

RESEARCH ARTICLE

Quality of Life and Psychological Well-Being of Breast Cancer Survivors in Jordan

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Abstract

Introduction: Breast cancer is the most common cancer among Jordanians. Breast cancer patients suffer from several negative consequences after treatment and these include pain, fatigue, sexual problems, appearance and body image concerns, with psychological dysfunction. This could affect the patient quality of life and psychological well-being. To the best of our knowledge, there is no published quantitative data on the quality of life and psychological well-being of breast cancer patients in Jordan. The objective of this study was to obtain such data and assess predictors with calculated scores. **Methods:** In this cross-sectional study conducted among breast cancer patients in Jordan diagnosed in 2009 and 2010, assessment was performed using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30), the Breast Module (QLQ-BR23) and the Hospital Anxiety and Depression Scale (HADS). Clinical, demographic and psychosocial indicators that could predict patient quality of life scores were collected. **Results:** The number of patients interviewed was 236 (mean age=50.7±10.7 years). The mean Global Health score for the QLQ-C30 was 63.7±20.2 SD. Among functional scales, “social functioning” scored the highest (mean=78.1±28.6 SD), whereas “emotional functioning” scored the lowest (mean=59.0±SD 33.5). For the QLQ-BR23, the worst scores within the functional scales were for “body image” (mean=52.1±36.8 SD) and “future perspective” (mean=52.9±38.5 SD). The worst symptom was “upset by hair loss” (mean=69.8±43.0). The mean HADS scores was 18.±9.0 SD. Out of study participants, 53% scored abnormal on the anxiety scale and 45% on the depression scale. Severe depression and severe anxiety were detected among 8% and 14% of study participants, respectively. Statistically significant predictors for individual scores were similar to those reported in published studies, such as the presence of recurrence since baseline, family history of cancer, low educational status, current social problems, extent of the disease, presence of financial difficulties, and employment status. **Conclusions and Recommendations:** Breast cancer survivors in Jordan have overall good quality of life scores when compared with patients from Western countries. However, their psychological wellbeing is more impaired. There is an urgent need for psychosocial support programs and psychological screening and consultation for breast cancer patients at hospitals of the Ministry of Health in Jordan.

Keywords: Breast cancer - quality of life - psychological well-being - hospital anxiety and depression scale - Jordan

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Introduction

Breast cancer is the most common type of cancer in Jordan. In the year 2010, it accounted for 37.4% (941 cases) of all newly diagnosed female cancers (n=2516) (Non-communicable Diseases Directorate MoH, Jordan. Jordan Cancer Registry, 2011). The median age at diagnosis for breast cancer patients in Jordan is 50 (Non-communicable Diseases Directorate MoH, Jordan. Jordan Cancer Registry, 2011). A study on the five-year survival rate of breast cancer patients in Jordan showed an overall survival rate of 64%. The survival rates at the

different stages of breast cancer were 83% for stage I, 7% for stage II, 59% for stage III and 35% for stage IV (Non-communicable Diseases Directorate MoH, Jordan, 2013).

With the increase of life expectancy over the last 50 years in the Western world, there was a need to develop measures to quantify morbidity and to assess the quality of life of people with various chronic illnesses. There was also a need to understand the health outcomes from the patient's perspective. The quantification of health outcomes is difficult, yet may still be important, especially when the outcome of some treatment or preventive service is more modest; pain, lethargy or other symptoms may be

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alleviated but not abolished (Bowling, 2001; McDowell, 2006).

In order to assess the short and long term effects of cancer on the quality of life, several cancer-specific health-related quality of life (HRQL) measures have been developed such as the Functional Adjustment to Cancer Therapy (FACT), the European Organization for Research and Treatment of Cancer (EORTC), the Functional Living Index-Cancer (FLIC), the Cancer Rehabilitation Evaluation System (CaRES), and the Quality of Life in Adult Cancer Survivor Scale (QLACS) (Avis et al., 2006).

A few questionnaires have been specifically developed for the assessment of the HRQL of breast cancers patients. These include the Breast Cancer Chemotherapy Questionnaire (BCQ) (Levine et al., 1988), the Functional Assessment of Cancer Therapy-Breast (FACT-B) questionnaire (Brady et al., 1997), and the European Organization for Research and Treatment of Cancer core questionnaire and breast module (EORTC BR 3) (Sprangers et al., 1996). The most commonly used questionnaire is the EORTC-BR23 and has been translated and validated in different languages (EORTC European Organization for research and treatment of cancer. EORTC Quality of Life - Modules). This questionnaire could be used for breast cancer patients at different stages and on different treatment methods (Holzner et al., 2001).

Treatment of breast cancer could include different therapies like partial or total mastectomy, radiotherapy, and chemotherapy with or without systemic hormonal therapy. This is associated with short and long term complications such as pain, lymphedema, reduced vaginal lubrication and hot flashes (Souhami et al., 2001; Sun et al., 2013).

