



Assessment of age-related influences on the quality of life of breast cancer patients before and after surgical treatment

Procena uticaja životnog doba na kvalitet života bolesnica sa rakom dojke pre i posle hirurškog lečenja

Sanja Kostić*, Zafir Murtezani*, Zoran Andrić*, Nebojša Ivanović^{†‡},
Zoran Kozomara[§], Marko Kostić^{||}, Vesna Miličić^{¶**}, Sanja Kocić^{††‡‡}

Clinical Hospital Center "Bežanijska kosa", *Department of Medical Oncology, [†]Department of Surgery, Belgrade, Serbia; University of Belgrade, [‡]Faculty of Medicine, Belgrade, Serbia; Institute for Oncology and Radiology of Serbia, [§]Department of Surgery, Belgrade, Serbia; Clinical Center of Serbia, ^{||}Clinic for Thoracic Surgery, Belgrade, Serbia; University of Kragujevac, Faculty of Medical Science, [¶]Department of Dermatovenerology, ^{††}Department of Social Medicine, Kragujevac, Serbia; Clinical Center Kragujevac, ^{**}Clinic of Dermatovenerology, Kragujevac, Serbia; Institute for Public Health Kragujevac, ^{†††}Department of Social Medicine, Kragujevac, Serbia

Abstract

Background/Aim. Breast cancer comprises about 25% of all female cancers, and its incidence is increasing. New diagnostic procedures and therapeutic modalities have increased treatment success rates as well as patient survival. The goal of contemporary treatment is not only patient survival, but also a better quality of life (QoL). The objective of this study was to assess the effect of age at diagnosis on the QoL of patients with breast cancer before and after surgery. **Methods.** We analyzed QoL in 170 female patients (43 patients < 50 and 127 patients ≥ 50 years) diagnosed with breast cancer (I and II stage) a month before and after surgical treatment, using the European Organisation for Research and Treatment of Cancer (EORTC QLQ-C30) questionnaire and specific version for breast cancer patients (EORTC QLQ-BR23). **Results.** The QLQ-C30 questionnaire showed that surgical treatment significantly decreased

all domains of the patients' QoL in both age groups. Age-related differences were present in sexual functioning and pleasure independently of surgical treatment, with higher scores in the group of younger women. The analysis of data obtained using the QLQ-BR23 questionnaire revealed a lower QoL after surgical treatment in almost all dimensions regardless of patients' age. **Conclusion.** The results of our study pointed out statistically significant differences in the QoL domains of sexual functioning, and sexual enjoyment between women in both age groups independently of surgical treatment. The QoL was better in the younger age group. Surgical breast cancer treatment negatively affected patients QoL independently of age.

Key words:

breast neoplasms; quality of life; age groups; surgical procedures, operative; surveys and questionnaires.

Apstrakt

Uvod/Cilj. Rak dojke čini oko 25% svih malignih tumora žena, sa incidencom u porastu. Novije dijagnostičke procedure i terapijski modaliteti lečenja rezultiraju uspešnijim lečenjem i većom stopom preživljavanja žena obolelih od raka dojke. Cilj savremenog lečenja podrazumeva, ne samo bolje preživljavanje, već i bolji kvalitet života. Cilj ove studije bio je da se proceni kvalitet života bolesnica obolelih od karcinoma dojke pre i posle hirurške intervencije u zavisnosti od njihovog životnog doba pri postavljanju dijagnoze. **Metode.** Analizirali smo kvalitet života 170 bolesnica sa

karcinomom dojke (43 starosti do 50 godina i 127 starosti 50 i više godina) u I i II kliničkom stadijumu bolesti, mesec dana pre i nakon hirurškog lečenja, primenom upitnika Evropske organizacije za istraživanje i lečenje karcinoma (EORTC QLQ-C30) i specifične verzije upitnika za karcinom dojke (EORTC QLQ-BR23). **Rezultati.** Analizom upitnika QLQ-C30 pokazano je da je hirurško lečenje značajno negativno uticalo na kvalitet života bolesnica u obe starosne grupe. Nezavisno od hirurškog lečenja, između bolesnica mlađih i starijih postojale su razlike u seksualnom funkcionisanju i seksualnom uživanju, sa višim skorovima u grupi mlađih žena. Analiza uticaja hirurškog lečenja na kva-

litet života, primenom upitnika QLQ-BR23, pokazala je statistički značajno pogoršanje kvaliteta života nakon hirurškog lečenja u skoro svim domenima kod bolesnica obe starosne grupe. **Zaključak.** Rezultati našeg istraživanja ukazali su na statistički značajne razlike u kvalitetu života između žena obe starosne grupe nezavisno od hirurškog lečenja i to u domenima seksualnog funkcionisanja i uživanja. Pritom je

bolji kvalitet života bio u grupi žena mlađe životne dobi. Hirurško lečenje bolesnice sa karcinomom dojke negativno je uticalo na kvalitet života, nezavisno od starosnog doba.

