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Original Article

Health-related quality of life and sense of coherence changes in a sample of women with breast Cancer during Radiotherapy

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ABSTRACT

Background: Living with cancer often involves changes in the life of the breast cancer patient. Thus, the aims of this study were to measure (1) Health related Quality of Life (HRQoL) and the Sense of Coherence (SOC) changes as well as (2) to explore the predictor role of the SOC for dimensions of HRQoL over time in a sample of women with breast cancer. Methods: This is the first part of a larger study with a prospective design. It was carried out in three phases (T1 to T3) of radiotherapy (RT) in a sample of women with breast cancer (n=60). Data collection were done using four instruments, i.e., Patient Demographic-Clinical Information Questionnaire, the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30), the EORTC QLQ-BR23 (breast cancer module) and the SOC Scale. The data was analyzed by SPSS version 21 through Repeated Measures and Friedman tests to evaluate the changes in outcome variables over time. Multiple Linear Regression (MLRs) models were applied to examine the role of the SOC in prediction of HRQoL dimensions. Results: Descriptive results indicate that the mean age of women was 47.70 ± 8.19. Changes in dimensions of HRQoL showed that "physical functioning" ($p<0.001$) and "sexual enjoyment" ($p<0.05$) decreased over time from T1 to T3. "Nausea/vomiting" showed a fluctuation in patients ($p<0.05$). It decreased at T2 and increased at T3. "Patients' fatigue" ($p<0.05$) and "financial difficulties" ($p<0.05$) worsened from T1 to T3. But, the SOC didn't show a significant change over time ($p=0.603$). The MLR analyses showed that some dimensions of HRQoL at T1 could predict the same dimensions at T3 (($p<0.001$). The SOC of the patients at T3 could predict changes in the patients' fatigue over time during the RT period ($p<0.05$). Conclusions: Health care providers, especially nurses should have a holistic perspective to breast cancer patients and measure their HRQoL and SOC during the RT courses. They can design intervention programs from the beginning of the RT and integrating it into the care plan of the patients.

Keywords: Breast cancer health-related quality of life, Radiotherapy, sense of coherence.

Introduction

The increased prevalence of cancer in recent years and its effects on the various aspects of physical, psychological and social of human life have led to cancer being recognized as a major health problem of the century [1]. Cancer is the third cause of death after cardiovascular diseases and accidents in the world [2], breast cancer is the second most common cancer in the world [3] and the second cause of death in Iran after lung cancer [4]. According to the World Health Organization (WHO) report in 2014, 14.2 percent of women worldwide die from breast cancer every year [4]. It seems that Iranian women suffer from this disease a decade earlier than women in developed countries [5]. According to an epidemiological study by Mousavi et al. (2007), the incidence of breast cancer in Iran is estimated 22.4 per 100,000 women in the age group of 35-44 [6]. The total number of women with breast cancer in Iran is 40,000, and more than 7,000 patients add to this number annually [7].

Living with cancer often involves changes in the life of the breast cancer patient [8]. Evidence shows that measurement of Health-related Quality of life (HRQoL) changes as an outcome

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variable is important during the cancer diagnosis and treatments process [9]. HRQoL is a multidimensional, subjective and dynamic concept of the physical, psychological and social functioning in relation to a medical condition [10]. Therefore, due to different treatments and various complications and symptoms, women with breast cancer are affected by numerous changes in physical and psychological aspects in their life [11]. In this article, HRQoL has been operationalized as the women's subjective evaluation according to their perceptions on health and aspects of life affected by disease and radiation therapy. Radiation therapy or Radiotherapy (RT) is a treatment for cancer that uses carefully measured and controlled high energy x-rays (the unit of dose is called a Gray or Gy. In primary breast cancer it aims to destroy any cancer cells that may be left in the breast area after surgery. Thus, RT is used as a standard treatment after surgery for a large number of patients with breast cancer (88%), and significantly prevents the recurrence of disease [12, 13]. The total dose that the patient receive, is split into a course of smaller treatments (called fractions), usually given daily over a few weeks. For example, a total of 40Gy may be given in 15 fractions over 15 working days [13]. RT has the greatest effect on cancer cells, but also affects healthy tissue in the area being treated. Therefore, RT can cause acute and delayed side effects and decrease patients' HRQoL [14]. Some of the main side effects of the RT in breast cancer patients are sore skin, fatigue, hair loss, feeling illness, eating and drinking problems, diarrhea, stiff joints and muscle, sex and fertility issues for women, emotional problems and lymphedema [15]. Few studies have focused on the impact of RT on HRQoL of the patients with breast cancer [16-18]. It is vital for healthcare providers; such as nurses to be aware of these changes in patients' HRQoL [19].

