

# Dermocosmetology and breast cancer patients: effectiveness on physical and mental wellbeing

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### Abstract

**Background:** breast cancer (BC) treatments could be the cause of side effects affecting the skin which reduce compliance to therapy and negatively impact on the patients' perception of Body Image, on their well-being and quality of life (QoL).

**Aim:** the goal of this study is to evaluate if a specific dermatological treatment could reduce skin related side effects and consequently improve the patient's well-being.

**Methods:** sixty-one women with BC were recruited. They were divided into two groups based on the treatments they were to undergo (radiotherapy or chemotherapy) and, in turn, each group was randomized in Experimental (EG) and Control Group (CG). For 28 days, EG use a specific dermatological treatment, while CG use a non-specific treatment. Participants were asked to perform 3 self-report instruments (Skindex-16, Body Image Scale, WHOQoL-Brief) at three points: at baseline (T0), after 7 days (T1) and after 28 days (T2).

**Results:** after 28 days both EG showed statistical significant improvement in their symptomatology accompanied by a better perception of their Body Image. Data revealed that QoL in patients of both EG enhanced after 28 days of treatments regarding physical and psychological health, social relationship and environment. On the contrary patients belonging to both CG didn't show the same level of improvement over time.

**Conclusions:** our results show that the use of specific dermatological products designed for the treatment of skin related side effects of cancer helps to reduce the negative impact of skin-related symptoms on HRQoL. Consequently, it leads women in terms of QoL.

### Keywords

Dermocosmetological treatments, breast cancer, skin, body image

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## Introduction

In Italy, in 2019 almost 175.000 women were diagnosed with malignancy. Breast cancer is the most common form of cancer in adult women, diagnosed both in the age group ranging from 0-49 (40%) and from 50-69 (35%) years old<sup>1</sup>. In attempt to cure breast cancer, a mastectomy or conserving surgery combined with radiotherapy or other cancer treatments, such as chemotherapy<sup>2</sup> can be prescribed. Oncological treatments may cause temporary or permanent consequences on the patient's physical features due to their side effects which include skin toxicity and skin-related disorders.

External beam radiation therapy is usually prescribed for breast cancer. The most unpleasant events of this treatment are linked to tactile and nociceptive effects, such as pain, and changes in skin colour and texture<sup>3</sup>. Radiotherapy can induce acute skin reactions (radiation dermatitis) that may range from a mild erythematous rash to severe ulceration. Approximately 85% of patients treated with radiotherapy will experience a moderate-to-severe skin reaction<sup>4-5</sup>. Skin toxicity caused by chemotherapy agents is often multifactorial since other factors (such as chronic diseases or the simultaneous intake of multiple drugs) may play a role other than the drug itself. Chemotherapy causes several adverse events acting against the skin, mucosa and adnexa<sup>5</sup>. Cytotoxic agents like cyclophosphamide, chlorambucil, busulfan and procarbazine can cause adverse events affecting hair and nails (alopecia, paronychia, melanonychia and other abnormalities), skin (erythematous rash, dryness, hyperpigmentation) and mucosa (mucositis, Steven-Johnson syndrome and toxic epidermic necrolysis)<sup>6-8</sup>. Dry skin is often associated with pruritus, pigmentation alterations, nail changes, mucositis, photoreactions, radiodermatitis and alopecia, which are common findings of this type of treatment<sup>9</sup>. Adverse events due to chemotherapy and radiotherapy can reduce the patient's compliance to the therapy and also negatively impact on the women's well-being perception and quality of life (QoL)<sup>3,6</sup>. Distortion in the patient's perception of their body image is commonly experienced during cancer treatments by the majority of women diagnosed with breast cancer<sup>10-17</sup>. Body Image represents a multidimensional structure which includes cognitive, behavioural and affective aspects related to physical appearance<sup>18</sup>. Women who are treated for breast cancer are exposed to marked changes in their physical appearance, such as resection or disfigurement of one or both breasts, surgical scars and skin adverse events related to treatments<sup>19</sup>. Alterations of Body Image can be accompanied with shame, low self-esteem or social avoidance<sup>20,21</sup> and psychological distress in the forms of depression and anxiety<sup>22,23</sup>. Hopwood et al.<sup>24</sup> identified three areas that characterize the complex concept of Body Image in breast cancer patients: affective (feeling feminine, feeling attractive), behavioural (avoiding people because of appearance), and cognitive aspects (satisfaction with appearance, or with scar). In some patients, the negative conception of their own Body Image can persist for a long period after their treatment<sup>19,25</sup> and can negatively impact on the patient's QoL<sup>10</sup>. Therefore, Body Image is acknowledged as an important aspect of Health-Related

