Impact of Breast Cancer and its Treatments on Tunisian Patient's Quality of Life: Case Control Study

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Abstract

Purpose: To highlight the quality of life (QOL) of women after the treatment of non-metastatic breast cancer compared with the general population in Tunisia and to determine the predictors of QOL.

Methods: We recruited 50 patients who were in remission for at least 3 months after initial treatment of breast cancer, and 50 controls. QOL was evaluated using the Arabic version of the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 questionnaire.

Results: The mean patients 'scores indicated a poor to average functioning (General QOL score: 56.7; functional scales scores: 55.6% to 67.3%). Those scores showed a significant deterioration of QOL in the sample of breast cancer survivors compared to the general population. Patients' age and duration of remission didn't intervene as predictor factors for functional domains of QOL alteration (p = 0.338). Deterioration of the QOL was induced by the worsening of the emotional (p = 0.005) and social (p = 0.008) functioning but it was independent of other symptoms.

Conclusion: The findings revealed a worsening of the overall QOL of Tunisian patients after the treatment of non-metastatic breast cancer. Emotional and social well-being was found to exert the most considerable influence on the women's QOL in comparison with other demographic and clinical factors.

Keywords: Breast Cancer; Remission; Quality of Life; Treatment; Case-Control

Introduction

Current advances in breast cancer therapeutic field have changed significantly the patients' prognosis which became associated with an uncertain future. As the disease outcome has changed, concern has increasingly been directed to patients' lives in the short and long term, including the physical, psychological and social treatments' consequences [1]. The increase in survival rates has raised the question of evaluating the quality of life (QOL) of women treated for breast cancer [2]. This assessment is based on physical, somatic, psychological and social dimensions.

Indeed, besides its physical repercussions, this disease affects a highly symbolic organ and thus causes a significant emotional and relational upheaval. It is a difficult existential test for the patient that concerns all the aspects of life and includes several threatening elements such as death, pain, mutilation, loss of functions and dependence [3].

Objective of the Study

The objectives of this study were to determine the impact of non-metastatic breast cancer and its treatment on patients QOL during remission compared to the general population and to assess predictor demographic and clinical factors of its alteration.

Patients and Methods

Study design and subject recruitment

This was a cross-sectional and comparative study which included patients after primary treatment of non-metastatic breast cancer. It aims to evaluate their QOL and to compare it to healthy controls.

The inclusion criteria were: breast cancer survivors in remission for at least 3 months, not receiving any oncological treatment other than tamoxifen hormone therapy and absence of metastasis or a symptomatology in favor.

The exclusion criteria were: patients with a disabling somatic pathology, a mental deficiency, a debilitating psychiatric disorder (e.g. schizophrenia) or neurological condition (e.g. dementia), a sensorimotor deficiency and having another history of cancer.

Those patients were previously referred to the Department of Gynecology in Sfax University Hospital for breast surgery during the period from 2010 to 2013, and then they had all received adjuvant therapy. The eligible patients were contacted and were invited to attend the hospital to collaborate to the study. The study's purpose was explained to each patient and consent was obtained orally. Only 50 patients agreed to participate. Among the other contacted women, 15 were not found, 5 had passed away and 10 did not consent to the study. This patient group was compared to a control sample of 50 healthy women matched on age (p = 0.832), geographic origin (p = 0.027) and socioeconomic level (p = 0.075).

Instruments

- A questionnaire that covered demographic and clinical characteristics was completed by the same investigator. Clinical data were collected directly from the patients' records (diagnosis date, duration of remission, stage, type of surgery, history of cancer therapy and other clinical characteristics).