Ključne reči:
dojka, neoplazme; kvalitet života; životno doba; hirurgija, operativne procedure; ankete i upitnici.

Introduction

Breast cancer makes up approximately 25% of all cancers in the female population in Europe and 28% in the most developed European countries with mortality rate of 14%–15%. In Serbian females, 26% of all cancer diagnoses and 17.5% of all cancer deaths are due to breast cancer¹. Globally, the incidence of breast cancer has been continuously rising by 3.1% *per* year over the last 30 years, while its mortality has varied¹. The age-standardized incidence rate of breast cancer, adjusted to the world population, in central Serbia in 2015 was 61.0 *per* 100,000 population, while the age-standardized breast cancer mortality rate, adjusted to the world population, was 19.8 *per* 100,000².

Most breast cancers (85%) are diagnosed early (stage I or II), a smaller number with locally progressive disease (stage III), and the fewest initial diagnoses are performed when the disease has already significantly progressed and is already the stage IV disease. Breast cancer therapy and treatment depend on the clinical stage of the cancer and on individual disease characteristics, comorbidities, as well as the patient's overall state¹.

Appropriate surgical intervention, followed by radiotherapy, chemotherapy, endocrinological and biological therapy dramatically increase the survival rates of breast cancer patients. The 5-year survival rate for patients diagnosed with the stage I or II disease is 92%³. New diagnostic procedures and therapies have lead to an increased number of women undergoing successful breast cancer therapy and improved overall survival rates⁴.

Current concepts in breast cancer therapy take into account not only disease progression, but also the patient's quality of life (QoL). The concept of QoL has a broader connotation than the concept of health, and it also includes living and material stipulations. It is defined as the patient's total welfare. Its goal is for the patient to live their life with satisfaction and with the ability to attain personal goals⁵. QoL includes cognitive and emotional perceptions regarding oneself and their environment. There is no single definition of QoL. However, it is generally accepted that it implies the functional status of the individual, as well as a positive feeling of wellbeing⁶.

For cancer patients, QoL is a complex and multidimensional concept which depends upon physical, psychological, social and sexual factors^{6,7}. Fundamental health dependent QoL dimensions include physical factors, disease and treatment dependent symptoms, psychological factors (emotional and cognitive states), as well as the patient's social milieu and interactions. Social support is generally defined as in-

formation, advice and/or assistance *via* contact with a social network which has a beneficial effect for the individual in question^{6,8,9}.

Available literature suggests points to significant psychosocial stress that patients experience following a breast cancer diagnosis¹⁰. If breast cancer is diagnosed in an early clinical stage, the initial treatment is mastectomy or breast-conserving therapy with or without axillary lymph node dissection. Subsequent treatment is dependent upon the patient's histopathological results. Irrespective of treatment modality (radiotherapy, chemotherapy, hormone or biological therapy), all patients endure a period of fear, anxiety and a degree of depression, all of which influence QoL.

The normal aging process is accompanied with QoL changes. Data suggests that younger breast cancer patients experience greater QoL changes than their older counterparts¹¹. Age-related differences in the psychological reactions to breast cancer and its therapy can be observed between younger breast cancer patients (under 50 years of age) and their older counterparts (50 years of age or older). The objective of our study was to assess the breast cancer patients' QoL before and after surgical treatment.

Methods

The study was carried out at the Oncology Clinic of the Clinical Hospital Center "Bežanijska Kosa" in Belgrade, Serbia. From 2017 to 2018, 170 newly diagnosed early stage breast cancer patients were included in the study. The study and informed consent form were approved by the Ethics Committee of the Clinical Hospital Center "Bežanijska Kosa" (approval number 3441/3 dated May 5, 2017). The study was carried out as *per* the Declaration of Helsinki. All participants signed the informed consent form. All participants were given a questionnaire with instructions as to how to complete the questionnaire. The questionnaires used in the study were in the Serbian language and were approved and certified by the European Organization for Research and Treatment of Cancer (EORTC). The purpose of the study was explained to each patient in an individual interview before the questionnaire was completed. The patients were informed as to the confidentiality of all data obtained as well as their right not to respond either partially or totally.

Inclusion criteria for the study were newly diagnosed breast cancer patients older than 18 years with the operable cancer stage I or II. Patients were divided into two groups, those under the age of 50 ($n = 43$) and those 50 years and older ($n = 127$). Exclusion criteria were: locally progressive or metastatic disease, chronic diseases including diabetes,

cardiomyopathy, or coronary disease, as well as pre-diagnosed psychological illness (depression or anxiety).

QoL questionnaires EORTC QLQ-C30 and EORTC QLQ-BR23 were administered after histopathological, clinical and radiological verification of the breast cancer stage I or II, before surgical intervention. The same questionnaires were then readministered one month after surgical treatment. In addition to the QoL questionnaires, the participants also filled out a socio-demographic background questionnaire.