Quality of Life (HRQOL) in cancer patients<sup>10,26,27</sup>. It is important to mention how to manage the skin related side effects secondary to the treatments, which could require a resolution time that goes beyond the end of oncological therapies. Moreover, it is important to monitor the changes in QoL in order to identify the benefits resulting from supportive care. The aim of this study is to evaluate the impact of skin side-effects of oncological treatments on HRQoL and on Body Image perception in breast cancer patients. In particular, we hypothesized that specific cosmetic treatments could significantly improve the women's wellbeing, decreasing the negative impact of iatrogenic side effects and enhancing Body Image perception and the QoL during antitumoral treatments.

## Materials and Methods

We performed a monocentric observational study including 61 women with breast cancer who were enrolled at the Oncology Unit of ASST Bergamo Est, Italy. The inclusion criteria were women of age greater than 30 years old, who had received a diagnosis of breast cancer and were undergoing traditional chemotherapy or radiotherapy treatment. Patients were excluded from the study if they had previously skin related diseases and if they had psychiatric or neurological conditions. Participants were randomized using a double-blind procedure in two groups: Experimental Group (EG) and Control Group (CG). In turn, each group was divided in two subgroups: women treated with chemotherapy and women treated with radiotherapy. All participants were asked to use a dermatological cosmetic: EG used a specific product for secondary side effects of oncological treatments, while CG used a non-specific product. The specific product is a lotion based on Almond Oil, Rice Oil, Vitamin E and shea butter, enriched with a hydration factor which guarantees the respect for the Natural Moisturizing Factor (NMF). For each woman of either experimental and control groups, sociodemographic (age, civil status, education, working profession, residency) and medical history (age at diagnosis, type of current or previous treatments, genetic mutation) data were registered. QoL-related questionnaires (Skindex-16, Body Image Scale, WHOQOL-Brief) were performed at three time points: at baseline during the recruitment (T0), after 1 week (T1) and after 28 days (T2) from when they enrolled. Women received the topical treatment at T0, when they started cancer treatment, in order to use it every day for the entire duration of the study. At the end of the dermatological treatment, the oncologists conducted a final evaluation on the skin's reaction to chemotherapy and radiotherapy. Skindex-16 is a self-report instrument that measures the effects of skin disease on HRQoL<sup>28,19</sup>. It is composed of 16 items rated on a 7 point Likert Scale, ranging from 0 (*never bothered*) to 6 (*always bothered*). It is divided into three subscales: Symptomatology, Social functioning and Emotive statement. Each categorical question asks the level of concern or discomfort related to the patient's skin condition. Scale of Skindex-16 had a high degree of internal consistency (Cronbach's  $\alpha = .86$ ,  $\alpha = .93$ ,  $\alpha$

= .92 for the Symptomatology, Emotive statement and Functioning scale respectively)<sup>29</sup>.

