



Contribution of Sociodemographic, Clinical, and Psychological Variables to Quality of Life in Women with Cervical Cancer in the Follow-Up Phase

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Abstract

This study evaluates the contribution of sociodemographic, clinical, and psychological variables to quality of life (QoL) of women with cervical cancer in the follow-up phase. This cross-sectional study, conducted at the Portuguese Oncology Institute of Lisbon, included 200 women with cervical cancer during follow-up. Patients were assessed on QoL (EORTC QLQ-C30), body image and specific symptoms (EORTC QLQ-CX24), psychological morbidity (HADS), social support (SSSS), emotional expression (CECS), and spirituality (SpREUK). Education and social support contributed positively to QoL, whereas body image and symptoms contributed negatively. Body image played a moderating role in the relationship between depression and QoL, but not between anxiety and QoL. Spirituality and emotional expression did not moderate the relationship between anxiety/depression and QoL. Health professionals should reference and monitor women with cervical cancer, providing support at the diagnosis and follow-up phase since physical and psychological symptoms, resulting from the disease, remain after the end of treatment and contribute negatively to their QoL. Interventions should focus on these particular outcomes to promote patients' QoL.

Keywords Cervical cancer · Follow-up · Spirituality · Emotional expression · Quality of life

Introduction

Cervical cancer (CC) is the seventh most frequent in the world and the second most common in women after breast cancer, with a high incidence in women between 35 and 50 years (Castro et al., 2014). According to the World Health Organization [WHO] (2014) in 2012, 528 000 new cases of CC were reported worldwide, with a majority (85%) occurring in less developed regions, with 266 000 deaths occurring in the same year. CC is therefore considered a major public health problem (Basu, Mittal, Vale, & Kharaji, 2018).

About 90% of CC(s) are squamous cell cancers and the other 10% correspond to adenocarcinoma (WHO, 2014). The diagnosis of CC is most often done through the HPV test or cervical/pap smear (Sasaki et al., 2017). The therapeutic modality depends on the diagnosis, disease stage, and

patient preference (Sociedade Portuguesa de Ginecologia [SPG], 2016). According to Basu et al. (2018), systematic preventing of woman through population-based programs may significantly decrease the CC mortality.

Age and education influence quality of life (QoL). Younger patients seem to present more psychological alterations (Sekse, Hufthammer, & Vika, 2014) and concerns about body image (Teo et al., 2017). However, the literature is not consensual, and some authors report a positive association between younger age and better QoL (Bae & Park, 2016), while other studies show no associations between these variables (Xie et al., 2013). High levels of education seem to be associated with better QoL, with a higher prevalence of psychological disorders in patients with low education (Reese, Lepore, Handorf, & Haythornthwaite, 2017).

Clinically, patients with advanced disease (e.g., stage III and IV) have poorer QoL and more changes in emotional functioning (Khalil et al., 2015) with slower recovery after treatment (Xie et al., 2013). Despite the negative association between advanced staging and QoL, there are studies that did not find differences in QoL according to disease stage of the disease (Greenwald, McCorkle, Baumgartner, Gotay, &

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Neale, 2014; Kobayashi et al., 2009). Staging is an important aspect to consider when selecting the therapeutic modality, with radiotherapy being associated with more depressive symptoms, anxiety, more somatization, and worse QoL (Osann et al., 2014).

According to Fernandes and Kimura (2010), not only the disease but also the treatment secondary effects contribute to a lower QoL. Symptoms of CC such as abdominal pain, urinary dysfunction, menopausal symptoms, and poor mental health are present after treatment (Korfage et al., 2009). However, as time progresses, there are significant improvements in QoL and mood, as well as a decrease in levels of anxiety and depression (Zhao et al., 2014).

Body image is an important dimension of QoL that changes as a result of CC. Yet, according to Korfage et al. (2009), body image tends to gradually improve over the years as women adapt to their body changes (Sekse, Gjengedal, & Råheim, 2013). Stokes and Frederick-Recascino (2003) emphasize body image as an important construct in mental health, defining it as a multidimensional self-perception toward the general appearance of one's body (e.g., shape, size) that includes two significant components, physical and psychological. They found a strong positive correlation between body image and happiness in women, with happiness being a predictor of QoL. Przedziecki et al. (2013) developed the first study to focus on the association between body image disturbance, self-compassion, and psychological distress (including symptoms of anxiety and depression) in oncology patients, and, as predicted, body image disturbance was associated with increased psychological morbidity. These findings suggest that patients' needs are not being effectively addressed, which contributes to a lower QoL (Teo et al., 2017).

Frequent symptoms of CC include watery vaginal leukorrhea with odor, vaginal bleeding often after sexual intercourse (Marlow, McGregor, Nazroo, & Wardle, 2014), blood loss between periods of menstruation, dyspareunia (Lim et al., 2014), fatigue, lack of appetite, pain, nausea, and vomiting (Dallabrida et al., 2014).

