

# Quality of life and radiation toxicity in patients with gynecological and breast cancer

*Qualidade de vida e toxicidade por radiação em pacientes com câncer ginecológico e mama*

*Calidad de vida y toxicidad por radiación en pacientes con cáncer ginecológico y mama*

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## ABSTRACT

**Objective:** To evaluate the quality of life and degree of acute toxicity by radiation in patients with cervical, breast and endometrium cancers in radiotherapy. **Methods:** Quantitative, descriptive, prospective, longitudinal study, conducted between 2012-2013, using the Scoring Criteria for Acute Radiation Morbidity and the tool developed by the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire. **Results:** 16 patients were followed, and the quality of life of these patients was considered good. Patients with breast cancer had radiodermatitis, and those with cancer of the cervix and endometrium showed acute toxicities by radiation in the gastrointestinal and genitourinary systems, and also showed radiodermatitis. **Conclusions:** Chemotherapy administered concurrently, income and age influenced the quality of life of patients. The lack of statistical difference between the measurements of the scores obtained in the first and last week may indicate that radiation treatment did not change the quality of life of women.

**Keywords:** Quality of Life; Breast Neoplasms; Uterine Cervical Neoplasms; Endometrial Neoplasms; Radiotherapy.

## RESUMO

**Objetivo:** Avaliar qualidade de vida e grau de toxicidade aguda por radiação em pacientes portadoras de câncer do colo uterino, mama e endométrio, em radioterapia. **Métodos:** Estudo quantitativo, descritivo, prospectivo, longitudinal, desenvolvido entre 2012-2013, utilizando-se o Critério de Escore para Morbidade Aguda por Radiação e o instrumento desenvolvido pela *European Organization for Research and Treatment of Cancer Quality of Life Questionnaire*. **Resultados:** Foram acompanhadas 16 pacientes, e a qualidade de vida delas foi considerada boa. As pacientes com câncer de mama apresentaram radiodermatite, e aquelas com câncer do colo uterino e endométrio apresentaram toxicidades agudas por radiação nos sistemas gastrintestinal e geniturinário, além de radiodermatite. **Conclusões:** Tratamento quimioterápico concomitantemente, renda e idade influenciaram a qualidade de vida das pacientes. A ausência de diferença estatística entre as medidas dos escores obtidos na primeira e na última semana pode indicar que o tratamento radioterápico não modificou a qualidade de vida das mulheres.

**Palavras-chave:** Qualidade de Vida; Câncer de Mama; Câncer de Colo do Útero; Câncer do Endométrio; Radioterapia.

## RESUMEN

**Objetivo:** Evaluar calidad de vida y grado de toxicidad aguda por radiación en pacientes portadoras de cáncer del cuello uterino, mama y endometrio, en tratamiento radioterápico. **Métodos:** Estudio cuantitativo, descriptivo, prospectivo, longitudinal, desarrollado entre 2012-2013, utilizando el Criterio de Escore para Morbidez Aguda por Radiación y el instrumento desarrollado por *European Organization for Research and Treatment of Cancer Quality of Life Questionnaire*. **Resultados:** Fueron acompañadas 16 pacientes, y la calidad de vida de estas fue considerada buena. Las pacientes con cáncer de mama presentaron radiodermatitis, aquellas con cáncer del cuello uterino y endometrio presentaron toxicidades agudas por radiación en los sistemas gastrointestinal y genitourinario, además de radiodermatitis. **Conclusiones:** Tratamiento quimioterápico concomitantemente, renta y edad influenciaron la calidad de vida de las pacientes. La ausencia de diferencia estadística entre medidas de escores obtenidos en la primera y última semana puede indicar que el tratamiento radioterápico no modificó la calidad de vida de las mujeres.

**Palabras clave:** Calidad de Vida; Neoplasias de la Mama; Neoplasias del Cuello Uterino; Neoplasias Endometriales; Radioterapia.

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## INTRODUCTION

According to estimates of cancer incidence in Brazil for the year 2016 (also applicable to 2017), approximately 596,000 new cases will occur, including non-melanoma skin cancer, reinforcing the magnitude of cancer problems the country faces. It is expected that a total of 300,800 new cancer cases for females would occur, with the highest incidence being breast, colon and rectum, and cervical cancers<sup>1</sup>.