The EORTC created a cancer specific questionnaire, QLQ-C30, which is composed of 30 questions designed to measure cancer patients' QoL. The QLQ-C30, version 3.0 is composed of nine multi-item scales and six single-item measures. These include a global health status/QoL scale, five functional scales (physical, role, emotional, cognitive, and social functioning), three symptom scales (fatigue, pain, and nausea and vomiting), and six single items (dyspnea, insomnia, appetite loss, constipation, diarrhea and financial difficulties)¹².

The EORTC has also created the QLQ-BR23, a 23 question breast cancer specific QoL questionnaire. The QLQ-BR23 measures QoL in various breast cancer stages as well as varying therapeutic modalities. It measures five domains: body image, sexuality, shoulder-related symptoms, breast cancer symptoms and therapeutic side effects.

The analysis of the answers to both questionnaires were performed as per the EORTC QLQ-C30 Scoring Manual¹²⁻¹⁴. All of the scales and single-item measures range from 0 to 100 scores. A high scale score represents a higher response level. Thus, a high score for the global health status represents a high QoL, a high score for a functional scale represents a high or healthy level of functioning, but a high score for a symptom scale or item represents a high level of symptomatology/problems.

Statistical analysis

Results are presented as count (%) or means \pm standard deviation (SD) depending on data type. Groups are compared using parametric (Student's *t*-test) and nonparametric (Mann-Whitney *U* test) tests. Within group comparisons were performed using the Student's *t*-test and the Wilcoxon Signed Ranks test. All *p* values < 0.05 were considered significant ($p < 0.05$). All data were analyzed using SPSS 20.0 (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY, IBM Corp.).

Results

Total of 170 female patients with diagnosis of breast cancer participated in the study. Most of the patients (51.2%), were 50–69 years old, cohabitated with their partners (58.8%), had children (84.1%), and middle or higher education (90.0%), lived in an urban setting (73.5%), and were religious (85.3%). Less than half (39.4%) of the patients were actively employed. Stage IA breast cancer was the most frequent diagnosis (31.8%), breast conserving therapy was performed in 65.9% of patients, and axillary lymph node dissection was performed in 38.2% of them.

For the purpose of this study patients were divided into two groups: those under the age of 50 ($n = 43$) and those 50 years or older ($n = 127$). Sociodemographic and clinical characteristics of patients were shown in Table 1.

There were statistically significant differences between age groups in marital status ($p = 0.041$), number of children ($p = 0.043$), education level ($p = 0.028$), employment status ($p < 0.001$) and salary ($p = 0.003$), but not in clinical features (Table 1).

Both younger and older patients experienced a decline in their QoL after undergoing surgery. This effect was present in every QoL dimension. However, when comparing two age groups before and after surgery, the only significant difference was in pre-surgery cognitive functioning domain. The better cognitive functioning was in younger women. This difference was no longer observed after surgery (Table 2).

QoL assessment showed that surgical treatment was significantly associated with financial difficulties and following disease symptoms: fatigue, pain and insomnia, and a loss of appetite and diarrhea in older women. Financial difficulties and above mentioned symptoms were more prominent after surgical treatment. Analysis of the disease symptoms did not show age-related differences (Table 3).

Analysis of the association between surgical treatment of breast cancer and QoL by use of the QLQ BR-23 showed statistically significant pre- and post-surgery differences in all categories except emotional reactions to hair loss. After surgical treatment all categories of QoL were in decline (Table 4).

Statistically significant differences were found in the body image perception and future perspective in all patients with the above-mentioned dimensions being more expressive in the older age group. Additionally, significant differences were found between age groups with regard to sexual functioning and sexual enjoyment, which were better in younger women. It is notable that these differences were significant both before and after surgery. Furthermore, there was a difference between two age groups with respect to their future perspective (only after surgery), with higher score for older women and emotional reaction to hair loss (only before surgery) which was higher in the younger women.

Discussion

The age at diagnosis, therapeutic modality, as well as therapeutic sequelae all contribute to breast cancer patient's QoL changes^{11, 15}. In this study we analyzed QoL of 170 early stage breast cancer female patients surgically treated, before and after the treatment. The results of our analysis showed that surgical treatment lead to decline of QoL across all categories regardless of age. However, there was no significant age-related differences in QoL changes after surgery in terms of patients' global health status/QoL, physical functioning, role functioning, or emotional and social functioning. The only observed difference between younger and older patients was in their pre-surgical cognitive functioning. Due to differences between examined groups regarding their sociodemographic characteristics (marital status, education, employment status, salaries), there is possibility that these variables are confounding factors in relationship between patients' age and QoL.