Psychological morbidity (anxiety and depression) includes disruptive and disabling symptoms that are present in cancer patients (Kumar, Singh, Rae, Singh, & Singh, 2016; Yang et al., 2013) with a negative impact on their QoL (Kluegel et al., 2017). Compared to the general population, as well as to other types of gynecological cancer, patients with CC appear to experience higher levels of psychological morbidity and, consequently, lower QoL (Osann et al., 2014).

Social support is a crucial factor for the readjustment to the new situation (Osann et al., 2014), being associated with less anxiety (Kimmel et al., 2014) and better QoL (Prasongvej et al., 2017). According to Yağmur and Duman (2016), a high perception of social support among women with

gynecological cancer is associated with less psychological morbidity and increased QoL, often being the patients' family their main source of social support.

Spirituality can be a strong aid in adapting to the new condition, seeking meaning for the illness and reducing stress levels (Fornazari & Ferreira, 2010; Garssen, Umland-Sikkema, & Visser, 2015), with an evident impact on health (Pinto & Ribeiro, 2010). In a study of Guerrero, Zago, Sawada, and Pinto (2011), spirituality is recognized as a strategy of renovation and support, a way to minimize suffering or obtain greater hope during treatment, being associated with better QoL. In this sense, it is important to study the moderating role of this variable (Reutter & Bigatti, 2014) in the relationship between psychological morbidity and QoL in women with CC, given the lack of studies in this field.

Emotional expression has been linked to QoL, being recognized as a coping strategy to deal with the stress brought on by the cancer experience. Conversely, denial or suppression strategies intensify and prolong distress, as well as levels of psychological morbidity, with a negative impact on QoL (Conley, Bishop, & Andersen, 2016).

The literature focusing on the moderating role of emotional expression and spirituality in the relationship between psychological morbidity and QoL of cancer patients is scarce. Despite this gap, studies with other clinical populations highlight the importance of the moderating role of spirituality on stress and health (Reutter & Bigatti, 2014), as well as the importance of positive and negative emotional expression regarding the psychological adjustment of cancer patients (Quartana, Laubmeier, & Zakowski, 2006).

Since the majority of studies developed with women with CC focus on the diagnostic and treatment phases (Basu et al., 2018; Rubinsak et al., 2019; SPG, 2016), this study aims to fulfill the gap regarding the follow-up phase. Therefore, the purpose of this study was to contribute to a better understanding of the CC disease trajectory, after the completion of treatments. From a heuristic point of view, this knowledge is important for the development of intervention programs with multidisciplinary teams targeted at women in the follow-up phase to help them develop strategies to better cope with the changes caused by the disease and treatments, in order to better respond to the physical and psychological needs that remain present even after treatments.

This study was based on the Psychosocial Adaptation to Chronic Disease Model of Livneh (2001), adapted to the CC since QoL is the main outcome. Besides the antecedents that include (a) triggering events and (b) contextual variables, the model incorporates the reactions and responses to the CC (symptoms, anxiety, and depression), as well as contextual influences related to the disease (disease stage, duration of diagnosis and time after treatment, treatment modality), sociodemographic characteristics (age, educational level), environmental characteristics (social support),

and characteristics associated with personality traits and psychological attributes (body image, spirituality, and emotional expression). Therefore, the focus of this study was (1) to analyze the relationship between sociodemographic, clinical, and psychological variables with QoL; (2) to find the variables that contributed to QoL; and (3) to evaluate the moderating role of the psychological attributes (body image, spirituality, and emotional expression) in the relationship between psychological morbidity and QoL. Taking into consideration the literature, it is expected that (1) older age, higher levels of education, longer time since diagnosis and after treatment, more social support, more emotional expression, and more spirituality will be positively associated with QoL, while treatment modality, more advanced disease stages, more psychological morbidity, more experience of symptoms, and worse body image will be negatively associated with QoL; (2) more advanced disease stages, worse body image, more specific symptoms, more anxiety and depression will contribute to a poorer QoL, and higher levels of education and more social support will contribute to a better QoL; (3) a relationship between psychological morbidity and QoL controlling education is expected in the presence of a worse body image, low levels of spirituality, and low levels of emotional expression.

Method

Participants

Participants were 200 women with CC in the follow-up phase, accompanied by the External Consultation of the Gynecology Service of the Portuguese Oncology Institute of Lisbon, Francisco Gentil (IPOLFG, EPE). The inclusion criteria were women diagnosed with CC; submitted to different therapeutic modalities; followed on an outpatient basis; over 18 years of age. Exclusion criteria were the presence of psychological or psychiatric disorders in the clinical record, evaluated by the psychiatrist.

Instruments

Satisfaction with Social Support Scale (SSSS; Ribeiro, 2011) consists of 15 items, grouped into four subscales that globally assess satisfaction with social support in a 5-point Likert scale. A high result indicates greater satisfaction. The original version's internal consistency of the total scale, evaluated through Cronbach's alpha, was 0.85, while in the present study it was 0.88.

