

**UDK: 618.19-006.6-089 613-056.24:618.19-006.6****THE INFLUENCE OF SURGICAL TREATMENT ON QUALITY OF LIFE OF IN THE PATIENTS WITH BREAST CANCER**

Dr sci med. Mirjana Marinković<sup>1,2</sup>, Dr sci med. Lidija Djordjević<sup>2</sup>,  
Spec. dr med. Miodrag Djordjević<sup>2</sup>, Doc. dr sci med. Vesna Karanikolić<sup>1</sup>,  
Spec. dr med. Toplica Bojić<sup>2</sup>

<sup>1</sup>Faculty of Medicine, University of Niš, Niš, Serbia

<sup>2</sup>Clinic for Endocrine Surgery and Breast Surgery Clinical Center Niš, Niš, Serbia

*Breast cancer is the most common localization of malignant tumors and the most common cause of death from malignant diseases in the female population. It accounts for about 20% of all malignant tumors in women. The primary treatment for breast cancer is surgery. The choice of surgical treatment depends on the histopathological findings and the characteristics of the tumor. Radical mastectomy is a mutilating surgical intervention accompanied by numerous complications and postoperative lifestyle restrictions and numerous activities. Spare surgical interventions are less mutilating procedures with a better cosmetic effect. The aim of this study was to examine the quality of life of patients treated with radical mastectomy and sparing surgery for breast cancer. The study included 60 women three months after surgery for breast cancer. A standardized questionnaire based on questions related to the emotional status of patients, their physical activity, sexual activity and social behavior was used. Numerous advantages have been identified in women with sparing surgery compared to women with radical mastectomy in all spheres of life and work. Better physical activity, more stable emotional status, better sexual functioning and good social communication were found in women who were treated with sparing surgery.*

**Key words:** breast cancer, quality of life, surgery treatment

**UTICAJ HIRURŠKOG TRETMANA NA KVALITET ŽIVOTA BOLESNICA SA RAKOM DOJKE**

*Rak dojke je najčešća lokalizacija malignih tumora i najčešći uzrok smrti od malignih bolesti u ženskoj populaciji. Čini oko 20% svih malignih tumora kod žena. Primarno lečenje raka dojke je hirurško. Izbor metode hirurškog lečenja zavisi od histopatološkog nalaza i karakteristika tumora. Radikalna mastektomija je mutilantna hirurška intervencija praćena brojnim komplikacijama i postoperativnim ograničenjima u načinu života i brojnim aktivnostima. Poštedne hirurške intervencije su manje mutilantne procedure sa boljim kozmetičkim efektom. Cilj ovog rada je bio ispitivanje kvaliteta života bolesnica koje su tretirane radikalnom mastektomijom i poštednom operacijom zbog karcinoma dojke. U studiju je uključeno 60 žena tri meseca nakon hirurške intervencije zbog karcinoma dojke. Korišćen je standardizovan upitnik baziran na pitanjima koje se odnose na emocionalni status bolesnica, njihovu fizičku aktivnost, seksualne aktivnosti i socijalno ponašanje. Utvrđene su brojne prednosti kod žena sa poštednom operacijom u odnosu na žene sa radikalnom mastektomijom u svim sferama života i rada. Utvrđena je bolja fizička aktivnost, stabilniji emocionalni status, bolje seksualno funkcionisanje i dobra socijalna komunikacija kod žena koje su tretirane poštednom hirurškom intervencijom.*

**Ključne reči:** rak dojke, operativno lečenje, kvalitet života

## Introduction

Breast cancer is the most common malignant tumor in women around the world and it makes up over 20% of all malignancies in the female population. More than 1.5 million new cases of illness (over 360,000 in Europe) and over 500,000 deaths with this diagnosis (in Europe around 92,000) are registered annually worldwide (1). The cumulative probability of the disease is around 12.5%, that is, it is expected that one in eight women will suffer from this illness (2).