Table 1
Sociodemographic and clinical characteristics of the study population

Parameters	Age (years)				<i>p</i> -value*
	< 50 (n = 43)		≥ 50 (n = 127)		
	n	%	n	%	
Marital status					
married/living with partner	31	(72.1)	69	(54.3)	0.041
[†] living alone	12	(27.9)	58	(45.7)	
Number of children					
0	12	(27.9)	15	(11.8)	0.043
1–2	23	(53.5)	86	(67.7)	
3+	8	(18.6)	26	(20.5)	
Education					
none or elementary school	2	(4.7)	15	(11.8)	0.028
middle school	20	(46.5)	77	(60.6)	
college/university	21	(48.8)	35	(27.6)	
Place of residence					
urban	28	(65.1)	97	(76.4)	0.148
countryside	15	(34.9%)	30	(23.6)	
Employment status					
employed	30	(69.8)	37	(29.1)	< 0.001
unemployed	12	(27.9)	16	(12.6)	
retired	1	(2.3)	74	(58.3)	
Salary/pension					
lower	21	(48.8)	93	(73.2)	0.003
higher	22	(51.2)	34	(26.8)	
Religion					
religious	39	(90.7)	106	(83.5)	0.247
atheist	4	(9.3)	21	(16.5)	
Disease stage					
IA	14	(32.6)	0	(31.5)	0.867
IB	5	(11.6)	11	(8.7)	
IIA	13	(30.2)	36	(28.3)	
IIB	11	(25.6)	40	(31.5)	
IIB	11	(25.6)	40	(31.5)	
Surgical intervention					
mastectomy	13	(30.2)	45	(35.4)	0.534
breast-conserving	30	(69.8%)	82	(64.6)	
Axillary lymph node dissection					
yes	18	(41.9)	47	(37.0)	0.571
no	25	(58.1)	80	(63.0)	
Lymph node metastasis					
no	31	(2.1)	87	(68.5)	0.659
yes	12	(7.9)	40	(31.5)	

**p*-value between age groups; [†]living alone: divorced, widowed and unmarried.

Table 2
Age-related differences in quality of life of breast cancer patients, analyzed using the QLQ-C30, before and after surgical intervention

Questionnaire domain	Age (years)		* <i>p</i> -value
	< 50 (n = 43)	≥ 50 (n = 127)	
Global health status			
pre-surgery	73.45 ± 19.27	67.32 ± 21.12	0.137
post-surgery	61.63 ± 20.10	62.01 ± 19.55	0.949
† <i>p</i> -value	< 0.001	0.006	
Physical functioning			
pre-surgery	90.339 ± 11.39	83.67 ± 18.78	0.103
post-surgery	81.24 ± 16.73	76.54 ± 18.74	0.134
† <i>p</i> -value	< 0.001	< 0.001	
Role functioning			
pre-surgery	86.05 ± 19.56	82.55 ± 22.99	0.446
post-surgery	72.87 ± 20.26	70.47 ± 23.02	0.645
† <i>p</i> -value	< 0.001	< 0.001	
Emotional functioning			
pre-surgery	63.18 ± 20.99	70.01 ± 21.98	0.080
post-surgery	51.74 ± 24.64	56.10 ± 27.45	0.544
† <i>p</i> -value	0.013	< 0.001	
Cognitive functioning			
pre-surgery	86.82 ± 18.39	80.18 ± 19.89	0.034
post-surgery	66.28 ± 24.80	67.72 ± 25.95	0.737
† <i>p</i> -value	< 0.001	< 0.001	
Social functioning			
pre-surgery	79.07 ± 23.60	83.20 ± 23.60	0.248
post-surgery	61.24 ± 24.05	70.21 ± 22.97	0.063
† <i>p</i> -value	< 0.001	< 0.001	

Results are given as mean ± standard deviation.

QLQ-C – Quality of Life Questionnaire-Cancer specific.

**p*-value between age groups; †*p*-value before and after surgery in the same age group.

Table 3
Age-related differences in disease symptoms of breast cancer patients, analyzed using QLQ-C30, before and after surgical intervention

Symptom	Age		* <i>p</i> -value
	< 50 (n = 43)	≥ 50 (n = 127)	
Fatigue			
pre-surgery	22.22 ± 17.82	24.32 ± 20.61	0.678
post-surgery	31.52 ± 17.81	33.59 ± 18.86	0.649
† <i>p</i> -value	0.002	< 0.001	
Nausea and vomiting			
pre-surgery	3.88 ± 10.18	5.64 ± 14.12	0.707
post-surgery	4.26 ± 10.97	3.54 ± 11.04	0.548
† <i>p</i> -value	0.951	0.101	
Pain			
Pre-surgery	12.02 ± 18.30	14.17 ± 20.37	0.619
Post-surgery	30.62 ± 19.56	28.21 ± 20.63	0.436
† <i>p</i> -value	< 0.001	< 0.001	
Dyspnea			
pre-surgery	3.10 ± 9.80	4.20 ± 16.26	0.816
post-surgery	3.88 ± 16.60	5.25 ± 17.53	0.531
† <i>p</i> -value	1.000	0.303	
Insomnia			
pre-surgery	20.93 ± 24.15	26.25 ± 27.74	0.312
post-surgery	34.11 ± 29.54	33.60 ± 27.70	0.950
† <i>p</i> -value	0.012	0.001	

