



# Symptom Clusters and Their Impact on Spiritual Well-Being Among Women with Breast Cancer

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**Purpose:** To explore symptom experience and symptom clusters among Jordanian women with breast cancer and investigate whether these clusters predict patients' spiritual well-being.

**Patients and Methods:** A sample of 142 Jordanian women with breast cancer were asked to complete the Memorial Symptom Assessment Scale (MSAS), Functional Assessment of Chronic Illness Therapy- Spiritual Well-being (FACIT-Sp) scale, and socio-demographic questionnaire. Exploratory factor analysis was used to group symptoms into clusters, and multiple linear regression was used to explore the symptom clusters that predict spiritual well-being.

**Results:** The most prevalent symptoms among women with breast cancer were fatigue, anxiety, tension, and pain. All these symptoms have a prevalence greater than 50%. Three clusters were found: treatment-related symptom cluster consisting of eight symptoms, gastrointestinal symptom cluster consisting of seven symptoms, and psychological symptom cluster consisting of five symptoms. The psychological symptom cluster was the only cluster predicting the women's spiritual well-being ( $t(141) = -3.049$ ;  $p < 0.01$ ).

**Conclusion:** Women with breast cancer experience several concurrent symptoms and symptom clusters. Screening for psychological symptom clusters and their treatment improves patients' spiritual well-being. The majority of women with breast cancer did not receive any complementary therapies and hardly any spiritual or psychological support, which should be provided in the future to support their spiritual well-being.

**Keywords:** symptom experience, symptom assessment, symptom clusters, oncology, spiritual well-being, Jordan

## Introduction

Cancer is a major health problem around the world.<sup>1</sup> In Jordan and the rest of the world, breast cancer is the most common malignancy.<sup>2,3</sup> In 2018, breast cancer represented 38.9% of cancer cases among Jordanian women.<sup>2</sup> Recent reports indicate that the number of new cases has increased substantially.<sup>2,4</sup> Furthermore, women in Jordan are being diagnosed with breast cancer at a younger age and with more advanced stages than women in Western countries.<sup>4</sup>

Symptoms experience is "the perception of the frequency, intensity, distress, and meaning of symptoms as they are produced and expressed".<sup>5</sup> Breast cancer and its treatment cause multiple symptoms that may interact with each other, causing bad symptom experience and distress for the patients.<sup>6,7</sup> Symptom cluster (SC) research focuses on symptoms that coincide and relate to each other.<sup>8</sup> Any symptom in a cluster can affect the occurrence and severity of other symptoms in that cluster.<sup>7</sup> Therefore, treating core symptoms in SC positively affects other symptoms and can decrease polypharmacy and improve patients' symptom experience.

Symptom experience and SCs in women with breast cancer were investigated before, during, and after cancer treatment.<sup>7</sup> The most commonly reported clusters during treatment were gastrointestinal, pain-fatigue-sleep disturbance, and psychological clusters.<sup>7</sup> Although these clusters appear stable over time in most studies, their content and number of symptoms included in each cluster are still debatable.<sup>6,7,9</sup>

Spiritual well-being is a component of spirituality and can be defined as "a sense of meaning in life, harmony, peacefulness, and a sense of drawing strength and comfort from one's faith".<sup>10</sup> Patients who are undergoing cancer

treatment are more likely to experience spiritual distress and are more sensitive to spiritual needs.<sup>11–13</sup> Many factors have been studied to determine their effect on spiritual well-being.<sup>14–16</sup> For example, having religious beliefs and higher faith could promote the spiritual well-being of the person with cancer.<sup>15</sup> In addition, complementary therapies have been receiving growing attention in cancer care and are associated with improved spiritual, physical, and psychological well-being in breast cancer.<sup>14,16</sup> However, little is known about the effect of symptoms and SCs on spiritual well-being. Some studies done on women with breast cancer evaluated spiritual well-being and its impact on single symptom such as pain.<sup>17–19</sup> Most of these studies found a positive relationship between spiritual well-being and controlling of assessed symptoms.<sup>18,19</sup> In one study, Albusoul et al evaluated the effect of spiritual well-being on multiple symptoms and found that spiritual well-being predicted 7.1% of the total variance in patients' symptom distress.<sup>20</sup> According to our knowledge, no study has evaluated whether SCs found in patients can predict their spiritual well-being. This study aimed to explore symptom experience and symptom clusters among Jordanian women with breast cancer and investigate whether these clusters predict patients' spiritual well-being.