About 4,500 women in Serbia is annually affected and about 1,800 dies from breast cancer. This is the leading cause of women's mortality between 25-44 years of age, and the third leading cause of mortality between 45 and 64 years of age. Breast cancer in Serbia has increased almost four times since 1970, and frequency increases by 4.3% per year (3).

Following primary treatment with curative intent, relapses occur in 10-30% of patients in stage I, during 10 years of follow-up and at 40-50% in stage II, during five-year follow-up (III, A). Up to 85% of the disease relapse occurs within 5 years of setting the diagnosis. Following post-operative radiotherapy, loco regional recurrence occurs in less than 10% of patients (I, A) (4). The 5-year survival rate indicates what percentage of people live at least 5 years following cancer diagnosis. This percent is calculated on 100 patients. The average 5-year survival rate for women with breast cancer is 90%. The average 10-year survival rate is 83% (5).

Following the diagnosis and depending on the histopathological finding, radical mastectomy or sparing breast surgery is performed, with the goal of removing cancer tissue and preventing further spread of the disease.

In 1889, American surgeon William Stuart Halsted began a new era of breast cancer treatment with radical mastectomy as a surgical technique which at the time became synonymous with breast cancer radical surgery. Halsted's radical mastectomy implied broad removal of the breast with a tumor, removal of the pectoral muscle and complete dissection of the armpit (6, 7).

Less mutilatory surgeries to remove whole breasts with tumors are various modifications of Halsted's radical mastectomy. Two surgeries bearing the names of the authors who first performed them can be distinguished.

In 1948, Patey and Dyson from the London-based Midlesex Hospital published a report on "modified radical mastectomy" which implied removing breast tissue with a tumor, en bloc removal of the axillary fat pad, where the large pectoral muscle was preserved (8, 9). This technique involves the dissection of all three

axillary folds by Berg, with the removal of the small chest muscle, that is, its coracoid and rib attachments. Along with the muscle, the medial pectoral nerve is cut, which results in denervation and atrophy of the lower third of the large breast muscle. This operation is still performed when the lymph nodes are affected by a metastatic disease.

Madden's radical mastectomy modification includes the removal of breast tissue after tumor-ectomy, the removal of the pectoral fascia, the dissection of the two lower axillary folds while preserving both the pectoral muscles (10-12) and complete innervation of the pectoral musculature.

The psychophysical effect on women who underwent breast removal for health reasons is clear. Sparing surgery, as a treatment of operable breast cancer, was developed in the 1980s by implementing a "cascading" theory of the cancer spreading by which the scale of operations in the treatment of breast cancer gradually changed (13, 14). Lumpectomy involves removal of the tumor as well as some surrounding tissue. This treatment includes the excision of a malignant tumor with a zone of surrounding healthy tissue and dissection of the armpit. Along with achieving local disease control, the purpose of sparing surgery is to obtain a good cosmetic result and improve the quality of life of a patient with breast cancer.

## Material and method

Our prospective study included 60 patients, hospitalized and primarily surgically treated for breast cancer at the Breast and Endocrine Surgery Department of the Clinical Center of Niš (CCN), in the period from November 1<sup>st</sup>, 2017 until December 31<sup>st</sup>, 2017.

In 30 patients, surgical treatment was supplemented with the dissection of a ipsilateral (same side) axilla after the primary surgery – tumor-ectomy as a whole. These patients were treated with sparing surgeries and they represented the treatment group. In another 30 patients, definitive surgical therapy after primary tumor-ectomy included radical mastectomy modification by Madden. These patients were the control group. The criteria for inclusion of patients in this study are an excellent surgical procedure, clinically verified tumor process, at least 3 months after the last surgical treatment of the breast, consent for inclusion in the study with prior knowledge of the purpose of the study. The criteria for excluding the patient from the study are metastatic breast disease and the presence of comorbidity (diabetes, hypertension, hypothyroidism, patients previously treated for certain psychiatric diagnosis). In the post-operative three-month period, a modality questionnaire was

used as the instrument for collecting data on the characteristics of respondents. The questionnaire was specially designed for this research and represented the official questionnaire for Department of General Surgery, Clinical Center Niš. After it has been confirmed that the patients meet the criteria for the inclusion in this research, the methodology and the goal of the research was explained to each respondent, clearly indicating that participation in the research was voluntary and that all the information obtained was confidential and would be used only for research purposes. The quality of life in this research is expressed in relation to these 4 domains: emotional status, physical functioning, sexual functioning, and social functioning.