General psychological well-being (subjective well-being) is a broad term. It covers negative aspects of the quality of life related to psychological morbidity, such as depression, anxiety and emotional distress, and positive aspects such as happiness, life satisfaction, morale, self-esteem and sense of coherence (Bowling, 1991). The assessment of psychological well-being for breast cancer patients is important in order to have a comprehensive assessment of the HRQL. Previous studies showed that one quarter to one third of breast cancer patients were detected through screening questionnaires to have distress, anxiety, and depression following breast cancer's diagnosis and treatment (Burgess et al., 2005; Fallowfield et al., 1990; Gumus et al., 2011).

To the best of our knowledge, there are no published reports on the HRQL and psychological well-being of breast cancer patients in Jordan. Therefore, we conducted a survey on intermediate breast cancer survivors (one to three years after diagnosis) to assess their quality of life and psychological well-being. This study would help in the evaluation of the current management of breast cancer in Jordan particularly in the absence of psychosocial support program for breast cancer survivors at the Ministry of Health hospitals, where the majority of breast cancer patients are primarily treated. Other objectives were to measure the proportion of patients with undiagnosed depression or anxiety and to identify the predictors of the quality of life and psychological well-being scores.

Materials and Methods

Study design

This project was a cross-sectional study conducted among female breast cancer patients diagnosed between January 1st 2009 and December 31st 2010. The assessment was therefore at 12 to 36 months after the initial diagnosis. This had allowed for assessment of intermediate onset (1-3 years after diagnosis) consequences of breast cancer like pain and fatigue, sexual problems, appearance and body image concerns and psychological dysfunction. The study did not investigate immediate post-treatment effects of breast cancer management.

Data for this study was collected at the Radiation Oncology Department at Al-Bashir hospital in the period from July 2012 till October 2013. Al-Bashir hospital is the largest Jordanian governmental hospital and is located in Amman, the capital of Jordan. Since 2009, it has become the primary hospital for treating breast cancer patients insured by the Ministry of Health. Patients are surgically treated in different hospitals, and then all are referred to Al-Bashir hospital for follow-up and to receive chemotherapy and radiotherapy. It is therefore believed that the selected sample is to a large extent representative.

Eligibility criteria

Inclusion criteria were being a female breast cancer patients diagnosed in the period from the 1st of January 2009 and the 31st of December 2010, being aged between 18 and 65 years, living permanently in Jordan, having no history of other cancers, and not having received therapy, other than hormonal, for a minimum of six months prior to the interview, signing an informed consent form. Exclusion criteria were being unable to attend or complete the interview due to time constraints, refusing to participate in the study, or choosing later to withdraw from it.

Study outcomes

Primary endpoints: *i*) The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) and the Breast module (QLQ-BR23); *ii*) The Hospital Anxiety and Depression Scale (HADS).

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) and the breast cancer-specific questionnaire (QLQ-BR23) have been widely used. The translated versions including the Arabic version have been validated (Alawadi and Ohaeri, 2009; Awad, Denic, and El Taji, 2008; Goldberg, 2004).

General psychological well-being (subjective well-being)

The HADS is a self-administered questionnaire that can detect minor psychiatric impairment. This scale is a screening instrument for anxiety and depression that has been validated in different settings for the general population and for patients with a wide range of medical conditions (Awad et al., 2008), including breast cancer patients (Alawadi and Ohaeri, 2009; Mehnert and Koch, 2008). A score of 0 to 7 is categorized as normal, a

score of 8 to 10 suggests possible anxiety or depressive disorder, and a score of 11 or above indicates a probable anxiety or depressive disorder (Zigmond and Snaith, 1983). Depression and anxiety scores were also classified separately into groups: normal (0-7), mild (8-10), moderate (11-14), and severe (15-21). Studies showed that patients who are more anxious and more depressed (with higher HADS scores) are less functional and more symptomatic (in QLQ-C30 and QLQ-BR23 questionnaires) (Alawadi and Ohaeri, 2009). Lower levels of body image scores following treatment were significantly associated with higher levels of depression ($p < 0.001$) (Alawadi and Ohaeri, 2009). This questionnaire was also validated on Arab populations, including on breast cancer patients (El-Rufaie and Absood, 1987).

Eligible participants who consented to participate in our study were interviewed alone by a female doctor research assistant, unless they preferred to be accompanied by a friend or a family member. Participants were free not to answer any question or to withdraw from the interview without being questioned. Research assistants were instructed to thank the withdrawals for their time and participation. For illiterate patients, a third party such as a family member or a friend of the participant was available when consenting.

Study outcomes were collected through a face-to-face breast cancer-specific questionnaire (QLQ-BR23) interview by a female junior house officer. These research assistants received extensive training on the study questionnaire.

