Self-efficacy for Coping Moderates the Effects of Distress on Quality of Life in Palliative Cancer Care

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Abstract. *Recent aggressive chemotherapeutic and combined treatments have resulted in increased survivorship for advanced stage breast cancer. In some patients, treatment produces an actual abatement of their cancer, while in others treatment mitigates the progression of cancer bringing those patients into palliative care where their chronic disease requires continuous management. There is also evidence that the majority of palliative-care cancer patients have a deteriorating quality of life that only precipitously declines in the final few weeks of life. The new paradigm of patient-centered care for palliative patients is resulting in a new model of treatment in which the self-efficacy seems to play an important role. The present study represents an extension of the role of self-efficacy for coping to palliative care. Using a stress-coping model, the primary aim of this study was to evaluate a process model, in which self-efficacy for coping with cancer is a moderator between stress and the quality of life in a sample of breast cancer patients in palliative care. The secondary aim was to validate a specific domain coping self-efficacy scale, the Cancer Behavior Inventory. The current study confirmed the role of self-efficacy for coping with cancer as moderator of the relationship between stress and quality of life of a sample of breast cancer patients in palliative care. In addition, this study confirmed the structure, reliability and validity of the scale.*

Approximately 1 in 12 women in Italy develop breast cancer. The overall 5-year survival rate for breast cancer currently stands at 90% – a dramatic improvement over the 63% survival rate in the early 1960s. When stratified by stage, the 5-year survival rates have increased to 99% for localized disease and 85% for regional advanced disease, a trend that can be attributed to early diagnoses and better treatment regimens. The 5-year relative survival rate for all cancers diagnosed during 2005-2011 was 69%, up from 49% during 1975-1977, reflecting a need for both new efforts and insights into the metastatic process and the effects of late stage diagnosis. This disparity in survival between early and late stage breast cancer represents a major obstacle in breast cancer management (1). Recent aggressive chemotherapeutic and combined treatments have resulted in increased survivorship for advanced-stage breast cancer. However, these aggressive treatments are often accompanied by severe side effects such as nausea, vomiting, alopecia, and fatigue, that can also affect the compliance with treatments (2), and can be a significant cause of distress.

In some patients, treatment produces an actual abatement of their cancer, while in other patients treatment mitigates the progression of cancer bringing those patients into palliative care where their chronic disease requires continuous management.

There is also evidence that the majority of palliative care cancer patients have a deteriorating quality of life that only precipitously declines in the final few weeks of life (3). Women with stage IV metastatic breast cancer, who face the likelihood of a foreshortened future, are particularly at risk for poor mental health (4). For example, metastatic breast cancer patients present high distress levels, with 60% meeting the criteria for psychiatric disorders (5). With progress in oncological care, patients with advanced cancer may increase their life expectancy for months or even years (6). And, for many, these advances may change a diagnosis of advanced cancer from "terminal" to "chronic". However, living with chronic illness poses its own challenges, such as decline in functioning due to the disease or its treatment (7), and late- or long-term effects, such as a reduction in quality of life and a psychological distress that may continue to persist or worsen (8).

Palliative care "is an approach [to cancer care] that improves the quality of life of patients and their families, facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual" (9). In the last few decades, the approach to care of advanced cancer patients in palliative care has changed its focus to that of patient- centered care. Palliative care systems have evolved and efforts have been made to integrate the palliative care and the supportive care in the different phases of cancer treatments. In the recent models (10), the patient is not a passive recipient of oncological care focused on the cancer; based on the new model, palliative care focuses in reducing the stress of the patients, improving quality of life, and empowering the patient to take an active role during the trajectory of the cure (11). Patients are now viewed as an active agent in their medical care and in the coping process. Thus, active, agentic coping models are clearly as applicable to palliative care as they are to coping with the effects of curative treatments.