Breast cancer is the most common cancer that affects women around the world, in developing and developed nations alike. In Brazil, it is the most common in terms of incidence and mortality among women. It shows an ascending curve starting at the age of 25 years, with most cases concentrated between 45 and 50 years. For 2016, 57,960 new cases are expected in Brazil<sup>1</sup>.

Cervical cancer is a leading worldwide public health problem. In Brazil, the number of new cervical cancer cases expected for 2016 is 16,340, considered the third most common type, following a worldwide trend. Endometrial cancer is the sixth most common type of cancer among women, whereas a total of 6,950 new cases are expected for 2016<sup>1</sup>.

Based on these estimates, cancer can be seen as an important cause of morbimortality worldwide. It is clear that nurses, at some point in their work, will provide assistance and care to oncological patients<sup>2</sup>.

The therapeutic modalities currently available for breast cancer treatment are surgery and radiotherapy (RT) as loco-regional treatment and hormone therapy, chemotherapy and biological therapy as a systemic treatment, depending on clinical staging and histological type of tumor. The RT is used with the purpose of destroying the remaining cells after surgery or for reducing the size of the tumor prior to surgery<sup>3</sup>.

Treatment for cervical cancer and endometrial cancer alike, are varied and established after lesion staging. In the case of cervical cancer, oncological colposcopy exam determines the procedure with the possibility of simply repeating the oncological colposcopy exam six months after surgical treatment, including the possibility of resolution through clinical treatment such as the RT. Chemotherapy is not the treatment of choice for cervical cancer, but several current guidelines have recommended concomitant use of radiotherapy, increasing its therapeutic response<sup>4</sup>.

This clearly shows that RT is a therapeutic resource used for treating cervical, endometrial, and breast cancer. It is the therapeutic modality that applies ionizing radiation in the battle against neoplasms, preventing malignant cells from multiplying through mitosis and/or determining cell death<sup>5</sup>.

There are several complications involving patients undergoing radiation therapy. Radiodermatitis is the predominant one, probably due to skin hypersensitivity and frequency of radiation received. It is more frequent in patients with breast,

cervical, and endometrial cancers who are subject to RT, and could affect their quality of life (QoL) by causing pain, discomfort, irritation, itching, and burning, thus limiting their daily activities<sup>6,7</sup>.

In 1982, the Radiation Therapy Oncology Group (RTOG) developed the *Acute Radiation Morbidity Scoring Criteria*. This scoring criteria schema was developed for classifying radiotherapy effects identified by grades: zero, one, two, three, and four. This grading classification provides the signs and symptoms relevant to each region of the person being evaluated. The scoring developed by the RTOG has been widely applied for more than 25 years, is accepted and acknowledged by nursing and medical communities and are the parameters used for weekly nursing consulting evaluation in radiotherapy<sup>5</sup>.

Currently, the measurement of Quality of Life in oncological patients is an important resource for evaluating treatment outcomes from the perspective of the patient. Nursing plays a major role in clinically evaluating the patient undergoing treatment. Monitoring the signs and symptoms of the disease and the side effects of the therapy are important aspects that have an influence on the QoL of cancer survivors<sup>8</sup>, and also help to determine the nursing procedures.

Assessment scales have been developed and/or adapted culturally and validated according to different contexts and realities. The use of scales has a significant impact on determining the procedures to be carried out and for evaluating the care provided to patients. However, scientific breakthroughs in the area require systematization and standardization of evaluation procedures in a way that allows for better measurement of the results, better communication among professionals, and consolidation of practices based on evidence<sup>9</sup>.

In oncologic nursing care context, there are several tools for evaluating the QoL of cancer patients found in the international literature. In this study, the tool of choice was the one developed by the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire "Core" 30 Items (EORTC-QLQ-C30) version 3.0 in Portuguese, which evaluates the quality of life of cancer patients<sup>10</sup>.

