC QLQ-C30 were collected on the first day of radiotherapy, and data from the EORTC QLQ-BR23 were collected 15 days after the start of treatment, when the participant received the 20 Gray (Gy) dose of radiation, at which point signs and symptoms that can impact quality of life appear⁽⁹⁻¹⁰⁾.

The EORTC QLQ-C30 assesses quality of life in general. It is a multidimensional, self-administered questionnaire made up of 30 questions divided into three scales: overall health status/quality of life; functional capacity, which has five sub-scales to assess physical, work, emotional, cognitive, and social capacity; and the symptoms scale, such as fatigue, nausea/vomiting, pain, dyspnea, insomnia, lack of appetite, constipation, and diarrhea, as well as an isolated item that assesses the financial impact of treatment⁽⁹⁾.

The EORTC QLQ-BR23 assesses the specific quality of life of individuals with breast cancer. It has 23 questions related to body image perception, sexual functioning, side effects of systemic therapy, and breast and arm symptoms. It has individual items that assess sexual pleasure, prospects, and the impact of hair loss⁽¹⁰⁾.

The answers to both instruments are Likert-type, except for the items that assess global health status, in which respondents provide a score of 1 to 7 for their overall global health status and quality of life, with 1 indicating 'bad/poor' and 7 indicating 'excellent.' All scales and single-item measures have scores ranging from 0 to 100. To calculate the scores, a linear transformation of the score (ranging from 0 to 100) must be performed. The higher the score for the functional and global health/quality of life scale items, the better the performance or the better the quality of life. On the symptoms scale, the closer the score is to

zero, the fewer symptoms are present and the better the quality of life⁽⁹⁾.

The data was entered into an Excel spreadsheet, double-entered independently, checked for inconsistencies, and analyzed using the SPSS program, version 21. Absolute and relative frequencies were analyzed for the qualitative variables; position and dispersion measures were used for the quantitative variables. The body mass index was calculated as weight/(height x height), according to the Brazilian Association for the Study of Obesity and Metabolic Syndrome⁽¹¹⁾. The normality of the data was checked using the Shapiro-Wilk test. Spearman's correlation was used to measure the strength of association between the continuous variables, considering the values $r = |\pm 1|$ as a perfect linear relationship; $r = |\pm 0.70|$ as strong; $r = |\pm 0.50|$ as moderate; $r = |\pm 0.30|$ as weak; and $r = 0$ as no linear relationship⁽¹²⁾. A 5% significance level was adopted for the statistical tests.

For the use and reproduction of the EORTC-QLQ-C30 instrument and the EORTC-BR-23 module, authorization was requested from the EORTC group. This study was conducted in accordance with the ethical principles outlined in Resolution 466/2012 of the National Health Council. It was approved by the Human Research Ethics Committee of the Federal University of Santa Maria, under opinion 5,230,615/2022, and a Certificate of Submission for Ethical Appraisal: 55385722.0.0000.5346.

Results

A total of 101 women took part in the study, with an average age of 57.6 (± 13.6) years, the majority of whom were white (90.1%), married (49.5%), with children (89.1%), had completed high school (29.7%), did not have a job (66.3%), and received government benefits (72%). Most of the women had a body mass index of 29.4 kg/m² (± 5.86), a large bra size ($\pm 52.5\%$), and an average chest circumference of 101 cm (± 11.74 cm). They didn't drink alcohol

(73.3%), had never smoked (67.3%), didn't do any physical activity (58.4%), and had another health problem (94.0%).

Table 1 shows the clinical characteristics of the women with breast cancer undergoing radiotherapy.

