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Assessment of quality of life and selected aspects of physical, psychological, social, and environmental functioning in patients treated for breast cancer 5 years after breast-conserving surgery or mastectomy

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Abstract

Introduction: Breast cancer is the most common cancer in women in well-developed countries. Modern treatment for breast cancer is multimodal, with surgery being the mainstay of treatment. The aim of the study was to assess quality of life, self-efficacy, and satisfaction with life in patients treated for breast cancer with two different surgery types.

Materials and methods: This study involved 360 women – 120 after mastectomy (MAS), 120 after breast-conserving surgery (BCT), and 120 healthy controls (CG). The standardized WHOQOL-BREF (abbreviated form) questionnaire, General Self-Efficacy Scale (GSES), and Satisfaction with Life Scale (SWLS) were used for measuring quality of life

Results: As regards physical, psychological, social, and environmental functioning (WHOQOL-BREF), women after mastectomy had the worst scores ($p<0.001$). We did not find any differences between the studied groups with regard to self-reported general health and general quality of life. The scores in GSES and SWLS were lowest among patients after mastectomy, whereas the BCT and CG groups did not differ significantly in this respect.

Conclusions: Mastectomy, which is necessary in some patients with breast cancer, significantly impairs quality of life. Regardless of the time that has passed since surgery, different patients need different kinds of support, including psychological care.

Key words: breast cancer, quality of life, mastectomy, breast conserving therapy

Introduction

According to the definition put forward by the World Health Organization, quality of life is “an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns” [1].

Health-related quality of life defines problems of the patient that result from the disease and the applied treatment. It analyzes the influence of disease on physical, psychological, and social activities, as well as on well-being, as assessed by the patients themselves [1,2].

Breast cancer is the most common cancer in women in well-developed countries. Modern treatment for breast cancer is multimodal, with surgery being the mainstay of treatment. Depending on the indications for surgery and the patient's preference, surgery involves either breast-conserving treatment (BCT) or mastectomy. Adjuvant treatments include radiation therapy and systemic treatment such as chemotherapy, immunotherapy, or hormone therapy [3-6]. Diagnostic workup and treatment for breast cancer can impair quality of life in the affected patients. Due to the improvement in treatment outcomes in patients with breast cancer in recent years, research on the quality of life in these patients has gained on importance, especially in the long-term.

The aim of the study was to assess quality of life, self-efficacy, and satisfaction with life in patients with breast cancer treated with two different surgery types. We also wanted to compare women with breast cancer with healthy controls matched for age and gender.

Materials and methods

Prior to study commencement, we obtained an approval from the Bioethics Committee, Collegium Medicum, Nicolaus Copernicus University, Torun, Poland (KB 665/2016).

This study involved 360 women, including 240 women treated surgically for breast cancer in the Oncology Center, Bydgoszcz, Poland; 120 patients underwent mastectomy (MAS), and 120 underwent breast conserving treatment (BCT). The control group (CG) comprised of 120 postmenopausal women who were recruited during meetings of an educational society (Klub III-wieku).

Patient were recruited via phone among women who were operated on for breast cancer at the Oncology Center, Bydgoszcz, Poland in 2011. We included 240 consecutive patients who agreed to participate. The study was conducted between December 2016 and February 2017.

The inclusion criteria were as follows:

- 5-year follow-up since surgery for breast cancer

- good general health condition (EOCG 0-1),
- consent to participate in the study,
- history of either mastectomy or breast-conserving surgery

The exclusion criteria were as follows:

- patients during oncological treatment,
- local cancer recurrence or distant metastases during 5-year follow-up after surgery,
- cancer of both breasts,
- history of reconstructive surgery,
- other cancers,
- conversion from breast-conserving surgery to mastectomy,
- other diseases that significantly impair quality of life, e.g. mental diseases, grade IV obesity, diabetes.

In the control group, we included women who agreed to participate in the study and did not have diseases that could significantly impair quality of life, e.g. mental diseases, grade IV obesity, diabetes.

We analyzed sociodemographic and selected medical data of all participants (360 women).

