



## Mental health and quality of life of female breast cancer survivors in Southeast Serbia

Mentalno zdravlje i kvalitet života žena koje su preživele karcinom dojke u jugoistočnoj Srbiji

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### Abstract

**Background/Aim.** Quality of life (QoL) is one of the outcome measures for patients with chronic diseases. Mental health issues often impact the QoL of cancer patients. Cancer patients with a good QoL have a longer life expectancy and are able to lead a more productive and social life. The aim of the study was to determine the association of mental health with the QoL, as well as to determine significant predictors of QoL in patients with breast cancer (BC). **Methods.** The study included 118 patients treated at the Specialized Breast Cancer Department of the Oncology Clinic of the University Clinical Center Niš, Serbia. The study's inclusion criteria were the presence of early-stage nonmetastatic BC and completed surgical treatment. The following questionnaires were used: the general sociodemographic questionnaire, Hospital Anxiety and Depression Scale (HADS), Buss-Perry Aggression Questionnaire, Early Maladaptive Schema questionnaire - short form (SQ-SF), Flanagan's Quality of Life Scale (QoLS), Holmes and Rahe Stress Scale, Berlin Social Support Scales (BSSS), Health Locus of Con-

trol. **Results.** A statistically significant negative correlation was found with emotional state, i.e., anxiety score, depressiveness score, total stress score, and physical aggression score, while QoL correlated positively with all subscales of the perceived social support (PSS) questionnaire. QoL was significantly different for patients with the following early maladaptive schemas: emotional deprivation, emotional inhibition, and a sense of entitlement/narcissism. Moreover, QoL differed significantly depending on partnership status, the presence of clinically significant anxiety, the presence of hormone-sensitive cancer, the presence of human epidermal growth factor receptor 2 (HER2)-positive cancer, and time since diagnosis. Multiple linear regression was performed, and depression and PSS had the highest share. **Conclusion.** In our study, the presence of depressiveness and PSS were the best predictors of QoL of BC survivors.

### Key words:

breast neoplasms; emotions; mental health; prognosis; quality of life; social factors; surveys and questionnaires; women.

### Apstrakt

**Uvod/Cilj.** Kvalitet života (KŽ) je jedna od mera ishoda za bolesnike sa hroničnim bolestima. Problemi mentalnog zdravlja često utiču na KŽ bolesnika obolelih od karcinoma. Bolesnici oboleli od karcinoma koji imaju dobar KŽ imaju duži životni vek i sposobni su da vode produktivniji i društveniji život. Cilj rada bio je da se utvrde povezanost mentalnog zdravlja i KŽ i prediktori KŽ kod obolelih od karcinoma dojke (KD). **Metode.** U istraživanje je uključeno 118 bolesnica koje su lečene na specijalizovanom Odeljenju za karcinom dojke Klinike za onkologiju Univerzitetskog kliničkog centra Niš, Srbija. Kriterijumi za uključivanje u studiju bili su prisustvo nemetastatskog KD u ranoj fazi i

završeno hirurško lečenje. Korišćeni su sledeći upitnici: opšti socijalno demografski upitnik, Bolnička skala za procenu anksioznosti i depresije (*Hospital Anxiety and Depression Scale* - HADS), Bas-Perijev Upitnik agresije (*Buss-Perry Aggression Questionnaire*), Upitnik o ranim maladaptivnim šemama – skraćena verzija (*Early Maladaptive Schema Questionnaire-Short Form* – SQ-SF), Flanaganova Skala za procenu kvaliteta života (*Flanagan's Quality of Life Scale* – QoLS), Holms-Raheova skala stresa (*Holmes and Rahe Stress Scale*), Berlinska skala so-cijalne podrške (*Berlin Social Support Scales* – BSSS), Zdravstveni lokus kontrole (*Health Locus of Control*). **Rezultati.** Utvrđena je statistički značajna negativna korelacija sa emocionalnim stanjem, odnosno skorom anksioznosti, skorom depresivnosti, ukupnim skorom stresa

i skorom fizičke agresije, dok je KŽ pozitivno korelisao sa svim subskalama upitnika percipirane socijalne podrške (PSP). Značajno drugačiji KŽ imale su bolesnice sa sledećim ranim maladaptabilnim shemama: emocionalna deprivacija, emocionalna inhibicija i osećaj za pravo/narcizam. Takođe, KŽ se značajno razlikovao u zavisnosti od partnerskog statusa, prisustva klinički značajne anksioznosti, prisustva hormon-senzitivnih karcinoma, prisustva *human epidermal growth factor receptor 2* (HER2)-pozitivnog karcinoma i

vremena od postavljanja dijagnoze. Urađena je višestruka linearna regresija, a najveći udeo imale su depresivnost i PSP. **Zaključak.** U našoj studiji, prisustvo depresivnosti i PSP bili su najbolji prediktori KŽ žena koje su preživele KD.