The Body Image Scale (BIS)<sup>24,30</sup> is a self-report questionnaire which measures affective, behavioural and cognitive aspects linked to body image. It is composed of 10 items rated on a 5 point Likert Scale as follows: 0 (*never*), 1 (*a little*), 2 (*mildly*), 3 (*a lot*), 4 (*I don't know*). Five of ten items deal with general Body Image issue (i.e., feeling self-conscious, dissatisfied with body), the other five items are related to Body Image in relation to the cancer diagnosis (i.e., less feminine, body less whole). The BIS final score ranges from 0 to 30. A high score stays if there is a discomfort in the patient's perception of their Body Image. The Italian validation of BIS was done by Cheli et al.<sup>30</sup> showing a strong internal consistency ( $\alpha = .91$ ). WHOQOL-BREF<sup>31,32</sup> is a self-report questionnaire composed of 26 items assessing how individuals perceive each aspect of their life through 4 different aspects: *physical health, psychological health, social relationships and environment*. This tool has shown good psychometric properties in previous studies, in particular the WHOQOL-BREF items proved to have good internal consistency in the Italian context, ranging from 0.65 for the social relationship aspect to 0.80 for the physical aspect. In this study, the global internal consistency was 0.83. Cronbach's alpha of single subscales ranges from 0.68 (social relationship) to 0.80 (physical health).

### Statistical analysis

Statistical analyses were performed using the Jamovi Software (Version 1.6.3.0, The Jamovi Project 2019, retrieved from <https://www.jamovi.org>). Groups were first explored using descriptive and frequency analyses to describe the whole sample and to investigate the possible presence of missing data. A second analysis, one-way analysis of variance (ANOVA) was conducted to investigate statistically significant difference between the four groups at the baseline, based on the questionnaires' results. Furthermore, an ANOVA for repeated measures and a Bonferroni post hoc test were performed to evaluate the trend of the variables across the three time points (at baseline - T0, 7 days after - T1 and 28 days after - T2).

### Results

The study involved 61 women, 30 randomized to the EG (15 treated with chemotherapy and 15 treated with radiotherapy) and 31 to the CG (16 treated with chemotherapy and 15 treated with radiotherapy). [Table 1](#) reports information about patients' sociodemographic and clinical characteristics. The four groups were investigated on the following points:

- Skin disease: at T0, there wasn't any statistical difference between the four groups in terms of impact of skin lesions on their HRQoL. Patients of the EG treated with radiotherapy demonstrated strong improvement in their symptoms ( $p < 0.05$ ), emotions ( $p < 0.05$ ) and functioning ( $p < 0.05$ ) already after 7 days of treatment. After 28 days of treatment, EG patients treated with chemotherapy and radiotherapy,

showed a statistically significant improvement in their symptoms ( $p < 0.001$ ,  $p < 0.001$ , respectively; [Figure 1A](#)), emotions ( $p < 0.001$ ,  $p < 0.001$ , respectively; [Figure 1B](#)) and functioning ( $p < 0.001$ ,  $p < 0.001$ , respectively; [Figure 1C](#)). Patients treated with chemotherapy and radiotherapy belonging to the CG did not exhibit any improvement during the study period.

- Body Image: at T0, there was no statistical difference between the four groups in terms of affective, behavioural and cognitive aspects related to Body Image perception. Patients of the EG treated with radiotherapy showed a statistical improvement already after 7 days of treatment ( $p < 0.01$ ).

After 28 days of treatment, the mean score of EG patients, treated with radiotherapy and chemotherapy, was significantly lower than at the baseline ( $p < 0.001$ ,  $p < 0.001$ , respectively; [Figure 1D](#)). Women treated with chemotherapy and radiotherapy belonging to the CG did not show any improvement during the study period.

- Quality of life: at baseline, patients belonging to the EG and treated with chemotherapy showed higher scores in physical health than patients of the same group treated with radiotherapy ( $p < 0.05$ ). Considering the psychological health item, patients of the EG treated with chemotherapy exhibited higher scores than patients treated with radiotherapy, both in the EG and CG ( $p < 0.05$ ,  $p < 0.01$ , respectively).