The mean age in the MAS, BCT, and CG groups was 64.42 years, 62.01 years, and 65.91 years, respectively. A vast majority of women in all groups had secondary education (MAS: 59.68%, BCT: 49.17%, CG: 55.83%). Over a half of participants were urban residents; in the BCT and CG groups, participants lived primarily in large cities (over 100,000 of inhabitants). The majority of participants enrolled in the study were married; MAS: 64.52%, BCT: 62.5%, CG: 45.83%. Retirement payment was the most common source of income.

All patients from both treatment groups, i.e., MAS and BCT, were qualified for adjuvant treatment after surgery. In the MAS group, 68.55% of patients required chemotherapy (34.17% in the BCT group), and 51% required radiation therapy. In line with the current treatment guidelines, all patients after breast-conserving surgery underwent local radiation therapy. Detailed information is given in Table 1.

Table 1. Sociodemographic characteristics of participants in all studied groups.

Data	**MAS** n (%)	**BCT** n (%)	**CG** n (%)
Age [years]			
- Mean	64.42	62.02	65.91
- Standard deviation	7.39	9.67	5.21
- Median	65	62	66
Education			
- elementary	4 (3.23%)	13 (10.83%)	3 (2.5%)
- occupational	29 (23.39%)	22 (18.33%)	11 (9.17%)
- secondary	74 (59.68%)	59 (49.17%)	67 (55.83%)
- higher	17 (13.71%)	26 (21.67%)	39 (32.5%)
Place of residence			
- the country	16 (12.90%)	26 (21.67%)	11 (9.17%)
-city up to 100.000 inhabitants	62 (50%)	33 (27.5%)	29 (24.17%)
-city over 100.000 inhabitants	46 (37.10%)	61 (50.83%)	80 (66.67%)
Occupation			
- job contract	9 (7.26%)	32 (26.67%)	3 (2.5%)
- farm	5 (4.03%)	3 (2.5%)	2 (1.67%)
- retirement	87 (70.16%)	67 (55.83%)	103 (85.83%)
-social benefits due to disease	20 (16.13%)	10 (8.33%)	4 (3.33%)
- unemployment	2 (1.61%)	6 (5%)	4 (3.33%)
- self-employment	1 (0.81%)	2 (1.67%)	4 (3.33%)
Marital status			
- single	5 (4.03%)	8 (6.67%)	5 (4.17%)
- married	80 (64.52%)	75 (62.5%)	55 (45.83%)

- widow - divorced	33 (26.61%) 6 (4.84%)	29 (24.17%) 8 (6.67%)	47 (39.17%) 13 (10.83%)
Socioeconomic status - low - medium - good - very good	 11 (8.87%) 78 (62.90%) 34 (27.42%) 1 (0.81%)	 17 (14.17%) 43 (35.83%) 44 (36.67%) 16 (13.33%)	 5 (4.17%) 64 (53.33%) 44 (36.67%) 7 (5.83%)
Adjuvant therapy - chemotherapy - radiation therapy - hormone therapy - other	 85 (68.55%) 63 (50.81%) 44 (35.48%) 0 (0.00%)	 41 (34.17%) 120 (100%) 43 (35.83%) 10 (8.33%)	None

In both patient groups, MAS and BCT, we measured quality of life, sense of self-efficacy, and satisfaction with life after 5 year since surgery. Subsequently, patient scores were compared with those of healthy controls (CG).

The standardized WHOQOL-BREF (abbreviated form) questionnaire, General Self-Efficacy Scale (GSES), and Satisfaction with Life Scale (SWLS) were used for measuring quality of life.

The WHOQOL-BREF questionnaire was developed by the World Health Organization, and its abbreviated form measures quality of life in physical, psychological, social, and environmental domains. The scale contains also one item regarding quality of life and one item regarding self-assessed health condition. The questionnaire consists of 26 items.

The General Self-Efficacy Scale (GSES) by M. Jerusalem and R. Schwarzer, in the adaptation by Z. Juczyński, can be used in adults regardless of health condition, and it assesses the general ability to cope with difficult situations. The score range is 10-40 pints; scores 10-24 indicate a low sense of self-efficacy, scores 25-29 indicate a moderate sense of self-efficacy, and scores 30-40 indicate a high sense of self-efficacy. Self-assessed sense of

self-efficacy is among the factors that influence one's own intensions and actions in different life domains.