**Ključne reči:**  
**dojka, neoplazme; emocije; mentalno zdravlje; prognoza; kvalitet života; socijalni faktori; ankete i upitnici; žene.**

## Introduction

Breast cancer (BC) is one of the most common types of cancer and is associated with a high mortality rate. According to the results of the International Agency for Research on Cancer of the World Health Organization for the year 2020, BC is the second most common cancer in Serbia, while it ranks first in the female population. The mortality rate for BC is also high and ranks second compared to all other cancers<sup>1</sup>.

It is well known that BC affects women's mental health (MH)<sup>2</sup>. Certain types of BC treatment can affect a woman's MH as much as the cancer itself. For instance, surgical treatments, chemotherapy, and radiotherapy can lead to important deterioration of the quality of life (QoL) and adverse psychological effects, such as depression, anxiety, and body dysmorphic disorder<sup>3</sup>.

Long-term MH problems that can occur in patients with BC include sadness, helplessness, anxiety, discomfort, grief, fatigue, difficulty concentrating, sleep disturbances, cognitive problems, sexual dysfunction, psychological problems, body image problems, and psychiatric disorders<sup>3</sup>.

The prevalence of psychiatric disorders in cancer patients ranges from 29% to 47%. The most commonly diagnosed psychiatric disorders are adjustment disorders, depressive disorders, neurotic disorders, and severe stress disorders. They can affect disease prognosis, treatment adherence and success, QoL, social functioning, and survival rate<sup>3</sup>. Many women treated for recently diagnosed BC report clinically relevant symptoms of depression and/or anxiety and impairment in all areas of QoL<sup>4</sup>. In one study, results showed that only 11.5% of those women had an optimal QoL<sup>5</sup>.

QoL measures are crucial for patients with BC. They help us assess the impact of health impairments and oncologic interventions on patients' lives<sup>6</sup>. A good QoL also ensures a longer life expectancy for cancer patients and enables them to lead a more social and productive life<sup>7</sup>.

Considering the abovementioned facts, our primary research objective was to determine the contribution of MH to the QoL of patients with early BC. Bearing in mind that other factors, such as socioeconomic factors and oncologic parameters, can also influence the QoL, our secondary aim was to compare all the factors mentioned and determine those that had a significant impact on the QoL of these

patients. In addition, we wanted to determine the profile of breast tumor patients considering the mentioned parameters, especially the MH profile. If we find that certain factors are more important for the QoL than others and are among the factors we can change, the results of our research could help us plan preventive measures to maintain and/or improve the QoL of BC patients.

## Methods

This observational, cross-sectional study of adult women with early, nonmetastatic BC was performed from October 2019 to October 2020. We obtained research approval from the Ethics Committee of the Clinical Center Niš, Serbia (No. 23679/50, from July 2, 2019).

### Participants

The patients were recruited from a specialized BC Department at the Oncology Clinic, University Clinical Center Niš. The presence of early, nonmetastatic ductal or lobular BC and completion of surgical treatment were the inclusion criteria for the study. At the time, all patients were on ongoing adjuvant therapy (chemotherapy, hormone therapy, targeted molecular or radiation therapy). Patients with comorbid conditions, including uncontrolled cardiovascular, metabolic, pulmonary, or renal disease, which may seriously affect QoL, were excluded from the study.

The patients were recruited during the control examination. The purpose, reason, and plan of the research were explained to the patient, and they gave their consent for participation by signing an informed consent form. The consent was obtained by an oncologist who is part of the team of authors of this article.

### Procedures

BC diagnoses have been made and based on the biopsy of the abnormality seen during clinical examination, ultrasound, and magnetic resonance imaging or mammography, depending on the age of the patient. Staging based on other systems was done to exclude the presence of metastases. After the biopsy, the pathohistological (PH) assessment showed the presence of either ductal or lobular BC, which was one of the inclusion criteria. The type of therapy was decided based on

prognostic parameters – the size of the tumor, lymph node status, and receptor status, such as estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). Patients with positive ER and/or PR were in the group of hormone-sensitive cancers, while the ones who were ER and PR negative were in the group of non-hormone-sensitive cancers.