Based on the above, this study was justified because of the importance of learning about the quality of life experienced by patients submitted to radiotherapy for treating breast, cervical, and endometrial cancers. This knowledge could contribute to the orientation and individualization of care which is scientifically based and could lead to the subsequent optimization of treatment and recovery. The team responsible for the therapy could intervene positively to assure the very best quality of life for women undergoing radiotherapy treatment. Studies that evaluate the quality of life of these patients during radiotherapy treatment were not identified in the scientific literature related to this field. This knowledge gap mobilized the interest for developing this study.

The aim of the current study was to evaluate the quality of life and the degree of acute toxicity by radiation in cervical, breast, and endometrial cancer patients undergoing radiotherapy treatment in the Radiotherapy sector of the Clinical Hospital of Federal University of Triangulo Mineiro (RT/HC/UFTM), in Uberaba/MG.

It can be noted here that the grouping of gynecological cancers includes cervical, endometrial, ovarian, and tubal cancer, among others that are rarer. In this study, the focus was on cervical and endometrial cancers since they are the cancers in which at some point of the treatment, radiotherapy is applied, a procedure that is not undertaken with the other types.

## METHODS

This was a quantitative, descriptive, prospective, and longitudinal study conducted with women with cervical, breast and endometrial cancers, older than 18 years of age, submitted to RT, exclusively or concomitantly with other antineoplastic treatment, under therapeutic follow-up in the HC/UFTM. From those participating in the group, women who had undergone previous radiotherapy treatment with radiation in the same region during the period of treatment in which data collection was carried out, and women incapable of answering the EORTC-QLQ-C30 were excluded.

The trial population consisted of all the referred women that agreed to participate in the study after reading, acknowledging, and signing the Informed Consent Form. The sample size calculation was not used due to the limited number of patients undergoing treatment in the HC/UFTM. However, it was necessary to approach all the women that met the inclusion criteria in order to reach the highest possible number of interviewed patients, and for facilitating and conferring more credibility to the information gathered after data processing; thus characterizing a convenience sampling.

The data needed for reaching the proposal goals were obtained from the identification of the patients included in the RT service schedule of the HC/UFTM, in the period from December 2012 to June 2013. Socio-demographic and clinical data included in the survey were: age (in years), origin, education (in years of study), profession/occupation, monthly income (personal in minimum wages). The clinical variables gathered were: oncologic diagnosis, staging, previous antineoplastic treatment, current antineoplastic treatment, total absorbed radiation dose (in centigrays - cGy), type of antineoplastic treatment prior to RT, concomitant antineoplastic treatment (yes, no, and type).

For classifying the degrees of acute toxicity caused by RT, the women were evaluated and classified according to the signs and symptoms shown by them based on the Acute Radiation Morbidity Scoring Criteria-RTOG. The first evaluation was carried out prior to the first chemotherapy session, in order to study the condition of the skin before being subject to any radiation and,

subsequently, once every week, between interviews and having a minimum interval of seven sessions. The quality of life of patients was assessed using the EORTC-QLQ-C30 tool, specific for oncologic patients, according to the same evaluation intervals of the skin lesions.

The Acute Radiation Morbidity Scoring Criteria developed by the RTOG group for classifying the toxic effects of radiation in terms of grades, follows a scale from zero to four. This tool assesses the following structures: skin, mucous membrane, pharynx and esophagus, upper abdomen, lower abdomen, and genitourinary system. The grades are defined after the evaluation of signs and symptoms and classified according to the tool that groups and codifies as grade zero (no involvement-none), one, two, three, or four. When two criteria for signs and/or symptoms fit in similar grades, the one resulting in the more severe grade should be used. The use of this tool is free-of-charge, provided that the property rights are respected, in conformity with the RTOG website; therefore, there was no need to ask for authorization for reproducing it in this work.

The EORTC-QLQ-C30 tool, version 3.0 in Portuguese, year 2001, designed by EORTC is valid for Brazil<sup>8</sup>. The tool includes 30 questions consisting of grades with multiple items and single item measurements, intended for reflecting the multidimensionality of the QoL concept. It also includes five functional scoring (physical functioning, cognitive functioning, emotional functioning, social functioning, and role performance), three symptoms scoring (fatigue, pain, nausea, and vomiting), one scoring for QoL and global health, six other items that evaluate common symptoms related by cancer patients (dyspnea, appetite loss-anorexia, insomnia, constipation, and diarrhea), and evaluation scoring the financial impact of the treatment and disease. The scoring of the grade and measures vary from zero to 100, whereas a higher scoring value represents a high level of response. Thus, if the score shown in the functional scale is high, this represents a healthy functional level, whereas a high score in the symptoms grade represents a high level of symptomatology and side effects<sup>8</sup>.