Scientific and ethics committees approvals

Ethical approvals were obtained from Ethics Committee of the Faculty of Medicine at Mutah University and from the Ministry of Health. All participants signed an informed consent form prior to being interviewed.

Sample size calculation and data analysis

The reported cases of breast cancer in Jordan for the years 2009 and 2010 were 978 and 942 respectively. Using the Kish formula (1965) for sample size estimation (Al-Subaihi, 2003), the estimated sample size was 236. This is the largest sample size based on the assumption of a significance level of 90% and a 5% of margin of error.

Plan for statistical analysis

Analysis was conducted using SPSS software version 19.0 (SPSS Inc., Chicago, IL, USA). In addition to calculating the quality of life scores, data on the predictors of the quality of life scores were collected through a standardized interview questionnaire and a clinical chart review form. They covered socioeconomic variables, histopathological findings, the stage and grade of breast cancer, treatment, and current medical conditions.

Student's t-test was used to compare the means of continuous variables for two groups, and one-way analysis of variance was used to compare the means of continuous variables for three or more groups (Waldmann et al., 2007).

Multiple linear regressions were used to relate the quality of life scores to their predictors. A stepwise

selection method was used to select the best regression model.

Predictors included in the regression model were classified into four groups: *i*) Social and economic indicators: Age, city, age at diagnosis, marital status, place of living (with husband, family, alone, or with others), literacy, level of education, husband's education, employment status, average monthly family income (JD), number of children under 18 at home, and smoking history; *ii*) Medical indicators: Presence of chronic diseases, family history of cancer, number of pregnancies, and if had reached menopause; *iii*) Clinical indicators: Laterality, stage at diagnosis, pathological type, differentiation, tumor size at histological examination, recurrence since baseline, extent of disease, axillary dissection, axillary lymph nodes removal, estrogen receptors status, type of surgery, surgical margin, chemotherapy duration, radiation therapy duration, took trastuzumab (Herceptin®), took tamoxifen, took aromatase inhibitors, hot flashes, night sweats, and numbness; *iv*) Psychosocial indicators: receiving psychological counseling after diagnosis, participation in a psychosocial support program, having suffered from traumatic events prior to the diagnosis with breast cancer, having suffered from traumatic events after diagnosis irrelevant to breast cancer, history of a diagnosis of depression, history of a diagnosis of anxiety, presence of current social problems causing major stress to the patient's life, presence of any financial difficulties that affect the patient's life and well-being, and total HADS score.

Results

Baseline assessment

The number of women who fulfilled the inclusion criteria and completed the study interview was 236. Twenty women refused to participate. The mean age of study participants was 50.7 years (SD: 10.7) and the mean time since diagnosis was 1.9 years (SD: 1.3). Of the study sample, 61.4% were residents of Amman, while the rest were residents of other governorates. Regarding the study participants' educational level, 15.3% could not read and write and only 9.8% had a university education. About half of the participants (49.6%) were housewives, 11.3% were in current employment, and the rest were either retired or unemployed. The mean number of children under 18 at home was 1.7 (SD: 1.8).

Regarding the medical history of the study participants, 76.7% reached the menopause and only 5.5% of the study participants had at least one chronic disease. Interestingly, 58.5% of the participants had a positive family history of breast cancer.

The analysis of clinical indicators revealed that that 91.5% of participants had invasive ductal carcinoma, while the rest had either invasive lobular carcinoma (4.5%) or ductal carcinoma in situ (4%). The percentage of patients who had stage I, II, III, and IV cancer was 12.8%, 45.5%, 34.6%, and 7.1% respectively. Only 7.1% of patients had distant metastasis. Regarding the type of surgery that the patients had, 75% of participants underwent mastectomy, 24% underwent lumpectomy

and 1% had no surgery. Surgical margin was positive in 22.5% of the cases.

Regarding psychological indicators, 87.7% of study participants stated that they did not receive any form of psychological counseling after diagnosis. On the other hand, 7.2% and 4.2% of study participants had a current diagnosis of depression and anxiety respectively. Only 2.5% of participants had joined psychosocial support programs. The percentage of participants who reported suffering from financial difficulties was 45.5%.

Quality of life assessment

Figure 1 shows the means and 95% confidence intervals for the QLQ-C30 and QLQ-BR-23, the proportion of participants scoring less than 33.3%, the proportion of participants scoring more than 66.7%, the quality of life scores for all study participants, and the mean scores and the 95% confidence intervals. The mean global health score (QL2) for the QLQ-C30 was 63.7 (SD: 20.2) with only 5% of study participants scoring less than 33.3%. Among functional scales, social functioning scored the highest 78.1 (SD: 28.6), whereas emotional functioning scored the lowest 59.0 (SD: 33.5). For the QLQ-BR23 questionnaire, the worst scores within the functional scales were for “body image” (mean=52.01±36.8) and “future perspective” (mean=52.9± 38.5 SD). The worst symptom in this questionnaire was “upset from hair loss” (mean=69.8±43.0 SD).