## Materials and Methods

### Design

This study is part of a descriptive cross-sectional research project entitled: The Effect of Spiritual Well-being and Social Support on the Symptom Experience in Patients with Cancer.<sup>20</sup> The original project aimed to explore the symptom experience among Jordanian women with cancer.

### Setting and Sample

A convenient sample of 142 women with breast cancer was recruited from three general hospitals that have oncology wards. Two hospitals are located in the capital city, Amman, and one is in the north of Jordan. The inclusion criteria were: women 18 years or older, initial diagnosis of breast cancer, knowing about the diagnosis, and being able to understand Arabic. All women meeting these criteria were welcomed to enter the study regardless of their religious beliefs or backgrounds. The sample size was determined based on the hypotheses addressed in the original project.

### Data Collection

Research team members identified eligible participants and introduced them to the study. Brief information was provided about the study's purpose and requirements. Patients who showed interest in participating were asked to sign a written consent form that clarified the rights of the participants. Then, the participants completed an Arabic version of the structured validated questionnaires related to the study. The research team members were available to help while participants completed the questionnaires. Information related to the participants' disease process, treatment, and comorbidities was gathered from patients' medical records. Data collection took place in 2018–2019 and took approximately seven months.

### Ethical Considerations

This study complies with the Declaration of Helsinki. The Scientific Research Committee at the School of Nursing at the University of Jordan (187412018/19) and the Institutional Review Boards of participating hospitals approved the project. Informed consent was obtained from all participants in the study. Participation in the study was voluntary, and patients could withdraw at any time without affecting their treatment plan. All participants' information was kept anonymous and confidential during the study.

### Instruments

The study instrument was a self-administered questionnaire that consisted of the following parts:

## Socio-Demographic Questionnaire

The authors developed a questionnaire to gather information about the patient's characteristics, such as age, marital status, education level, etc.

## Memorial Symptom Assessment Scale (MSAS)

The MSAS is a 32-item symptom assessment scale developed to measure symptoms in patients with cancer.<sup>21</sup> First, symptom occurrence is measured, and if a particular symptom occurs, it is evaluated on a four-point Likert scale in terms of frequency, severity, and associated distress. A higher symptom score on the Likert scale indicates a higher frequency, greater severity, or more distress, respectively. The scale was translated into Arabic language and has good validity and reliability.<sup>22</sup> In this study, six additional symptoms were added to the MSAS: muscle weakness, fever, hot flashes, forgetfulness, rash, and vaginal dryness.

## Functional Assessment of Chronic Illness Therapy- Spiritual Well-Being (FACIT-Sp)

The FACIT-Sp is a 12-item scale that measures spiritual well-being among cancer patients.<sup>23</sup> There are two subscales included in the scale: the Meaning/Peace subscale, which measures the sense of meaning and peace, and the faith subscale, which assesses the role of faith during illness.<sup>23</sup> A five-point Likert scale is used to rate the scale items, ranging from (0) "not at all" to (4) "very much". The Arabic version of the scale has good validity and reliability.<sup>24</sup>

## Statistical Analysis

The data were analyzed using IBM SPSS Statistics (Version 20) for Windows (IBM Corp., 2020).<sup>25</sup> Exploratory factor analysis was used to identify SCs clustered by the severity dimension. According to the recent review of the literature on women with breast cancer, exploratory factor analysis is the most common method used for clustering symptoms.<sup>7</sup> The sample size was evaluated for suitability for conducting exploratory factor analysis, and as recommended, the number of subjects was higher than 100 and was five times larger than the number of variables.<sup>26,27</sup> The number of SCs was determined by evaluating eigenvalues, scree plots, and parallel analysis. The factors were estimated using the principal axis factoring method with Promax (oblique) rotation.<sup>28</sup> The best fit of symptom grouping was determined according to the following criteria: 1) simple structure; 2) total variance explained by the SCs; 3) internal reliability of the SCs above 0.60; and 4) factor loading level of the symptoms  $\geq 0.30$ . Symptoms with a less than 20% prevalence were excluded from the analysis.<sup>29</sup> Multiple linear regression using the method "enter" was used to assess the ability of SCs to predict spiritual well-being (FACIT-Sp total score). In developing the regression model, pairwise deletion was used to manage missing data. We ensured that no assumptions were violated for the various tests we conducted.

