

RESEARCH ARTICLE

Health-Related Quality of Life among Breast Cancer Patients and Influencing Factors in Morocco

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Abstract

Background: Breast cancer is the most common cancer among women in most countries of the world. It is ranked first in females in Morocco (accounting for 33.4% of the total cancer burden) and more than 60% of cases are diagnosed at stage III or IV. During the last decade, health-related quality of life (HRQOL) has become an important aspect of breast cancer treatment. The objective of this study was to describe self-reported HRQOL in patients with breast cancer and to investigate its associations with sociodemographic and clinical variables. **Methods:** A prospective study was carried out in the main oncology centers in Morocco. Quality of life was measured using the Moroccan Arabic versions of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire C 30 (EORTC QLQ C30) and the Breast Cancer-Specific Quality of Life Questionnaire (EORTC QLQ-BR23). Statistical analyses were performed using descriptive statistics and multivariate analyses. **Results:** A total of 1463 subjects were included in the study, with a mean age of 55.6 (SD= 11.2) years, 70% being married. The majority had stage II (45.9%) and a few cases stage IV (12.9%) lesions. The participants' global health mean score was 68.5 and in "functional scales", social functioning scored the highest (Mean 86.2 (SD=22.7)). The most distressing symptom on the symptom scale was financial difficulties (Mean 63.2 (SD=38.2)). Using the disease specific tool, it was found that future perspective scored the lowest (Mean 40.5 (SD=37.3)). On the symptom scale, arm symptoms scored the highest (Mean 23.6 (SD=21.6)). Significant mean differences were noted for many functional and symptom scales. **Conclusion:** Our results emphasized that the general HRQOL for our study population is lower than for corresponding populations in other countries. This study provided baseline information on the quality of life for a large sample of Moroccan women diagnosed with breast cancer.

Keywords: Breast cancer- Morocco- quality of life, EORTC QLQ C 30, EORTC BR 23

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Introduction

Cancer is an important public health problem and can affect everyone, including females, males, the young, the elderly, the rich, and the poor. The majority of the cases are diagnosed in developed countries; however, most of the deaths occur in developing countries (Sloan et al., 2006).

In Morocco, breast cancer is ranked the first female cancer (33.4%) and more than 60% cases are diagnosed at stage III or IV (Registre des cancers de la Région du grand Casablanca, 2012).

Quality of life (QOL) measurements, based on the patient's perspective, are used frequently nowadays to determine the global impact of diseases as well as medical treatments. QOL refers to the psychosocial, emotional, and physical outcomes of health care treatments as perceived by the patient. Breast cancer is potentially life threatening, and its diagnosis and treatment can have dramatic effects on physical, psychological, social and financial aspects of

life (Albert et al, 2004).

Health-related quality of life (HRQOL) assessment is now considered as a key component of clinical oncology trials (Mandelblatt et al, 1995). HRQOL issues are especially important when trying to weigh the clinical benefits of a possible treatment for breast cancer. Previous studies of patients with advanced or metastatic breast cancer have shown HRQOL data to be predictors of primary clinical outcomes (Montazeri et al, 1996; Montazeri et al, 1996; Montazeri et al, 2003; Montazeri et al, 2001; Coates et al, 1992).

Breast cancer is one of these prevailing chronic conditions which adversely affects the HRQOL in the patients and has been the subject of many studies (Perry et al, 2007). Patients with breast cancer can have physical and emotional troubles as well as problems affecting their families, social activities and work by the disease itself, or can be related to the cancer treatment like surgery, radiotherapy, chemotherapy and hormone

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therapy. In addition studies have shown that uncontrolled nausea, vomiting and weight gain have a negative effect on the quality of life of women with breast cancer who are receiving chemotherapy (Lev et al, 1997; Lev et al, 2000; Spagnola et al, 2003). To our knowledge no studies on HRQOL of Moroccan cancer patients has been reported.

The aim of the present study was to describe self-reported HRQOL in patients with breast cancer and to investigate its associations with sociodemographic and clinical variables.