Analysis of QLQ-C30 scores by different clinical parameters showed that patients who had underwent lumpectomy had statistically significant better global scores compared with patients who had mastectomy (69.2±15.8 versus 62.7±20.9, p=0.044). Patients with a family history of cancer had worse global scores when compared with those with a negative history (65.3±22.2 versus 63.0±18.3, p=0.044).

Analysis of the QLQ-C30 by psychosocial indicators revealed that there was a statistically significant difference in the global score between women who had received

psychological counseling after diagnosis and those who had not (64.9±19.5 versus 53.5±25.0, p=0.02), physical functioning (70.8±25.7 versus 57.7±28.3, p=0.03), and role functioning domains (66.3±33.3 versus 47.2±45.1).

Scores of symptom scales for QLQ-C30 are summarized by clinical indicators in Table 6. As shown in this table, there was a statistically significant difference in fatigue scores by the type of surgery (lumpectomy versus mastectomy, p values?). Patients who underwent mastectomy (76%) had worse fatigue score than those who underwent lumpectomy only (42.1±29.6 versus 30.2±28.0, p=0.01).

Analysis of the functional and symptoms scale for QLQ-BR23 by clinical indicators indicates a statistically significant difference in sexual function by the differentiation grade. There was also a statistically significant difference in systematic side effects symptoms by the type of surgery. Patients who underwent mastectomy had worse scores than those who underwent lumpectomy (38.9±21.5 versus 31.4±19.8, p=0.030). A statistically significant difference was found between patients who were currently or previously using tamoxifen and those who did not use it in sexual functioning and sexual enjoyment.

Predictors of the quality of life scores

In order to detect predictors of the quality of life scores, stepwise selection method was used with alpha-to-enter of 0.05 and alpha-to-remove of 0.1. Results of the stepwise method are shown in Table 1 for the global and functional scores and in Table 2 for the symptom scores of the QLQ-C30. For the global scores, only two predictors were selected by the stepwise method. Those were the presence of current social problems and the HADS scores. These two predictors explain about 21% of the total variation in global health score (R-squared=0.209).

Similar to finding of tables 2 and 3, HADS score was also a statistically significant predictor for most of the scales of the QLQ-BR23, except for sexual functioning

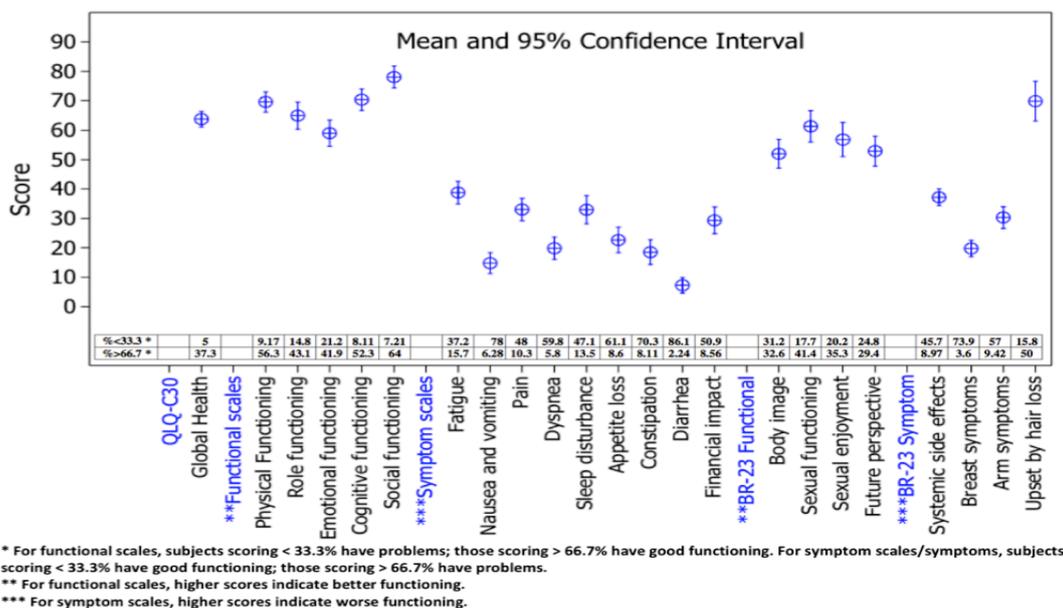


Figure 1. 95% Confidence Interval for The Mean of Quality of Life Measures. Numbers in the table represent the percentage of participants scoring <33.3% and >66.7% respectively

Table 1. Estimated Regression Coefficients for the Global and Functional Scores of QLQ-C30*