- QLQ-C 30: The QOL was assessed using the QLQ-C30 general scale elaborated by EORTC (European Organisation for Research and Treatment of Cancer) [4]. It is a cancer-specific questionnaire developed in oncology and validated rigorously. An Arabic translation of this questionnaire is already approved by the authors of the instrument [5]. It includes 30 items distributed as follows: 5 functional scales (physical state, functional domain with limitations of activities, cognitive state, emotional state, social relations); 3 symptom scales (nausea, fatigue, pain); 2 visual analog scales for self-evaluation of global health and overall health related QOL scales; 6 additional items to evaluate other symptoms (dyspnea, insomnia, loss of appetite, constipation and diarrhea) and financial difficulties. The scoring of the EORTC QLQ-C30 items was performed according to the EORTC scoring manual [6]. All scores were linearly transformed to a 0 to 100 points scale. A higher score represented a better level of functioning or a higher level of symptoms.

Statistical methods

The data were analysed using the Statistical Package for the Social Science SPSS version 11.0. We used descriptive statistics for clinical, sociodemographic and therapeutic variables and t- and chi-square tests. The t-test for dependent samples was used to compare the main score values for the QOL domains. Multivariate analysis was performed to identify predictors for a poor general health and physical symptoms. The significance was set at p < 0.05.

Results

Personal characteristics of patients

The mean age of patients was 52.06 ± 10.072 years (range 32 - 77 years). The patients' distribution according to their age showed that most of them (68%) were between the ages of 40 and 60 years. Table 1 presents the sociodemographic characteristics of the patients.

	Frequency (%)
Residence area	
Urban	56%
Rural	44%
Education level	
Illiterate	34%
Primary	40%
Secondary	26%
Socioeconomic level	
Low	44%
Average	50%
High	6%
Employment status	
Unemployed	62%
Employed	38%
Marital status	
Married	94%
Widowed	4%
Single	2%

Table 1: *Sociodemographic characteristics of participants.*

Seventeen patients (34%) had at least one chronic somatic disease while 22 patients (44%) had cancer history in their family. Breast cancer represents 60.18%.

At the time of the survey, 45 participants (90%) were already menopausal. Among them, 25 (56%) were menopausal before the onset of cancer, while the rest had presented either an iatrogenic menopause (16 cases: 36%), or a natural menopause (9 cases: 8%). Among the 25 patients not yet menopausal at the time of diagnosis, 16 (64%) had presented an induced menopause by the effect of adjuvant therapy.

Clinical characteristics of patients

Age of the patients at diagnosis: The mean age of patients when diagnosed was 49.66 ± 10.2 years (range 30 - 70 years). 86% of them were over the age of 40 years at this time. Only 4 patients (8%) were under 35 years old when diagnosed.

Duration of remission: The average duration of patients' remission was 17.4 ± 9,17 months with a minimum of 3 months and a maximum of 40 months (3 years and 4 months).

Breast cancer stage: Forty four percent of the patients had a tumor with a size between 2 and 5 cm in its largest dimension (T2) and 22% had extensive tumors (T4).

Therapeutic characteristics of patients

Breast surgery: Forty-one patients (82%) had had a radical mastectomy. A Breast- conserving surgery with lumpectomy was performed for 9 patients (18%). No patient had had a breast reconstruction after mastectomy. Nineteen patients (38%) had external breast implants to restore the shape and feminine appearance.

Adjuvant therapy: The most of patients (70%) had received concomitant radiotherapy-chemotherapy as an adjuvant therapy.

Hormonal therapy: Thirty-two patients (64%) had received antiestrogens as a competitive hormonal therapy. The Tamoxifen was the treatment of choice for all these patients.

Quality of life with EORTC scale: QLQ-C30

A comparative study of quality of life of patients and controls

As shown in table 2, compared to control group, we observed a significant deterioration in overall QOL of patients (p = 0.001), in physical (p = 8.10-6), emotional (p = 0.016), cognitive (p = 0.028), social (p = 0.038) and role functioning (p = 0.0003) and in financial difficulties scale (p = 9.10^{-7}).