Furthermore, patients of the EG treated with chemotherapy showed higher scores in the environmental item than women treated with radiotherapy, both in EG and CG ( $p < 0.001$ ). Considering the same domain, patients of the CG treated with chemotherapy showed higher scores than those treated with radiotherapy, both in EG and CG ( $p < 0.01$ ,  $p < 0.001$ , respectively).

For the physical health domain ([Figure 2A](#)), patients of the EG treated with chemotherapy and radiotherapy showed significant improvement both after 7 days ( $p < 0.01$ ,  $p < 0.001$ ) and after 28 days ( $p < 0.001$ ,  $p < 0.001$ ) of treatment. In terms of psychological health ([Figure 2B](#)), significant improvement was observed after 28 days of treatment for EG patients, treated with chemotherapy and radiotherapy ( $p < 0.001$ ,  $p < 0.001$ , respectively). In addition, patients of EG treated with radiotherapy showed statistical improvement already after 7 days of treatment ( $p < 0.05$ ). For social relationships domain ([Figure 2C](#)), a significant improvement was reported after 28 days of treatment, but not after 7 days, for EG patients, treated with chemotherapy and radiotherapy ( $p < 0.05$ ,  $p < 0.05$ , respectively). Considering the environmental domain ([Figure 2D](#)), after 28 days of treatment EG patients, showed a statistically significant improvement ( $p < 0.05$ ,  $p < 0.001$ , respectively). Patients treated with radiotherapy showed a significant improvement already after 7 days of treatment ( $p < 0.001$ ). In all four domains, patients treated with chemotherapy and radiotherapy belonging to the CG did not exhibit any improvement during the study period. Skindex-16, Body Image and WHOQOL-Bref scores are reported in [Table 2](#).

Sociodemographic variables			Clinical variables		
Frequencies (%)			Frequencies (%)		
<b>Age, years (mean) Education</b>	<b>54.4 (range: 41-75)</b>		<b>Type of cancer</b>		
< High school diploma	17	27.9	Breast cancer	59	96.7
HS diploma	27	44.3	Metastatic breast cancer	2	3.3
> HS diploma	7	27.9			
<b>Marital status</b>			<b>Diagnostic age, years (mean) Treatments</b>	<b>53.5 (range: 40-75)</b>	
Married	56	91.8	Chemotherapy	34	55.7
Not married	5	8.2	Radiotherapy	30	49.2
<b>Employment</b>			Surgery	60	98.4
Employed	9	14.8	Hormone treatment	21	34.4
Precarious	33	54.1	Enantone	12	19.7
Housewife	19	31.1	Vaccine	20	31.8

Table 1 - Characteristics of the study sample (N=61).