## Results

### Sample Characteristics

One hundred and forty-two female patients with breast cancer were conveniently selected from three hospital sectors: Governmental (n, 73; 51.4%), university-affiliated (n, 64; 45.1%), and private (n, 5; 3.5%). Most patients were in the treatment phase (n, 80; 56.3%) and underwent chemotherapy (n, 84; 59.2%). Many patients (n, 59; 41.5%) were diagnosed with comorbidities, most commonly hypertension (n, 38; 26.8%). Most patients did not receive spiritual support (n, 134; 94.4%) or psychological support (n, 125; 88%) during hospitalization. More information on the sample characteristics are presented in [Table 1](#).

### Symptom Occurrence and Severity

Thirty-six symptoms were assessed using occurrence and severity dimensions. Women with breast cancer experienced several symptoms simultaneously; on average, 11 symptoms out of 36. The most prevalent symptom was fatigue (n, 92; 64.8%), followed by anxiety, tension, and pain, which all had a prevalence above 50% ([Table 2](#)). The least prevalent symptoms were rash, vaginal dryness, sexual desire and activity problems, fever, diarrhea, problems with urination, cough, shortness of breath, dysphagia, and vomiting. All the least prevalent symptoms had a prevalence of less than 20%

**Table 1** Demographic and Clinical Characteristics of the Sample (N, 142)

Characteristics	Mean (SD)	Range
Age (years)	48.30 (10.07)	26–74
Symptom occurrence	11.46 (7.68)	0–27
FACIT-Sp <sup>a</sup> Total	37.52 (7.54)	16–48
FACIT-Sp <sup>a</sup> meaning and peace subscale	22.54 (6.66)	3–32
FACIT-Sp <sup>a</sup> faith subscale	14.98 (1.74)	8–16
	Categories	n (%)
Marital status	Married	108 (76.1%)
	Non-Married	34 (23.9%)
Education	Primary/Secondary	84 (59.1%)
	College/university	58 (40.9%)
Employment status	Employed	18 (12.7%)
	Not employed	123 (86.6%)
Disease progress	Newly diagnosed	9 (6.3%)
	Treatment phase	80 (56.3%)
	Remission phase	38 (26.8%)
	Hospice phase	15 (10.6%)
Breast cancer stages	0–2	53 (37.3%)
	3–4	48 (33.8%)
Treatment type	Surgery	1 (0.7%)
	Chemotherapy	84 (59.2%)
	Radiation therapy	6 (4.2%)
	I am not receiving treatment	41 (28.9%)
	Other	9 (6.3%)
Complementary therapy	Yes	40 (28.2%)
	No	102 (71.8%)
Received spiritual support during hospitalization	Yes	8 (5.6%)
	No	134 (94.4%)
Received psychological support during hospitalization	Yes	17 (12%)
	No	125 (88%)

**Abbreviation:** FACIT-Sp<sup>a</sup>, Functional Assessment of Chronic Illness-Spiritual Well-being.

and were not included in the factor analysis. The overall score of symptom severity for the 36 symptoms was moderate (score 2.61 out of a total of 4). The mean symptom severity score for the 36 symptoms ranged from 2.13 for dysphagia to 3.12 for fatigue on a 0 to 4 scale. The most prevalent symptoms with their associated mean severity scores are summarized in [Table 2](#).