Table 1 – Characterization of women with breast cancer undergoing radiotherapy, according to clinical variables (n=101). Santa Maria, RS, Brazil, 2025

Variables	n (%)
Tumor type	
Ductal carcinoma in situ	10 (9.9)
Invasive ductal carcinoma	56 (55.4)
Lobular carcinoma <i>in situ</i>	1 (1.0)
Invasive lobular carcinoma	8 (7.9)
Other	26 (25.7)
Disease stage (n=95)	
0	15 (15.8)
I	23 (24.2)
II	43 (45.3)
III	13 (13.7)
IV	1 (1.1)
HER2+* positive	
Yes	17 (16.8)
No	84 (83.2)
Surgery performed (n=99)	
Unilateral mastectomy	21 (21.2)
Sectorectomy	78 (78.8)
Perform chemotherapy (n=100)	
Yes	49 (49.0)
No	51 (51.0)
Mobility of the limb parallel to the affected breast	
Good	89 (88.1)
Bad	1 (1.0)
Limited	11 (10.9)

*HER2: *human epidermal growth factor receptor-type 2*

As for treatment characteristics, there was a predominance of women who were not undergoing any treatment concomitant with radiotherapy (73.0%), who received a total radiation dose of 4,005 Gy (77.2%), a daily dose of 267 centigray (cGy), and a total of 15 radiotherapy sessions (77.2%).

Table 2 presents the mean scores for the Global Health Status/Quality of Life Scale and the Functional and Symptom Scales of the EORTC QLQ-C30.

Table 2 – Mean scores of the Global Health Status/Quality of Life Scale, Functional and Symptom Scale of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire - Core 30 of women with breast cancer (n=101). Santa Maria, RS, Brazil, 2025

Variables	Average	SD*	Median	IQR [†]
Global Health Status/Quality of life	81.3	18.3	83.3	66.7 - 100
Functional scale				
Physical capacity	84.5	16.9	86.7	80 - 100
Work capacity	91.4	18.9	100	100 - 100
Emotional capacity	73.9	25.6	75	66.6 - 91.7
Cognitive capacity	82.1	22.1	83.3	66.7-100
Social capacity	85.9	24.6	100	83.3 - 100
Symptom scale				
Fatigue	9.4	14.9	0	0 - 11.1
Nausea and vomiting	3.3	8.9	0	0 - 0
Pain	14.2	23.7	0	0 - 16.6
Dyspnea	4.8	16.7	0	0 - 0
Insomnia	33	39.1	0	0 - 66.6
Lack of appetite	4.9	16	0	0 - 0
Constipation	12.5	26.6	0	0 - 0
Diarrhea	1.3	6.7	0	0 - 0
Financial difficulties	28.1	32.9	33.3	0 - 33.3

*SD: standard deviation; [†]IQR: interquartile range

Table 3 shows the mean scores for the Functional and Symptom Scales of the EORTC QLQ-BR23.

Table 3 – Mean scores of the Functional and Symptom Scales of the European Organization for Research and Treatment of Cancer Breast Cancer-Specific Quality of Life Questionnaire in women with breast cancer (n=101). Santa Maria, RS, Brazil, 2025

Variables	Average	SD*	Median	IQR [†]
Functional scale				
Body image	90.3	18.9	100	91.7 - 100
Sexual function	58.3	21.5	58.3	37.5 - 79.1
Sexual pleasure	41.7	32	50	8.3 - 66.7
Future outlook	66.7	27.2	66.7	41.6 - 91.6
Symptom scale				
Effect of systemic therapy	12.5	9.9	9.5	4.8 - 19
Breast symptoms	15.2	15	8.3	8.3 - 25
Symptoms in the arm	14.6	19	11.1	0 - 22.2
Remains of hair	12.1	16.8	0	0 - 33.3

*SD: standard deviation; [†]IQR: interquartile range

Regarding the relationship between general quality of life and biosocial and health characteristics of women with breast cancer undergoing radiotherapy, a weak and negative correlation was found between age and fatigue ($r = -0.196$; $p = 0.050$). When identifying the relationship between the specific quality of life of people with breast cancer and biosocial and health characteristics, there were negative and weak correlations between age and breast symptoms ($r = -0.202$; $p = 0.050$) and negative and moderate correlations between age and sexual function ($r = -0.484$; $p = 0.050$). Positive and weak correlations were also found between weight and breast symptoms ($r = 0.256$; $p = 0.050$); between total radiation dose and sexual function ($r = 0.214$; $p = 0.050$) and future outlook ($r = 0.267$; $p = 0.010$); between daily radiation dose and sexual function ($r = 0.204$; $p = 0.050$); between number of radiotherapy sessions and sexual function ($r = 0.214$; $p = 0.050$) and future outlook ($r = 0.259$; $p = 0.010$). No other associated variables were identified.