Questionnaire	Subscales	Groups	T0 enrollment	T1 after 7 days	T2 after 28 days	Interaction between time and aesthetic treatment
			Mean (SD)	Mean (SD)	Mean (SD)	
Skindex-16	Symptoms	EG Chemotherapy	3.32 (0.486)	2.62 (0.886)	1.57 (0.770)	$p < 0.001$
		EG Radiotherapy	3.35 (1.295)	2.37 (0.865)	1.98 (1.195)	
		CG Chemotherapy	3.06 (1.039)	2.70 (0.833)	2.84 (0.970)	
		CG Radiotherapy	3.15 (0.986)	3.30 (0.851)	3.17 (0.816)	
	Emotions	EG Chemotherapy	3.30 (0.541)	2.50 (0.862)	1.72 (0.880)	$p < 0.001$
		EG Radiotherapy	3.22 (1.213)	2.26 (1.069)	1.97 (1.142)	
		CG Chemotherapy	3.20 (0.917)	2.85 (0.504)	2.90 (0.657)	
		CG Radiotherapy	3.27 (0.889)	3.36 (0.806)	3.30 (0.886)	
	Functioning	EG Chemotherapy	3.05 (0.840)	2.56 (0.989)	1.61 (0.686)	$p < 0.001$
		EG Radiotherapy	3.35 (1.065)	2.39 (1.115)	2.07 (1.202)	
		CG Chemotherapy	3.10 (1.065)	2.77 (0.505)	2.80 (0.793)	
CG Radiotherapy		3.23 (0.965)	3.41 (1.076)	3.36 (0.936)		
Body Image Scale	Total Score	EG Chemotherapy	19.5 (5.71)	16.9 (3.36)	12.4 (5.87)	$p < 0.001$
		EG Radiotherapy	22.5 (2.29)	16.8 (3.80)	13.9 (4.03)	
		CG Chemotherapy	20.9 (3.32)	19.1 (3.75)	19.1 (4.30)	
		CG Radiotherapy	21.7 (4.61)	22.3 (4.10)	22.9 (2.94)	
WHOQOL-Bref	Physical health	EG Chemotherapy	3.30 (0.201)	3.62 (0.313)	3.90 (0.372)	$p < 0.001$
		EG Radiotherapy	3.16 (0.241)	3.57 (0.382)	3.76 (0.536)	
		CG Chemotherapy	3.19 (0.207)	3.21 (0.244)	3.23 (0.285)	
		CG Radiotherapy	3.07 (0.178)	3.04 (0.250)	3.03 (0.316)	
	Psychological health	EG Chemotherapy	3.01 (0.213)	3.17 (0.351)	3.53 (0.338)	$p < 0.001$
		EG Radiotherapy	2.74 (0.288)	3.01 (0.447)	3.26 (0.573)	
		CG Chemotherapy	2.80 (0.299)	2.77 (0.321)	2.77 (0.333)	
		CG Radiotherapy	2.69 (0.251)	2.57 (0.294)	2.52 (0.314)	
	Social relationships	EG Chemotherapy	3.02 (0.527)	3.02 (0.495)	3.40 (0.361)	$p < 0.01$
		EG Radiotherapy	2.84 (0.452)	3.18 (0.547)	3.20 (0.532)	
		CG Chemotherapy	2.92 (0.333)	2.96 (0.319)	2.94 (0.327)	
		CG Radiotherapy	2.69 (0.344)	2.64 (0.320)	2.67 (0.282)	
	Environment	EG Chemotherapy	3.74 (0.266)	3.94 (0.320)	4.06 (0.246)	$p < 0.001$
		EG Radiotherapy	3.12 (0.500)	3.60 (0.604)	3.98 (0.458)	
		CG Chemotherapy	3.64 (0.261)	3.60 (0.214)	3.60 (0.282)	
		CG Radiotherapy	3.10 (0.406)	3.07 (0.393)	3.10 (0.340)	

EG = Experimental Group, CG = Control Group WHOQOL-Bref = World Health Organization Quality Of Life - Shorter version

Table 1 - Skindex-16 subscales, Body Image Scale and WHOQOL-Bref subscales mean scores in the experimental and control groups, at T0, T1 and T2.