Material and Methods

Study population and data collection

This was a prospective study of quality of life in breast cancer patients. The study was conducted during 2009-2011; cancer patients were recruited from the main oncology centers in the country (National institute of oncology in Rabat, oncology center of Ibn Rochd hospital in Casablanca, oncology center of Mohamed VI hospital in Marrakech, oncology center of Hassan II hospital in Fez, oncology center in Oujda, oncology center in Agadir). Data collection was made by investigators doctors administering standardized questionnaires at the inclusion before treatment (week 0), through treatment (Week 12) and after treatment (Week 24, 38 and 52). In this study we presented only baseline HRQOL data.

Patients responding to following criteria were included in our study:

- Patients with histological diagnosis of breast cancer confirmed, since less than 3 months,
 - Patients adults (≥ 18 years)
- The exclusion criteria were as follows:
- Patients who have previously received treatment for more than 3 months for their breast cancer.
 - Patients with severe neuropsychiatric disorders.

We included patients with all types of treatment, as determined by their doctors. Hence, patients received a wide variety of chemotherapy. Ethical approval was obtained from the ethics committees in the University Hospital Hassan II in Fez- Morocco and all the subjects were informed of the conditions related to the study; and gave their written- informed consent.

Measures

Patient Information Form

The form included questions about personal information: gender, educational level, age was reported in these categories: 18-34; 35-54 and ≥ 55 years, marital status was defined in these categories: single, married and Divorced/separated/widowed, employment status and health insurance, illness related (stage of disease, family history of a malignant disease), and treatment-related (chemotherapy, history of surgical intervention and radiation related to the breast) characteristics.

Methods of HRQOL evaluation

Quality of life was measured using the Moroccan Arabic version of EORTC QLQ-C30 and its supplementary breast cancer questionnaire (QLQBR23) (El Fakir et al, 2014).

The EORTC QLQ-C30 is a well-known instrument for measuring quality of life in cancer patients. It is composed of nine multi-item scales: 5 functional scales, a global QOL scale (GQOL), and three symptom scales (fatigue, pain, nausea / vomiting). In addition, there are five single item symptom scales (dyspnea, sleep disturbance, appetite loss, constipation and diarrhea); and a final item evaluates the perceived financial impact of the disease. The QLQ-BR23 is a specific questionnaire containing 23 items measuring functioning and symptoms related to breast cancer.

Statistical analysis

Scores on the items and scales were linearly transformed to a scale from 0 to 100. A high score for a functional scale represents a healthy level of functioning. A high score for the global health status represents a high quality of life, but a high score for a symptom scale/ item represents a high level of symptomatology (Fayers et al, 2001).

The descriptive statistics technique was used for the description of clinical, socioeconomic, and demographic variables such as age, place of residence, date of the diagnosis of breast cancer, stage of the disease, marital status, education level and profession.

We analyzed the association of scale scores with socio-demographic and clinical variables, by t-tests and one-way ANOVA. Variables with $P \leq 0.20$ on univariate analysis were taken in account in the multivariate linear regression model to assess the predictors of the scales of the EORTC QLQ – C30 and EORTC BR 23. Results of the multivariate analyses are presented as β with a P value.

The P value of equal or less than 0.05 was considered significant. Data analysis was performed using the statistical software package SPSS 17.0.

Results

A total of 1,463 subjects were included in the study. The subjects' mean age was 55.6 (SD. 11.2) years. The majority (970 or 66.3%) of the subjects indicated that they lived in the urban area. The distribution of the patients according to the diagnosed stages of breast cancer showed that the majority of the subjects had stage II breast cancer (606 or 45.9%). and the few cases had stage IV (12.9%) breast cancer. A greater part of the subjects were married (70%). The majority of them were illiterate (61.7%) and 26.9% of them had health insurance. Table 1 displays the demographic and clinical characteristics of participants.