**Table 2** Most Frequently Reported Symptoms with Associated Levels of Reported Severity

Symptom	Occurrence n (%)	Severity Mean $\pm$ SD
Concentration	59 (41.5%)	2.54 $\pm$ 0.79
Tension	80 (56.3%)	2.79 $\pm$ 0.80
Sadness	65 (45.8%)	2.80 $\pm$ 0.94
Anxiety	86 (60.6%)	2.85 $\pm$ 0.80
Body image "I don't look like myself."	36 (25.4%)	2.94 $\pm$ 0.79
Fatigue	92 (64.8%)	3.12 $\pm$ 0.86
Numbness	63 (44.4%)	2.75 $\pm$ 0.80
Vertigo	60 (42.3%)	2.41 $\pm$ 0.72
Pain	77 (54.2%)	2.65 $\pm$ 0.85
Insomnia	59 (41.5%)	2.75 $\pm$ 0.84
Xerostomia	65 (45.8%)	2.64 $\pm$ 0.82
Nausea	48 (33.8%)	2.55 $\pm$ 0.79
Dysgeusia	56 (39.4%)	2.68 $\pm$ 0.83
Loss of appetite	59 (41.5%)	2.56 $\pm$ 0.74
Weight loss	36 (25.4%)	2.27 $\pm$ 0.83
Peripheral edema	31 (21.8%)	2.39 $\pm$ 0.84
Sweat	39 (27.5%)	2.74 $\pm$ 0.91
Itching	40 (28.2%)	2.53 $\pm$ 0.84
Oral ulcer	29 (20.4%)	2.45 $\pm$ 0.91
Hair loss	52 (36.6%)	2.25 $\pm$ 0.76
Skin color change	37 (26.1%)	2.51 $\pm$ 0.87
Bloating	35 (24.6%)	2.49 $\pm$ 0.81
Constipation	41 (28.9%)	2.46 $\pm$ 0.71
Muscle weakness	63 (44.4%)	2.82 $\pm$ 0.87
Hot flashes	58 (40.8%)	2.71 $\pm$ 0.83
Forgetfulness	52 (36.6%)	2.67 $\pm$ 0.81

**Note:** Only symptoms with the occurrence of 20% and above were included.

### Symptom Clusters Using the Symptom Severity Dimension

Twenty-six symptoms with a prevalence above 20% were included in the factor analysis (Table 2). Inspection of the correlation matrix revealed the presence of many coefficients of 0.3 and above among symptoms, indicating that the data is suitable for factor analysis.<sup>30</sup> The Kaiser-Meyer-Okin value was 0.83, and Bartlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix.

The results showed symptoms grouped into four clusters as follows: 1- treatment-related SC that consists of eight symptoms; 2- gastrointestinal SC that consists of seven symptoms; 3- psychological SC that consists of five symptoms;

and 4- sweat, hair loss, body image, and pain SC. The fourth SC showed a Cronbach’s  $\alpha$  less than 0.60; therefore, we did not consider it a reliable cluster, and we will not discuss it further in this paper. The three remaining SCs explained 45.25% of the variance, with treatment-related SC contributing the most (30.20%). Cronbach’s  $\alpha$  values for the three remaining clusters were above 0.80, indicating excellent internal reliability of the clusters. For more details, see Table 3.

### The Impact of SCs on Spiritual Well-Being

A multiple linear regression was conducted to investigate whether SCs would predict patients’ spiritual well-being. Some variables were entered into the model to control for extraneous effects (Table 4). The score of the total FACIT-Sp scale

**Table 3** Symptom Clusters Present in Women with Breast Cancer

Symptoms	Pattern Coefficients				Structure Coefficients			
	Factor 1 Treatment-related SC	Factor 2 Gastrointestinal SC	Factor 3 Psychological SC	Factor 4	Treatment-Related SC	Gastrointestinal SC	Psychological SC	Factor 4
Muscle weakness	0.817				0.766			
Fatigue	0.727				0.763			
Bloating	0.665				0.618			
Change in color of skin	0.628				0.658			
Hot flashes	0.524				0.522			
Forgetfulness	0.494				0.673			
Numbness	0.468				0.575			
Peripheral edema	0.424				0.514			
Oral ulcers		0.801				0.687		
Dysgeusia		0.716				0.733		
Xerostomia		0.646				0.769		
Constipation		0.581				0.598		
Nausea		0.579				0.551		
Loss of appetite		0.418				0.556		
Weight loss		0.398				0.425		
Anxiety			0.789				0.672	
Tension			0.749				0.754	
Sadness			0.720				0.759	
Concentration			0.496				0.608	
Insomnia			0.409				0.558	
Sweat				0.528				0.583
Hair loss				0.469				0.265
Body image				0.433				0.515
Pain				0.377				0.551
Cronbach's Alpha	0.846	0.806	0.802	0.438				
Variance explained (%)	30.20	8.43	6.62	5.92				