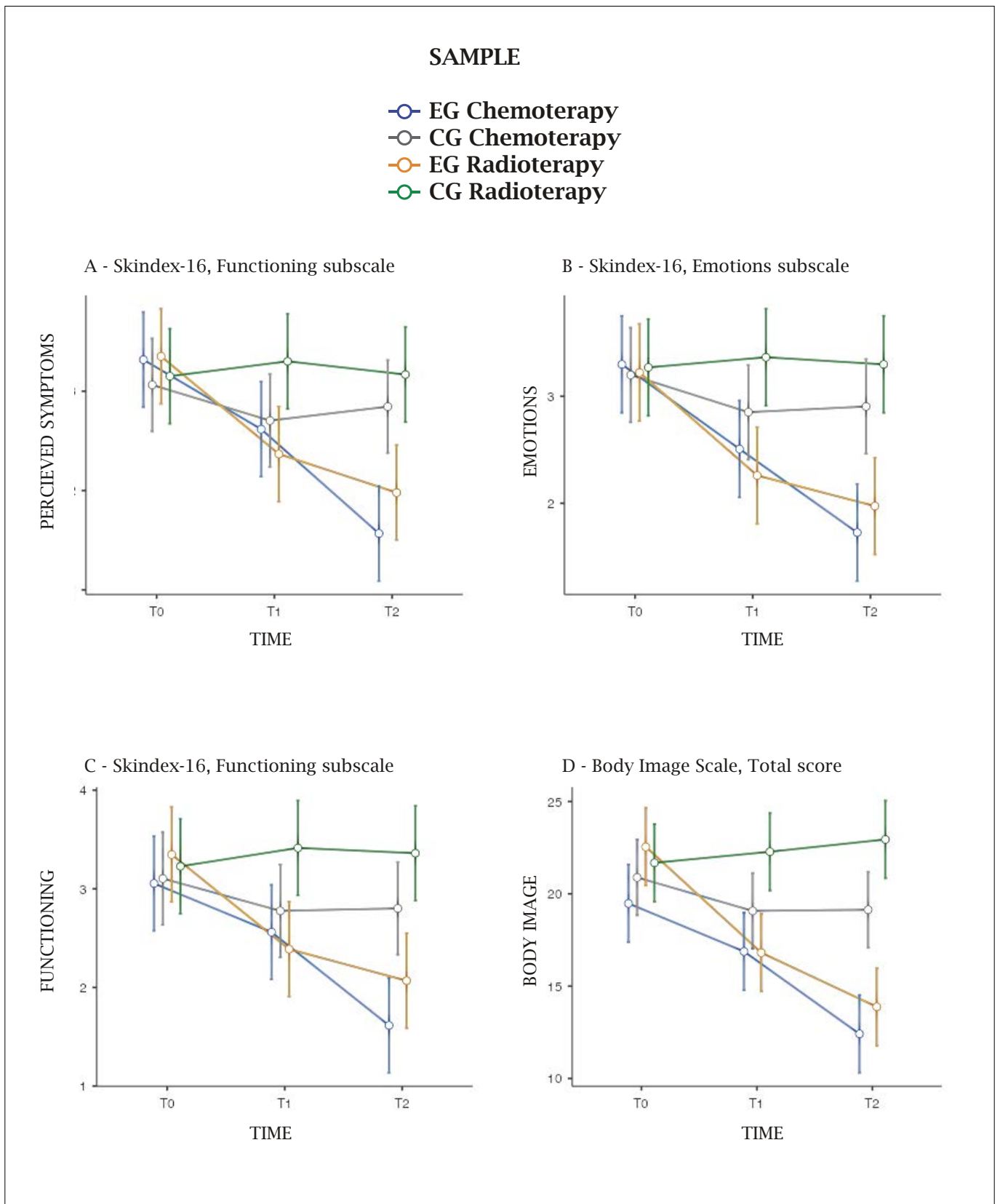


Figure 1 - Interaction between time and aesthetic treatment effects on Skindex-16 and Body Image Scale scores in different cancer treatments groups.