In traditional stress appraisal and coping theory, "a particular relationship between the person and the environment is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (12) . According to this perspective, in cancer patients, primary appraisal can be referred to the stress perceived by the patient, whereas secondary appraisal concerns an evaluative phase of the coping options and the extent to which the individual determines that he or she is able to execute the coping behaviors needed in that situation. According to Lazarus and Folkman (12), "secondary appraisals of coping options and primary appraisals of what is at stake interact with each other in shaping the degree of stress and the strength and quality of the emotional reaction." This may be especially important in palliative care, where

the situation may involve serious side effects or distress, and the ability to execute coping behaviors effectively is critical. Thus, coping may moderate the negative effects of stressful situations.

According to social cognitive theory, self-efficacy expectations, one's belief in one's own capability to exercise some control over one's functioning and to cope with stressful events, contributes to secondary appraisal (13). Thus, people with high self-efficacy expectations *versus* low efficacy expectations are better able to manage their personal functioning and the myriad environmental demands elicited by the events (13-15). This high confidence, or perceived self-efficacy, has its basis in judgments that a person makes about how well he or she can perform certain behaviors required to manage or cope with prospective situations. Cancer diagnosis, treatment, and survivorship are experiences that could challenge the coping capacity of those affected and threaten psychosocial functioning and quality of life. The importance of feelings of personal effectiveness and mastery for successful coping have been reported in a number of studies and self-efficacy for coping with cancer appears to promote more favorable outcomes (16-19). Previous studies, in fact, showed that cancer patients with higher coping self-efficacy are more likely to engage in effective strategies and demonstrate greater persistence in trying to achieve the desired psychosocial (*e.g.* better adjustment and quality of life) and medical outcomes (*e.g.* fewer and/or less intense symptoms and side effects), as compared to those with lower self-efficacy (16). Thus, self-efficacy for coping, which has been studied primarily in the context of curative oncology care, may also be critical in the context of new models of palliative care in which the patient is viewed as an active agent and collaborator in cancer care.

This study represents an extension of the role of self-efficacy for coping in palliative care. Using a stress-coping model, the primary aim of this study was to evaluate a process model, in which self-efficacy for coping with cancer is a moderator between stress as primary appraisal and the quality of life in a sample of breast cancer patients in palliative care. The secondary aim was the validation of a specific domain coping self-efficacy scale, the Cancer Behavior Inventory. We expected to replicate the structure of the CBI-B-IT on an Italian palliative care sample and provide strong evidence for its psychometric properties.

Patients and Methods

This is an observational study of patients with breast cancer diagnosis. The Institutional Review Board at National Cancer Institute of Naples, Italy, approved the study (Protocol #1307012400). All participants provided written informed consent.

Participants. We recruited participants at the Breast Cancer Department at National Cancer Institute in Naples, Italy. Eligible

patients were women with stage IV breast cancer who had a ≥6, <12 months prognosis, (per their health care provider), were age 21 +, spoke Italian speaking, lived in Italy. We excluded patients if their health care provider advised against participation in the study, for example, due to psychiatric instability, or very poor physical condition.

Procedure. At the moment of their admittance to the Breast Department a sample of patients (N=109) completed a first assessment composed by a measure of self-efficacy for coping with cancer and socio-demographic items as part of a routine screening protocol, which is mandated by hospital procedures. On the basis of physician referrals and the inclusion and exclusion criteria, we identified 58 participants for the study. Patients were approached by their surgeon or nurse to determine interest in the study. If interested, a psychologist research assistant (RA) explained the purpose of the study to the prospective participant. Consented participants (N=58) completed a booklet of questionnaires with the help of the RA during their hospitalization. The data collection procedure (complete administration of a booklet containing questionnaires) took about 30 min to complete. RAs paused or rescheduled data collection if the patient did not feel well enough to complete this activity. Every effort was made to schedule data collection at a convenient time for all participants being very flexible with last-minute changes. All data collection instruments -identified only by a randomly selected participant ID number- were in an encrypted format.