Moreover, sense of coherence (SOC) is an influential factor on HRQoL of the individuals, and can determine the adapting capabilities of the person [20]. It is assumed that a high SOC is a determinant for successful adaptation with a stressful situation and may cause to better health and HRQoL [8, 21, 22]. The SOC is one of the components of the Antonovsky's Salutogenic theory of health and defined as a personal orientation towards life [23]. Antonovsky explains how the SOC as an internal resource provides the ability to select an appropriate coping strategy in dealing with stress [23]. The SOC reflects the degree of individual's perception of the world and its events, and it shows how one treats the events of life as comprehensible, manageable, and meaningful challenges [23]. This perception enables an individual to attract the available resources to adapt to stressful situations [23]. The number of studies available in women with breast cancer during the RT phase is rare in Iran [24, 25] and abroad [16, 18]. Two studies were of a prospective design, but in Iran we did not find a prospective study. Therefore, we decided to concentrate on three phases of RT and (1) to measure HRQoL and the SOC changes as well as (2) to explore the predictor role of the SOC for dimensions of HRQoL over time in a sample of women with breast cancer.

Methods

Design

This is the first part of a larger study with a prospective design, which was approved by the Code of Ethics IR. SBMU.PHNM.1395.568 at the School of Nursing and Midwifery of Shahid Beheshti University of Medical Sciences.

Sampling and data collection

The present study was carried out in a sample of women with breast cancer who were referred to the RT department of one university hospital. The number of required samples was calculated 63 by the formula ($r = 0.40$, $\alpha = 0.05$, $\beta = 0.10$). Three women were excluded from the study due to withdraw from the follow-ups, and the total number of samples reached to 60.

$$n \geq \left[\frac{(Z_{1-\alpha/2} + Z_{1-\beta})}{0.5 \times ln[(1+r)/(1-r)]}\right]^2 + 3$$

The study was carried out in three phases of the RT. The phases included T1, at the beginning of the RT between the first to the third session, T2, in the middle of the course, the second week after RT on days 12-15, and T3, at the end of treatment, the fourth week after the RT, on days 22-25. As a standard treatment, RT is started 3 to 4 weeks after the completion of chemotherapy for breast cancer patients. The number of RT sessions is 25 routinely, which is provided for breast cancer patients from Saturday to Wednesday from 7:30 am to 6:30 pm. In RT department, filing the records of new patients was only carried out in the first three days of the week, thus, at the beginning of the sampling, the first author visited the RT department only on these three days for three months from April to June 2017. After identifying women with breast cancer who were eligible for the research and obtaining the oral and written consent, sampling was carried out with a non-random method by purposive sampling. Data collection was done by distributing questionnaires between the eligible patients. The inclusion criteria for women with breast cancer included (1) women over than 18 years of age with a definite diagnosis of breast cancer (2) their treatment were started with surgery and consequently completed a chemotherapy adjuvant treatment, and then were referred to the RT department for planning of their RT treatment, (3) they were able to read and write in Persian and could answer the questionnaires. Exclusion criteria from the study consisted of (1) a recurrence of breast cancer, and (2) a history of other malignancies.