## Statistical data processing

Statistical data processing was performed according to the received questionnaire responses. The data is presented in the form of absolute and relative numbers. Frequency comparison of different mental status parameters with respect to the type of surgery was performed by the Chi-square test. The hypothesis was tested with a significance threshold  $p < 0.05$ . Statistical data processing was done in the EpiInfo software package.

## Results

All patients in both the treatment and control groups were represented in Table 1.

**Table 1.** All patients in both the treatment and control groups

	Sparing surgery (N = 30)		Radical mastectomy (N = 30)		p <sup>1</sup>
	Count	%	Count	%	
Emotional domain					
Anxiety	3	10.0	17	56.7	< 0.001
Discomfort and fear	2	6.7	14	46.7	0.001
Stress	6	20.0	21	70.0	< 0.001
Insomnia	11	36.7	19	63.3	0.071
Feelings of humiliation	0	0.0	15	50.0	< 0.001 <sup>#</sup>
Helplessness	1	3.3	27	90.0	< 0.001 <sup>#</sup>
Depression	2	6.7	19	63.3	< 0.001
Suicidal thoughts	1	3.3	6	20.0	0.108
Dissatisfaction with the relationship with children and the closest family	4	13.3	7	23.3	0.504
Dissatisfaction caused by work-related problems	9	30.0	16	53.3	0.116
Physical domain					
Pain	5	16.7	27	90.0	< 0.001
Tiredness	3	10.0	16	53.3	< 0.001
Early post-operative complications (seroma, hematoma...)	3	10.0	7	23.3	0.298
Lymphoedema	0	0.0	12	40.0	< 0.001 <sup>#</sup>
Body image changes	4	13.3	30	100.0	< 0.001 <sup>#</sup>
Sexual domain					
Changing one's spouse	0	0.0	4	13.3	0.052 <sup>#</sup>
Perception of sexual functioning	17	56.7	5	16.7	0.003
Change in body image	2	6.7	28	93.3	0.001
Changes in sexual desire	1	3.3	9	30.0	0.015
Social domain					
The impact of the disease on an individual	16	53.3	30	100.0	< 0.001
Disturbed marital relations	4	13.3	17	56.7	0.001
Loss partner	1	3.3	10	33.3	0.033
Average number of days on sick leave with present illness	15 ± 6.7	30 ± 9.2	< 0.001 <sup>2</sup>		

<sup>1</sup>Chi-square test; <sup>#</sup> Fisher's exact test

Respective surgeries were performed in 53.3% of patients over 41 years of age, in 23.3% of patients between 36 and 40 years of age, 13.3% of patients between 31 and 35 years of age and 10.0% of patients younger than 30 years. Radical mastectomy was performed in 63.3% of patients over 41 years of age, 23.3% of patients between 36 and 40 years of age, 10.0% of patients between 31 and 35 years of age and 3.3% of patients under 30 years of age. It was found that there was no statistically significant difference in age of the patient relative to the difficulty of the surgery performed ( $p = 0.706$ ).

Anxiety is statistically significantly more common in radical mastectomy patients (56.7% versus 10.0%,  $p < 0.001$ ). Discomfort and fear are statistically significantly more common in radical mastectomy patients (46.7% versus 6.7%,  $p = 0.001$ ). Stress is statistically significantly more common in radical mastectomy patients (70.0% vs 20.0%,  $p < 0.001$ ). Insomnia is equal to surgical difficulty level ( $p = 0.071$ ). Feelings of humiliation, helplessness and depression are present in most radical mastectomy patients (50.0%, 90.0% and 63.3%) and are statistically significantly more frequent than in sparing surgery patients (for all:  $p < 0.001$ ).