European Organization for Research and Treatment of Cancer (EORTC QLQ-C30; Aaronson et al., 1993; Portuguese Version of Pais-Ribeiro, Pinto, & Santos, 2008) assesses the QoL of cancer patients, through 30 items that

address general issues about physical, emotional, and social health, and specific issues related to symptoms present in cancer patients. The questionnaire has 9 multi-item scales, specifically 5 functional scales, 3 symptom scales, a global health scale (2 items), and 6 unique items to assess additional symptoms. All items are answered in a 4-point Likert scale. A high score indicates better overall QoL. In the symptoms and financial difficulties' scales, higher scores indicate more symptoms and more financial difficulties. The internal consistency, for the global health scale, was 0.88 in both the original and present study.

Quality-of-Life Questionnaire Cervical Cancer Module (EORTC QLQ-CX24; Greimel et al., 2006; Portuguese Research Version of Bacalhau, 2017). This module is specifically designed for patients with CC. It consists of 24 questions divided by 3 multi-item scales: "symptom experience" (11 items); "body image" (3 items); "sexual/vaginal functioning" (4 items); and 6 single item scales. A high result indicates malfunction, except on the scales of sexual activity and sexual satisfaction. The internal consistency was 0.72 in the "symptom experience" subscale, 0.86 in "body image," and 0.87 in "sexual/vaginal functioning." In the present study, the Cronbach's alpha was 0.73 for the subscale "symptom experience," and 0.89 for the subscales "body image," and "sexual/vaginal functioning."

Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983; Portuguese Version of Pais-Ribeiro et al., 2007). It consists of 14 items that evaluate psychological morbidity through two subscales, each one with 7 items, quoted separately ("anxiety" and "depression"), with a maximum score of 21 points for each subscale. The items are answered with a 4-point Likert scale. A higher score indicates greater anxiety and depression. In the Portuguese version, for the subscale "anxiety" the alpha was 0.76, and for the "depression" subscale it was 0.81, revealing good internal consistency. In the present study, Cronbach's alpha was 0.80 for the subscale "anxiety" and 0.86 for the subscale "depression".

Spiritual and Religious Attitudes in Dealing with Illness (SpREUK; Büssing, 2010; Portuguese Version of Pereira, Vilaça, Pedras, Vieira, & Lima, 2019) assesses how patients with chronic diseases perceive the impact of spirituality on their health and how they deal with the disease. It consists of 15 items grouped in 3 subscales, each one composed of 5 items, using a 5-point Likert scale. A high result indicates greater spirituality. The internal consistency of the full original scale was 0.94. In this study, Cronbach's alpha was 0.92 for the full scale.

Courtauld Emotional Control Scale (CECS; Watson & Greer, 1983; Portuguese Version of Patrão, 2007). This scale evaluates the degree of suppression or total emotional control in daily life. It consists of 21 items grouped into 3 subscales: "control of anger", "anxiety" and "depression," each

with 7 items. The response format follows a 4-point Likert scale. A high result indicates greater suppression of negative emotions and greater emotional control. In the original version, the internal consistency was 0.88 for the full scale, while in the present study was 0.89.

Procedure

The study used a cross-sectional design. Participants were recruited at the Portuguese Institute of Oncology, in Lisbon, and the project was approved by the Ethics Committee of the respective institution. Initially, 215 women were recruited, of whom 15 did not participate in the study. Ten pledged to contact the investigator later, and five filled out some questionnaires but decided to drop out the study. Patients identified by their onco-gynecologist were asked to participate after the completion of the treatments if they fulfilled the inclusion criteria. Participation was voluntary and an informed consent was obtained from all individual participants included in the study.

Data Analysis

Data were analyzed using the IBM SPSS® software, version 24.0. In order to evaluate the relationship between sociodemographic, clinical, and psychological variables, Pearson correlation analyses were performed. A hierarchical multiple regression (enter method) was carried out in order to find which variables contributed to QoL. Variables were selected if they correlated with QoL (that is, $p < .05$). After confirming the multicollinearity ($VIF < 2$ and tolerance > 0.1) and the normality assumption, the number of years of education and disease stage were entered in the first block, body image and specific symptoms in the second block, anxiety and depression in the third block, and finally social support in the fourth block. To evaluate differences in QoL according to treatment modality (surgery; surgery + radiotherapy/chemotherapy; radiotherapy/chemotherapy), an ANOVA was performed. Finally, to evaluate the moderating role of body image, spirituality, and emotional expression in the relationship between psychological morbidity and QoL, the macro process command in SPSS (Hayes, 2013), version 2.16.1, was used with the Mean Center for products and Heteroscedasticity-consistent SEs, controlling for the sociodemographic characteristics that were significant in the previous final regression model (i.e., education). The interaction effect was evaluated using the Johnson–Neyman technique in order to examine significant interactions between continuous predictors (at the 0.050 level) (Hayes & Rockwood, 2017; Johnson & Neyman, 1936; Preacher & Hayes, 2008). This technique graphically demonstrates regions of significance of the range of values of the moderator variable in which the independent variable has significant

effects on the dependent variable (95% confidence interval, moderator interval within which the simple slope of y in x is significantly different from zero) (Hayes, 2013; Hayes & Matthes, 2009; Hayes & Montoya, 2017). In this sample, there were no missing data.