Table 3 (continued)

Symptom	Age		* <i>p</i> -value
	< 50 (n = 43)	50 ≥ (n = 127)	
Appetite loss			
pre-surgery	14.73 ± 23.35	13.65 ± 23.89	0.650
ost-surgery	17.05 ± 22.27	20.47 ± 27.87	0.733
† <i>p</i> -value	0.495	0.002	
Constipation			
pre-surgery	6.20 ± 19.59	11.81 ± 23.20	0.084
post-surgery	7.75 ± 20.36	10.50 ± 20.01	0.282
<i>p</i> -value	0.589	0.429	
Diarrhea			
pre-surgery	6.98 ± 17.15	5.77 ± 13.99	0.876
post-surgery	1.55 ± 7.10	2.10 ± 8.13	0.692
† <i>p</i> -value	0.053	0.006	
Financial difficulties			
pre-surgery	19.38 ± 29.31	15.75 ± 26.17	0.448
post-surgery	31.78 ± 33.30	21.00 ± 26.83	0.057
† <i>p</i> -value	0.007	0.024	

Results are given as mean ± standard deviation.

QLQ-C – Quality of Life Questionnaire-Cancer specific.

**p*-value between age groups; †*p*-value before and after surgery in the same age group.

Table 4

Age-related differences in quality of life of breast cancer patients, analyzed using QLQ-BR23, before and after surgery intervention

Parameters	Age (years)		* <i>p</i> -value
	< 50 (n = 43)	≥ 50 (n = 127)	
Body image functioning			
pre-surgery	83.92 ± 21.00	88.91 ± 18.46	0.227
post-surgery	55.43 ± 26.35	67.52 ± 27.09	0.011
† <i>p</i> -value	< 0.001	< 0.001	
Sexual functioning			
pre-surgery	39.15 ± 28.38	13.91 ± 18.87	< 0.001
post-surgery	27.13 ± 24.94	8.53 ± 14.37	< 0.001
† <i>p</i> -value	0.006	< 0.001	
Sexual enjoyment			
pre-surgery	42.64 ± 38.71	16.54 ± 25.15	< 0.001
post-surgery	24.03 ± 31.98	6.82 ± 16.97	< 0.001
† <i>p</i> -value	0.002	< 0.001	
Future perspective			
pre-surgery	44.19 ± 29.75	49.61 ± 32.22	0.320
post-surgery	24.81 ± 30.07	39.37 ± 33.97	0.013
† <i>p</i> -value	0.003	0.006	
Breast symptoms			
pre-surgery	11.24 ± 11.19	10.96 ± 14.19	0.437
post-surgery	23.84 ± 13.68	25.26 ± 16.33	0.452
† <i>p</i> -value	< 0.001	< 0.001	
Arm symptoms			
pre-surgery	9.30 ± 14.93	9.71 ± 16.26	0.951
post-surgery	27.91 ± 14.42	22.75 ± 15.95	0.065
† <i>p</i> -value	< 0.001	< 0.001	
Upset by hair loss			
pre-surgery	15.50 ± 28.50	5.77 ± 17.36	0.011
post-surgery	10.85 ± 24.90	5.51 ± 15.58	0.208
† <i>p</i> -value	0.15	0.929	

Results are given as mean ± standard deviation.

QLQ-BR – Quality of Life Questionnaire-Breast specific.

**p*-value between age groups; †*p*-value before and after surgery in the same age group.

Gavric⁶ analyzed the influence of breast cancer on patients' QoL in 161 women with newly diagnosed breast cancer and compared the results with an age matched segment of the general population ($n = 949$). Using the QLQ-C30 questionnaire at the time of diagnosis, as well as three and 12 months postoperatively, she showed that breast cancer patients had a significantly lower QoL in term of emotional, cognitive and social functioning ($p < 0.01$) than age-matched controls.

Most QoL studies of breast cancer patients have shown that younger age was a risk factor for lower QoL as well as for significant stress after treatment¹⁵⁻¹⁹. On the other hand, it has been observed that there was an improvement in the perceived QoL in all domains regardless of therapeutic modality. Bantema-Joppe et al.¹¹ studied the influence of age on breast cancer patients' QoL after radiotherapy. The average follow-up time was 34 months (range 6-70 months), and results were compared to age-matched controls in the general population in Holland. They showed an improvement in QoL which was greatest after the initial stress of cancer diagnosis and the first treatment phase. A greater improvement was observed in younger patients, a fact that was attributed to a better overall physical state, as well as their superior capacity for recovery. Hau et al.¹⁸ performed a 12-year follow-up study on a cohort of women with an average age of 49.8 years at the time of breast cancer diagnosis. The patients showed a dramatic improvement in all QoL dimensions over the follow-up period, to the point that 12 years after breast cancer treatment no QoL differences were observed in terms of overall QoL, physical or emotional functioning, or fatigue¹⁸.