The EORTC group requires formal request and permission before using and reproducing the EORTC-QLQ-C30 tool. Therefore, a contact was made with the group prior to initial data collecting, via e-mail address provided by the tool manual. After permission had been granted, the data collecting started.

The obtained data were digitalized using *Microsoft Excel* 2013 spreadsheet and transferred to the *Statistical Package for Social Science* (SPSS) version 20, going through double digitalization for minimizing errors. Initially, the data were elaborated according to answers obtained and later, categorized to make statistical analysis possible.

The scores related to the severity of skin reactions were described based on percentage and absolute frequencies for the original scores (0, 1, 2, 3, 4), followed by central tendency

and dispersion measures (median, minimum and maximum values, mean, and standard deviation). The global quality of life and specifics were described based on central tendency and dispersion measures (median, minimum and maximum values, mean, and standard deviation). To check whether there was a correlation between the degree of toxicity shown by the patients each week and the level of QoL experienced by them, the Spearman's Correlation Test was applied, whereas  $p \leq 0.05$  values were considered statistically significant. In cases where there was significance, negative or positive, the correlation coefficient  $0 \leq r < 0.3$  was considered weak,  $0.3 \leq r < 0.5$  moderate, and  $0.5 \leq r < 1$  strong.

The presence of correlation was verified between socio-demographic and clinical variables and the QoL scores of some functions and symptoms, obtained with the EORTC-QLQ-C30. To obtain the mentioned correlation, the Shapiro-Wilk Normality Test was applied for the dichotomous variables, due to the size of the study population, in order to determine whether the data followed a normal distribution ( $p \geq 0.05$ ). In cases where the variables followed a normal distribution (antineoplastic treatment concomitant with physical functioning, role functioning, pain, insomnia, and appetite loss), the Student's *t*-Test was carried out; otherwise (income with role functioning) Mann-Whitney's Test was considered. In the case of categorical variables, the Spearman's Correlation Test was applied. Statistical significance was considered with  $p \geq 0.05$ , whereas  $p \leq 0.001$  was considered highly significant.

The quality of life scores were compared with the initial and final moments of the evaluation, based on the Student's *t*-Test paired. The level of significance was considered with  $p \leq 0.05$ .

For developing the current study, the project was submitted to the Ethics in Research Committee of UFTM and approved under the protocol number 1698/2010.

## RESULTS AND DISCUSSION

During the data collecting period, which took place between the months of December 2012 and June 2013, 18 women underwent radiotherapy treatment for breast, cervical, and endometrial cancers, in the RT/HC/UFTM. All of them were approached by the researcher and invited to participate in the research, but one of them died after three weeks of treatment and one showed cognitive disability for answering the questionnaire due to neurologic involvement by brain metastasis. Thus, 16 women assisted in the referred sector participated in it.

Tables 1 and 2 show the socio-demographic and clinical characterization, respectively, of the group of patients that participated in the study.

### Reactions due to acute toxicity by RT

The profile of acute toxicities by radiation shown by patients is described separately, since the toxicities manifest differently depending on the radiated area. Patients with breast cancer

**Table 1.** Socio-demographic characterization of interviewed women assisted in the RT/HC/UFTM. Uberaba (MG), 2013

Variables	N	%
<b>Age (years)</b>		
30-40	1	6.3
41-50	6	37.5
51-60	7	43.6
61-70	1	6.3
Above 70	1	6.3
<b>Origin</b>		
Uberaba	8	50
Araxá	3	18.8
Other	5	31.2
<b>Education</b>		
Illiterate	0	0
Incomplete elementary school	11	68.7
Complete elementary school	2	12.5
Incomplete high school	0	0
Complete high school	3	18.8
Undergraduate school	0	0
<b>Occupation</b>		
Housewife	9	56.3
Maid	3	18.8
Other	4	25
<b>Income (individual)</b>		
Up to 1 MW	10	62.5
1 TO 2 MW	6	37.5
Above 2 MW	0	0

Source: Data collected by the authors during the period from 2012 to 2013.