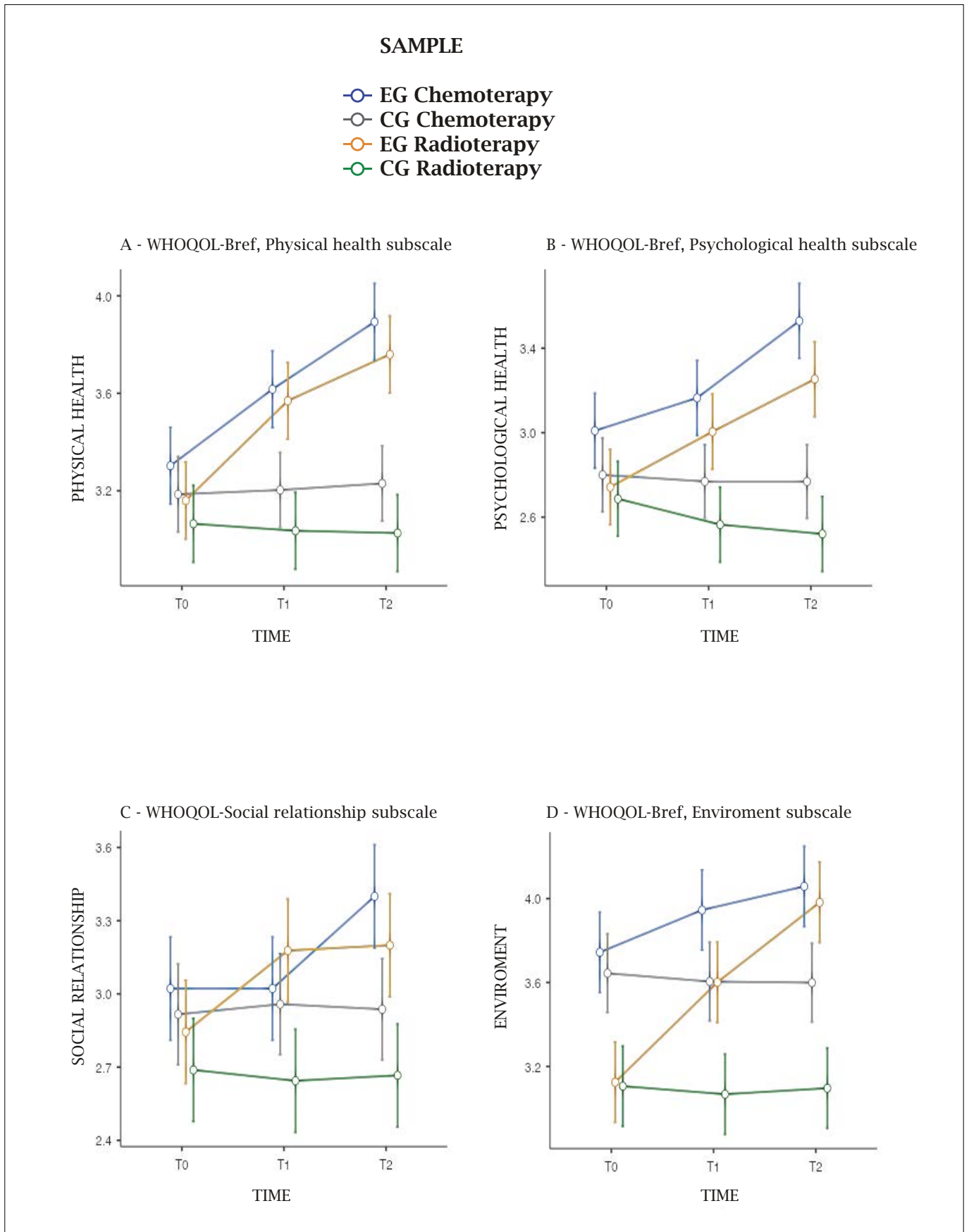


Figure 2 - Interaction between time and aesthetic treatment effects on WHOQOL-Bref scores in different cancer treatments groups.

## Discussion and conclusions

The oncological literature emphasizes that both chemotherapy and radiotherapy can cause different side-effects, often in cutaneous layers and its appendages. These side effects alter not only the physiology of the skin, but also the physical appearance of the oncologic women. Changes in physical aspects have a negative impact on the patient's perception of Body Image<sup>10</sup>, with the resulting risk of shame, lower self-esteem and social avoidance for the oncologic patients<sup>20,21</sup>, and a consequent worsening of anxiety and depression<sup>22,23</sup>.

It was also reported<sup>3,5</sup> that the use of specific dermatological treatments can have a positive impact on the perception of well-being in oncological women.