In this study, no age-related differences in the symptoms were noted after surgery. Furthermore, surgery was associated with physical and psychological changes in all patients. Goldstein et al.²⁰ studied breast-cancer treatment associated fatigue in 218 patients and concluded that fatigue was a common symptom and generally a call for help. On the basis of multivariate analysis, they suggested that patient age was no longer a fatigue-related risk factor six months after the completion of adjuvant treatment²⁰.

Our results from the QLQ-BR23 questionnaire showed that surgical treatment changed patients' QoL in all categories except emotional reactions to hair loss (after surgical treatment all categories declined), that can be explained by the stress of a diagnosis of breast cancer. The extent of the surgical intervention, whether complete mastectomy or breast-conserving therapy, has a negative effect on body image, sexual relations, and social activities, and it can be said that a breast cancer diagnosis represents one predictor of depression²¹. As society favors physical appearance and attractiveness, it is generally accepted that surgical intervention leads to an impaired QoL, including social interactions²²⁻²⁴. Psychological effects can have an influence on breast cancer patients' day-to-day lives and can affect their social and vocational interactions. Additionally, marital status, support of family and friends, education, vocation, as well as financial situation all influence a patient's QoL.

Avis et al.²⁵ pointed out that there is a lack of information regarding the emotional, social and psychological reper-

cussions on younger patients who face a breast cancer diagnosis. They followed 202 women diagnosed with stages I to III breast cancer at age 50 or younger from 4-42 months after diagnosis and identified factors that impact their QoL. Factors which were found to negatively impact women's ability to deal with breast cancer diagnosis included the relationship with a partner, sexual functioning and body image issues. A poor relationship with a partner, especially poor communication, was negatively associated with nearly all QoL dimensions²⁵.

The importance of stress management strategies has been the focus of numerous breast cancer studies^{10, 26}. Younger patients who have never been faced with a potentially life-threatening illness were found to require assistance to develop effective strategies to handle the psychological consequences of their diagnosis. Kerr et al.²⁷ noted that patients younger than 50 years of age required more social and psychological assistance than their older counterparts. Younger patients were less satisfied with the information given regarding breast cancer treatment, as well as its effects during and after completion. It was suggested that more information is required for younger age groups²⁷. Other studies have confirmed that after a breast cancer diagnosis, younger women need more psychological mechanisms in order to adapt to their new situation, than their older counterparts^{28, 29}.

Several published studies focused specifically on younger women with breast cancer. Bloom et al.³⁰ and Allen et al.³¹ performed intervention studies among younger women with breast cancer to address their specific psychological needs. The Cancer and Menopause Study (CAMS)³² confirmed a substantial degree of psychological distress which persisted many years after the initial diagnosis of breast cancer in young women, especially those aged 25-34 at the time of diagnosis. It was also shown that better general health was positively correlated with more than a high level of education, better emotional and psychological functioning, less comorbid conditions and an unchanged menopausal status over the course of treatment. The authors determined that the emotional functioning was of essential importance in the youngest women who faced diagnosis of malignant disease, such as breast cancer. Older women at diagnosis (the oldest group in the study cohort) with more life experience may have developed better emotional resistance and reacted better to a diagnosis of malignant disease. However, older women may have weaker physical resiliency due to underlying comorbidities or greater physical limitations associated with age which limit their tolerance to various treatment modalities³².

The results of this study showed a statistically significant difference in sexual functioning and enjoyment between younger and older patients. However, surgical treatment was not associated with age-related differences in these QoL aspects. Bantema-Joppe et al.¹¹ showed that radiotherapy can also be associated with changes in sexual functioning. They analyzed three age groups and found that immediately after radiotherapy the sexual functioning was best in the youngest group and the worst in the oldest group. Contrary to other

QoL dimensions, sexual functioning did not show improvement over time in any age group. The lack of change over time cannot be explained by the use of systemic treatment, resulting in vaginal dryness since the authors controlled for systemic treatment¹¹.

Ganz et al.³² used standardized questionnaires to study QoL in 691 breast cancer patients over 65 years of age. They applied the questionnaire three months after surgery and twice more over the course of the next year. Just three months after surgery, their results showed a high degree of physical and emotional functioning. They also showed that chemotherapy by itself in the presence of comorbid conditions had a significant negative impact on the physical functioning of older patients. Due to a higher number of comorbidities, they found that three months after surgery older patients had worse physical functioning regardless of the extent of the surgery or radiotherapy³³. Their results are in congruence with other studies which examined the physical functioning of older breast cancer patients³⁴⁻³⁶. The results of our study showed that surgical treatment for early-stage breast cancer influenced the changes in physical, emotional, cognitive and social functioning independently of the patients' age.