Patient outcomes

Cancer Behavior Inventory- Brief Form, Italian version (CBI-B-IT). The Cancer Behavior Inventory-Brief is a 12-item measure of self-efficacy expectations about coping with cancer (16). The scale comprised of four factors: "independence and maintaining a positive attitude", "participation in their medical care", "coping and stress management", "management of affect". Participants reported their level of confidence to perform each coping behavior on a nine-point Likert-type scale ("not at all confident" to "totally confident"); item scores were summed to form a total score. Alpha for this scale was 0.94 in the original validation study (16). The scale was translated into Italian using a translation and back-translation procedure. The translation process included two separate, parallel translations; one was the main and the other the secondary translation. The two translators worked separately and independently. The main translator was a professional, native English speaker, interpreter fluent in Italian. The secondary translator was a professional, native Italian speaker, psychologist, with a background in questionnaire design and analysis, fluent in English. The secondary translator focused on issues regarding operational and measurement equivalence. The agreement of the two translators was considered the final form of the questionnaire. The CBI-B-IT was given to all the patients admitted to the Breast Department as part of different projects active at the Institute.

EORTC QLQ 30. Quality of life (QoL) outcomes are extremely wide-ranging, and have been described as encompassing almost all aspects of a cancer patient's well-being (20).To measure the individual's subjective perception of QoL, the European Organization for Research and Treatment of Cancer QLQ-C30 scale was used. This instrument was validated for Italian population according to the guidelines of the EORTC QLQ group, and presented good reliability and validity. The EORTC QLQ-C30 is a 30-item questionnaire composed of multi-item scales and single items that reflect the multidimensionality of the quality-of-life construct. It incorporates five functional scales (physical, role, cognitive, emotional, and social), three symptom scales (fatigue, pain, and nausea and vomiting), and a global health and quality-of-life scale. The remaining single items assess additional symptoms commonly reported by cancer patients (dyspnea, appetite loss, sleep disturbance, constipation, and diarrhea), as well as the perceived financial impact of the disease and treatment.

Hospital anxiety and depression scale. The hospital anxiety and depression scale (HADS) (21) is a 14-item scale measuring current levels of depression and anxiety. The Italian version (22) has good psychometric qualities and comprises two subscales: depression and anxiety, both with seven items. The items are rated on a 4-point scale (0-3) and the total score for each subscale ranges from 0 to 21, with higher scores indicating more symptomatology.

Mini mental adjustment to cancer scale. The mini-mental adjustment to cancer (Mini-MAC) scale (23, 24) was used to assess the patients' cognitive and behavioral attitudes toward cancer, specifically hopelessness (H) and anxious preoccupation (AP). Both subscales consist of eight items, the first measuring the tendency to adopt a pessimistic and despairing attitude about the illness; the second measuring the tendency to feel worried and preoccupied about illness. Each item is rated on a 1-4 Likert-type scale (from 1=it definitely does not apply to me, to 4=it definitely applies to me range score for both H and AP=8-32).

Data analysis. In order to confirm factorial structure of the CBI-B-IT, a confirmatory factor analysis (CFA) was carried out using MPLUS7 software (Muthen & Muthen, Los Angeles, CA) (25). Model parameters were estimated using the maximum likelihood (ML) estimation method, and the quality of the measurement model was examined through the fit indices estimates. Cronbach's alpha coefficients for the scale were estimated for data from the total sample (N=109), in order to evaluate the reliability of scale. Generally, alpha's values below 0.60 were not acceptable, while values above 0.90 indicated an excellent internal consistency of the items within the scale.

Descriptive, correlational and moderation analysis, were carried out exclusively on a subsample of the patients considered in the present study (N=58) that were enrolled in the broader protocol (26). For the descriptive and correlational analysis we used the SPSS 20.0 (27). Finally, in order to evaluate the moderation role of self-efficacy expectations about coping with cancer in the relationship between distress and quality of life, we used the variance-based structural modeling (VB-SEM – also known as Partial Least Squares analysis), performed using the WARP PLS v.5.0 statistical software (WARP PLS v.5.0, ScriptWarp Systems™, Laredo, Texas USA) (28). VB-SEM is similar to covariance-based SEM analyses in that it explicitly models measurement error through the construction of latent factors. However, unlike methods used in covariance-based SEM, the partial least-squares algorithm is based on ranked data and is, therefore, distribution-free (*i.e.*, the estimation is less affected by the complexity of the model, small sample size, or non-normality of the data). The VB-SEM analysis permits evaluation of the model at the measurement level and at the structural level according to published criteria for VB-SEM models (29).