QLQ-C30 Criteria	Patients mean ± SD	Controls mean ± SD	p
Overall health status	56.7 ± 14	68.6 ± 18.9	0.001
Functional scales			
Physical functioning	58.6 ± 15.1	74.9 ± 18.9	8.10^{-6}
Role functioning	55.6 ± 23.4	75.3 ± 29.5	0.0003
Emotional functioning	56.3 ± 19.7	67.3 ± 24.9	0.016
Cognitive functioning	66.6 ± 20.2	75.9 ± 21.6	0.028
Social functioning	67.3 ± 24.7	78 ± 25.9	0.038
Physical symptoms scales			
Asthenia	39.1 ± 16.0	36.8 ± 21.6	0.562
Nausea and vomiting	9.3 ± 12.6	7.6 ± 15.5	0.558
Pain	36.3 ± 22.0	36.6 ± 27.9	0.947
Dyspnoea	16.6 ± 21.5	21.5 ± 25.6	0.305
Insomnia	23.9 ± 24.3	27.9 ± 31.1	0.476
Appetite loss	18 ± 27.9	12 ± 17.5	0.202
Constipation	23.3 ± 23.5	16.6 ± 24.5	0.169
Diarrhoea	7.3 ± 13.9	5.3 ± 15.5	0.501
Financial difficulties	30.6 ± 25.0	7.9 ± 17.2	9.10^{-7}

Table 2: Mean scores of the two groups on different QLQ-C30 scales.
SD: standard deviation.

Among the studied dimensions of the QOL, the role functioning was the most affected with an average of 55.6.

Predictors of patients' general health

In order to study the factors that significantly correlated with the overall health status in a multivariable model, we performed a linear regression where the overall health status was the dependent variable and the functional scales and the scales of the physical symptoms were explanatory variables.

The results of the linear regression allow claiming that the social and emotional dimensions were significantly correlated with the overall health status (Table 3).

Explanatory variables	Dependent variable Overall health status	
	Coefficient ß	P
Functional scales		
Physical functioning	$-6,52.10^{-02}$	0,707
Functional domain	0.11	0,257
Emotional functioning	0.22	0,02
Cognitive functioning	$1,85.10^{-02}$	0,822
Social functioning	0.24	0,014
Physical symptoms scales		
Asthenia	0.23	0,053
Pains	-0.11	0,19
Insomnia	$3.42\ 10^{-02}$	0,624
Financial difficulties	-0.104	0,155

Table 3: Predictive factors of the overall health status.

Predictors of patients' physical symptoms

In order to study the factors that significantly correlated with the physical symptoms in a multivariable model, we have conducted linear regressions where the physical symptom represented in each time the dependent variable and the functional scales were the explanatory variables.

The results of these linear regressions enable to claim that only the social functioning variable was significantly correlated with the asthenia and that only the physical functioning variable was significantly correlated with pain (Table 4).

Explanatory variables	Dependent variables			
	Asthenia		Pains	
	Coefficient ß	p	Coefficient ß	p
Physical functioning	-0.17	0.367	-0.82	0,005
Functional domain	-0.13	0.275	$-9,9.10^{-03}$	0,954
Emotional functioning	$1,53.10^{-02}$	0.894	-0.25	0,117
Cognitive functioning	$-2,73.10^{-02}$	0.799	$7,1.10^{-02}$	0,635
Social functioning	-0.27	0.008	$5,1.10^{-03}$	0,971

Table 4: Predictive factors of asthenia and pains.

In addition, the emotional functioning variable was significantly correlated with insomnia and the physical functioning variable was significantly correlated with the financial difficulties (Table 5).