Measurement

The research instruments included: Patient Demographic-Clinical Information Questionnaire, the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30), the European Organization for Research and Treatment of Cancer Quality of

Life Questionnaire-Breast 23 (EORTC QLQ-BR23), and the Sense of Coherence Scale short form (SOC-13).

Patient Demographic-Clinical Information Questionnaire: This questionnaire included, age, place of living, education level, job status, health insurance status, support agency, chronic disease, disease stage, surgery type and number of chemotherapy session. Clinical information was completed through the patients' clinical records by the first author, and the rest of information was filled by the participants.

EORTC QLQ-C30: HRQoL was measured using the EORTC QLQ-C30 in this study. It should be noted that the EORTC QLQ-C30 has 30 questions on a four-point Likert Scale with five functional scales, i.e., physical (5 questions), role (2 questions), emotional (4 questions), cognitive (2 questions), social (2 questions), and nine symptom scales, i.e. fatigue, nausea/vomiting, pain, dyspnea, insomnia, appetite loss, constipation, diarrhea, financial difficulties as well as the global quality of life which are evaluated by two questions on a 7-point Likert Scale. The scores of questions in this questionnaire range from 0 to 100, where higher scores in the functional scales and the global quality of life indicate a better status of the individual in that scale, but in the symptom scales, the higher scores imply an increase in the severity of the symptoms and disease problems. Reliability of this questionnaire has been evaluated in various scales by Cronbach's alpha coefficient between 0.76 to 0.96 [26]. The Persian version of the questionnaire has also been approved by the European Cancer Research and Treatment Association as a valid and reliable questionnaire [27].

EORTC QLQ-BR23: HRQoL was measured by a disease-specific module for breast cancer with the EORTC QLQ-BR23. It is a supplementary questionnaire module for breast cancer patient which should be applied in combination with the core EORTC QLQ-C30. The questionnaire is contained four functional scales, i.e., body image (4 questions), sexual functioning (2 questions), sexual enjoyment (1 question), future perspective (1 question), and four scales of symptoms, i.e., systemic therapy side effect (7 questions), breast symptoms (4 questions), arm symptoms (3 questions) and upset by hair loss (1 question) on a four-point Likert scale. The scoring method of the questionnaire is quite similar to the EORTC QLQ-C30 questionnaire. The validity and reliability of the Persian version of the questionnaire was established. The internal consistency of the questionnaire was acceptable by Cronbach's alpha coefficient in different scales (0.51-0.98) by Montazeri et al. [27].

Sense of Coherence Scale (SOC): The concept of SOC was measured by a short form of the SOC scale (SOC-13). It developed by Antonovsky in 1987 to measure the SOC, consisting of three subscales of meaningfulness, comprehensibility and manageability. The short form of the scale which was used in this study, has 13 questions, and the scores range between 13-91, where the higher scores indicate a higher SOC [23]. The validity and reliability of the Persian version of the scale has been studied and approved in Iran [28].

Statistical analysis

The data was analyzed by SPSS software version 21, using descriptive and analytical tests. Outcome variables were tested for the normality assumptions by Kolmogorov-Smirnov tests. Patients' responses to the scales of the EORTC-QLQ with one question, didn't show a normal distribution. Thus, both parametric and non-parametric tests were used in the study. For all analyses, the significance level was set at $p < 0.05$.

Repeated Measures and Friedman tests were used to evaluate the changes in HRQoL dimensions and the SOC of patients over time during the RT. Multiple Linear Regression (MLRs) models were applied to examine the role of the SOC in prediction of HRQoL dimensions. Ahead of principal MLR analyses, for finding significant demographic and clinical variables, all variables one by one was entered into the series of univariate MLR analyses. In principal MLR analyses, independent variables were entered in three blocks: significant demographic and clinical variables (dichotomized, age as a continues variable), the SOC scale scores at T3, and baseline scores of HRQoL dimensions (T1). For running the principal MLRs, we hypothesized that the level of the SOC at the end of a treatment can predict changes in HRQoL dimensions over time according to an earlier study with breast cancer patients [8]. The MLR analyses were run with each of the HRQoL dimensions at T3 as dependent variables. The MLR assumptions (normal distribution of the residuals and homoscedasticity) were tested and fulfilled [29].