Results

Sample Characteristics

The participants' sociodemographic and clinical characteristics are shown in Table 1.

Relationship Between Sociodemographic, Clinical, and Psychological Variables

The results showed a negative association between disease staging ($r = -.141$, $p = .046$), anxiety ($r = -.281$, $p < .001$), depression ($r = -.238$, $p < .001$), specific symptoms/symptom experience ($r = -.617$, $p < .001$), body image ($r = -.493$, $p < .001$), and QoL. Thus, more advanced disease stages, high levels of psychological morbidity, more specific symptoms, and worse body image were associated with worse QoL. There were also positive associations between education levels ($r = .223$, $p < .001$), social support ($r = .378$, $p < .001$), and QoL, indicating that higher education levels and more social support were associated with better QoL. The remaining variables were not correlated with QoL (Table 2). No differences in QoL according to treatment modality were found [$F(2,197) = 0.749$, $p = .475$].

Variables that Contribute to QoL

Education and disease stage (Model 1) explained 7.3% of the total variance of QoL, being the significant model $R^2 = 0.073$, $F(4,195) = 3.811$, $p = .005$. When body image and specific symptom variables are added to the model (Model 2), the total variance explained is increased by 40.1%, $R^2 = 0.473$, $F(2,193) = 73.490$, $p < .001$. After including anxiety and depression (Model 3), the total variance explained increases by 2.2%, $R^2 = 0.495$, $F(2,191) = 4.079$, $p = .018$. Finally, after adding social support (Model 4), the total variance explained increased by 1.5%, $R^2 = 0.510$, $F(1,190) = 5.922$, $p = .016$.

The final model explained 51.0% of the total variance, $R^2 = 0.510$, $F(9, 190) = 22.000$, $p < .001$, R^2 Adjusted = 0.487. Thus, the final model showed that a worse body image ($\beta = -0.216$, $t = -3.647$, $p < .001$) and more specific symptoms related to the disease and treatment ($\beta = -0.428$, $t = -7.238$, $p < .001$) contributed to lower QoL, while more social support ($\beta = 0.138$, $t = 2.434$, $p = .016$) and education ($\beta = 0.166$, $t = 3.144$, $p = .002$) contributed to

Table 1 Sociodemographic and clinical characteristics

	<i>N</i> = 200	%	Mean (<i>SD</i>)/minimum–maximum
Age			48.08 (11.693)/23–79
No. years of education			9.67 (4.304)/0–17
No education	5	2.5	
4 years	34	17.0	
6 years	20	10.0	
9 years	51	25.5	
12 years	62	31.0	
Higher education	28	14.0	
Place of residence			
Urban	135	67.5%	
Rural	65	32.5%	
Marital status			
With partner	140	70.0	
No partner	60	30.0	
Marital status			
Single	28	14.0	
Married/unmarried	133	66.5	
Widow	13	6.5	
Divorced	26	13.0	
Religion			
Yes	168	84.0	
No	32	16.0	
Age of 1st sexual intercourse			18.43 (2.685)/13–30
Number of abortions			0.55 (0.803)/0–5
Number of children			1.79 (1.264)/0–7
Number of Partners in the last 3 years			0.96 (0.655)/0–5
Smoking habits			
Yes	69		
No	131		
Staging			
Stage I	107	53.5	
Stage II	73	36.5	
Stage III	10	5.0	
Stage IV	10	5.0	
Time since diagnosis (in months)			22.91 (14.553)/0–80
Time after completed treatments (in months)			17.99 (14.620)/0–75
Therapeutic modality			
Surgery	92	46.0	
Surgery + radiotherapy/chemotherapy	37	18.5	
Radiotherapy/chemotherapy	71	35.5	

better QoL (Table 3). The statistical power calculated using G * Power (3.1.9.2) was moderated (0.62).

Body Image as Moderator Between Psychological Morbidity (Anxiety and Depression) and QoL

Body image did not moderate the relationship between anxiety and QoL, controlling for education, $F(4,195) = 22.1484$, $p < .0001$, $\beta = -0.0175$, 95% CI $[-0.0353, 0.0003]$,

$t = -1.9402$, $p = .0538$. The model that tested the moderating role of body image in the relationship between depression and QoL, controlling the effects of education, was significant, $F(4,195) = 21.5183$, $p < .0001$, $\beta = -0.6478$, 95% CI $[-1.1634, -0.1322]$, $t = -2.4779$, $p = .0141$, explaining 33.03% of the variance. Thus, there was a negative relationship between depression and QoL when body image was higher, $\beta = -1.1618$, 95% CI $[-1.8791, -0.4445]$, $t = -3.1949$, $p = .0016$. The Johnson–Neyman (JN)