On the other hand, younger patients who have undergone breast-conserving therapy with radiotherapy or mastectomy experienced a more significant drop in physical functioning than patients who have only undergone breast-conserving therapy. Additionally, breast cancer may be the only illness in younger patients, resulting in a relatively fast recovery of physical functioning in the months following treatment³⁷. Ganz et al.³² noted that in older breast cancer patients, when all factors were considered in the determination of QoL, the extent of surgical intervention had less in-

fluence on QoL changes than other factors, such as emotional and social QoL dimensions. However, age is a more significant factor than the extent of surgery on changes in physical, emotional and social dimensions when considering a patient's QoL³³. In our study, there were no statistically significant differences in physical functioning between older and younger patients before or after surgery. Although, it should be noted that our cohort included only breast cancer patients without preexisting comorbidities.

Our research represents one of the few studies of QoL in women with breast cancer in the Republic of Serbia, which provides insight into the physical and psychological characteristics of this group of patients. However, this is one center study, which has some limitations: a small number of patients, and a relatively short period of readmitting of questionnaires. Another limitation is that we did not include other important variables such as social support, current mood, and fear of recurrence.

Conclusion

The results of this study point out significant differences between patient age groups in QoL dimensions specific to cancer and breast cancer patients before and after surgery that enhance our knowledge of factors which influence patients' QoL and help us to consider potential possibilities for its improvement.

Surgical breast cancer treatment negatively affected patients' QoL, especially in the physical and psychological domains. These domains are sensitive and require a multidisciplinary treatment approach. There is a need for further research, primarily in the psychological approach of women with breast cancer.

R E F E R E N C E S

1. *Pekmezović T.* Epidemiology of breast cancer. In: *Milašinić G*, editor. *A Guide to Good Clinical Practice for Diagnosing and Treatment of Breast Cancer*. Belgrade: Ministry of Health of the Republic of Serbia; 2013. p. 5-7. (Serbian)
2. Cancer Registry of Central Serbia. *Cancer incidence and mortality in Central Serbia 2015*. Belgrade: Institute of Public Health of Serbia "Dr Milan Jovanović Batut"; 2017.
3. Early Breast Cancer Trialists' Collaborative Group (EBCTCG). *Effect of radiotherapy after breast-conserving surgery on 10-year recurrence and 15-year breast cancer death: meta-analysis of individual patient data for 10 801 women in 17 randomised trials*. Available from: DOI: [https://doi.org/10.1016/S0140-6736\(11\)61629-2](https://doi.org/10.1016/S0140-6736(11)61629-2)
4. *Paterson C.* Quality of life measures. *Br J Gen Pract* 2010; 60(570): 53.
5. *Paraskevi T.* Quality of life outcomes in patients with breast cancer. *Oncol Rev* 2012; 6(1): e2.
6. *Gavrić Ž.* Quality of life of women with breast cancer-emotional and social aspect. *Am J Cancer Prev* 2015; 3: 13-8.
7. *Šarac S, Milić R, Vasiljević M, Šarac M.* Quality of life in patients with non-small cell lung cancer. *Vojnosanit Pregl* 2017; 74(7): 625-32.
8. *Berkman LF.* Social networks, support, and health: taking the next step forward. *Am J Epidemiol* 1986; 123(4): 559-62.
9. *Nedović G, Marinković D, Rapajić D, Berat S, Kozomara R.* Health-related quality of life assessment in Serbian schoolchildren hospitalized for malignant disease. *Vojnosanit Pregl* 2013; 70(2): 195-9.
10. *Stanton AL, Danoff-Burg S, Cameron CL, Bishop M, Collins CA, Kirk SB*, et al. Emotionally expressive coping predicts psychological and physical adjustment to breast cancer. *Consult Clin Psychol* 2000; 68(5): 875-82.
11. *Bantema-Joppe EJ, de Bock GH, Woltman-van Iersel M, Busz DM, Ranchor AV, Langendijk JA*, et al. The impact of age on changes in quality of life among breast cancer survivors treated with breast-conserving surgery and radiotherapy. *Br J Cancer* 2015; 112(4): 636-43.
12. *Fayers PM, Aaronson NK, Bjordal K, Groenwold M, Curran D, Bottomley A.* On behalf of the EORTC Quality of Life Group. *The EORTC QLQ-C30 Scoring Manual*. 3rd ed. Brussels: European Organisation for Research and Treatment of Cancer; 2001.
13. *Young T, De Haes JCJM, Curran D, Fayers PM, Brandberg Y.* On behalf of the EORTC Quality of Life Study Group. *Guidelines for Assessing Quality of Life in EORTC Clinical Trials*. Brussels: European Organisation for Research and Treatment of Cancer; 1999.
14. *Sprangers MA, Groenwold M, Arraras JJ, Franklin J, te Velde A, Muller M*, et al. The European Organization for Research and Treatment of Cancer breast cancer-specific quality-of-life questionnaire module: first results from a three-country field study. *J Clin Oncol* 1996; 14(10): 2756-68.