Results

Demographic and clinical characteristics of the women with breast cancer are shown in Table 1. Descriptive results indicate that the mean age of women was 47.70 ± 8.19, all women were married, and more than 6-month past from their breast cancer diagnosis. The findings showed that the global quality of life (QoL) mean score from the EORTC QLQ-C30 in women with breast cancer were 58.58 ± 23.51, 59.02 ± 21.98 and 56.38 ± 21.98, respectively at phases T1, T2 and T3 during RT courses. They didn't show any changes over time. In functional scales of the EORTC QLQ-C30, the highest mean score in all three RT phases is related to the scale of the "cognitive function", and the lowest mean score to the "social function". But, Repeated Measures showed that changes in the mean score of the "physical" ($p \leq 0.44$) and "cognitive" ($p \leq 0.000$) function of women with breast cancer was significant. In the symptom scales of the EORTC QLQ-C30, "pain" with a parallel mean, i.e., 42.22 ± 23.26 and 42.77 ± 25.74, respectively was the most main symptom that women reported in phases T1 and T2. In T3, the highest symptom was "fatigue" with an average of 44.81 ± 18.63. Also from T1 to T3, the mean score of "financial difficulties" was 53.33 ± 34.83, 53.88 ± 34.22 and 57.77 ± 33.57, respectively. Changes in the "financial difficulties" of women was significant over time by the Friedman test ($p \leq 0.028$). The lowest mean score for symptoms refers to "diarrhea" which was 6.11± 16.79, 3.33± 10.08 and 4.44± 11.42, respectively from T1 to T3. In the

Repeated Measures tests, changes in the "fatigue" ($p \leq 0.044$) and "nausea/vomiting" ($p \leq 0.012$) was significant over time during the RT.

In the EORTC QLQ-BR23, for the functional scales, the highest mean score was related to the "body image" which was 59.86± 26.99, 59.16± 27.17 and 60.97± 26.55, respectively from T1 to T3. But, the lowest mean score was relevant to "sexual functioning", i.e., 19.44± 19.68, 16.94± 17.75, 17.50± 18.51, respectively from T1 to T3. Also, in the symptoms scales, the highest mean score was related to "being upset by hair loss", i.e., 49.62± 34.62, 45.83± 29.50 and 37.77± 21.33, respectively from T1 to T3. The lowest symptom was relevant to "breast symptoms", i.e., 16.25± 18.05, 19.30± 20.78 and19.16± 19.96, respectively from T1 to T3. The results showed that changes in "sexual enjoyment" ($p \leq .022$) and "upset by hair loss" ($p \leq .002$) in women was significant by the Friedman tests.

The mean score of the SOC from T1 to T3 were 56.98 ± 12.17, 57.35 ± 11.93 and 57.68 ± 12.04, respectively. According to the Repeated Measures test, changes in the SOC of women with breast cancer were not significant (Table 2).

The results of the MLR analyses showed that two functional (physical function, cognitive function in T1) and two symptom scales (fatigue, nausea/vomiting in T1) of the EORTC QLQ-C-30, in addition to financial difficulties at T1 could predict the same variables at T3.

"Sexual enjoyment" (functional scale) and "upset by hair loss" (symptom scale) from the EORTC QLQ-BR23 at T1 could predict the same variables at T3. Interestingly, the SOC at T3 could predict only the changes of the scale of fatigue over time during the RT (Table 3).

Discussion

The aim of this study was to investigate changes in HRQoL and SOC in women with breast cancer in three phases of RT and to explore the role of the SOC as a predictor for HRQoL dimensions over time. In the present study, the "global QoL" did not change significantly from the beginning until the end of RT, although the "global QoL" mean scores showed decreasing over time. This result is opposite to the research by Sharma et al. who they studied on 60 patients with radical mastectomy [17]. It can be discussed that methodological differences may be influence on our results.