Health-related quality of life

EORTC QLQ C30

Of the QLQ – C30 scales, Table 2 presents the mean scores of the functional and the symptom scales. The mean score for the global health status for breast cancer patients was 68.5 (SD=18.5). The best functional outcomes were found for the social, cognitive and physical functioning subscales (the respective mean scores were 86.2(SD=22.7), 83.2(SD=23.2) and 78.1(SD=21.5)), while the evaluation of the emotional function scored the lowest, the mean score was 68.5. Almost 69% of all women with breast cancer reported that they felt depressed, irritable,

Table 1. Characteristics of Breast Cancer Patients, Morocco, 2009-2011

Characteristic	N	%
Demographic characteristics		
Age (N=1,460)		
Mean(SD)	55.6 (11.2)	
18-34	79	5.4
35-54	922	63.2
≥55	459	31.4
Gender(N=1,463)		
Male	18	1.2
Female	1,445	98.8
Educational level (N=1,463)		
No schooling	903	61.7
Elementary	234	16.0
Secondary	243	16.6
University	83	5.7
Marital status		
Single	196	13.4
Married	1,026	70.1
Divorced/separated/widowed	241	16.5
Professional status(N=1463)		
Active	196	13.4
Retired	31	2.1
Without profession	126	8.6
Housewife	1,106	75.6
Student	4	0.3
Clinical characteristics		
Metastasis (N=1,463)		
Yes	188	13.3
Treatment received(N=1,231)		
Chemotherapy+Surgery+Radiation	277	22.5
Chemotherapy+Surgery	581	47.2
Chemotherapy	174	14.1
Chemotherapy+Radiation	29	2.4
Surgery+Radiation	19	1.5
Surgery	151	12.3

tense, or worried. In the symptom scale, fatigue and Pain were the most pronounced symptoms (the respective mean scores were 29.2(SD=24.5), 23.8(SD=26.8)), and the mean evaluation of the financial trouble aspect was 63.2(SD=38.2).

EORTC QLQ BR 23

On the EORTC-QLQ-Br23, scores on functioning scales ranged from 40.5 for future perspective to 79.8 (SD=24.6) for body image (Table 2).

Scores on symptoms scales ranged from 18.7 to 23.6. "Systemic therapy side effects" scale had the lower score 18.7. More than half of patients reported pain in the breast area, 35% had swelling in the breast area, over half reported over-sensitivity and 25.4% had skin problems. 27.6% reported having no interest in sex and

Table 2. Scores of EORTC QLQ-C30 and EORTC QLQ Br 23, among Breast Cancer Patients, Morocco, 2009-2011

Functional subscale or symptoms item	Mean	Standard deviation
EORTC QLQ-C30		
Global health status	68.5	18.5
Functional scales		
Physical functioning	78.1	21.5
Role functioning	74.1	28.6
Emotional functioning	62.5	28.5
cognitive functioning	83.2	23.2
Social functioning	86.2	22.7
Symptoms scales		
Fatigue	29.2	24.5
Nausea and vomiting	9.3	19.8
Pain	23.8	26.8
Dyspnea	15.5	24.8
Insomnia	21.1	29.2
Appetite loss	21.7	29.6
Constipation	10.9	23.0
Diarrhoea	4.4	14.1
Financial difficulties	63.2	38.2
EORTC QLQ BR23:		
Functional scales		
Body image	79.8	24.6
Sexual enjoyment	57.5	30.3
Future perspective	40.5	37.3
Symptoms scales/items		
Systemic therapy side effects	18.7	18.1
Breast symptoms	21.3	21.7
Arm symptoms	23.6	21.8
Upset by hair loss	19.5	28.5

58.1% reported being sexually inactive. Of 612 sexually active patients, 19.4 % reported that sex was not enjoyable, whereas enjoyment was described as 'a little', 'quite a bit' or 'very much' by 40.5%, 25.0% and 10.3% women, respectively.