Table I. *Descriptive statistics for socio demographic information.*

Age mean	54.05
	N
Status	
Single	20
Married	56
Divorced	18
Widow	14
Education	
Low	39
High school	36
University	33
Work	
Yes	50
No	58

Table II. *Pearson correlation for the keys variables of the study.*

	CBI
HADS/A	−0.464**
HADS/D	−0.662**
QOL/GHS	0.356**
QOL/PF	0.270*
QOL/RF	0.344**
QOL/EF	0.300*
QOL/CF	0.379**
QOL/SF	0.131
QOL/F	−0.304*
QOL/N	−0.014
QOL/P	−0.246
QOL/Dy	−0.328*
QOL/I	−0.362**
QOL/AL	−0.405**
QOL/C	−0.135
QOL/D	−0.174
QOL/FP	−0.214
MAC/H	−0.455**
MAC/AP	−0.268*
MAC/A	0.326*
MAC/F	0.344**
MAC/FS	0.661**

CBI, Cancer behavior inventory global index; HADS/A, anxiety; HADS/D, depression; QOL/GHS, global health status; QOL/PF, physical function; QOL/RF, role function; QOL/EF, emotional function; QOL/CF, cognitive function; QOL/SF, social function; QOL/F, fatigue; QOL/N, nausea; QOL/P, pain; QOL/Dy, dyspnea; QOL/I, insomnia; QOL/AL, appetite loss; QOL/C, constipation; QOL/D, diarrhea; QOL/FP, financial problems; MAC/H, hopeless; MAC/A, anxious preoccupation; MAC/A, avoidance; MAC/F, fatalism; MAC/FS, fighting spirit. **$p<0.01$, *$p<0.05$.

Results

From the 109 patientsthat completed the CBI-B as screening survey, 58 patients were eligible for the main aim of the study, and completed all the questionnaires. No differences were found between the two samples on CBI scores.

Descriptive statistics were used to describe the sample (see Table I).

The factorial structure and reliability of the CBI-B-IT. The factorial arrangement of CBI-B IT was analyzed using a structural equation model (SEM) to confirm the 4-factors of the original questionnaire (16). The structural equation model was specified by defining the relationship between each item of the questionnaire and its latent structure (domains or scales) as showed in Heitzmann et al, 2011 (16). The adaptation of the specified model was evaluated by examining the global adaptation; the parameter estimates that identify associations in the model showed a good fit of the model to the data ($\chi^2_{(48)}$=131.15; p=0.001; CFI=0.925, RMSEA=0.127; 90 Percent C.I. 0.07, 0.152; Probability RMSEA=0.012; SRMR=0.054). The literature indicates the following as good fit model indices: CFI (Comparative Fit Index) values close to 0.95; SRMR (Standardized Root Mean Squared Residual) value below 0.08 and RMSEA (Root Mean Square Error of Approximation) value below 0.06 (30). Furthermore, the Cronbach's alpha coefficient (α=0.94) revealed an excellent reliability of the global score of the scale, confirming Heitzmann *et al.*, which had alphas that ranged between 0.84-0.94 in different samples.

Initial validation of the CBI-B-IT. In order to analyze the relationship between self-efficacy for coping with cancer and the other key variables of the study, bivariate correlation tests were computed between both factors and the composite index (See Table II for coefficients).

Higher coping self-efficacy scores were associated with greater QoL. The composite index of CBI-B IT was positively correlated with the overall quality of life, physical, role function, emotional and cognitive measured by the QLQ-C30 questionnaire (r=356, p=0.007; r=0.270, p=0.040; r=344, p=0.008; r=0.300, p=0.023; r=0.379, p=0.004); the higher coping self-efficacy scores were also associated with greater the ability to fight the disease. The CBI-B-IT composite index was positively correlated with "fighting spirit" (r=0.661, p=0.000) and negatively correlated with "hopeless", "anxious preoccupation" (r=-0.455, p=0.000; r=−0.268, p=0.044) as measured by the Mini–MAC. Finally, higher self-efficacy to cope with cancer scores was associated with lower anxiety and depression scores. The composite index of CBI- B IT was negatively correlated with anxiety and depression scales (r=−0.464, p=0.000; r=−0.662, p=0.000), as measured by the HADS questionnaire.