The Satisfaction with Life Scale (SWLS) by E. Diener, R. A. Emmons, R. J. Larson, and S. Griffin, in the adaptation by Z. Juczyński, measures satisfaction with current life. The score range is 5-25 points. Scores 5-17 points indicate a low satisfaction with life, scores 18-23 points indicate moderate satisfaction with life, scores 24-36 points indicate a high satisfaction with life with regard to achievements and acceptance of life. The scale comprises of 5 items regarding the course of one's life. The tool can be used in adult people, both patients and healthy people. Satisfaction with life is one of the most important factors that influence the general quality of life [Juczyński 2012].

Statistical analysis

For statistical analysis, we used the PQStat software, version 1.6.2.901. We used the Kruskal-Wallis test and the Dunn post-hoc test for analyzing demographic characteristics. For between-group comparisons regarding qualitative scales, we used the chi-squared test. The GSES, SWLS, and WHOQOL-BREF scores were analyzed with the Kruskal-Wallis test and the Dunn post-hoc test.

$P < 0.05$ was considered statistically significant, and $p < 0.001$ as highly significant.

Results

The WHOQOL-BREF scores in the physical, psychological, environmental, and social aspects, as well as with regard to self-assessed health condition are presented in Table 2.

Table 2. Quality of life assessment in the studied groups (with the abbreviated WHOQOL-BREF questionnaire).

Functional domains		**MAS**	**BCT**	**CG**	**Significance**	MAS vs. BCT	MAS vs. CG	BCT vs. CG
Physical	x	22.15	24.05	23.83	<0.0001	<0.0001	0.0038	0.9007
	SD	2.53	4.79	6.05				
	Me	22	24	23				
Psychological	x	19.11	23.69	20.57	<0.0001	<0.0001	0.0005	<0.0001
	SD	2.23	3.40	3.18				
	Me	19	24	20				
Social	x	14.18	15.68	13.99	<0.0001	<0.0001	1.0000	<0.0001
	SD	2.34	2.72	2.33				
	Me	15	16	14				
Environmental	x	27.03	30.31	27.74	<0.0001	<0.0001	0.2356	<0.0001
	SD	3.14	3.74	3.47				
	Me	27	30	28				
General health assessment	x	3.54	3.67	3.59	0.3007	0.3636	1.0000	1.0000
	SD	0.79	0.80	0.69				
	Me	4	4	4				
General quality of life	x	3.40	3.43	3.39	0.8897	1.0000	1.0000	1.0000
	SD	0.71	0.89	0.78				
	Me	3	4	4				

MAS – patients after mastectomy, BCT – patients after breast-conserving surgery, CG – control group, x-arithmetic mean, SD- standard deviation, Me-median

The lowest quality of life in the physical domain was found in patients after mastectomy, and it was highly significantly lower than quality of life in the remaining groups (BCT, CG, $p < 0.001$), whereas the BCT and CG groups did not differ significantly.

As regards psychological, social, and environmental functioning, the highest scores were observed in patients after breast-conserving surgery ($p< 0.0001$), being significantly higher than in the MAS group ($p< 0.01$) and similar as in the CG group.

We did not find any significant differences between the studied groups with regard to self-reported general health and general quality of life (p> 0.05).

With respect to self-efficacy assessment, performed with the GSES, the lowest scores were observed in patients after mastectomy, and they were significantly lower than the scores in the BCT (p= 0.0259) and control (p= 0.0265) groups. The scores in the BCT and CG did not differ significantly (p= 1.0000).

We observed similar findings with regard to life satisfaction assessed with the SWLS. The lowest scores were seen in the MAS group, and were significantly lower than the scores in the BCT (p= 0.0010) and CG groups (p= 0.0080). The BCT and CG groups did not differ significantly (p= 1.0000),

Table 3. Self-efficacy assessed with the in the studied groups.