Factors associated with HRQOL scale scores EORTC QLQ C30

In the functional scale we found that younger patients (aged less than 55 years old) demonstrated better physical functions than older patients (79.9 versus 77.2 ; P=0.03). In the symptom scale, mean scores showed that patients aged between 35-54 years experienced greater financial troubles than older patients (63 versus 57; P=0.03). We showed no statistically significant differences between the three groups and other functional and symptom scale (Table 3 and Table 4).

The analysis of the mean scores of the parameters of the quality of life showed that women who were married demonstrated better Global health status, Physical, Role and Cognitive than women who were Divorced/separated

Table 3. Multivariate Linear Regression Models for QLQ Functional Scales in EORTC QLQ-C30 Associated to Socio Demographic Variables and Clinical Characteristics, Among Breast Cancer Patients, Morocco, 2009-2011

	QL β	PF β	RF β	EF β	CF β	SF β
Age (versus ≥ 55 years)						
18-34	4.4*	6.2*				
35-54	2.2*	2.8*				
Marital status(versus Divorced/separated/widowed)						
Single	0.7	2.7	7.7**		5.3*	
Married	3.5**	4.9**	5.1*		5.2**	
Metastasis						
No versus yes	15.4**	11.6**	2.5**	9.5**	8.9**	5.4**
Treatment received (versus Surgery)						
Chemotherapy+Surgery+Radiation		2.1	-0.8		2.8	-9.4**
Chemotherapy+Surgery		-0.7	1.6		-2.5	-5.5**
Chemotherapy		-8**	-8**		-8.0**	-10**
Chemotherapy+Radiation		-7.6	-0.2		7.7	-17**
Surgery+Radiation		5.6	3.2		4.9	-13**

Global health status, (QL); Physical functioning, (PF); Role functioning, (RF); Emotional functioning, (EF); Cognitive functioning, (CF); Social functioning, (SF); B, β-coefficient; *, P<0.05; **, P<0.01

or widowed. Mean scores of all scales in these women reflected better well-being.

Women who were married had significantly fewer problems than women who were Divorced/separated or widowed with Nausea and vomiting (P = 0.005), Pain (P = 0.04), Constipation (P = 0.01), and Financial difficulties (P<0.001) (Table 4).

We compared mean values of the characteristics between different stages of the disease. In the functional

scale we found that women with early-stage of breast cancer demonstrated better general health status and better physical, emotional, cognitive, and social functions than those with breast cancer in its later stages. In the symptom scale, more pronounced symptoms in all categories were found in women with later-stage breast cancer.

After adjusting for confounding factors, Global health status and physical functioning were better in women who were married than women who were Divorced/

Table 4. Multivariate Linear Regression Models for Symptom Scales in EORTC QLQ-C30 Associated to Socio Demographic Variables and Clinical Characteristics, Among Breast Cancer Patients, Morocco, 2009-2011

	FA β	NV β	PA β	DY β	SL β	AP β	CO β	DI β	FI β
Age(versus ≥55 years)									
18-34									-1
35-54									8.2**
QLQ functional scales									
Marital status(versus Divorced/separated/widowed)									
Single		-4.6*					-6.3**		4.2
Married		-3	.7**				-3.9**		-6.4*
Metastasis									
No versus yes	-10.8**	-5.1**	-12.7**	-7.2**	-8.1**	-9.2**	-8.9**		
Treatment received (versus Surgery)									
Chemotherapy+Surgery+Radiation	2.3	-1.3	2.9	-6.2**		-2.4			-12.4**
Chemotherapy+Surgery	2.2	1.7	5.8**	-5.9**		0.5			-10.5**
Chemotherapy	10**	8.6**	18.2**	2.1		15.8**			-8.5*
Chemotherapy+Radiation	11*	-2.3	3.7	-1.7		2.5			-13.3
Surgery+Radiation	3.2	-0.2	7.1	-6		0.8			-16.6

Fatigue, (FA); Nausea and vomiting, (NV); Pain, (PA); Dyspnoea, (DY); Insomnia, (SL); Appetite loss, (AP); Constipation (CO); Diarrhoea, (DI); Financial difficulties, (FI); B, β-coefficient; *, P<0.05; **, P<0.01