**Table 2.** Distribution of interviewed women according to clinical and surgical characterization related to the diagnosis and according to radiation parameters for radiotherapy treatment. Uberaba (MG), 2013.

Variables	N	%
<b>Oncological Diagnosis</b>		
Breast cancer	11	68.7
Cervical cancer	3	18.8
Endometrial cancer	2	12.5
<b>Staging</b>		
Initial*	10	62.5
Loco-regionally advanced**	5	31.2
Advanced disease***	1	6.3

Continued Table 2.

Variables	N	%
Previous oncologic treatment		
Yes	0	0
No	16	100
Current oncologic treatment		
Surgery, CT, and RT	2	12.5
RT only	0	0
QT and RT	1	6.3
CT and RT concomitantly	2	12.5
CT, Cirurgia, QT, RT	1	6.3
CT, Surgery, and RT	3	18.8
Surgery and RT	7	43.6
Oncologic treatment concomitantly with RT		
Yes	2	12.5
No	14	87.5
Antineoplastic treatment prior to RT		
Surgery and CT	6	37.5
Surgery	7	43.6
CT	1	6.3
None	2	12.5
Total RT dose		
4000 - 5000 cGy	2	12.5
5001 - 6000 cGy	13	81.2
Above 6000 cGy	1	6.3
Fractionated RT dose		
180	14	87.5
200	2	12.5
Number of RT sessions		
25	3	18.8
28	4	25
30	2	12.5
33	7	43.6

Source: Data collected by the authors during the period from 2012 to 2013. \* T1 or T2, N0 e M0 or from Ia to IIa; \*\* T3 or T4 with N1 or N2 and M0 or from IIb to IIIa; \*\*\* any T, any N and M1 or higher or above IIIb.

receive radiation on the thorax, and the structure involved that shows acute toxicity is the skin. The patients with cervical and endometrial cancer receive radiation on the pelvis, and this fact makes the patients manifest other types of acute toxicities, involving other structures besides the skin, including the intestine, vaginal mucous membrane, and genitourinary system.

The most common acute toxicity in patients that receive radiation on the thorax, although reversible in most cases, and less common than in the past, is radiodermatitis. The severity of skin reactions is attributed to a series of factors, among them the radiation dose, radiation energy, number of fractions, and anatomical area treated. The therapeutic program is decisive for the outbreak and evolution of skin reactions that occur in different ways and in different treatment phases<sup>11</sup>.

All the patients that received radiation on the thorax (n = 11) showed zero degree of toxicity during the first week, as expected. Throughout the second and third weeks, the degree of zero toxicity was the most prevalent (eight - 72.7% and seven - 63.3%, respectively), whereas three patients (27.3%) showed grade one in the second and third weeks, and one patient (9.1%) showed grade two on the third week. A study conducted in the United States in 2011 analyzed toxic reactions by RT in patients with breast cancer that were submitted to surgery prior to the radiotherapy treatment, in which hypofractionation was used, with each session (30 to 33 sessions) of 50 to 60 cGy. It was noted that grade one radiodermatitis was the most common toxic outcome, followed by grade two for a few patients, which is similar to the current study; however, it should be taken into consideration that the work mentioned used hypofractionation, differently from this one that used normal dosages (180 and 200 cGy/session)<sup>12</sup>.

Five patients that received radiation on the pelvis showed lesions of grade zero during first evaluation. During the second week of treatment, grade zero prevailed in the evaluations (three - 60%), but one woman (20%) showed grade one, and another (20%) grade three. The patient that showed grade three toxicity during the second week was one who had undergone chemotherapy treatment concomitantly. A study conducted with women undergoing radiotherapy treatment concomitant with chemotherapy, between 2006 and 2010 in the United States, showed that 61% of the women submitted to less than five cycles and 72% submitted to five chemotherapy cycles during the RT showed toxicity of grade two, whereas the difference among the amount of cycles was not statistically significant<sup>13</sup>.