After the control examination, the patients filled out questionnaires at the Oncology Clinic (20–25 min). The patients' completed questionnaires were returned in closed envelopes to ensure anonymity and put in a closed box with other envelopes. After opening the envelopes, nine of the 127 questionnaires were incomplete, so the data obtained from 118 respondents entered the final data processing.

Information on whether they were currently receiving chemotherapy, hormonotherapy, targeted therapy, or radiation therapy, information about HER2 or hormonal receptor positivity, PH type, and stage of BC were given by the clinicians.

We used several evaluation instruments. The first one was the general sociodemographic questionnaire, a standardized questionnaire for obtaining information on patient's place of residence, age, partnership/marital status, level of education, occupational status, and satisfaction with their relationships. The second was the Hospital anxiety and depression scale (HADS) used to assess anxiety and depressiveness in patients with somatic diseases. It is designed to avoid questions about somatic correlates of emotions, as these could be part of a somatic illness or part of the clinical presentation of depression and anxiety. For this reason, the results of this questionnaire are more appropriate and reliable. The scale consists of fourteen questions, of which seven refer to anxiety and seven to depression. A score  $\leq 7$  indicates the absence of pathological depression or anxiety, a score of 8–10 suggests a possible presence of anxiety and depression, and a score  $\geq 11$  indicates the presence of clinically significant depression and anxiety<sup>8</sup>. HADS has been used extensively in the field of cancer, but some authors suggested lower cut-off scores for this population. The best balance between sensitivity and specificity for cancer patients is  $\geq 5$  [HADS - depression subscale (HADS-D)],  $\geq 7$  [HADS - anxiety subscale (HADS-A)], and  $\geq 13$  [HADS for the total score (HADS-T)]<sup>9</sup>. Therefore, we used these cut-off scores. The third evaluation instrument we used was the Buss-Perry Aggression Questionnaire, developed by Arnold Buss and Mark Perry<sup>10</sup>. It is a self-report instrument that has become the gold standard for measuring aggression<sup>11</sup>. It consists of four subscales: physical aggression, verbal aggression, anger, and hostility. A total aggression score was also calculated<sup>10</sup>. The purpose of the questionnaire is to provide a comprehensive assessment of aggression, with an average score calculated to compare the subscales. The fourth instrument we used, the Early Maladaptive Schema Questionnaire-short form (SQ-SF), is comprised of 75 questions and was developed to measure 15 early maladaptive cognitive schemas. The score in each schema is calculated by adding the scores of five questions of the same schema. A high score indicates a strong pres-

ence of dysfunctional schemas; the minimum score for each schema is 5, and the maximum is 25. Young and Brown<sup>12</sup> consider a schema with two or more items scoring 5 or 6 clinically significant. Early maladaptive schemas (EMS) are the patterns most commonly formed in childhood and develop throughout a person's life. These patterns, which relate to the individual and their relationships with others, determine how they perceive and interpret their behavior and the world around them. They can be the result of traumatic experiences and unmet basic needs in the early stages of development. They are self-reinforcing and resistant to change<sup>13, 14</sup>. In the fifth instrument we used, QoL was estimated using the 15-item Flanagan's QoL Scale (QoLS)<sup>15, 16</sup>, modified by adding a 16th item for independence<sup>17, 18</sup>. All items were scored on a 7-point scale<sup>19</sup>. A total score with a possible range of 16 to 112 was used for this study. The sixth evaluation instrument was the Health Locus of Control. It is a questionnaire that measures where patients locate the center of control over the illness – internally (the patient considers himself/herself predominantly responsible for his/her health and the course of the illness) or externally (the patient believes that external factors such as chance, fate, doctors, and other people are responsible for the course of his/her illness and the outcome of treatment)<sup>20</sup>. A higher total score means a higher external locus of control. Holmes and Rahe Stress Scale is the seventh questionnaire we used in order to assess stress levels over the past year. It consists of 43 stress situations or items; each item brings a certain number of points. A score of 150 indicates low stress, which is less likely to affect physical health. A score  $\geq 300$  indicates very high stress, which represents a high risk for the later occurrence of somatic disorders<sup>21</sup>. The final instrument we used was the Berlin Social Support Scales (BSSS). It is an instrument for measuring multidimensional social support<sup>22</sup>. The six subscales of the BSSS (perceived support, provided support, received support, need for support, support seeking, and protective buffering) measure both cognitive and behavioral aspects of social support. They can be used in different clinical and healthy adult populations. Our study used four subscales based on patients' subjective estimation of support: Perceived Social Support (PSS), Need for Support, Seeking Support, and Received Social Support. The remaining two scales have to be filled by some family members or some other people who give the patient social support. Subjective estimation is more important for our psychological well-being, even if the real support is the opposite.