Depression is present in 6.7% of sparing surgery patients and 46.7% of radical mastectomy patients. Depression is statistically significantly more common in radical mastectomy patients ( $p = 0.001$ ). Suicidal thoughts occurred in 3.3% of patients who underwent sparing surgery and in 20.0% of radical mastectomy patients. Suicidal thoughts are not statistically significantly related to the type of surgery ( $p = 0.108$ ). Disturbed marital relationships are statistically significantly more common in radical mastectomy patients (56.7% versus 13.3%,  $p = 0.001$ ). Dissatisfaction with the relationship with children and the closest family members is present in 23.3% of radical surgery patients and 13.3% of sparing surgery patients, but no statistically significant difference was found ( $p = 0.504$ ). Dissatisfaction caused by work-related problems is present in 53.3% of radical mastectomy patients and 30.0% of patients who underwent sparing surgeries and were equal in comparison to the tested groups ( $p = 0.116$ ).

Pain occurs in 90.0% of radical surgery patients and in 16.7% of sparing surgery patients. Tiredness occurs in 53.3% of radical surgery patients and 10.0% of sparing surgery patients. Lymphoedema occurs in 40.0% of radical surgery patients. Body image changes are present in all radical surgery patients and 13.3% of sparing surgery patients. Pain, tiredness, lymphedema, and changes in body image are statistically significantly more common in radical surgery patients (for all:  $p < 0.001$ ). Early post-operative

complications are aligned with surgical difficulty ( $p = 0.298$ ).

The frequency of changing one's spouse is not statistically significant in relation to surgical difficulty ( $p = 0.052$ ). Perception of sexual functioning was statistically significantly better in sparing surgery patients (56.7% versus 16.7%,  $p = 0.003$ ). The change in body image is statistically significantly more common in radical surgery patients (93.3% versus 6.7%,  $p < 0.001$ ). Changes in sexual desire are statistically significantly more common in radical surgery patients (30.0% versus 3.3%,  $p = 0.015$ ).

The impact of the disease on an individual, as well as on their social role, is statistically significantly higher in radical mastectomy patients (for all:  $p < 0.001$ ). Patients treated with radical mastectomy were twice as long and statistically significantly longer in the hospital compared to patients treated with sparing surgery ( $p < 0.001$ ).

## Discussion

The results of this study clearly indicate that breast cancer and its treatments include many physical, psychological and social side effects. The findings also suggest that QoL and the body image of women who had mastectomy were negatively affected and there was an important correlation between their body image and QoL in relation to women who underwent sparing surgery ( $p > 0.05$ ).

Women often have to receive various treatments for breast cancer as part of their therapy and as a result, experience sudden and bothersome physical changes to the body.

In modern oncology, the choice of operational technique must be in accordance with the postoperative quality of life, which is of paramount importance to the patient. Patients with breast cancer where the aesthetic appearance and functional state of the breast are preserved also shown good psychophysical stability (15). Bearing in mind that the age limit for the occurrence of breast cancer shifted to the younger age (from 30 to 40 years old), the knowledge that the surgery will permanently change their body image burdens the patients and makes them mentally unstable (16). Diagnosing cancer and its further treatment causes not only physical disturbances, but also emotional trauma (17, 18).

The changes in body image, stressful events, financial and problems with sexual intercourse as well as depression impair the patient's quality of life (19). The following parameters that influence the quality of life are to be taken into account: attractiveness, body image impact, sexuality, the importance of menopausal symptoms such as hot flashes burden and presence of lymphedema (20). Data obtained in this study



indicate that disturbed marital relationships occur statistically significantly more frequently in patients with radical mastectomy (56.7% vs 13.3%,  $p = 0.001$ ). Losing a partner is also present (33.3% vs 3.3%,  $p = 0.033$ ).