A glance at the mean scores of patients' HRQoL dimensions, regardless of statistical tests, shows that the areas of "social and sexual functioning" were the worst areas in all three phases of the RT. But, Sharma et al. found out "emotional functioning" as the worst area in their study in the first and second phases of RT, while in the third phase of RT similar to our study, "social functioning" was introduced as a worst area by the patients [18]. Sharma et al. mentioned that the sexual issues of breast cancer women who have problems with sexual functioning are normal [18, 30]. However, in most studies, accurate evaluation of the sexual function of women with breast cancer remains absent, and there needs to be a closer attention to the valid instruments and measurements in this regard [18].

In the area of symptoms, the "upset by hair loss" is the highest average among symptoms, which can be justified due to the completion of chemotherapy, minimum in the past three weeks. Pain and fatigue were two distinct symptoms at the onset and in the middle of RT, respectively. While at the end of the RT period, fatigue was reported as a superior symptom by the patients. Cancer-related fatigue, is one of the most commonly reported symptoms among breast cancer patients and is also one of the most common side effects of treatments, including RT. This kind of fatigue is not related to the level of activity of the individual and is not resolved with rest [24]. The daily commute of patients to the hospital for RT, the low number of state-run RT centers in the country, as well as the long wait, were also intensifying factors in patients' fatigue. In addition, the financial difficulties of patients has been a significant problem throughout the entire period of the RT. According to the existing financial difficulties, the cost of RT treatment, as well as the fact that 70% of women participant in our study responded that their monthly family income is not enough, this severity of financial problems can be justified.

A glance at details of HRQoL dimensions during the course of the RT after statistical tests shows that "physical functioning" and "sexual enjoyment" of patients has decreased over time, contrary to the Sharma's study [18]. Perhaps fatigue and its impact on women can explain this issue during RT treatment. "Nausea/vomiting" have also been fluctuating, and this symptom has decreased in the middle of treatment compared with the onset of RT, but at the end of RT it has increased again, which can be interpreted by the side effects of radiation on women's digestive tract [15]. Our results showed that "patients' fatigue" and "financial difficulties" worsened until the end of the RT period. Although "breast-related symptoms" did not show significant changes, these changes are very close to significant, and indicated that, as expected, due to RT in the breast area, the symptoms of breast were also worse during the treatment. Skin reactions and burns that are experienced by women during RT treatment can be considered as a possible cause of deterioration [15, 18]. However, our results showed that the "upset by hair loss" and "cognitive functioning" of patients improved until the end of the RT period. So, the patients were in the recovery process over time after completion of chemotherapy. But, the level of the SOC as an internal resource for the patients, didn't show significant changes over time. This is consistent with previousr studies on breast cancer patients [8, 31]. Antonovsky discussed that SOC may point out minor changes in stressful situations, but these changes are out of clinical relevance [23].

The findings of regression models showed that reported HRQoL dimensions by the patients at the onset of RT in areas of "physical and cognitive function", and symptoms such as "fatigue", "nausea/vomiting", "upset by hair loss", and ultimately "financial difficulties" were able to predict the changes in the same variables at the end of the RT period. This

result is consistent with a study by Rohani et al. in Iran [8]. It should be noted that in our study, patients' SOC at the end of the RT period could predict only "fatigue changes" in patients undergoing RT while, further dimensions were predicted by the SOC in the study by Rohani et al. [8]. This can be explained by the difference in methodology of the studies, the type of patients and the type of treatment.

Thus, our findings show that by measuring the degree of patient's SOC, we can predict their fatigue during RT treatment and design our interventions with a focus on improving the patient's physical and sexual functioning, reducing fatigue and solving their financial difficulties. Intervention strategies, such as QoL therapy, should be started by measuring HRQoL dimensions with aiming to reduce the effects of disease and improve the aspects of patients' HRQoL. In general, the results of our study indicated that there needs to be a coherent nursing care program during RT for women with breast cancer.