Indicator	Categories	Global health	Physical functioning	Role functioning	Emotional functioning	Cognitive functioning	Social functioning
Recurrence since baseline	Constant	55.5	24.6	55.3	2.0	59.0	49.6
	No		13.2		17.0		
	Yes						
Extent of disease	Distant			-20.8			
	Local			-2.7			
	Regional						
Axillary Lymph nodes	0-1			-4.8			
	2-3						
	>3			4.8			
Surgical margin	Negative					3.8	
	Positive						
Axillary dissection	No						-8.5
	Yes						
Tamoxifen use	Currently				-2.2		
	Never				8.4		
	Previously						
Night sweats	No		11.4			12.6	
	Yes						
Numbness	No				10.6		
	Yes						
Education	Illiterate			-10.7		-1.1	-4.3
	1st-9 th class			-16.4		-16.3	-5.8
	10 th -12 th class			-5.8		-3.8	1.2
	College			-5.2		-1.9	-8.3
	University						
Employment status	Employed				-1.7		
	Housewife				-10.0		
	Retired				8.6		
Diagnosed with anxiety	No		17.7		25.1		12.9
	Yes						
Current social problems causing major stress	No	6.9	16.4	13.9			14.0
	Yes						
Financial difficulties that affect life and well-being	No				10.9	9.6	10.6
	Yes						
HADS	Low	9.5		21.5	21.7	9.1	13.0
	Moderate						
	High	-14.9		-17.4	-26.4	-13.4	-13.5
No. of indicators in the reduced model	2	4	5	7	5	6	
R-squared	0.21	0.31	0.39	0.58	0.41	0.46	
R-squared adjusted	0.19	0.27	0.34	0.54	0.37	0.42	
P-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

*Listed are only the predictors in the final model of the stepwise selection method

and upset by hair loss scales. Other predictors by scale are shown in Table 3.

Psychological well-being assessment

The mean total HADS score was 18.0 ± 9.0 SD. The results of the anxiety and depression scales, when analyzed separately, and are shown in Figure 2. Of the study participants, 53% scored abnormal on the anxiety scale and 45% scored abnormal on the depression scale. The percentages of participants with severe depression and severe anxiety were 8% and 14% respectively. Eight percent of the study participants were detected with severe depression, while 14% were detected with severe anxiety.

The statistically significant predictors of the total HADS score were the stage of breast cancer at diagnosis, place of living, employment status, average monthly family income (JD), and any current social problems causing major stress to the patient. Analysis was repeated after excluding subjects with current social problems causing major stress to their lives and the above factors were the only detected predictors.

For anxiety scores, the statistically significant

predictors were similar to the predictors of HADS score except age, which was a significant predictor for anxiety but not the HADS score. On the other hand, the place of living was the only statistically significant predictor for the depression score.

The correlation between the symptoms scales of the QLQ-C30 and BR-23 and the HADS, anxiety score and depression score was conducted to assess the impact of symptoms on psychological status. The mean scores for dyspnea, financial difficulties, systemic side effects, and upset by hair loss were statistically correlated with the HADS total score, while dyspnea and financial difficulties predicted the anxiety scale score. Finally, depression score was predicted by the mean score for pain, systematic side effects, and upset by hair loss.

Discussion

This projects is the first quantitative study to assess the quality of life and psychological well-being for intermediate breast cancer survivors in Jordan. The majority of our study participants reported a good to high

Table 2. Estimated Regression Coefficients for the Symptom Scores of QLQ-C30

Indicator	Categories	Fatigue	Nausea & vomiting	Pain	Dyspnea	Sleep disturbance	Loss of appetite	Constipation	Diarrhea	Financial impact
	Constant	48.1	39.2	73.6	65.5	71.7	123.0	23.7	18.1	47.3
Tumor size at histological examination	<2 cm			-9.2						
	≥2cm									
Recurrence since baseline	No		-31.3		-24.6		-38.1		-13.9	
	Yes									
Extent of disease	Distant			13.3						
	Local			5.9						
	Regional									
Axillary dissection	No								4.0	
	Yes									
Radiation therapy duration	Numeric						-1.4			
Night sweats	No			-11.4		-16.7		-8.8		
	Yes									
Literacy	Literate						-12.9			
	Illiterate									
Level of education	Illiterate								8.9	
	1 st -9 th class								1.9	
	10 th -12 th class								1.3	
	College								1.1	
	University									
Employment status	Employed	-2.7								
	Housewife	7.3								
	Retired	-15.1								
	Unemployed									
Average family monthly income (JD)	1-209	18.5	10.7				-15.1			
	210-629	6.7	2.2				-14.1			
	630-999									
	>1000	8.5	15.4				-8.0			
Smoker	Current			-5.4						
	None			-5.6						
	Ex-smoker									
Psychological counseling after diagnosis	No				-19.8	15.4				
	Yes									
History of depression	No									
	Yes									
History of anxiety	No	-15.2		-18.5		-36.4	-25.4			
	Yes									
Current social problems causing major stress	No			-12.3		-22.6	-7.7	-6.4		
	Yes									
Financial difficulties that affect life	No							-1.3		-38.3
	Yes									
HADS	Low	-17.7	-1.0	-12.4	-10.2					
	Moderate									
	High	11.1	10.2	6.0	6.6					
Family history of cancer	Negative					11.0				
	Positive									
Reached menopause	No							13.5		9.5
	Yes									
No. of indicators in the reduced model		4	3	7	3	5	6	4	3	2
R-squared		0.38	0.23	0.48	0.20	0.39	0.39	0.26	0.29	0.46
R-squared adjusted		0.36	0.20	0.43	0.17	0.35	0.34	0.23	0.27	0.45
P-value		0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.023	0.000