Explanatory variables	Dependent variables			
	Insomnia		Financial difficulties	
	Coefficient ß	p	Coefficient ß	p
Physical functioning	$3.42\ 10^{-02}$	0.854	-0.82	0,005
Functional domain	$1,002.10^{-02}$	0.930	$-9,9\ 10^{-03}$	0,954
Emotional functioning	-0.31	0.02	-0.25	0,117
Cognitive functioning	-0.12	0.409	$7,1\ 10^{-02}$	0,635
Social functioning	-0.21	0.085	$5,1\ 10^{-03}$	0,971

Table 5: *Predictive factors of insomnia and financial difficulties.*

Quality of life according to age and clinical factors

At the Chi^2 test, the type of surgery significantly influenced the overall health status (p = 0.004) that was better in case of conservative surgery (68.51% in case of conservative surgery versus 54.12% in case of mastectomy). The different other functional scales remained independent of the surgery type (Table 6).

Adjuvant treatment strategy (concomitant or sequential chemoradiotherapy) and the hormonotherapy didn't correlate with the dimensions of QOL and the overall health status (Table 6).

Pearson correlations showed that the duration of remission and the age of the patient have an impact neither on the overall health status nor on the functional scales of QOL (Table 6).

Criteria of QLQ-C30	Age	Type of surgery	Adjuvant treatment	Hormonal treatment	Duration of remission
Overall health status	0.338	0.004	0.462	0.348	0.548
Functional scales					
Physical functioning	0.509	0.606	0.733	0.944	0.778
Functional domain	0.161	0.442	0.758	0.316	0.277
Emotional functioning	0.36	0.157	0.401	0.253	0.678
Cognitive functioning	0.127	0.549	0.967	0.189	0.56
Social functioning	0.844	0.104	0.312	0.185	0.803

Table 6: *Correlations of age and clinical factors with quality of life variables.*

Discussion

The score of patients' overall health status in QLQ-C30, compared to healthy subjects was significantly lower. This alteration affected all our patients' age groups regardless of the duration of remission and the strategy of the adjuvant treatment. In contrast, other studies have found that this score has improved after one year of diagnosis to become equivalent to that of the general population [7,8], knowing that chemotherapy was not used for all patients included in these studies. The administration of chemotherapy to all our patients may explain this divergence in findings. Besides, in the study of Hopwood., *et al.* [9], the chemotherapy was identified as the only clinical factor affecting the patients' general health. In addition, the administration of chemotherapy reflects the advanced stage of cancer.

The strategy of chemoradiotherapy administration for our patients did not affect significantly the overall patient's health status (p = 0.462). To our knowledge, the strategy of adjuvant therapy as well as the duration of oncological treatment has not been the subject of research as a predictive factor of QOL. In the literature, there is a study demonstrating that the short duration of treatment was a predictive factor of less fatigue in the long term [10].

Among the clinical factors, mastectomy had a negative effect on the overall health status (p = 0.004). The authors conclude as well that the surgery type had an important impact on women's QOL which was more likely to be negative after mastectomy. Women in the breast-conserving surgery group showed better outcomes with respect to emotional and social function, nausea/vomiting, financial difficulty, body image, arm symptoms and self-esteem [11]. However, according to Ahn., *et al.* [7], beyond the first year after the diagnosis, the QOL was more correlated to the patient sociodemographic characteristics than to the type of surgery.

Regarding the physical health, it was evaluated by the physical dimension and the symptoms scales in QLQ C30. The analysis of our data showed that the physical dimension was altered, compared to controls. In fact, all the patients had received an adjuvant treatment with a chemo-radiotherapy and more than the half were under Tamoxifen with all possible adverse effects and several that even last for a long time. Although the relation was not evaluated in our study, this alteration of the physical health may also be attributed to the presence of somatic comorbid diseases in 34% of patients. In Ahn., *et al.* study [7], it has been demonstrated that somatic comorbidity correlated with deterioration in QOL.

On the physical symptoms scales in QLQ-C30, the patients' symptoms intensity was equivalent to that of control subjects. It seems that the physical symptoms, at an average of one year and a half of remission, disappear gradually to reach the level of the general population. Even in the literature, many authors [12,13] found that most symptoms abate between three months and one year of treatment. Furthermore, the presence of pain negatively influences the physical functioning of patients. Beyond that, some studies have identified pain as a survival prognosis factor of women during the development of cancer [14,15]. These pains hindered the return to the habitual daily life physical activity.