Discussion

The women investigated had a good general state of health and quality of life. In terms of the score, this result was better than another study also carried out with women with breast cancer, but after chemotherapy and/or radiotherapy. This one identified a general health status score of 75 points, which is lower than the one discussed⁽¹³⁾. As for the sociodemographic profile of the women evaluated, the data corroborate other studies carried out in settings and characteristics equivalent to those experienced by the population analyzed in this study⁽¹³⁻¹⁴⁾.

The evidence of the good general state of health and quality of life presented by the women surveyed may be related to the stage of treatment, since radiotherapy does not cause systemic side effects like chemotherapy, and is one of the last stages of the therapeutic process for breast cancer. In this phase, women are generally motivated by the prospect of

completing treatment, the nearness of a cure, and the return to their routine family and social life, as well as the reduction in routine appointments, exams, medication, and other care they have undergone up to that point⁽¹⁵⁾.

The results presented by the participants on the functional scales were like the average scores of the reference values indicated⁽¹⁶⁾. However, emotional capacity had the lowest mean score. This result is identical to a study carried out to assess the association between exercise and quality of life, among others, in women diagnosed with breast cancer at the beginning and end of cancer treatment. In this study, at the beginning of treatment for women who did not exercise, as in the sample discussed, emotional capacity had the lowest score (66.7 points)⁽¹⁷⁾. In contrast, another study with women also suffering from breast cancer found that the worst score was cognitive function (65.43 points), followed by emotional function, which scored 67.16 points⁽¹³⁾.

This highlights the need for an integrative and humanized approach to breast cancer treatment, which should transcend conventional medical therapies and include emotional and psychological support, which are essential for recovery and improving the quality of life of these women⁽¹⁸⁾.

Regarding the evaluation of the EORTC QLQ-C30, the items 'pain' and 'financial difficulty' had the highest average scores, indicating an impaired quality of life. The reported pain may be related to positioning during radiotherapy sessions, to the presence of lymphedema in the limb on the same side as the treated breast, and to the occurrence of radiodermatitis, an expected adverse effect that may affect up to 100% of patients and cause severe pain⁽⁶⁻⁷⁾. An essential resource for mitigating the impact of lymphedema is to refer women impacted by this condition to physiotherapy services, which is a possible strategy for promoting quality of life at this time. Regarding financial difficulties, these can exacerbate the clinical condition due to debt, loss of professional opportunities, changes in family habits, abandonment of treatment, and,

consequently, a decline in quality of life⁽¹⁹⁻²⁰⁾.

It has been observed that younger women are more fatigued, a similar result to a study in which women with breast cancer aged < 50 years had more fatigue and poorer quality of life compared to women aged ≥ 50 years⁽²¹⁾. One of the expected adverse effects of radiotherapy is fatigue, which, due to the deleterious effect on the cells of the hematopoietic tissues, is progressive, and its peak can occur when the individual reaches a specific dose of radiation^(2,4).

In addition to this, there are other things to think about, such as the strenuous treatment routine, sleep deprivation, the need to wake up early and go to bed late because of the commute to the municipality that offers treatment, and because of the routine life of women who are mothers, wives, workers, and responsible for household chores. Thus, there is a need to propose public policies and incentives to increase the supply of sites for radiotherapy treatment in the interior of the nation's states, as well as to broaden the clinical perspective of the health professionals who treat these women⁽²²⁾.

About the correlations of the EORTC QLQ-BR 23, it was observed that younger women with breast cancer presented greater intensity of breast symptoms. This evidence is reinforced by a review of the relevant literature, which indicates that this profile is often associated with more aggressive tumors and a poorer prognosis^(1,3). It is also known that younger women continue to carry out their professional activities since, as a rule, they are responsible for the family's financial income, and, as radiotherapy does not cause visible effects such as hair loss, nausea, and vomiting (common in chemotherapy), they feel at ease to continue working.