Table 5. Multivariate Linear Regression Models for Scores of EORTC QLQ-BR 23 Associated to Socio Demographic Variables and Clinical Characteristics, Among Breast Cancer Patients, Morocco, 2009-2011

	BRBI	BRSEE	BRFU	BRST	BRBS	BRAS	BRHL
	β	β	β	β	β	β	β
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Age(versus \geq 55 years)							
18-34	-8.5**	-9.9		-4.5			1.9
35-54	-2.9*	-7.4**		-2.9**			-6.3*
Marital status(versus Divorced/ separated/widowed)							
Single	-0.1				1.01	-2.9	
Married	3.9*				-3.3*	-4.8**	
Metastasis							
No versus yes	8.5**		9.3**		-7.8**	-5.6**	-11.01**
Treatment received (versus Surgery)							
Chemotherapy+Surgery +Radiation				-4.9**	4.5*		8.1
Chemotherapy+Surgery				-2.5	5.7**		15.2**
Chemotherapy				3.3	18.8**		15.9**
Chemotherapy+Radiation				-6.9	2.01		7.2

Body image, (BRBI); Sexual enjoyment, (BRSEE); Future perspective, (BRFU); Systemic therapy side effects, (ST); Breast symptoms, (BRBS); Arm symptoms, (BRAS); Upset by hair loss, (BRHL); *, P<0.05; **, P<0.01

separated or widowed and younger patients than older patients (aged>55years old)(P<0.01). Global health status and functioning scales were deteriorated in patients with metastasis. For Global health status, patients without metastasis had on average of 15.4 points higher compared to patients with metastasis (Table 3).

EORTC QLQ BR 23

In the functional scale we found that Body image and Sexual enjoyment were negatively affected by younger age (P<0.01). The mean score of the Body image scale for women undergoing mastectomy were significantly worse than those treated by wide local excision (the respective mean scores were 78.7, 85.5, p<0.001). Patients with metastasis had significantly more problems with Body image (P<0.001), Future perspective (P=0.002), Systemic therapy side effects (P<0.001), Breast symptoms (P<0.001) and Arm symptoms (P=0.001).

As shown in Table 5, the multivariate regression models included age, marital status, employment, metastasis and treatment received. The analysis revealed that body image and sexual enjoyment were worse in younger patients than older patients (aged > 55 years old). For body image, patients aged between 18 and 34 years old had on average of 8.5 points lower compared to patients aged over 55 years old. Body image, Future perspective Breast symptoms, Arm symptoms and Upset by hair loss were negatively affected by the presence of metastasis. For upset by hair loss, patients without metastasis had on average of 11.1 points lower compared to patients with metastasis.

Discussion

From a survey of a large sample, the present study examined the Quality of Life (QoL) in patients with breast cancer and the association between socio-demographic, clinical variables and QoL in the Moroccan population.

Our findings showed that Global health status in patients with breast cancer in Morocco was fairly good (mean score, 68.5; SD, 18.5). Comparison of our findings with similar studies on the QoL performed in other countries showed that Global health status/QoL scores evaluated using the same instrument were comparable to those of Morocco. A study performed in Germany (Arndt et al, 2006) showed that the mean quality-of-life score was 65.3 (SD, 22.0) and the score in South Korea was 66.4 (Ahn et al., 2007). Moroccan women with breast cancer scored much better on almost all functional and symptoms scales of the EORTC-QLQ-C30 compared to Kuwaiti women and Lebanese women with BC (Alawadiet al, 2009; Abu-SaadHuijjer et al., 2012). With regard to the pattern of functional scale scores of the EORTC QLQ – C30, our findings was similar to the results reported by King et al., (1996), the lowest scores were noted for physical functioning and role functioning; while the highest scores were for cognitive and social functioning. It may be that Moroccan women receive psychological support through other means such as the family social support and institutional (Waldman et al, 2007). It could also be that participants in this study had greater difficulty understanding the meaning of quality of life and consequently responded to questions more positively.