In another approach, we tried to identify the predictive factors of overall health in a linear regression model. Our results indicate that the overall health status was influenced by emotional and social functioning of the patient while it was independent of physical and cognitive functioning and functional role. These findings are consistent with the prior literature [16]. When faced with a life-threatening illness, such as cancer, many patients develop stress symptoms, avoidance behavior and intrusive thoughts and worry [17]. Moreover, in our study, the psychological component that was evaluated by the emotional and cognitive scales was significantly more altered in the group of patients than controls. During remission, the troubles caused by cancer and its treatment will vary depending on the social support and psychological experience.

Further, our results indicate that difficulties in emotional functioning were the only predictive factor of sleep disorders among patients. In this context of breast cancer, insomnia is a deleterious symptom and many are the studies that link it to anxiety and depression combined thereby to deteriorate patients' QOL from the time of diagnosis until advanced stages of the disease [18]. A systematic review indicates that exercise may have beneficial effects and significantly reduces the level of anxiety among breast cancer survivors more than those with other types of cancer. So, moderate or vigorous-intensity activities are recommended [19]. Moreover, stress management interventions have proven to be effective on breast cancer patients [17,20].

In our study, social functioning was more altered in patients than controls and fatigue played a major role in this alteration. Or, about one third of breast cancer survivors suffer from persistent severe fatigue after completion of curative oncological treatment [21]. Fatigue may results from inappropriate coping, fear of progression, catastrophizing, depressive mood and sleeping problems [22]. Otherwise,

some authors [23,24] estimate that fatigue is subsequent to a prolonged social stress coming from many sources: the changes in physical appearance after surgery, in the role at work and in family and concerns about the future or financial difficulties. In addition, it is possible that women suffering from severe fatigue have less social support and consequently their social functioning would also be problematic [25]. Face-to-face cognitive behavioral therapy, especially designed for fatigue in cancer survivors, was found effective in reducing fatigue [21]. However, Abrahams., *et al.* proposed a web-based cognitive behavior therapy to provide an additional treatment option for fatigue in breast cancer survivors. This intervention is less intensive and requires less therapist time [21]. A large multicenter randomized clinical trial demonstrated the effectiveness of physical exercise during adjuvant chemotherapy in enhancing physical fitness, minimizing fatigue and maintaining or enhancing patients 'QOL [26].

Finally, all the physical, social, emotional and cognitive dimensions and the functional role varied independently of patient age. These results probably mirror the importance of spirituality as the main coping mechanism used during all phases of the cancer experience [27]. In our society, religious faith and the couple cohesion play a beneficial role for a better adjustment to the cancerous disease and contribute to the constancy of QOL level on different age groups.

Limitations

The study has some limits such as the cross-sectional design which cannot be used to establish causality, the narrowness of the sample and the limited duration of remission that doesn't evaluate the long term. Other prospective studies are then recommended to better follow the evolution of the QOL over time and identify individual, clinical and therapeutic factors influencing its various dimensions.

Conclusion

In conclusion, despite therapeutic advances, the present paper suggests that patients' QOL treated for breast cancer in Tunisia remains altered compared to the general population. The patients' age does not intervene as a predictive factor in all functional domains alteration of QOL. This reflects the specificity of our Arab-Muslim culture where religious faith and family support contribute to the adjustment and psycho-social adaptation to cancer.

Having an appreciation of QOL can be important for breast cancer survivors and health care providers. It seems that health related QOL variables, particularly emotional and social functioning, contribute as independent prognostic factors of the overall health status. Thus, a psycho-oncological intervention appears even relevant among patients in remission from breast cancer to better develop adaptation capacities and anticipate changes due to oncological treatment.

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Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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