**Abbreviation:** SC, Symptom Cluster.

**Table 4** Predictors of Spiritual Well-Being Using Multiple Linear Regression (N, 142)

Predictors	Spiritual Well-Being		
	b	Beta	t
Severity of treatment-related SC	0.031	0.032	0.294
Severity of Gastrointestinal SC	0.024	0.020	0.194
Severity of psychological SC	-0.403	-0.296	-3.049**
Age	0.014	0.019	0.224
Education (school vs college or university)	1.010	0.066	0.788
Marital status (married vs single)	-1.943	-0.110	-1.333
Disease progress	0.499	0.051	0.602
Use of complementary therapy	3.278	0.196	2.363*

**Notes:** \* $p < 0.05$ , \*\* $p < 0.01$ . Dependent Variable: FACIT-Sp total score (R, 0.393; R<sup>2</sup>, 0.155; F, 3.020;  $p < 0.01$ ).

**Abbreviation:** FACIT-Sp, Functional Assessment of Chronic Illness-Spiritual Well-being.

was used to indicate the degree of spiritual well-being in women with breast cancer. Predictors of the total FACIT-Sp score using multivariate analysis were psychological SC and complementary therapy (Table 4). The overall model was statistically significant (F, 3.020;  $p < 0.01$ ). The variables included in the model explained 15.5% of the variance (R, 0.393; R<sup>2</sup>, 0.155). Treatment-related SC and gastrointestinal SC did not predict the total FACIT-Sp score.

The multivariate analysis was repeated using FACIT-Sp subscales instead of FACIT-Sp total score. Using the FACIT-Sp meaning subscale as an outcome variable with the same predictors resulted in a better model fit (R, 0.428; R<sup>2</sup>, 0.183; F, 3.693;  $p < 0.001$ ). In addition, this model resulted in better psychological SC estimates (B, -0.387; Beta, -0.321;  $p < 0.01$ ). On the other hand, using the FACIT-Sp faith subscale as an outcome variable resulted in a poor model fit, and the overall model was statistically insignificant (F, 0.985;  $p$ , 0.451).

## Discussion

The findings of this study described symptom experience and SCs presented in a homogeneous sample of women with breast cancer. In addition, the study evaluated whether existing SCs impact patients' spiritual well-being. The most frequently reported symptoms were fatigue, anxiety, tension, and pain, all of which have a prevalence of more than 50%. These findings are supported by other studies evaluating symptom experience in women with breast cancer,<sup>31-34</sup> in which the prevalence of these symptoms, when assessed, was greater than 50%. Other symptoms that occurred frequently across studies include difficulty sleeping, feeling sad, and irritability.<sup>33,34</sup> Most studies reported four to six predominant symptoms. Interestingly, in one study conducted by Alqadire et al, the prevalence of symptoms was higher than in other studies; 12 out of 30 symptoms had a prevalence rate higher than 50%.<sup>34</sup>

Several studies have reported the presence of SCs in women with breast cancer.<sup>7</sup> Unfortunately, there is still no agreement on the number of SCs or the content and number of symptoms in each cluster. The cause of the difference may be related to many factors: the number of symptoms assessed, the dimension used to cluster symptoms, the statistical analysis used, differences in the type of treatment, or differences in sample characteristics.

This study found three stable SCs: treatment-related, gastrointestinal, and psychological. Previous research supports these findings.<sup>7,34</sup> The symptoms with the highest loading in treatment-related SC were muscle weakness and fatigue. Fatigue frequently co-occurs with pain and sleep disturbance during cancer treatment.<sup>7</sup> However, the three symptoms were in separate clusters in our study.