It has also been found that younger women have worse sexual function. In this sense, breast cancer treatment hurts women, as surgery is mutilating and chemotherapy usually causes weight loss and hair loss. Thus, it is expected that these women experience feelings of dissatisfaction and insecurity regarding their current body image, both in relation to their

sexual partner and within social interactions, since the stigma associated with a cancer diagnosis still remains strongly present in contemporary society. Furthermore, although cancer affects various aspects of people's lives, sexuality is one of the main aspects concerned in the case of women⁽²³⁻²⁴⁾. It is therefore imperative that this issue be addressed when health professionals provide care guidelines to these women.

It has been found that the greater the weight, the more symptoms there are in the breast. Obese women generally have large breasts and large areas of friction; characteristics related to the intensity and occurrence of radiodermatitis. Corroborating this, women with large breasts develop more erythema; in addition, those characterized as obese have moist desquamation in the treatment area⁽⁵⁾. In addition, body mass index and breast size favored skin toxicity during radiotherapy. Therefore, paying attention to these characteristics can minimize these effects and improve women's quality of life⁽²⁵⁾.

It was therefore found that the higher the total radiation dose, the greater the impact on prospects. The radiotherapy protocol for breast cancer consists of applying a radiation dose of 45 to 50 Gy, followed by a boost dose of 10 Gy to the tumor area, to reduce the future possibility of recurrence^(2,26). This is a relatively lengthy treatment, marked by uncertainties, including the fear of recurrence. It is therefore up to professionals to maintain a close relationship with these women, providing self-care guidance, clarifying doubts and preconceptions, and encouraging them to maintain a positive and hopeful outlook⁽²⁷⁻²⁸⁾.

It was also found that the higher the treatment dose, daily dose, and number of radiotherapy sessions, the greater the impact on women's sexual function. Furthermore, it is assumed that the higher the radiation dose and treatment time, the worse the adverse effects will be, which can have repercussions in terms of fatigue and reduced libido. In addition, physical changes can trigger low self-esteem and stress, as can the use of some opioids, aspects that influence sexual function. It is worth considering that breast cancer

treatment leads to a decrease in estrogen levels, which can trigger early menopause and vaginal dryness⁽²⁹⁾.

Study limitations

The limitations of this study are related to the fact that some information was collected from medical records, a tool that depends on third parties for complete data. Additionally, the specific characteristics of this research design should be considered, as it is not possible to establish a cause-and-effect relationship for the event being investigated.

Contributions to practice

The evidence generated from this research contributes to both the health and nursing fields, especially to fostering new care strategies to mitigate the effects of radiotherapy on women's quality of life, such as the need to integrate psychological support services, pain control, social assistance, and guidance on sexuality into cancer care, promoting more comprehensive and effective monitoring. To this end, understanding that factors such as age, body weight, radiation dose, and number of sessions negatively influence quality of life reinforces the importance of individualized care, with therapeutic planning adapted to the specific needs of each patient.

Conclusion

The women investigated had good general health and quality of life. A correlation was found between age, breast symptoms, sexual function, weight, total radiation dose, and prognosis. There was also a correlation between daily radiation dose and sexual function, and radiotherapy sessions with sexual function and prospects. Therefore, factors such as age, weight, radiation dose, and number of radiotherapy sessions weaken the quality of life of women with breast cancer undergoing radiotherapy. This shows that women

undergoing radiotherapy suffer losses in various aspects that are important for maintaining quality of life.

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Authors' contribution

Study conception, analysis, and interpretation of data; writing of the article; relevant critical review of the intellectual content; and approval of the final version to be published and agreement to be responsible for all aspects of the manuscript related to the accuracy or integrity of any are investigated and resolved appropriately: Marconato CS, Lourensi CM, Severo EAA, Stekel LMC, Munhoz OL, Magnago TSBS.

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