The patients submitted to RT for six weeks (two - 40%) were those who were taking chemotherapy concomitantly. After the interruption of the chemotherapy in the third week, the degrees of toxicities declined, whereas one (20%) continued with grade two during the fourth and sixth week, and one (20%) evolved to grade one. Therefore, it is important to note that none of the patients reached grade four of toxicity. A longitudinal study that followed women with endometrial cancer and cervical cancer during the RT and up to 30 days after treatment had stopped showed that only one patient (1.53%) had grade four toxicity<sup>14</sup>. Data show how uncommon the occurrence of toxicity with grade four was.

### Quality of life

In order to check the reliability of the EORTC-QLQ-C30 tool in this population, the Cronbach's alpha test with 0.73 value was carried out. The test conferred reliability for results above 0.7, therefore the tool is reliable as it measured accurately the QoL of the studied population.

Table 3 shows the calculations of the means, medians, standard deviation, minimum and maximum values obtained from each patient, during the entire period of treatment with weekly evaluation of the QoL.

A similar study conducted between 2007 and 2008, in Ribeirão Preto/SP, found that the means of the physical, cognitive, social, and role functioning varied from 60.23 to 66.00, indicating a degree from regular to satisfactory, lower values than the means found in the current work<sup>15</sup>.

The symptoms scales showed lower means, which represents a low level of symptomatology among the patients followed in the current study.

### Toxicity severity and quality of life

During the first week of evaluation, all 16 women showed grade zero of toxicity since they had not received radiation yet, thus the correlation tests were carried out from the second to the seventh week.

Table 4 shows that there was a strong correlation between social functioning and the degrees of toxicity from the second week, which means that the higher the degree of toxicity reached by the patients, the lower was the score of the social

functioning item. The QoL, the psychosocial stress, and the sexual functioning of women treated with radiotherapy were worse when compared to those treated with surgeries and control treatments<sup>16</sup>. It is important to take this fact into consideration, since nursing plays an important role in controlling the side effects and the consequences of the treatment regarding physical, psychological, and social performance of the patient<sup>8</sup>.

During week three, there was no statistically significant correlation between the degrees of toxicity and the QoL scores. As for weeks four and five, there was a strong and positive correlation for the diarrhea item, which means that the greater the degree of toxicity shown by the patient, the higher was the score for the diarrhea symptom. Among the most common side effects during the radiotherapy treatment in the pelvis, besides bladder irritation, diarrhea was noted. This correlation was expected to happen, since the intestinal mucous membrane sensitivity to radiation is high, intensifying the acute symptoms related to the intestine and rectum. This correlation did not hold during the sixth and seventh week due to the discontinuation of the concomitant chemotherapy, thus showing improvement of the condition. Since the symptomatology shown by the patient was high, this factor would have a negative impact on treatment regarding the levels of QoL. A study conducted with 30 patients under adjuvant chemotherapy treatment in Ribeirão Preto/SP, in 2006-2007, indicated that the diarrhea item score showed a mean and standard deviation of zero, contrasting with the mean of the current study, and called to attention this symptomatology in radiotherapy treatment<sup>17</sup>.

**Table 3.** QoL measurements, according to the EORTC-QLQ-C30, of women with breast cancer, endometrial cancer, and cervical cancer, weekly evaluated during the treatment. Uberaba (MG), 2013

Scale items	Mean	Medium	Standard deviation	Minimum	Maximum
Physical functioning	85.2262	86.6667	14.95094	54.44	100
Role functioning	83.5218	85.7143	18.66991	41.67	100
Emotional functioning	71.7063	71.5278	28.79254	8.33	100
Cognitive functioning	81.6022	89.1667	19.43906	35.71	100
Social functioning	90.3274	100	15.37436	58.33	100
Fatigue	18.1184	17.4603	16.99023	0	52.38
Nausea and vomiting	9.7917	1.1905	17.64879	0	64.29
Pain	15.1885	11.1111	15.91162	2.78	63.89
Dyspnea	4.8909	0	8.62208	0	26.67
Insomnia	18.869	18.3333	17.78154	0	52.38
Appetite loss	14.8413	11.1111	18.77002	0	61.11
Constipation	4.1667	0	8.48625	0	27.78
Diarrhea	16.3988	5.5556	23.12546	0	80
Financial difficulties	31.8849	25.2381	32.19726	0	86.67
Global health status/QoL	80.6597	82.7778	16.60472	40.28	100

Source: Data collected by the authors during the period from 2012 to 2013.