According to a recent systematic review of the literature (2001-2021), gastrointestinal SC is common during cancer treatment and has been reported in at least ten studies.<sup>7</sup> The core symptoms in the gastrointestinal SC are nausea and loss

of appetite.<sup>7</sup> Additional symptoms presented in this SC vary from study to study. The most common symptoms reported were bowel problems, weight changes, oral problems (eg, dry mouth, taste changes), fatigue, sleep disturbance, and hair loss. In this study, oral ulcers and dysgeusia (metallic taste sensation in the mouth) were the core symptoms of gastrointestinal SC. Consistent with the literature,<sup>7</sup> nausea and loss of appetite were part of the gastrointestinal SC in addition to constipation, xerostomia, and weight loss.

Psychological SC is another cluster commonly presented in the literature.<sup>7</sup> The most common symptoms included in this cluster were anxiety, depression, worry, sadness, nervousness, and irritability.<sup>7</sup> In this study, anxiety, tension, and sadness were the core symptoms, clustering moderately with concentration and insomnia.

A cancer diagnosis has a profound impact on patients' spiritual well-being.<sup>12,13</sup> According to Pearce et al, more than 91% of patients exhibit spiritual needs at the time of their diagnosis.<sup>12</sup> In another study conducted in Jordan, Abdalrahim et al found that a cancer diagnosis may disturb patients' beliefs and meaning of life and can cause religious struggles.<sup>13</sup> Despite the clear impact of a cancer diagnosis on spiritual well-being, according to our study, cancer patients in Jordan believe that they do not receive adequate spiritual or psychological support during hospitalization. This may indicate that the cancer patients in our study may be struggling to cope with cancer and cancer treatment, and their emotional well-being may be negatively influenced by the experienced psychological symptoms.

Few studies have explored the relationship between patients' symptoms and spiritual well-being.<sup>17–20,35</sup> However, to our knowledge, no study has evaluated the effect of SCs on spiritual well-being. According to our results, only psychological SC predicted spiritual well-being. Patients experiencing this cluster showed a lower score on the FACIT-Sp scale. There is no surprise in these results, as the presence of psychological symptoms such as anxiety, sadness, or tension, as well as their interaction, can negatively affect the meaning of the patient's life and their sense of peace.

In our study, psychological symptoms were more prevalent than physical symptoms. This may indicate that psychological symptoms may be overlooked during patients' treatment and need more attention.<sup>34</sup> Other studies conducted in Jordan support these findings.<sup>34,36</sup> Reducing psychological symptoms in patients and eliminating psychological SC may have a positive effect on patients' spiritual well-being.

Complementary therapy use was another factor that predicted spiritual well-being. In our study, as well as in the literature, complementary therapies positively impact the patient's spiritual well-being.<sup>16</sup> According to the American Society of Clinical Oncology (2021), complementary therapies may include mindfulness-based interventions, physical activity, nutrition counseling, massage, and many more.<sup>16,37</sup> Unfortunately, the hospitals included in our study did not support complementary therapies. Therapies were performed at the patients' risk, were not supervised, and mainly included dietary changes and taking herbal supplements.

The main limitation of our study is related to its cross-sectional design. This makes it impossible to assess the stability of reported SCs over time. Another limitation is that the sample is culturally homogenous, and the meaning of spiritual well-being may vary among different cultures.<sup>38</sup> Despite these limitations, the study is unique in that it evaluates the effect of SCs on spiritual well-being.

## Conclusion

Women with breast cancer experience several concurrent symptoms and symptom clusters. Screening for psychological symptom clusters and their treatment improves patients' spiritual well-being. The majority of women with breast cancer did not receive any complementary therapies and hardly any spiritual or psychological support, which should be provided in the future to support their spiritual well-being.

## Acknowledgment

We thank Prof. Huda Abu-Saad and the FACIT organization for permitting us to use the Arabic versions of the scales. The authors are also grateful for the funding support provided by the Deanship of Scientific Research at the University of Jordan, which was necessary for this study to be completed. The authors thank all cancer patients who continue participating in research studies despite their vulnerability and burden.



## Funding

The Deanship of the Scientific Research at The University of Jordan supported this study.

## Disclosure

The authors declare no conflicts of interest regarding this work.

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