Scale	**Level**	**MAS**		**BCT**		**CG**		**Significance of differences**
		n	**%**	**n**	**%**	**n**	**%**	
GSES	low	13	10.48%	17	14.17%	5	4.17%	p=0.0005
	moderate	55	44.35%	27	22.5%	39	32.5%	
	high	56	45.16%	76	63.33%	76	63.33%	
	x	29.18		30.52		30.54		p=0.0097
	SD	4.27		5.15		4.42		
	Me	29		31		30		
SWLS	low	29	23.39%	16	13.33%	24	20%	p=0.0065
	moderate	73	58.87%	60	50%	55	45.83%	
	high	22	17.74%	44	36.67%	41	34.17%	
	x	20.05		22.41		21.52		p=0.0006
	SD	4.17		5.13		4.66		
	Me	20		22		22		

MAS – patients after mastectomy, BCT – patient after breast-conserving surgery, CG – control group, x-arithmetic mean, SD- stand deviation, Me-median, GSES – General Self-Efficacy Scale, SWLS – Satisfaction with Life Scale

Discussion

We compared quality of life and selected aspects of physical, psychological, social and environmental functioning between patients operated on for breast cancer with two different surgery types, i.e. breast-conserving surgery and mastectomy. Of note, the assessments were carried out after 5 years of follow-up, during which there was no cancer recurrence. Moreover, we compared patients with breast cancer with healthy controls matched for gender and age. This makes our results reliable among the studies that have analyzed quality of life in patients with breast cancer.

As regards removal of the primary locus of breast cancer, breast-conserving surgery and mastectomy are the two most common surgery types that are used in the current practice. Fisher et al. reported that these two surgery techniques are associated with similar long-term outcomes, i.e., survival time and time free from disease recurrence [7]. However, the very fact of being diagnosed with breast cancer causes considerable distress and anxiety in the affected patients. This situation is also associated with many problems, which impairs general quality of life [8]. According to Holland et al. and other authors, negative emotions caused by a new health-related situation accompany patients since the onset of initial symptoms throughout the treatment period [9-11].

In our study, we found significant differences with regard to quality of life and other studied parameters between patients treated with different surgery types. Regardless of the diagnostic tool used, i.e., WHOQLQ-BREF, GSES, and SWLS, patients after mastectomy had the lowest scores. At the same time, there were no significant differences in any of the studied parameters between patients after breast-conserving surgery and healthy controls. This might be related to a higher frequency of adverse effects after mastectomy, such as lymphedema of the upper limb on the side of surgery, limited joint mobility, and more frequent occurrence of posture disorders [12-14].

According to the research carried out by Chachaj et al., patients after mastectomy significantly more frequently than patients after breast-conserving surgery experience the so-called “half women complex” [15]. As underlined by other authors, the removal of breast causes lower quality of life in the emotional, social, and family domains [16,17].

Based on the assessment of the general quality of life and general health with the WHOQOL-BREF questionnaire, we did not find any significant differences between the studied patients and healthy controls. Similar observations were made by Bower et al. [18]

and et al. [19] who reported that the prevalence of anxiety and depression in patients treated for breast cancer did not differ significantly from that in the group of healthy controls.

When planning this study, we decided to perform the analyses after a sufficiently long follow-up, i.e., after 5 years since treatment completion. As has been established in numerous clinical trials, the duration of follow-up can influence treatment outcomes. According to Montazeri et al. and Arora et al, the functional state of women operated on for breast cancer improves with time after surgery [20,21]. Based on other research, the critical period of stress related to treatment lasts approximately 2 years since surgery [22,23].

We also assessed self-efficacy and satisfaction with life in our patients, and found that patients after breast-conserving surgery had the most favorable scores, which is in line with the study by Veronesi et al. and other studies [7,25]. According to those authors, this is caused primarily by the good esthetic outcomes of surgery, which significantly reduces emotional stress related to surgery. Quality of life in patients undergoing BCT is impaired in the perioperative period and during radiation therapy; however, a significant improvement is seen as quickly as six months after treatment completion [26,27].

Our study has some limitations. We performed recruitment via phone, and some of potential participants did not agree to take part in the study. Perhaps, people in a favorable mental condition could be more prone to participate, which could create a selection bias in both patient groups. Therefore, for further research, an improved, direct way of collecting relevant data should be applied.

Conclusions

1. In patients with breast cancer, mastectomy causes significant changes in later functioning, including quality of life. Despite the fact that we studied patients after 5 years since surgery, we still found that patients treated for breast cancer with mastectomy had significantly lower scores in the applied scales, i.e., WHOQOL-BREF, GSES, and SWLS than patients after breast-conserving surgery.
2. Regardless of the time that has passed since surgery, patients after mastectomy require special psychological and social support, as well as rehabilitation in order to reduce the negative consequences of surgery and improve self-esteem and satisfaction with life.

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