*Listed are only The Predictors in The Final Model of The Stepwise Selection Method

overall health, while only 5% of them reported that they had a low overall health. The global score of QLQ-C30 (63.7±20.2 SD) was close to regional and international figures. The global score in a recent study from Bahrain was 63.9±21.3 SD (Jassim and Whitford, 2013) and was in a study from Germany 65.5±22.2 SD (Waldmann et

al., 2007). On the other hand, this score is lower than the score reported in Kuwait, an another Arab country (mean=45.3±15.3 SD) (Alawadi and Ohaeri, 2009).

Emotional functioning had the lowest mean score (58.98±33.5 SD) within the functional scales for the QLQ-C30; 21.2% of participants reported problems in

Table 3. Estimated Regression Coefficients for QLQ-BR23 Scores*

Indicator	Categories	Body image	Sexual functioning	Sexual enjoyment	Future perspective	Systemic side effects	Breast symptoms	Arm symptoms	Upset by hair loss
Stage at diagnosis	Constant	33	107.87	103.14	35.114	77.218	9.825	51.69	89.02
	I		-16.15			-14.41		-13.72	
	II		-11.09			-8.24		-4.37	
	III		-5.39			-8.013		-10.89	
	IV								
Pathological type	DCIS	-42.02							
	IDC	-20.97							
	ILC								
Extent of disease	Distant						4.493		
	Local						8.108		
	Regional								
Auxiliary Lymph nodes	0-1								11.779
	2-3								
	>3								8.943
Estrogen receptors status	Negative				-7.756				
	Positive								
Chemotherapy duration	Numeric		2.327						
	Trastuzumab (Herceptin®)								
Tamoxifen use	No								
	Yes								
	Currently				-5.199			-17.584	
Night sweats	Never				3.451			-12.741	
	Previously								
	No					-14.89			
City	Yes								
	Amman	-12.939	17.989	14.805					
Age at diagnosis	Other								
Marital status	Numeric	0.5469							
	Married		-55.87	-43.41					24.28
Place of living	Single		0.75	5.27					35.4
	Widowed								
	Family		-18.78				-10.634	-12.514	
Literacy	Husband								
	Literate		-17.906	-16.281				-4.885	
Educational level	Illiterate						8.777		
	1 st -9 th class	2.79					9.096		
	10 th -12 th class	-4.853					3.592		
	College	5.451					4.649		
	University	3.882							
Employment status	Employed				2.338		-3.056		
	Housewife				-5.695		-4.452		
	Retired				3.18		-11.06		
	Unemployed								
	1-219	-2.552	1.28					4.77	-10.55
Received psychological counseling after diagnosis	210-629	-5.572	-0.91					6.598	-9.91
	630-999								
	>1000	23.78	-30.93					49.39	-24.99
	No	-18.844							
Traumatic events prior to diagnosis	Yes								
	No				7.579				
Traumatic events after diagnosis irrelevant to medical condition	Yes								
	No	3.134	11.722						
History of anxiety	Yes								
	No	22.71				-21.289			
HADS	Low	33.603		-9.362	27.74	-9.602	-0.665	-4.739	
	Moderate								
	High	-13.924		-3.544	-7.67	8.705	3.093	21.053	
Chronic disease	No								
	Yes								
Reached menopause	No								
	Yes								
No. of indicators in the reduced model		9	8	5	5	4	6	6	5
R-squared		62.17	53.76	38	49.83	35.19	37.17	36.55	49.86
R-squared adjusted		57.81	48.07	34.3	46.69	32.07	32.45	31.85	45.47
P-value		0.000	0.000	0.000	0.000	0.000	0.008	0.001	0.086

*Listed are only the predictors in the final model of the stepwise selection method