15. Ganz PA, Greendale GA, Petersen L, Kahn B, Bower JE. Breast cancer in younger women: reproductive and late health effects of treatment. *J Clin Oncol* 2003; 21(22): 4184–93.
16. Ho PJ, Gernaat SA, Hartman M, Verkoijen HM. Health-related quality of life in Asian patients with breast cancer: a systematic review. *BMJ Open* 2018; 8(4): e020512.
17. Oberguggenberger A, Meraner V, Szankay M, Hilbert A, Hubalek M, Holzner B, et al. Health behavior and quality of life outcome in breast cancer survivors: prevalence rates and predictors. *Clin Breast Cancer* 2018; 18(1): 38–44.
18. Hau E, Bronne L, Capp A, Delaney GP, Fox C, Kearsley JH, et al. The impact of breast cosmetic and functional outcomes on quality of life: long-term results from the St. George and Wollongong randomized breast boost trial. *Breast Cancer Res Treat* 2013; 139(1): 115–23.
19. Morrow PK, Broxson AC, Munsell MF, Basen-Enquist K, Rosenblum CK, Schover LR, et al. Effect of age and race on quality of life in young breast cancer survivors. *Clin Breast Cancer* 2014; 14(2): e21–e31.
20. Goldstein D, Bennett BK, Webber K, Boyle F, de Souza PL, Wilcken NR, et al. Cancer-related fatigue in women with breast cancer: outcomes of a 5-year prospective cohort study. *J Clin Oncol* 2012; 30(15): 1805–12.
21. Cažin K. Quality of life in patients after breast cancer surgery. *Nurs J* 2013; 18: 29–32. (Croatian)
22. Hadi N, Soltanipour S, Talei A. Impact of modified radical mastectomy on health-related quality of life in women with early stage breast cancer. *Arch Iran Med* 2012; 15(8): 504–7.
23. Klikovac T. Psychological Support and Psycho-social Relief for Women Suffering from Breast Cancer. *Psihološka istraživanja* 2014; 17(1): 77–95. (Serbian)
24. Villar RR, Fernández SP, Garea CC, Pillado MTS, Barreiro VB, Martín CG. Quality of life and anxiety in women with breast cancer before and after treatment. *Rev Lat Am Enfermagem* 2017; 25: e2958.
25. Avis NE, Crawford S, Manuel J. Quality of life among younger women with breast cancer. *J Clin Oncol* 2005; 23(15): 3322–30.
26. Schnoll RA, Harlow LL, Stolbach LL, Brandt U. A structural model of the relationships among stage of disease, age, coping, and psychological adjustment in women with breast cancer. *Psychooncology* 1998; 7(2): 69–77.
27. Kerr J, Engel J, Schlesinger-Raab A, Sauer H, Hölzgel D. Communication, quality of life and age: Results of a 5-year prospective study in breast cancer patients. *Ann Oncol* 2003; 14(3): 421–7.
28. Grogan S, Mehan J. Body image after mastectomy: A thematic analysis of younger women's written accounts. *J Health Psychol* 2017; 22(11): 1480–90.
29. Słowik AJ, Jabłoński MJ, Michałowska-Kaczmarczyk AM, Jach R. Evaluation of quality of life in women with breast cancer, with particular emphasis on sexual satisfaction, future perspectives and body image, depending on the method of surgery. *Psychiatr Pol* 2017; 51(5): 871–88. (English, Polish)
30. Bloom JR, Stewart SL, Johnston M, Banks P. Intrusiveness of illness and quality of life in young women with breast cancer. *Psychooncology* 1998; 7(2): 89–100.
31. Allen SM, Shah AC, Nezu AM, Nezu CM, Ciambone D, Hogan J, et al. A problem-solving approach to stress reduction among younger women with breast carcinoma: A randomized controlled trial. *Cancer* 2002; 94(12): 3089–100.
32. Ganz PA, Guadagnoli E, Landrum MB, Lasb TL, Rakowski W, Silliman RA. Breast cancer in older women: quality of life and psychosocial adjustment in the 15 months after diagnosis. *J Clin Oncol* 2003; 21(21): 4027–33.
33. Given CW, Given B, Azzouz F, Stommel M, Kozachik S. Comparison of changes in physical functioning of elderly patients with new diagnoses of cancer. *Med Care* 2000; 38(5): 482–93.
34. Vinokur AD, Threatt BA, Vinokur-Kaplan D, Satariano WA. The process of recovery from breast cancer for younger and older patients: changes during the first year. *Cancer* 1990; 65(5): 1242–54.
35. Fu MR, Axelrod D, Guth AA, Cleland CM, Ryan CE, Weaver KR, et al. Comorbidities and quality of life among breast cancer survivors: A prospective study. *J Pers Med* 2015; 5(3): 229–42.
36. Ganz PA, Schag AC, Lee JJ, Polinsky ML, Tan SJ. Breast conservation versus mastectomy: Is there a difference in psychological adjustment or quality of life in the year after surgery? *Cancer* 1992; 69(7): 1729–38.

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