Mild to moderate depression with a lower quality of life in all areas (e.g. sexual activity) (21) except family functioning (22) is reported in breast cancer survivors

Depression and depressive disorders, anxiety and anxiety disorders, anger and low self-esteem and low emotional support cause psychological discomfort in breast cancer patients (23). A lot of factors add to psychological distress (24) even years after diagnosis and treatment, and some of them are fears and concerns regarding death and disease recurrence, impairment of body image, alteration of femininity, sexuality and attractiveness. The data obtained in this study show that the presence of pain, tiredness and lymphedema are statistically significantly more common in patients with radical surgery (for all:  $p < 0.001$ ).

Psychological disorders that come with cancer are dramatically reducing the quality of life and affect the outcome of the disease, increase mortality, and according to literature, they occur in 50% of patients with the cancer diagnosis. Early detection of psychiatric disorders, screening, the selection of adequate diagnostic procedures and the selection of adequate therapy are a prerequisite for improving the quality of life of such patients and influence a more favorable prognosis (25, 26). Depressive disorder in patients with breast cancer is considered to be conditioned by the loss of the part of the body invested in feminine representation, along with the fear of the incurable disease, resulting in stigma and suffering (27, 28). Being an extremely difficult time, initial breast cancer recurrence is often associated with psychological distress, such as higher rates of anxiety and depressive disorders ( $> 40\%$ ) (29).

The results obtained in this study coincide with data derived from published literature. Depression is statistically significantly more common in patients with radical mastectomy (46.7%, 6.7%,  $p = 0.001$ ). Also, in a prospective study, Watson et al. (30) found among 578 early breast cancer patients that anxiety, hopelessness and similar depressive symptoms were linked to an increasingly reduced chance of survival at 5 years follow-up.

Different types of depression that subsequently might impair the quality of life can occur after traumatic breast cancer treatment (31). Depression factors that influence the quality of life are fatigue, past history or a recent episode of depression following the onset of breast cancer,

cognitive attitudes of helplessness/hopelessness and resignation (32, 33).

Some studies (34) show that psychological disorders are the rarest in the group with sparing surgery, then in those with reconstruction, while they are the most common in the group with mastectomy. The results of this study showed that QoL of women with radical mastectomy compared to sparing surgery was very low. Anxiety (56.7% versus 10.0%,  $p < 0.001$ ), distress and fear (46.7% versus 6.7%,  $p = 0.001$ ), stress (70.0% vs. 20.0%,  $p < 0.001$ ), a sense of humiliation and helplessness are present in most patients who underwent radical mastectomy (50.0%, 90.0%,  $< 0.001$ ), and are statistically significantly more frequent than in patients who underwent sparing surgery. Our findings coincide with findings from the published literature. Rabin et al. (35) indicate in their studies that the lowest QoL score in both physical and psychological domain is in fact seen in women who underwent mastectomy.

The complex concept of body image in women who have been treated for breast cancer includes three distinctive areas. The first is affective (feeling feminine and attractive), then behavioral (avoiding people due to changes in appearance), and finally cognitive (satisfaction with the scar or appearance in whole) (36). It is common that poor body image perceptions in breast cancer survivors negatively influence the physical and psychological functioning and also the quality of their relationships (37).

As it can cause more disfigurement than other forms of surgery, including lumpectomy, mastectomy leads to a poorer body image and a deterioration in the patient's QoL (38). Our study showed that changes in body image were statistically significantly more common in patients with radical surgery (30.0% versus 3.3%,  $p = 0.015$ ) compared to sparing surgeries. Bagheri and Mazaheri (39) also implied that there was an important relationship between QoL and body image in patients who underwent a unilateral mastectomy. Gardikiotis et al. (40) also claim that the QoL of mastectomized women was influenced by the level of satisfaction with the body image. Mastectomy patients reported low body image at follow-up and experienced certain problems with sexual functioning. Other studies among women with breast cancer confirmed this finding (41, 42). In this study, the obtained data indicate that perception of sexual functioning (56.7% vs. 16.7%,  $p = 0.003$ ), changes in sexual desires (93.3% versus 6.7%,  $p < 0.001$ ) were statistically significantly worse in patients with radical mastectomy.