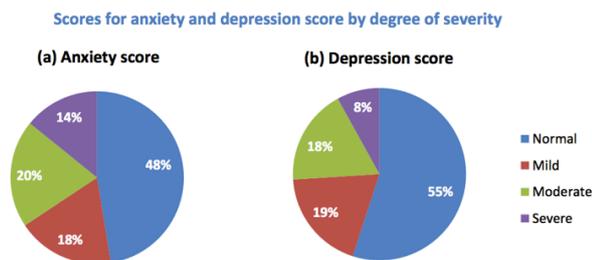


Figure 2. Percentage of Participants Classified as Normal, Mild, Moderate and Severe According to Their (a) Anxiety Score and (b) Depression Score

domain. This score is close to scores reported in Kuwait (Alawadi and Ohaeri, 2009), but slightly lower than scores reported in Bahrain (Jassim and Whitford, 2013) and Germany (Waldmann et al., 2007). The remaining scores of QLQ-C30 functional scales were also lower than those reported in Western countries (Hopwood et al., 2007; Waldmann et al., 2007). The physical functioning mean score in this study was 69.6 ± 26.1 SD, which is lower than that reported in Bahrain (mean= 74.9 ± 21.7 SD) (Jassim and Whitford, 2013) and much lower than reported from Germany (mean= 93.2 ± 6.8 SD) (Waldmann et al., 2007). Results for the remaining physical scales are close to regional and international figures. On the other hand, when compared with regional or international figures (Hopwood et al., 2007; Waldmann et al., 2007; Jassim and Whitford, 2013), the patients' low scores in the physical functioning domain, could not be justified by the age difference (Arndt et al., 2004), the presence of other co-morbidities, or by the prevalence of fatigue (Bower et al., 2000). The study participants' mean age of 50.7 years is similar to the mean age in the Bahraini study (Jassim and Whitford, 2013) and only 5.5% of the Jordanian patients had at least one chronic disease. There is no difference in the prevalence of fatigue between our sample and the published figures (Hopwood et al., 2007; Waldmann et al., 2007; Jassim and Whitford, 2013). We therefore suggest further research in this field in addition to focusing on this scale in counseling services and health promotion campaigns targeting breast cancer survivors in Jordan.

The worst scores among the QLQ-C30 symptoms were for fatigue (mean= 38.8 ± 29.5 SD) with 15.7% of the participants scoring more than 66.7%. This was followed by insomnia with 13.5% of participants scoring more than 66.7%. These results are close to regional and international figures (Hopwood et al., 2007; Waldmann et al., 2007; Jassim and Whitford, 2013). Studies examining the prevalence of fatigue among breast cancer patients found that up to 99% of patients suffer from some degree of fatigue during chemotherapy and/or radiotherapy and that more than 60% of them experience moderate to severe fatigue (Bower et al., 2000; 2006). Published studies showed that fatigue predicts psychological impairment in the forms of HADS score, depression score and anxiety score (Vahdaninia et al., 2010). Similar results were not found in our study. Participants in our study might had other worries than fatigue, such as fear from death or financial worries, that could had affected their psychological well-being more than fatigue or physical

functioning.

Body image showed the lowest scores within the functional scales of the breast module (BR23) (mean= 52.1 ± 36.8 SD). This score is worse than scores from the UK (mean= 78.1 ± 25.8 SD) (Hopwood et al., 2007) and Germany (score= 73.7 ± 30.6 SD) (Waldmann et al., 2007). Breast reconstruction rates have not been assessed in Jordan in any published report. We therefore cannot judge whether counseling and psychological support programs or the type of surgery conducted in Jordan are the predictors of these low scores. Results from Norway showed that the body image score is stable over time and that poor body image is not improved with breast reconstruction (Haghighat et al., 2003). Further research is recommended to compare the breast surgery operations conducted in Jordan with those in the UK. It is also recommended that counselors and those in charge of the psychosocial support programs should focus on this domain.

Regarding the symptoms scales of the QLQ-BR23 "upset by hair loss" had the lowest mean score (mean= 69.8 ± 43.0 SD) with 50% of participants scoring more than 66.7%. These scores are higher than those reported in Bahrain (mean= 46.3 ± 42.9 SD) where only 13.4% of participants scored more than 66.7% (Jassim and Whitford, 2013) and from Germany (mean= 59.3 ± 37.5 SD) (Waldmann et al., 2007). Interestingly, the results are better than reported in Kuwait (mean= 44.8 ± 29.6 SD) and 40.8% scored more than 66.7% (Alawadi and Ohaeri, 2009).

More interestingly, only presence of current social problems and HADS scores predicted the global quality of life score. Similar to results from Iran, HADS score had statistically significant correlation with global health scores and emotional functioning (Montazeri et al., 2003). This means that those who were more anxious or depressed showed lower levels of emotional functioning and global quality of life. In our study, HADS predictors also all physical domains for the QLQ-C30 except physical functioning and all BR-23, except the sexual functioning.