The worst scores among the QLQ-C30 symptoms were for financial trouble (mean score= 63.2 (SD=38.2). This was followed by fatigue (mean scores were

29.2(SD=24.5)). 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.

On the EORTC-QLQ-Br23, scores on functioning scales (Body image, sexual enjoyment) are similar to other study conducted in the United Kingdom (Hopwood et al, 2007). Scores of symptoms scales (Breast symptoms, arm symptoms) were worse than those reported previously (Hopwood et al, 2007;Jayasekara et al, 2008).

In agreement with previous studies (Høyer et al, 2011), that younger age was associated with poor functioning or high symptom burden included Body image, Sexual enjoyment, Systemic therapy side effects and Upset by hair loss.

It seems that for this sample of Moroccan patients with BC, the impact of clinical characteristics on QoL is far more significant than demographic characteristics, which was again supported by the negative correlation seen between symptoms and the global health status/QoL and functional dimensions.

Disease stage is an important variable in planning treatment and in giving care and support. We also found that functional scale scores were lower in patients with metastasis as compared to those without metastasis. This finding is similar to the studies that have reported that the stage of cancer has a negative effect on quality of life and its dimensions (Lidgren et al, 2007;Ivanauskiene et al, 2010). In a study conducted with a population of Turkish breast cancer patients (Ogce et al, 2007), it was determined that as the cancer stage increased, general quality of life, psychological wellness, perceived social support and performance status were more negatively affected.

Fatigue, sleeping disorders, pain, and arm symptoms were the most frequently reported symptoms. Our results also corroborated these findings.

Few limitations warrant careful interpretation of the results. Selection bias is related to the fact that all participants were recruited from outpatient clinics; our study sample may not have been representative of the general population of women with breast cancer. Because of the high frequency of illiteracy among participants, an interviewer had administered the questionnaire for all patients. Unlike northern countries, the questionnaire could not be used as an auto-administered questionnaire except for a minority of Moroccan population. Moreover, short duration of follow-up avoided to capture long-term benefits of treatments, as these are more interested in chronic diseases.

This study has a number of clinical implications. More attention targeted toward improving QoL should be given to patients who are suffering from metastasis and financial difficulties.

In conclusion, the quality of life among women with breast cancer in Morocco was found to be fair. Women with later-stage of breast cancer demonstrated poorer condition and were less socially active as compared to women diagnosed with early-stage of breast cancer.

This study provided baseline information on the quality of life of a large sample of Moroccan women diagnosed with breast cancer. The results of this study can

set the ground work to address major concerns related to symptoms and financial difficulties.

Competing interests

The author(s) declare that they have no competing interests.