**Table 4.** Correlation between QoL scores and the degree of toxicity by radiation, during the weeks of treatment. Uberaba (MG), 2013.

Scale items	Week 2		Week 3		Week 4		Week 5	
	r	p	r	p	r	p	r	p
Physical functioning	-0.120	0.645	-0.372	0.157	-0.095	0.727	-0.043	0.874
Role functioning	-0.209	0.437	-0.431	0.096	-0.208	0.440	-0.057	0.835
Emotional functioning	-0.104	0.701	-0.232	0.386	0.306	0.249	0.346	0.189
Cognitive functioning	-0.085	0.753	-0.200	0.457	0.144	0.594	0.045	0.868
Social functioning	-0.516	0.041	-0.353	0.180	-0.391	0.135	0.121	0.656
Fatigue	-0.062	0.818	0.189	0.483	-0.287	0.281	0.155	0.567
Nausea and vomiting	0.279	0.295	0.431	0.095	0.224	0.405	0.359	0.172
Pain	0.040	0.883	0.431	0.095	-0.267	0.317	0.334	0.206
Dyspnea	-0.172	0.524	-0.110	0.684	0.000	1.000	-0.278	0.297
Insomnia	-0.042	0.878	0.422	0.104	-0.147	0.588	0.183	0.498
Appetite loss	0.287	0.281	0.366	0.163	0.060	0.826	0.469	0.067
Constipation	0.126	0.642	-0.271	0.310	0.253	0.344	0.342	0.195
Diarrhea	0.202	0.453	0.477	0.061	0.723	0.002	0.559	0.024
Financial difficulties	0.133	0.622	-0.153	0.571	0.209	0.437	0.229	0.394
Global health status/QoL	-0.053	0.837	-0.008	0.976	0.090	0.742	0.157	0.560

Source: Data collected by the authors during the period from 2012 to 2013. r: correlation; p: statistical significance.

During the sixth and seventh weeks, there was no statistically significant correlation between toxicities and QoL. What happened in the last weeks was that the QoL improved at the end of the treatment. The degrees of toxicity, which were higher in patients undergoing chemotherapy treatment concomitant with RT, declined during the last weeks due to the discontinuation of the chemotherapy, which led to a drop of the overall symptomatology levels of the patients. A similar study found that women undergoing radiotherapy treatment showed better physical and emotional functioning and the QoL scores, in general, were better at the end of the treatment<sup>18</sup>.

### Socio-demographic and clinical profile and the QoL

It was noted that the socio-demographic and clinical variables that significantly affected the QoL scores were income, age, concomitant chemotherapy treatment, and total RT dose. The QoL items affected were physical and role functioning, pain, insomnia, appetite loss, and global health status.

Women undergoing concomitant chemotherapy treatment was a statistically significant factor in terms of affecting physical functioning ( $p = 0.001$ ), role functioning ( $p = 0.017$ ), pain ( $p = 0.033$ ), insomnia ( $p = 0.002$ ), and appetite loss ( $p = 0.017$ ) symptoms. Income had a major influence on role functioning ( $p = 0.042$ ). Global health status showed strong and positive correlation with the age variable ( $r = 0.504$  and  $p = 0.046$ ), and strong and negative correlation with total RT dose variable ( $r = 0.599$  and  $p = 0.014$ ).

A study conducted in São Paulo/SP, between 2008 and 2009, found that among the QoL predictors are the domains of physical, social, family, and functional well-being. A study carried out in Sweden, in 2007, indicated that there is a drop in overall QoL, physical functioning, role functioning, anxiety, and body image, in addition to an increase in symptoms such as fatigue, dyspnea, pain, nausea and vomiting, and constipation, when the treatment is carried out with chemotherapy<sup>18,19</sup>.

### Quality of life evolution during the period of treatment

According to Table 5, it is possible to see the difference between the means of the QoL scores from the first and the last weeks of radiotherapy treatment.