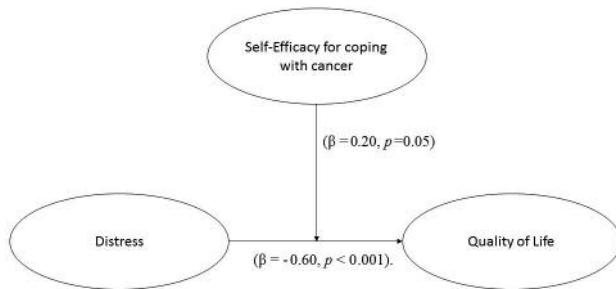Table II presents the correlations between key variables of the study.

Figure 1. *Estimated parameters of the tested model.*

Figure 2. *Moderator analysis with the moderator, self-efficacy for coping with cancer, plotted at –1SD and +1SD.*

Moderation analysis. Composite reliability coefficients for each latent factor exceeded the 0.70 criterion (29). In addition, the square root of the estimated variance extracted by each factor exceeded its correlation with all other latent variables supporting the discriminant validity of each factor. Overall, the hypothesized moderation model exhibited good fit with the observed data (GoF=0.482; APC=0.402, p<0.001; ARS=0.540, p<0.001; AFVIF=2.278). Adequacy of the hypothesized pattern of relations among the model constructs is considered adequate using an overall goodness-of-fit (GoF) index given by the square root of the product of the AVE and average R^2 for the model (0.100, 0.250, and 0.360 correspond to small, medium, and large effect sizes) (31). Further information on the adequacy of the model is provided by the average path coefficient (APC) and average R^2 (ARS) coefficient across the model, both of which should be statistically significantly different from zero.

Standardized parameter estimates from the analysis are presented in Figure 1. The results showed that the distress of patients is negatively related to their quality of life (β=–0.60, p<0.001). According to the hypothesis, the results also showed that self-efficacy to cope with cancer has a moderation role (β=0.20, p=0.05) in this relationship (Figure 1). Figure 2 depicts the interaction plot represented at three different levels of the moderating variable – self-efficacy for coping: low (one standard deviation below the mean), moderate (at the mean), and high (on standard deviation above the mean). This figure reveals that, consistent with the hypothesis, patients with moderate to high self-efficacy for coping with cancer experience higher quality of life than those with low self-efficacy at all levels of distress, but the difference is even greater at high levels of distress.

Discussion

The current study confirmed the role of self-efficacy for coping with cancer (CBI-B-IT) as moderator of the relationship between stress and quality of life of a sample of breast cancer patients in palliative care. In addition it confirmed the structure, reliability and validity of the CBI-B-IT.
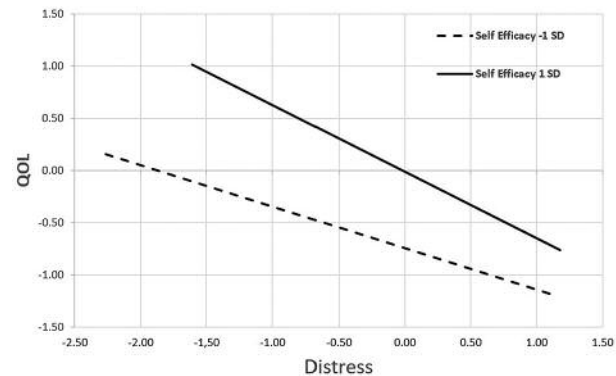
Similar to Serpentini *et al*. (26), the results of our CFA confirmed the original structure of the scale showing acceptable fit indexes. The high Cronbach alpha index of the global score of the CBI-B is in line with Heitzmann *et al*. (16), which also confirms that CBI-B has stability in different languages and cultures (Italy and USA). Thus, our results confirm the use of CBI-B-IT in Italian cancer care without any loss of its excellent psychometric properties. However, broader research is needed to conduct a replication of the psychometric properties of the scale with more participants.