The aim of the study was to evaluate whether the use of a specific dermatological treatment can improve cutaneous side effects from an aesthetic point of view, thus improving the perception of the Body Image and the QoL of the patient, protecting the onset of anxious-depressive psychopathological disorders.

Regarding the effects of cutaneous lesions on HRQoL, the results underline that the symptomatology, the emotional state and social functioning domains can be predicted according to time, presence/absence of the dermatological product and interaction of both those factors. We know that chemotherapy and radiotherapy are associated with side-effects that could impair the patient's HRQoL<sup>15,23</sup>. In our study, at the time of the first administration the means score in the domains previously described was elevated for both study groups. After 28 days of treatment, both EG showed an improvement of skin lesions, with a decrease in itching, burning and pain. Emotional well-being was also improved, with less frustration and embarrassment related to their skin condition. Patients treated with radiotherapy belonging to the EG had visible improvement since the first week of cutaneous treatment and even more after 28 days of treatment. Conversely, CG patients did not show a significant improvement in their dermatological condition. Our results confirm that the use of a specific dermatological cosmetic product is a key factor in reducing skin related symptomatology<sup>5,33-35</sup> and, consequently, in improving the patients' emotional state and ability to function socially. The daily use of cosmetic products had a positive impact not only on dermatological symptoms, but also on the affective, behavioural and cognitive aspects related to Body Image perception. At T0, all women showed high scores on the Body Image Scale, meaning that before starting the dermatologic treatment, patients felt discomfort in how they perceived their body. Recent studies have already highlighted that women treated for breast cancer can experience changes in their physical appearance<sup>19</sup> and it can be associated with shame, low self-esteem or social avoidance<sup>20,21</sup>. In the current study a significant decrease in psychological discomfort have been found in both experimental groups after 28 days of treatment. In addition, our results revealed that patients of an experimental group treated with radiotherapy exhibited a significant improvement after 7 days. Thus, women who applied the specific topical treatment felt more aware and satisfied with their body during the study period. The control groups instead did

not show any improvement in the way in which they perceived their body.

Evidence found in scientific papers revealed that women diagnosed with cancer must fight various difficulties and challenges<sup>36</sup> which can bring an indelible negative impact on their life. Oncological women can experience bad consequences in various physical, social, emotional, psychological and practical aspects<sup>37</sup>. In our study, at the baseline there was a significant difference between the groups for the QoL domains concerning physical health, psychological health and the environment.

Women treated with radiotherapy showed a lower level. This may be due to the fact that radiation therapy can cause worse side effects, particularly those rising on the skin. During the study period, women who used the specific dermatological product showed a gradual improvement in QoL, in terms of physical and psychological health, social relationship and environment. The use of the cream lead women to experience less pain and discomfort, improving their quality of sleep, their self-esteem and their social relationships. Thus, the change in QoL seems to be influenced by the improvement of skin lesions. This fits with the idea that good health no longer simply represents the absence of the physical disease<sup>38</sup>, but also a level of wellbeing on physical and psychosocial levels. Our results seem to confirm what literature has already affirmed: taking care of the body, and specifically the skin, helps to increase not only physical health, but also psychological well-being. The data also showed that only the use of dermatological products specifically designed for the treatment of cutaneous side effects of oncological therapies leads women to a better psychological well-being and perception of their Body Image, decreasing negative impact of skin-related symptoms on HRQoL. Consequently, the decrease of dermatological side effects and the improvement of the QoL could lead to a better adherence to the therapy<sup>39,40</sup>: since it is already known that in case of side effects the compliance decrease<sup>41,42</sup>. In conclusion, it is auspicious that dermatologists cooperate with oncologists to prevent and alleviate the cutaneous side effects of treatments and to improve patients' QoL.

## Conflicts of interest

There is no conflict of interest, otherwise please complete the 'Conflict of Interest' form.



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