It is clear that, between the initial and final evaluations, there was a slight improvement in the mean of the items, except for the social functioning where the score declined, whereas for the pain, dyspnea, and diarrhea items the score increased. But, between the initial and final scores there were no statistically significant differences ( $p \leq 0.05$ ). However, the global health status of the women showed improvement at the end of the study, but without statistical significance. This result could show that the assistance provided during treatment was efficient in the sense that it minimized the RT side effects, as well as that the patients showed improvement in the disease signs and symptoms as a result of the treatment.

**Table 5.** QoL initial and final measurements, according to the EORTC-QLQ-C30 of women with breast cancer, cervical cancer, and endometrial cancer. Uberaba (MG), 2013

Scale items	First week	Last week	Standard deviation	t-test	p-value
Physical functioning	82.5	91.66	24.29145	-0.943	0.36
Role functioning	83.33	85.41	19.30379	-1.899	0.077
Emotional functioning	69.79	76.04	29.7353	-0.28	0.783
Cognitive functioning	71.87	83.33	36.70464	-0.681	0.506
Social functioning	90.63	89.58	37.376	-1.226	0.239
Fatigue	21.52	13.19	35.73075	0.117	0.909
Nausea and vomiting	12.5	2.08	29.67586	1.123	0.279
Pain	7.29	21.87	20.97218	1.987	0.066
Dyspnea	4.17	6.25	27.80491	-2.098	0.053
Insomnia	31.24	14.58	14.75	-0.565	0.58
Appetite loss	8.33	6.25	57.09064	1.168	0.261
Constipation	6.25	0	19.12353	0.436	0.669
Diarrhea	6.25	16.67	25	1	0.333
Financial difficulties	37.5	27.08	31.549	-1.321	0.206
Global health status/QoL	76.56	82.29	49.76912	0.837	0.416

Source: Data collected by the authors during the period from 2012 to 2013.

A study conducted in Poland, in 2011, showed that the tendency of the functional scales with the evolution of time during treatment and after the treatment is to increase, and all the domains showed the same tendency as the current study, following the same line of the score or showing a slight increase, except for the emotional functioning<sup>20</sup>.

A limitation regarding this study had to do with the fact of it being carried in a limited time frame, which resulted in a small number of evaluated subjects; although the fact of its not being developed in a longitudinal and prospective format helped to assure its consistency. Further studies are necessary in order to clarify the degree of influence toxicities from radiotherapy treatment have on the QoL of the patients; to compare QoL degrees reached by the patients during different phases and modalities of treatment; and post-treatment follow-up to learn more about late toxicities and the levels of QoL at the end of the therapies.

## CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

The profile found among the participants in the study was of women with breast, endometrial, or cervical cancers, age ranging from 51 to 60 years, from Uberaba/MG, with an incomplete elementary school education, that of a housewife being the most common occupation, and individual income being up to minimum wage. Regarding the clinical aspects, most women had breast cancer at an initial stage, with surgery and RT being the most common treatment, and in which only two women were submitted to chemotherapy concomitant with RT.

Patients with breast cancer received, on average, higher doses of RT and were submitted to a higher number of sessions. The acute toxicity because of radiation was found to be radiodermatitis. The patients undergoing treatment for cervical and endometrial cancer showed acute toxicities because of radiation in the gastrointestinal and genitourinary systems, in addition to radiodermatitis.

The current study compared the means of the scores related to QoL in a global format and not based on each domain separately. Overall, the QoL showed by the women was considered good, while the emotional functioning item was the most affected and had a lower minimum score, indicating that diagnosis, treatment, and side effects have a major impact on the emotional aspect of these patients. The study also concluded that women undergoing concomitant chemotherapy treatment were affected in their physical functioning, role functioning, and the symptoms of pain, insomnia, and appetite loss. Income had a significant influence on role functioning. The global health status showed strong and positive correlation with the age variable, and strong and negative correlation with the variable total RT dose.

The lack of statistical differences among the QoL scores obtained on the first and last weeks could indicate that the radiotherapy treatment did not change the QoL of these women.

As for implications for the practice of nursing care in this area, the findings of this study shows how careful and continuous evaluation of the patient is important in cancer therapy, supported by consistent technical-scientific tools, in order to provide qualified, holistic, and individualized care.

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