The limitations of this study include those of responding to self-report questionnaires. Also, according to our cultural context, patients were shy and not comfortable to respond to questions related to sexual functioning and enjoyment.

Conclusion

Changes in the dimensions of HRQoL showed that "physical functioning" and "sexual enjoyment" in breast cancer patients decreased over time from the beginning of the RT courses up to the end. "Nausea/vomiting" in patients showed a fluctuation. It decreased in the middle of the RT compared with the beginning of the RT, but at the end of the RT it increased again. Also, "patients' fatigue" and "financial difficulties" of them worsened until the end of the RT period. But, the level of the SOC of the patients didn't show significant changes over time. The SOC of the patients at the end of the period of RT could predict only changes in the patients' fatigue over time during the RT. Our findings suggest that the health care providers, especially nurses should have a holistic perspective to the patients and measure HRQoL and SOC during the RT courses. They can design intervention programs from the beginning of the RT and integrating it into the care plan of the patients.

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Conflict of Interest

The authors have no conflict of interest to declare it.

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Table 1: Demographic and clinical characteristics of the women with breast cancer (n=60)

Variables	n (%)
Place of living	
Capital city	54 (90.0)
Other cities	6 (10.0)
Education level	
Primary school	8 (13.5)
Secondary school	13 (21.3)
High school	3 (5.4)
College and higher	36 (59.8)
Job status	
Housewives	56 (93.3)
Employed	4 (6.7)
Health insurance status	
Yes	59 (98.3)
No	1 (1.7)
Support agency	
Yes	1 (1.7)
No	59 (98.3)
Income	
Yes	18 (30)
No	42 (70)
Chronic disease	
Yes	12 (20.0)
No	48 (80.0)
Disease stage	
Stage I	13 (21.7)
Stage II	26 (43.3)
Stage III	20 (33.3)
Stage IV	1 (1.7)
Surgery type	
Lumpectomy	19 (31.7)
Mastectomy	41 (68.3)
Number of chemotherapy sessions	
6-8	54 (89.8)
9-16	6 (10.2)

Table 2: The results of Repeated Measures and Friedman tests over time from T1 to T3 during radiotherapy for changes in the EORTC QLQ-C30, the EORTC QLQ-BR23 and the sense of coherence scores in women with breast cancer (n=60)

Variables	Range	Phase 1 (T1) Mean (SD)	Phase 2 (T2) Mean (SD)	Phase 3 (T3) Mean (SD)	P value*
EORTCQLQ-C30					
Global Quality of Life	0-100	58.88 (23.51)	59.02 (21.98)	56.38 (21.98)	.151
Functional scales					
Physical	0-100	77.66 (15.46)	72.33 (17.52)	67.88 (13.41)	.000
Role	0-100	76.38 (21.76)	75.27 (22.44)	76.66 (19.69)	.655
Emotional	0-100	66.94 (19.70)	68.61 (17.51)	68.75 (17.46)	.380
Cognitive	0-100	78.33 (20.65)	81.38 (21.05)	81.66 (21.41)	.044
Social	0-100	65.27 (24.21)	65.00 (27.22)	65.00 (24.87)	.976
Symptom scales					
Fatigue	0-100	41.48 (20.44)	40.74 (20.42)	44.81 (18.63)	.044
Nausea /vomiting	0-100	9.72 (19.71)	7.50 (17.20)	8.61 (18.2)	.012
Pain	0-100	42.22 (23.26)	42.77 (25.74)	43.05 (25.54)	.904
Dyspnea	0-100	11.66 (21.10)	12.77 (22.20)	12.22 (22.09)	.867
Insomnia	0-100	18.88 (24.05)	16.66 (21.69)	17.22 (21.69)	.174
Appetite loss	0-100	16.11 (26.39)	15.00 (21.63)	15.55 (22.52)	.867
Constipation	0-100	20.00 (25.45)	17.77 (24.90)	18.33 (24.87)	.197