Similar to a study from Bahrain (Jassim and Whitford, 2013) and opposite to other studies, age was not a statistically significant predictor of the quality of life or psychological well-being scores (Volker et al., 2005; Hopwood et al., 2007). In our study, the age range was from 40 to 65. Excluding women older than 65 might justify this result. In Jordan, the prevalence of chronic diseases is very high amongst women older than 65. This might affect the overall result of this study.

Family history of cancer was an important predictor of a low quality of life score. Our results are different from those reported in other studies (Northouse et al., 2002; Von Ah et al., 2012). It is recommended that counselors and psychosocial support programs should also focus on the family history as a factor that could have an adverse impact on the quality of life scores.

Other predictors of individual scores were similar to those reported in published studies such as the presence of recurrence since baseline, educational level, current social problems, extent of the disease, presence of financial difficulties, and employment status (Haghighat et al.,

2003; Arndt et al., 2004; Hopwood et al., 2007; Jassim and Whitford, 2013). Future psychosocial support and counseling services need to consider in their programs those with low education, low income and those with financial difficulties.

Out of the study participants, 53% had mild to severe anxiety where 31 participants (14%) had severe anxiety. Using HADS score, 45% of participants had mild to severe depression and 18% had severe depression. Results from Germany showed that at 18 to 24 months after diagnosis only 19.9% of patients were abnormal on the depression scale and 29.1% were abnormal on the anxiety scale (Falk Dahl et al., 2010). However, there was a small difference in the proportion of patients with severe anxiety or depression between these two populations.

The worrying result is that a large proportion of patients was unaware that they might have depression or anxiety. This is presumed to be because no psychological screening had been offered to them previously. The patients' unawareness is certainly the result of lack of psychological counseling and screening at this hospital.

Monthly family income has been found by our study and other relevant studies as one of the main predictors of the psychological well-being scores (Montazeri et al., 2003; Ell et al., 2005; Jassim and Whitford, 2013). Therefore, attention should be given to patients with a low income as they are at a higher risk for psychological impairment and anxiety secondary to breast cancer.

Women living with their husbands had higher depression score when compared with single women or women living with their family members. This is similar to results from Bahrain (Jassim and Whitford, 2013). This could be justified by women's fear about their children. In addition, this might be also explained in Islamic communities by women's fear that their husbands might get married to another woman, as this is allowed in Islamic law.

Regarding the effect of the presence of symptoms, which were assessed through QLQ-C30 and BR-23, on the psychological status, dyspnea and financial difficulties scores predicted anxiety scale score, while depression score was predicted by the mean score for pain, systematic side effects, and upset by hair loss. Results from other countries, showed that pain and fatigue were significant predictors of anxiety and depression amongst breast cancer cases (Reich et al., 2008). However, fatigue did not predict psychological well-being scores in our study, although it had the lowest score within the symptoms scale for the QLQ-C30 questionnaire and the mean score in our study was lower than reported in the region. In addition, in our study pain predicted depression but not anxiety scores. This is different from what is reported in other studies where 'pain interference' and to a lesser extent, 'pain severity' have been significantly correlated with developing anxiety among patients with breast cancer (Lueboonthavatchai, 2007).

A study from Germany showed that less social support predicts psychological co-morbidity amongst breast cancer survivors. Regarding participation in support programs, this study showed that 57% of the participants had engaged in cancer rehabilitation and 24% in other psychosocial

support programs (Mehnert and Koch, 2008).

Results from Turkey showed that that hopelessness of breast cancer patients decreased with the increase in their social support (Oztunc et al., 2013). A pilot study from the same country showed that group therapy leads to significant reduction in depression, anxiety and distress for patients with breast cancer (Yavuzsen et al., 2012). In contrast, only 8.8% of study participants received psychological counseling after diagnosis and only 2.7% participants in psychosocial support program. The above figures explore the big gap in cancer rehabilitation and psychosocial support programs between developed and developing countries (Oluka et al., 2014). This could justify the poor quality of life scores and the high psychological co-morbidities detected in Jordan when compared with other countries.

The main limitations of this study were that we could not get information from the patients who were diagnosed in 2009 and 2010 and died, those who did not come for follow-up, those receiving treatment in the private sector, and those older than the age of 65 years.

Regarding conclusions and recommendations, we would like to stress the following points: Breast cancer patients in Jordan have good quality of life scores when compared with patients from Western countries. However, their mental aspects are more impaired; Around half of the patients scored average to high scores on the HADS indicating a high rate of psychological impairments; Attention should be given to the unjustified high positive surgical margin detected in this study and the incomplete axillary lymph nodes removal; There is an urgent need for psychosocial support programs and psychological screening and consultations for patients diagnosed with breast cancer at the Ministry of Health hospitals; Social services could consider finding solutions for employment and financial constraints of breast cancer survivors.

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