When it comes physical functioning, a negative body image can often be the cause of certain sexual difficulties (43). These difficulties

can include decreased libido, vaginal dryness, atrophic vaginitis, and hot flashes due to a premature menopause. These can have negative consequences on the sexuality of the younger woman being treated for breast cancer (44, 45).

Studies and research reported findings in relation to body image and the negative influence it may have on the younger breast cancer survivors and their partnered relationships. (46, 47).

In this study, the obtained data indicate that perception of sexual functioning (56.7% vs. 16.7%,  $p = 0.003$ ), changes in sexual desires (93.3% versus 6.7%,  $p < 0.001$ ) were statistically significantly worse in patients with radical mastectomy. The influence of the disease on the individual as well as on their social role is statistically significantly higher in patients with radical mastectomy (for all:  $p < 0.001$ ). Women treated with radical mastectomy were twice as long and statistically significantly longer in the hospital compared to patients who underwent sparing surgery. ( $p < 0.001$ ).

Patients who return to work may also have to deal with certain problems, not only in the relationship with their colleagues but also in their cognitive functioning (48).

## Conclusion

Despite the limitations of this study due to a small number of respondents, it was con-

cluded that the analysis of the predictors of the quality of life also showed the predictive influence of the health characteristics of the respondents describing the functional status, the predictors of the quality of life in the domain of mental health as well as the characteristics of the treatment.

The perception of the quality of life in patients who underwent radical mastectomy and patients treated with a sparing surgery is different, with a poorer perception of the quality of life observed in patients treated with radical mastectomy. Patients undergoing sparing surgeries have a higher level of quality of life in the domain of emotive, physical, sexual and social health than patients who underwent radical mastectomy.

The quality of life, psychosocial condition and body image were most severely disrupted in patients who were subjected to mastectomy, unlike patients who underwent sparing surgery. Mastectomy has more negative effects both on body image and QoL when compared to other treatment types.

According to the results of the study, it can be suggested that during the planning of surgical oncology treatment, special attention should be paid to specific differences in possible changes in the body image and QoL of women who are subjected to mastectomy or sparing surgery, with the exclusion of other variables that may have a confounding effect.