Diarrhea	0-100	6.11 (16.79)	3.33 (10.08)	4.44 (11.42)	.180
Financial difficulties	0-100	53.33 (34.82)	53.88 (34.22)	57.77 (33.53)	.028
EORTC QLQ-BR23					
Functional scales					
Body image	0-100	59.86 (26.99)	59.16 (27.17)	60.97 (26.55)	.429
Sexual functioning	0-100	19.44 (19.68)	16.94 (17.75)	17.50 (18.51)	.422
Sexual enjoyment**	0-100	34.37 (13.34)	32.14 (11.04)	32.14 (11.04)	.022
Future perspective	0-100	49.44 (29.10)	50.00 (27.78)	47.77 (28.36)	.341
Symptom scales					
Systemic therapy side effects	0-100	35.39 (18.97)	33.65 (18.42)	33.57 (17.14)	.232
Breast symptom	0-100	16.25 (18.05)	19.30 (20.78)	19.16 (19.96)	.052
Arm symptom	0-100	32.22 (24.69)	31.29 (25.17)	31.48 (24.81)	.738
Upset by hair loss**	0-100	46.62 (35.36)	45.83 (29.50)	37.77 (21.33)	.002
Sense of coherence	13-91	56.98 (12.17)	57.35 (11.93)	57.68 (12.04)	.603

** According to scoring module of the EORTC QLQ-BR23 the numbers of women in these two subscales are not equal to 60. For the "sexual enjoyment" in T1 the number of women are n=32, T2, n=28 and T3, n=28. For the "upset by hair loss" subscale, in T1, n=23, T2, n=16 and T3, n=15.

* p-value < 0.05

Table 3: The results of the Multiple linear regression analyses for HRQoL dimensions, summary of the significant predictors for the scales of the EORTC QLQ-C30, EORTC QLQ-BR-23 in the women with breast cancer at the third phase of RT (n=60)

Dependent variables	β	p-value
Physical Functioning		
Education Level	0.03	.705
PF-T1	0.75	.000
SOC-T3	0.05	.514
$R^2 = 0.60$		
Cognitive Functioning		
Income	-0.11	.197
Chemotherapy sessions	-0.03	.675
Chronic disease	0.05	.545
CF-T1	0.77	.000
SOC-T3	0.03	.699
$R^2 = 0.69$		
Fatigue		
Chemotherapy sessions	-0.11	.237
FA-T1	0.52	.000
SOC-T3	-0.25	.021
$R^2 = 0.50$		
Nausea / vomiting		
Age	-0.01	.641
Education Level	-0.01	.678
Chemotherapy sessions	-0.02	.638
Chronic disease	-0.03	.474
NV- T1	0.94	.000
SOC-T3	-0.01	.747
$R^2 = 0.93$		
Financial Difficulties		
Income	0.18	.007
FI-T1	0.81	.000
SOC-T3	-0.02	.750
$R^2 = 0.80$		
Sexual enjoyment		
SEE-T1	0.78	.000
SOC-T3	0.14	.062
$R^2 = 0.69$		
Upset by hair loss		
Education level	0.26	.002
Income	0.23	.010
HL-T1	0.69	.000
SOC-T3	0.05	.548
$R^2 = 0.67$		

PF: Physical Functioning; CF: Cognitive Functioning; FA: Fatigue; NV: Nausea/ Vomiting; FI: Financial Difficulties; SEE: Sexual Enjoyment; HL: Upset by hair loss; SOC: Sense of Coherence.

Coding of the independent variables: age (continuous variable), job status (housewives; employed), education level (under college; college and higher), Income (yes; no), family size (2 people; 3 and more), disease staging (stage 2 and less; stage 3 and more), surgery type (lumpectomy; mastectomy), chronic disease (yes; no), chemotherapy session (6-8/9-16).

β: Standardized regression coefficient; R2: R squared