Table 2 Relationship between sociodemographic, clinical, and psychological variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Quality of Life	–													
2. Age	–0.053	–												
3. Education	0.223**	–0.303**	–											
4. Staging of the disease	–0.141*	0.318**	–0.185**	–										
5. Time after treatment	0.087	–0.028	–0.014	0.035	–									
6. Time since diagnosis	0.050	0.028	–0.052	0.058	0.939**	–								
7. Treatment modality	–0.016	–0.010	–0.030	–0.098	–0.031	–0.025	–							
8. Social support	0.378**	0.120	–0.032	–0.084	0.001	–0.006	–0.055	–						
9. Emotional expression	–0.056	0.136	–0.151*	0.038	0.080	0.123	0.121	–0.184**	–					
10. Anxiety	–0.281***	0.015	–0.094	–0.033	–0.070	–0.044	0.108	–0.191**	–0.005	–				
11. Depression	–0.238**	0.019	–0.076	–0.035	–0.105	–0.061	0.022	–0.235**	0.128	565**	–			
12. Spirituality	–0.082	0.038	–0.176*	–0.045	–0.018	–0.047	0.070	0.043	0.093	0.146*	0.122	–		
13. Specific symptoms	–0.617***	–0.041	–0.105	0.083	–0.126	–0.102	0.064	–0.334**	–0.008	–0.210**	0.119	0.059	–	
14. Body image	–0.493***	–0.089	–0.021	0.141*	–0.047	–0.026	–0.012	–0.345**	0.041	0.187**	0.177*	0.039	0.443**	–

* $p < .05$; ** $p < .01$; *** $p < .001$

technique showed that depression was significantly correlated with QoL when the standardized value of body image was -0.46 above the mean ($\beta = -0.3105$, $p = .0500$), and this was true for 50.5% of the sample (Figs. 1, 2, 3).

Spirituality as a Moderator Between Psychological Morbidity and QoL

Spirituality did not moderate the relationship between anxiety and QoL, controlling for education, $F(4,195) = 7.9408$, $p < .0001$, $\beta = 0.0395$, 95% CI $[-0.0007, 0.0798]$, $t = 1.9382$, $p = .0540$, as well as the relationship between depression and QoL, controlling for education, $F(4,195) = 4.9955$, $p < .0100$, $\beta = 0.0227$, 95% CI $[-0.0134, 0.0587]$, $t = 1.2396$, $p = .2166$.

Emotional Expression as a Moderator Between Psychological Morbidity and QoL

Emotional expression did not moderate the relationship between anxiety and QoL, controlling for education, $F(4,194) = 7.0336$, $p < .0010$, $\beta = 0.0374$, 95% CI $[-0.0089, 0.0838]$, $t = 1.5917$, $p = .1131$, or between depression and QoL, controlling for education, $F(4,194) = 4.9382$, $p < .0100$, $\beta = 0.0163$, 95% CI $[-0.0229, 0.0555]$, $t = 0.8207$, $p = .4128$.

Discussion

Regarding the first goal, the results showed that education was positively correlated with QoL, which is corroborated by the literature indicating that more education is associated with better QoL (Reese et al., 2017). There was also a positive association between social support and QoL. In fact, the literature recognizes the benefits of social support so far as they contribute to better psychological adjustment, low levels of psychological morbidity (Yağmur & Duman, 2016), and consequently better QoL (Tejada et al., 2015).

The disease stage correlated negatively with QoL. This result is in agreement with some literature showing an association between more advanced stages of the disease and worse QoL (Azmawati, Najibah, Hatta, & Norfazilah, 2014; Xie et al., 2013). However, other studies found no differences in QoL due to the initial and advanced staging of the disease (Greenwald, McCorkle, Baumgartner, Gotay, & Neale, 2014; Kobayashi et al., 2009).

There were negative associations between anxiety, depression, and QoL. It is known that after the disease diagnosis, emotional changes may arise (e.g., sadness, anxiety) and remain after the completion of treatments. Thus, this finding is corroborated by the literature, since patients that