## References

1. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, et al. GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013. Available from: <http://globocan.iarc.fr>, accessed on 13/12/2013.
2. Pekmezović T. Epidemiologija raka dojke. U: Milašinović G, urednik. Vodič dobre kliničke prakse za dijagnostikovanje i lečenje raka dojke. Beograd: Ministarstvo zdravlja Republike Srbije; 2013:5-7.
3. Hospitalni registar za rak Instituta za onkologiju i radiologiju Srbije, 2012.
4. ESMO Minimum Clinical Recommendations for diagnosis, treatment and follow-up of locally recurrent or metastatic breast cancer (MBC). Annals of Oncology 16 (Supplement 1): i10-i12, 2005.
5. <https://www.cancer.net/cancer-types/breast-cancer/statistics/2015>
6. Halsted WS (1894) I. The results of operations for the cure of cancer of the breast performed at the Johns Hopkins Hospital from June, 1889 to January, 1894. Ann Surg 20:497-555.
7. Halsted WS. The results of radical operation for the cure of the carcinoma of the breast. Ann Surg. 1907;46:1.
8. Patey DH, Dyson WH. The prognosis of carcinoma of the breast in relation to the type of operation performed. Br J Cancer 1948;2:7-13.
9. Djordjevic L. Korelacija lokalnog recidiva i p nalaza na ekscizionim površinama kod bolesnica lecenih postednim operacijama zbog karcinoma dojke. Magistarska teza. 2000. Nis.
10. Madden JL, Kandalafi S, Bourque R. Modified radical mastectomy. Ann Surg. 1972;175:624.
11. Schnitt SJ et al. Can we identify patients with invasive breast cancer adequately treated with breast conserving surgery alone? Mod Pathol. 1998;11(2):129-33.
12. Auchincloss H. Significant location and number of axillary metastases in carcinoma of the breast. A justification for conservative operation. Ann Surg. 1963;158:37.
13. Veronesi U, Cascinelli N, Mariani L, Greco M, Saccozzi R, Luini A, Aguilar M, Marubini E. Twenty-year follow-up of a randomized study comparing breast-conserving surgery with radical mastectomy for early breast cancer. N Engl J Med 2002;347(16):1227-32.
14. Sarrazin D, Le M, Rouesse J et al. Conservative treatment versus mastectomy in breast cancer tumors with microscopic diameter of 20 mm or less. Cancer, 1984;53:1209.
15. Avis NE, Crawford S, Manuel J. Psychosocial problems among younger women with breast cancer. Psychooncology 2004;13(5):295-308.
16. Wilkins EG, Cederna PS, Lowery JC, Davis JA, Kim HM, Roth RS, Goldfarb S, Izenberg PH, Houin HP, Shaheen KW Prospective analysis of psychosocial outcomes in breast reconstruction: one-year postoperative results from the Michigan breast reconstruction outcome study. Plast Reconstr Surg. 2000;106(5):1014-25.
17. Kissane DW, Maj M, Sartorius N. Depression and cancer. Hoboken, NY: John Wiley & Sons Ltd, 2011.
18. Meijer A, Roseman M, Delisle VC i sur. Effects of screening for psychological distress on patient outcomes in cancer: A systematic review. J Psychosom Res 2013;75:1-17.
19. Andritsch E, Dietmaier G, Hofmann G, Zloklikovots S, Samonigg H. Global quality of life and its potential predictors in breast cancer patients: an exploratory study. Support Care Cancer 2007;15(1):21-30.
20. Grabsch B, Clarke DM, Love A, McKenzie DP, Snyder RD, Bloch S et al. Psychological morbidity and quality of life in women with advanced breast cancer: a cross-sectional survey. Palliat Support Care. 2006;4(1):47-56.
21. Andritsch E, Dietmaier G, Hofmann G, Zloklikovots S, Samonigg H. Global quality of life and its potential predictors in breast cancer patients: an exploratory study. Support Care Cancer. 2007;15(1):21-30.
22. Mols F, Vingerhoets AJ, Coebergh JW, van de Poll-Franse LV Quality of life among long-term breast cancer survivors: a systematic review. Eur J Cancer. 2005;41:2613-19.
23. Casati A, Meyerowitz BE. Psychosocial correlates of breast cancer and its treatments. Psychol Bull 1980;87(1):108-31.
24. Baucom DH, Porter LS, Kirby JS et al. Psychosocial issues confronting young women with breast cancer. Breast Dis. 2006;23:103-13.
25. Asevedo E, Brietzke E, Chaves AC. First manic episode in a patient with breast cancer. Gen Hosp Psychiatry 2013;35:13-14.
26. Harter M, Reuter K, Aschenbrenner A i sur. Psychiatric disorders and associated factors in cancer: results of an interview study with patients in inpatient, rehabilitation and outpatient treatment. Eur J Cancer 2001;37:1385-93.
27. Vin-Raviv N, Akinyemiju TF, Galea S i sur. Depression and Anxiety Disorders among Hospitalized Women with Breast Cancer. PLOS One 2015;10(6):129-69.
28. Fresche de Souza B, Andrade de Moraes J, Inocenti A i sur. Women with breast cancer