The correlational analysis showed that there is a statistically significant association between self-efficacy for coping with cancer and the Mini-MAC questionnaire; in fact self-efficacy for coping with cancer was positively correlated with active coping factor (fighting spirit) and negatively correlated with passive or ineffective one (hopeless, anxious preoccupation), thus confirming the same association found in the first validation study (17) and past literature on this issue (32). The analysis of the correlation between self-efficacy for coping with cancer and quality of life as well showed results in line with theory and past literature as well. Both the composite index and all the factors of the scale (except for the "managing affect" factor) confirmed this relationship with QoL. These findings are in line with both original validation of the scale, and current literature that shows self-efficacy as having a positive influence on quality of life in cancer patients and those with chronic disabilities (33-35) and Qol of their caregivers (35). Moreover, self-efficacy for coping with cancer showed a statistically significant negative correlation with the HADS scale for both anxiety and depression. The latter is well-supported by the existing literature as well. In past literature, in fact, general self-efficacy measure (*i.e.*, General Self-Efficacy scale) has been reported to correlate with anxiety symptoms, and psychological distress (36). Self-efficacy for coping with

cancer has consistently been found to be negatively related to anxiety (17, 18). Furthermore, similar to the present study, general self-efficacy has been shown to have a direct and an indirect relationship between psychological distress and QoL (33, 37, 38).

Self-efficacy theoretically refers to a specific domain, as in the case of self-efficacy for coping with cancer (16-18). Self-efficacy for coping with cancer is a state-like expectation in one's competence (39, 40), to cope with cancer-related stressors. Both theoretical and empirical evidence suggest that cancer patients with high self-efficacy should be better-adapted and thereby less likely to have negative psychological outcomes (41).

In our sample of cancer patients in palliative care, self-efficacy for coping with cancer may play an important role in mitigating the effects of stress on QoL. In fact, the moderator analysis revealed a critical role of self-efficacy for coping with cancer in the relationship between distress and QOL, namely, exacerbating or reducing the impact of distress on QOL. In other words, self-efficacy acts as buffer in this relationship; in our sample, patients that felt more able to cope with cancer reported higher QOL than patients feeling less able to cope – at the same level of distress. This result is largely supported both by the theory and by the practice of palliative care in its new paradigm of patient-centered cure. From a theoretical point of view, higher levels of efficacy are characterized by a sense of agency or control; a highly efficacious cancer patient may perceive some causal relationship between coping behaviors executed and certain desired outcomes, such as level or type of quality of life, managing external factors (cancer stressors). Thus, as noted in Merluzzi et al., self-efficacy for coping with cancer may be construed as part of a self-regulatory process that patients engage in, as they cope with the disease, its treatments, and the emotional sequelae of the disease (18). The potentially powerful moderator role of the self-efficacy for coping with cancerfits with both the theoretical framework and with empirical data. The new models of palliative care are focusing their efforts in improving the sense of agency of the patients, recent literature, then, has already confirmed that targeted intervention can increase self-efficacy (41-43).

In conclusion, psychosocial interventions have shown great promise in improving self-efficacy outcomes. Understanding the impact of the perception of self-efficacy as it applies to health behavior, and cancer related stressors it is a new challenge for interventions paradigms, especially for palliative care contexts. While it may be possible to target multiple symptoms with an intervention to enhance self-efficacy, it may be necessary to define self-efficacy as it relates to adjustment to cancer more precisely than has been done to date, and to support research with specific instruments (44) and specific people, such as those in palliative care. The limitation of the present study is its observational and cross-sectional design,

as well as the number of the participants, even though the statistical power of this research was enough to test the model with a Confirmative Factorial Analysis. Future research should examine how coping with cancer self-efficacy is related with key outcomes in cancer trajectories, in longitudinal studies and with a larger number of participants providing stronger statistical power for the study, also with targeted interventions.

Conflicts of Interests

No conflict of interests for any of the Authors of the study.

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