#### *Statistical analysis*

Categorical variables were shown using percentages and frequencies, and continuous variables were shown using arithmetic means and their standard deviations. Student's *t*-tests and ANOVA were used to examine possible differences in an overall QoL score within the variables studied. A correlation analysis of QoL with the continuous variables was performed, and a multiple regression analysis was used to examine the predictors of QoL.

## Results

### Group structure

The group consisted of 118 patients with ductal or lobular BC. The average age of participants was  $53.55 \pm 11.435$  years. The average score of satisfaction with partnership was  $8.04 \pm 2.2$ . The average total aggression score was  $56.07 \pm 14.465$ . The average score was calculated for subscales as well. The participants had the highest average score on the subscale of verbal aggression ( $2.36 \pm 0.729$ ) and the lowest average score on the subscale of physical aggression ( $1.45 \pm 0.361$ ). The average stress score in the previous year was  $62.59 \pm 66.218$ . The average value of the locus of control was  $41.12 \pm 10.017$ . Patients with BC had the lowest scores on “need for support” ( $11.14 \pm 2.413$ ) and “support seeking” ( $14.66 \pm 2.421$ ). The highest score was on “received social support” ( $50.67 \pm 11.491$ ) (Table 1).

The highest percentage of patients lived in the city area (93.2%), were employed (56.8%), were in a relationship (84.7%), had two children (42.40%), and had a bachelor degree (42.40%). The highest percentage of patients with clinically significant schemas had the “unrelenting standards” schema (45.80%), followed by the “self-sacrifice” schema (39.00%) (Table 2).

The average intensity of anxiety was  $6.37 \pm 3.404$ , and clinically significant anxiety was present in 40.70% of participants. The average intensity of depression was  $4.34 \pm 2.996$ , and clinically significant depression was present in 42.40% of participants (Tables 1 and 2).

Oncological heredity was present in only 12.70% of participants. Approximately two-thirds of patients had hormone-sensitive cancers (62.70%), negative HER2 (67.80%), and time since diagnosis was shorter than six months (63.55%). The highest percentage of patients had ductal BC (83.05%) (Table 2).

**Table 1**  
**Characteristics of patients with ductal or lobular breast cancer**

Parameter	Values	
	Mean $\pm$ SD	Min–Max
Age (years)	$53.55 \pm 11.435$	28–80
Anxiety	$6.37 \pm 3.404$	0–16
Depression	$4.34 \pm 2.996$	0–13
Total distress	$10.71 \pm 5.651$	1–25
Stress	$62.59 \pm 66.218$	0–273
Aggression – total	$56.07 \pm 14.465$	28–91
Anger – mean score	$2.06 \pm 0.915$	0.14–4.57
Physical aggression – mean score	$1.45 \pm 0.361$	0.22–2.22
Verbal aggression – mean score	$2.36 \pm 0.729$	1.2–4.80
Hostility – mean score	$2.1 \pm 0.726$	0.63–3.75
Locus of control	$41.12 \pm 10.017$	13–61
QoL – total score	$80.54 \pm 12.7$	54–107
Perceived social support	$27.72 \pm 3.518$	15–32
Need for support	$11.14 \pm 2.413$	6–15
Support seeking	$14.66 \pm 2.421$	9–20
Received social support	$50.67 \pm 11.491$	16–60
Satisfaction with partnership	$8.04 \pm 2.2$	0–10

QoL – quality of life; SD – standard deviation; Min – minimum; Max – maximum.