- taking chemotherapy: depression symptoms and treatment adherence. *Rev Lat Am Enfermagem* 2014;22(5):866-73.
29. Okamura H, Watanabe T, Narabayashi M, Katsumata N, Ando M, Adachi I et al (2000) Psychological distress following first recurrence of disease in patients with breast cancer: prevalence and risk factors. *Breast Cancer Res Treat* 61:131-7.
  30. Watson M, Haviland JS, Greer S, Davidson J, Bliss JM. Influence of psychological response on survival in breast cancer: a population-based cohort study. *Lancet*. 1999;354:1331-6.
  31. Deshields T, Tibbs T, Fan MY, Taylor M Differences in patterns of depression after treatment for breast cancer. *Psychooncology*. 2006;15: 398-406.
  32. Kissane DW, Grabsch B, Love A, Clarke DM, Bloch S, Smith GC (2004) Psychiatric disorder in women with early stage and advanced breast cancer: a comparative analysis. *Aust N Z J Psychiatry* 38(5):320-6.
  33. Okamura M, Yamawaki S, Akechi T, Taniguchi K, Uchitomi Y (2005) Psychiatric disorders following first breast cancer recurrence: prevalence, associated factors and relationship to quality of life. *Jpn J Clin Oncol* 35(6):302-9
  34. Nissen MJ, Swenson KK, Ritz LJ, Farrell JB, Sladek ML, Lally RM. Quality of life after breast carcinoma surgery: a comparison of three surgical procedures. *Cancer*. 2001 Apr;1;91(7): 1238-46.
  35. Rabin EG, Heldt E, Hirakata VN, Fleck MP. Quality of life predictors in breast cancer women. *Eur J Oncol Nurs* 2008;12:53-7.
  36. Hopwood P, Fletcher I, Lee A, Al Ghazal S. A body image scale for use with cancer patients. *European journal of cancer*. Jan; 2001;37(2): 189-97.
  37. Fobair P, Stewart SL, Chang S, D'Onofrio C, Banks PJ, Bloom JR. Body image and sexual problems in young women with breast cancer. *Psychooncology*. Jul; 2006;15(7):579-94.
  38. Chow R, Pulezas N, Zhang L, Ecclestone C, Leahey A, Hamer J, DeAngelis C, Bedard G, McDonald R, Bhatia A, Ellis J, Rakovitch E, Vuong S, Chow E, Verma S. Quality of life and symptom burden in patients with breast cancer treated with mastectomy and lumpectomy. *Support Care Cancer* 2016;24:2191-9.
  39. Bagheri M, Mazaheri M. Body image and quality of life in female patients with breast cancer and healthy women. *Journal of Midwifery and Reproductive Health* 2015;3: 285-92
  40. Gardikiotis I, Manole A, Azoicăi D. Quality of life with mastectomy for breast cancer, in terms of patients' responses of SF-36 questionnaire. *Rev Med Chir Soc Med Nat Iasi* 2015;119:529-35.
  41. Collins KK, Liu Y, Schootman M, et al. Effects of breast cancer surgery and surgical side effects on body image over time. *Breast Cancer Res Treat*. Feb; 2011;126(1):167-76.
  42. Rasmussen DM, Hansen HP, Elverdam B. How cancer survivors experience their changed body encountering others. *European journal of oncology nursing: the official journal of European Oncology Nursing Society*. Apr; 2010;14(2):154-9.
  43. Panjari M, Bell RJ, Davis SR. Sexual function after breast cancer. *The journal of sexual medicine*. Jan; 2011;8(1):294-302.
  44. Rowland JH, Meyerowitz BE, Crespi CM, et al. Addressing intimacy and partner communication after breast cancer: a randomized controlled group intervention. *Breast Cancer Research and Treatment*. Nov; 2009;118(1):99-111.
  45. Avis NE, Crawford S, Manuel J. Quality of life among younger women with breast cancer. *Journal of Clinical Oncology*. May 20;2005 23(15):3322-30.
  46. Zimmermann T, Scott JL, Heinrichs N. Individual and dyadic predictors of body image in women with breast cancer. *Psychooncology*. Oct; 2010;19(10):1061-8.
  47. Elmir R, Jackson D, Beale B, Schmied V. Against all odds: Australian women's experiences of recovery from breast cancer. *J Clin Nurs*. Sep; 2010;19(17-18):2531-8.
  48. Helena Carreira, Rachael Williams, Martin Müller, Rhea Harewood, Krishnan Bhaskaran. Adverse mental health outcomes in breast cancer survivors compared to women who did not have cancer: systematic review protocol. *Syst Rev*. 2017;6:162.