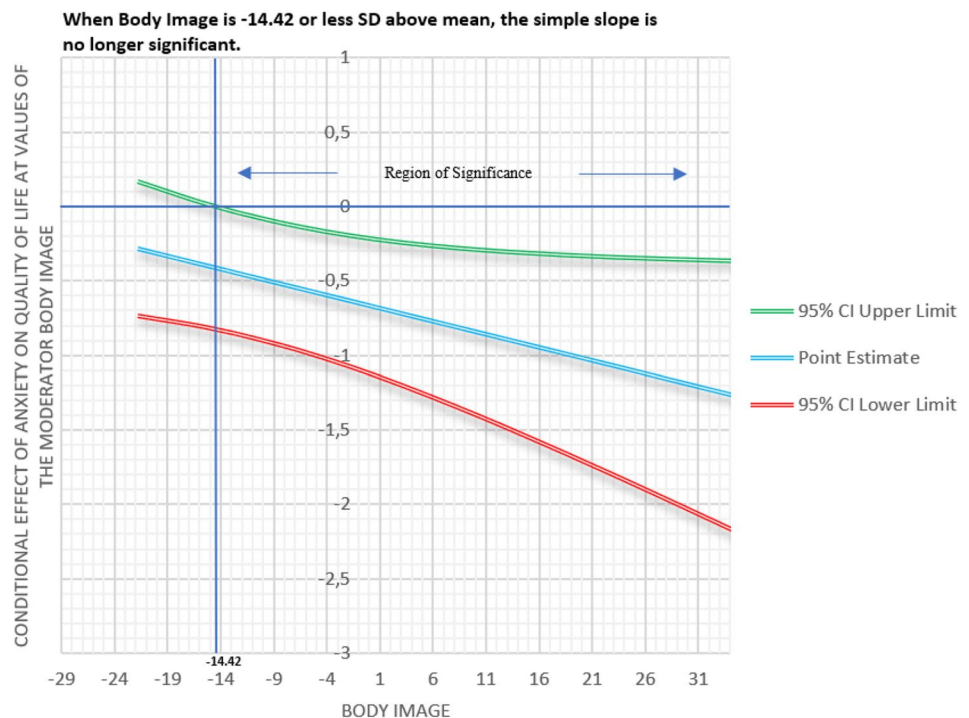
Table 3 Variables that contribute to quality of life

Quality of life		Model 1		Model 2		Model 3		Model 4	
Variable		<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>
Education		0.802	3.093**	0.608	3.073**	0.563	2.878**	0.610	3.144**
Disease stage									
Stage1 × 2		-4.325	-1.857	-0.746	-0.416	-1.339	-0.751	-1.294	-0.735
Stage1 × 3		-7.411	-1.457	-4.947	-1.280	-6.306	-1.644	-6.588	-1.739
Stage1 × 4		-1.216	-0.234	0.309	0.078	0.388	0.100	1.360	0.352
Body image				-0.151	-4.632***	-0.136	-4.178***	-0.120	-3.647***
Specific symptoms				-0.657	-8.089***	-0.634	-7.854***	-0.591	-7.238***
Anxiety						-0.260	-1.192	-0.250	-1.161
Depression						-0.284	-1.524	-0.221	-1.186
Social support								0.179	2.434*
<i>R</i> ²			0.073		0.473		0.495		0.510
<i>F</i>			3.811**		28.926***		23.407***		22.000***
ΔR^2			0.073		0.401		0.022		0.015
ΔF			3.811		73.490		4.079		5.922

B unstandardized regression coefficients

p* < .05; *p* < .01; ****p* < .001

Fig. 1 Body image as moderator between anxiety and QoL controlling for education



report high levels of psychological morbidity present lower QoL (Kumar et al., 2016).

The presence of symptoms was negatively associated with QoL. Symptoms such as fatigue, pain, and menopausal signs have been associated with the development of psychological disorders, as the more symptoms the patient experiences

the greater the likelihood of developing anxiety and depression (Lau et al., 2013), with negative repercussions on body image and QoL (Hossain, Akter, Banu, & Mahmud, 2015).

Body image was negatively associated with QoL. With the diagnosis and underlying treatments, there are changes in body image that lead women to feel less feminine and less

Fig. 2 Body image as moderator between depression and QoL controlling for education