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References

- Abu-Saad Huijjer H, Abboud S (2012). Health-related quality of life among breast cancer patients in Lebanon. *Eur J Oncol Nurs*, **16**, 491-97.
- Ahn SH, Park BW, Noh DY, et al (2007). Health-related quality of life in disease-free survivors of breast cancer with the general population. *Ann Oncol*, **18**, 173-82
- Alawadi SA, Ohaeri JU (2009). Health - related quality of life of Kuwaiti women with breast cancer: a comparative study using the EORTC quality of life questionnaire. *BMC Cancer*, **9**, 222.
- Albert US, Koller M, Wagner U, et al (2004). Survival chances and psychological aspects of quality of life in patients with localized early stage breast cancer. *Inflamm Res*, **53**, 136-41.
- Arndt V, Stegmaier C, Ziegler H, et al (2006). A population based study of the impact of specific symptoms on quality of life in women with breast cancer 1 year after diagnosis. *Cancer*, **107**, 2496-503.
- Cancer Registry of Greater Casablanca (2012). Registre des cancers du grand Casablanca. 2005-2006-2007.
- Coates A, Gebiski V, Signorini D, et al (1992). Prognostic value of quality-of-life scores during chemotherapy for advanced breast cancer. Australian New Zealand Breast Cancer Trials Group. *J Clin Oncol*, **10**, 1833-38.
- El Fakir S, Abda N, Bendahhou K, et al (2014). The European organization for research and treatment of cancer quality of life questionnaire-BR 23 breast cancer-specific quality of life questionnaire: psychometric properties in a Moroccan sample of breast cancer patients. *BMC Res Notes*, **7**, 53.
- Fayers PM, Aaronson NK, Bjordal K, et al (2001). The EORTC QLQ-C30 scoring manual. 3rd ed. Brussels: European organisation for research and treatment of cancer.
- Hopwood P, Haviland J, Mills J, et al (2007). START Trial Management Group. The impact of age and clinical factors on quality of life in early breast cancer: an analysis of 2208 women recruited to the UK START Trial (Standardisation of Breast Radiotherapy Trial). *Breast*, **16**, 241-51
- Høyer M, Johansson B, Nordin K, et al (2011). Health-related quality of life among women with breast cancer - a population-based study. *Acta Oncol*, **50**, 1015-26.
- Ivanauskiene R, Kregzdyte R, Padaiga Z (2010). Evaluation of health-related quality of life in patients with breast cancer. *Medicina (Kaunas)*, **46**, 351-9.
- Jayasekara H, Rajapaksa LC, Brandberg Y (2008). Measuring breast cancer-specific health-related quality of life in South Asia: psychometric properties of the Sinhala version of the EORTC QLQ-BR23. *Qual Life Res*, **17**, 927-32.
- King MT (1996). The interpretation of scores from the EORTC quality of life questionnaire QLQ-C30. *Qual Life Res*, **5**, 555-67.
- Lev EL (1997). Bandura's theory of self-efficacy: applications to oncology. *Sch Inq Nurs Pract*, **11**, 21-35.
- Lev EL, Owen SV (2000). Counseling women with breast cancer

- using principles developed by Albert Bandura. *Perspect Psychiatr Care*, **36**, 131-38.
- Lidgren M, Wilking N, Jonsson B, et al (2007). Health related quality of life in different states of breast cancer. *Qual Life Res*, **16**, 1073-81.
- Mandelblatt JS, Eisenberg JM (1995). Historical and methodological perspectives on cancer outcomes research. *Oncology*, **9**, 23-32.
- Montazeri A, Gillis CR, McEwen J (1996) Measuring quality of life in oncology: is it worthwhile? Part I. Meaning, purposes, and controversies. *Eur J Cancer Care*, **5**, 159-67.
- Montazeri A, Gillis CR, McEwen J (1996). Measuring quality of life in oncology: is it worthwhile? Part II. Experiences from the treatment of cancer. *Eur J Cancer Care*, **5**, 168-75.
- Montazeri A, Milroy R, Hole D et al (2001). Quality of life in patients with lung cancer: as an important prognostic factor. *Lung Cancer*, **31**, 233-40.
- Montazeri A, Milroy R, Hole D et al (2003). How quality of life data contribute to our understanding of cancer patients' experiences? A study of patients with lung cancer. *Qual Life Res*, **12**, 157-66.
- Ogce F, Ozkan S, Baltarli B (2007). Psychosocial stressors, social support and socio-demographic variables as determinants of quality of life of Turkish breast cancer patients. *Asian Pac J Cancer Prev*, **8**, 77-82.
- Perry S, Kowalski TL, Chang CH (2007). Quality of life assessment in women with breast cancer: benefits, acceptability and utilization. *Health Qual Life Outcomes*, **5**, 24-37.
- Sloan FA, Gelband H (2006). Cancer control opportunities in low- and middle-income countries. Washington DC: The National Academies.
- Spagnola S, Zabora J, BrintzenhofeSzoc K, et al (2003). The satisfaction with life domains scale for breast cancer (SLDS-BC). *Breast J*, **9**, 463-71.
- Waldman A, Pritkuleit R, Raspe H, et al (2007). The OVIS study: Health – related quality of life measured by the EORTC QLQC30 and BR23 in German female patients with breast cancer from Schleswig -Holstein. *Qual Life Res*, **16**, 767-76.