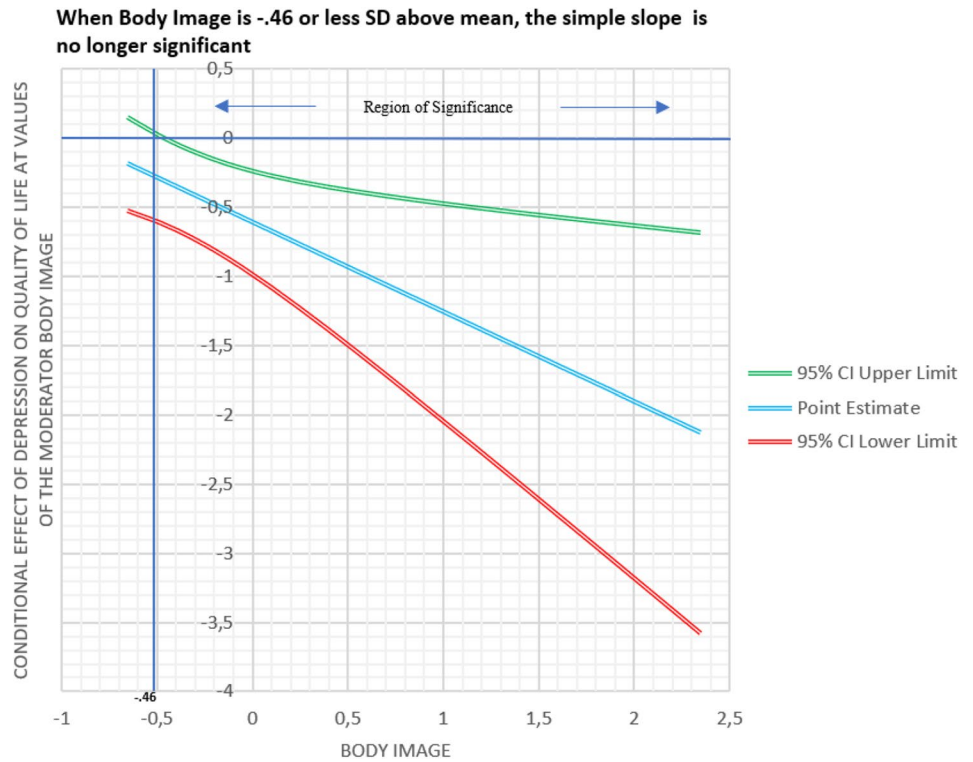
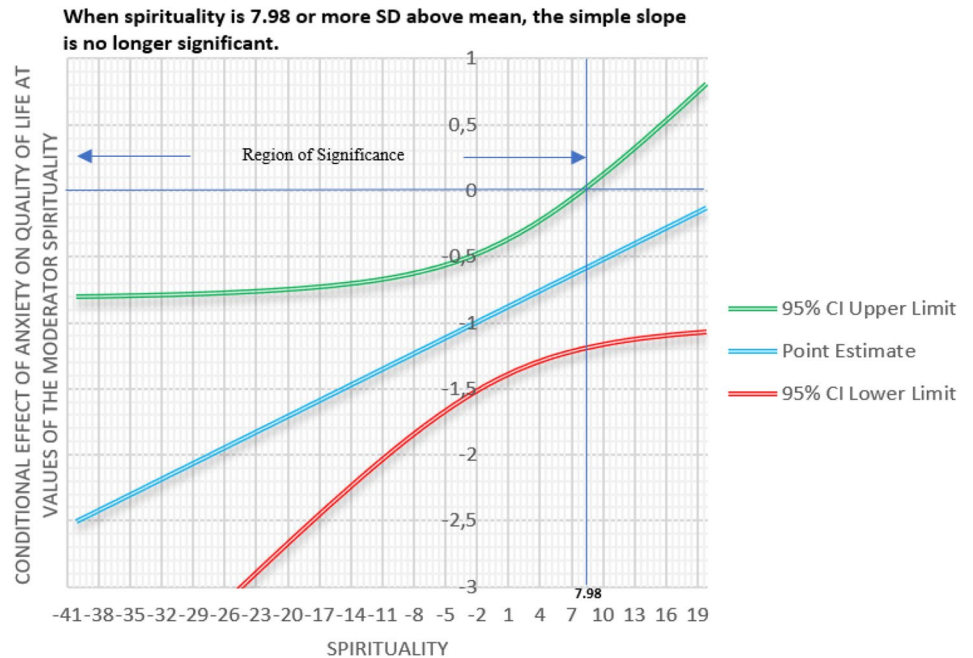


Fig. 3 Spirituality as moderators between psychological morbidity (anxiety and depression) and QoL controlling for education



physically attractive (Abbott-Anderson & Kwekkeboom, 2012), causing a strong sexual impact and negatively affecting QoL (Lee et al., 2016).

In the present study, the absence of differences in QoL accordingly to the treatment modality may be related to the characteristics of the sample, particularly if we consider that

the average duration of treatment was 18 months. According to the literature, as time progresses, there is a reduction in the levels of psychological morbidity, resulting in improvements in QoL (Zhao et al., 2014).

The second goal was to analyze the variables that contributed to QoL, and the results showed that the experience of

symptoms contributed negatively to QoL. In fact, the disease and treatments drive a set of symptoms, some remaining in a long-term period (Mantegna et al., 2013). High prevalence of symptoms has been associated with higher prevalence of anxiety and depressive disorders (Lau et al., 2013) and, in turn, lower QoL (Deshields, Potter, Olsen, & Liu, 2014; Teo et al., 2017). Body image contributed negatively to QoL, as expected since these two variables correlated negatively, as discussed before. In fact, the treatments may cause changes in body perception that may contribute to patients feeling less satisfied with their body (Khalil et al., 2015). Teo et al. (2017) found that a positive body image contributed to physical, emotional, and social well-being, while body dissatisfaction contributes negatively to QoL (Teo et al., 2017).

As previously mentioned, social support had a positive impact on QoL, supporting the notion that social support has a buffering role against anxiety and depression (Yağmur & Duman, 2016). This support is essential for patients' better acceptance and adaptation to CC, facilitating the integration of the disease experience by enabling dialogue on disease-related concerns (Carpenter, Fowler, Maxwell, & Andersen, 2010), promoting more active behaviors about it and, consequently, better QoL (Li, Chen, Chang, Chou, & Chen, 2015). However, the results of the regression analysis should be interpreted with caution since the effect size was poor (0.62).

The third goal included the assessment of the moderating role of psychological attributes (body image, spirituality, and emotional expression) in the relationship between psychological morbidity and QoL. Since education was the only sociodemographic variable contributing positively to QoL, was controlled in the analysis. Results showed only significant effects for body image in the relationship between depressive symptoms and QoL. Since body image is a self-appraisal of one's physical perception and condition, negative perceptions about their body and appearance may lead to negative feelings and thoughts that may contribute to symptoms of depression and anxiety (Stokes & Frederick-Recascino, 2003). Accordingly, in this study, it seems that patients with a better body image were those who experienced a lower impact of psychological morbidity in QoL. This finding is expected since a positive body image is associated with better self-esteem, and hence it can function as a protective factor to prevent and reduce depression. Furthermore, Sarwer and Cash (2008) emphasize the importance of the body image, stressing the need for mental health specialists to take this variable into account in order to better guide and care for their patients.

No significant results were found for the moderating role of spirituality and emotional expression in the relationship between anxiety/depression and QoL, when controlling the variable education. In fact, emotional processing and expression is seen as a coping strategy to deal with stress caused by the disease, with potential

benefits for psychological adjustment and QoL (Reese et al., 2017), while emotional suppression is associated with high levels of anxiety (Marroquín, Czamanski-Cohen, Weihs, & Stanton, 2016; Peh et al., 2017). Spirituality has also been recognized as an important coping strategy that facilitates adaptation to disease, reducing levels of psychological morbidity (Fornazari & Ferreira, 2010) and having a positive impact on health (Pinto & Ribeiro, 2010). However, the non-significant results may be explained by the moment the assessment took place, i.e., when women had already finished (18 months ago) their treatment and manifestations of anxiety and depression symptoms could no longer be as evident as before. Therefore, one may hypothesize that there was no longer a strong need to resort to coping strategies such as spirituality and emotional expression, as a way to mitigate such symptoms. Nevertheless, when analyzing the moderating role of body image and spirituality in the relationship between anxiety and QoL, the result reveals to be marginally significant (body image: $p = .054$; spirituality: $p = .054$) suggesting that more studies with larger samples are needed in order to confirm the observed tendency.

Some of the variables in the correlation and regression hypothesis were not confirmed, such as age, time after treatment, anxiety/depression, spirituality, and emotional expression. Regarding age, we did not find a significant correlation with QoL, as highlighted in previous studies (Xie et al., 2013). This result may be due to the participants' low average age (48 years old) that did not allow for a proper discrimination. In terms of the psychological variables, after the treatment completion, participants may have been integrated in their daily routines, which may have helped them with psychological adjustment, with social support representing an important buffer resource as shown by the results. In turn, patients' perceptions of body image, as well as disease symptoms, were significant, probably because they persist in time as shown in this study and in previous studies (Korfage et al., 2009; Sekse, Gjengedal, & Råheim, 2013). Thus, body image and symptoms may have continued implications in QoL, even 18 months after the completion of treatment. Surprisingly, time after completion of treatment was not associated with QoL. Therefore, future studies should include women that have completed their treatments for longer periods in order to assess the effect of time on QoL.

The present study revealed the identification of important variables related to the QoL of patients with CC in the follow-up phase, as well as the moderating role of body image in the relationship between depression and QoL. Overall, the theoretical adopted model used was adequate to study QoL in this population, but more research is needed to identify which relevant variables have a moderator role in the relationship between psychological morbidity and QoL.

Limitations and Future Implications

The present study presents some limitations that should be acknowledged, in particular, the used instruments that are all self-report measures, as well as the cross-sectional design of the study. Given that body image was a predictor of QoL, future studies should include partners of women with CC and use longitudinal designs in order to better understand the trajectory of the illness and its impact on the dyad, over time. Also, given the low effect size found in the regression analysis, results of this study should be interpreted cautiously, while this study analysis should be replicated with a larger sample.

Conclusion

This study suggests that a poorer body image and the presence of symptoms related to the disease and treatments contributed negatively to QoL, while social support and education had a positive contribution. Spirituality had a moderating role in the relationship between anxiety and QoL and emotional expression did not moderate the relationship between anxiety/depression and QoL. Given that physical and psychological symptoms remain after the end of treatments, contributing negatively to QoL, it is important for health professionals to offer CC patients multidisciplinary consultations in order to provide patients with information about possible long-term consequences and limitations, as well as strategies to promote their physical, psychological, and relational well-being. It is particularly important to help patients to better adapt to the changes in body image, due to its significant role in the relationship between psychological morbidity and QoL.

Overall, the results highlight the need for oncological multidisciplinary teams that include clinical and health psychologists in order to effectively address patients' needs, promoting QoL. Finally, intervention should also provide patients with strategies for a better use of their social support network, facilitating emotional expression and recognizing the importance of spirituality since these variables predicted QoL.

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Compliance with Ethical Standards

Conflict of interest The authors Ana Clara Lopes, Rosário Bacalhau, Martim Santos, Marta Pereira, and M. Graça Pereira declare they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent All participants signed an informed consent form, participated voluntarily, and were assured anonymity along with the possibility of withdrawing at any time.

Research Involving Human Participants All procedures followed the ethical principles outlined in the Declaration of Helsinki, and the Ethics Committee of the institution where data collection took place approved this study.

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