**Table 2**  
**Sociodemographic and clinical characteristics of patients ductal or lobular breast cancer**

Parameter	Values, n (%)
Place of residence – city area	110 (93.20)
Relationship status – in a relationship	100 (84.70)
Number of children	
without	14 (11.90)
one	40 (33.90)
two	50 (42.40)
three or more	14 (11.90)
Level of education	
primary	10 (8.50)
secondary	40 (33.90)
bachelor	50 (42.40)
master/doctoral	18 (15.20)
Employment status	
employed	67 (56.80)
unemployed	32 (28.00)
retired	18 (15.20)

**Table 2 (continued)**

Parameter	Values, n (%)
Clinically significant anxiety	48 (40.70)
Clinically significant depression	50 (42.40)
Clinically significant EMS	
emotional deprivation	10 (8.50)
abandonment	20 (16.90)
distrust	18 (15.30)
social isolation	2 (1.70)
defectiveness	2 (1.70)
failure in achievement	2 (1.70)
dependence	0 (0)
vulnerability	6 (5.20)
symbiosis	12 (10.20)
subjugation	2 (1.70)
self-sacrifice	46 (39.00)
emotional inhibition	8 (6.80)
unrelenting standards	54 (45.80)
entitlement/narcissism	10 (8.50)
over control	8 (6.80)
Positive oncological heredity	15 (12.70)
<sup>1</sup> Hormone-sensitive cancer	74 (62.70)
Time since diagnosis < 6 months	75 (63.55)
Positive HER2	38 (32.20)
Pathohistological type	
ductal	98 (83.05)
lobular	20 (16.95)

**EMS – early maladaptive schema; HER2 – human epidermal growth factor receptor 2.**

**Note:** <sup>1</sup>estrogen receptor positive.

*Differences in the QoL of BC patients – influence of psychological, oncological, and sociodemographic factors*

QoL was significantly different in persons who had clinically significant following schemas: emotional deprivation ( $p = 0.002$ ), emotional inhibition ( $p = 0.007$ ), and a

sense of entitlement/narcissism ( $p = 0.001$ ). In addition, QoL significantly differed depending on the partnership status ( $p < 0.001$ ), the presence of clinically significant level of anxiety ( $p = 0.028$ ), whether the cancer was hormone-sensitive or not ( $p = 0.004$ ), whether the cancer was HER2 positive or not ( $p = 0.034$ ), and the time since the diagnosis ( $p = 0.017$ ) (Table 3).

**Table 3**

**Differences in the quality of life (QoL) of breast cancer patients depending on the sociodemographic, psychological, and oncological characteristics**

Parameter	Mean	SD	SE	<i>t</i> -test/ <i>F</i> -test	<i>p</i> -value
Place of residence					
city area	80.64	12.341	1.199		
rural area	78.67	19.439	7.936	0.369	0.713
Partnership/marital status					
single	82.38	11.572	1.181		
in a relationship	69.50	13.924	3.481	4.000	< 0.001
Clinically significant anxiety					
yes	77.55	13.108	1.892		
no	82.81	11.988	1.498	-2.230	0.028
Clinically significant depression					
yes	79.46	13.549	1.956		
no	81.34	12.070	1.509	-0.776	0.439
EMS – emotional deprivation					
yes	86.80	4.917	1.555		
no	79.92	13.071	1.294	3.400	0.002
EMS – abandonment					
yes	82.60	15.935	3.563		
no	80.09	11.941	1.245	0.801	0.425

**Table 3 (continued)**

Parameter	Mean	SD	SE	<i>t</i> -test/ <i>F</i> -test	<i>p</i> -value
EMS – distrust					
yes	80.89	17.872	4.212		
no	80.50	11.705	1.220	0.089	0.930
EMS – vulnerability					
yes	75.00	8.198	3.347		
no	80.88	12.985	1.273	-1.095	0.276
EMS – symbiosis					
yes	87.33	15.406	4.447		
no	79.73	12.298	1.242	1.964	0.052
EMS – self-sacrifice					
yes	82.38	14.712	2.270		
no	79.44	11.461	1.390	1.171	0.244
EMS – emotional inhibition					
yes	69.00	10.876	3.845		
no	81.42	12.436	1.219	-0.743	0.007
EMS – unrelenting standards					
yes	81.12	13.626	1.890		
no	80.07	12.139	1.594	0.423	0.671
EMS – entitlement/narcissism					
yes	93.20	14.673	4.640		
no	79.30	11.979	1.198	3.428	0.001
EMS – over control					
yes	79.00	7.521	2.659		
no	80.69	13.156	1.303	-0.357	0.722
Oncological heredity					
yes	81.23	13.111	1.977		
no	80.09	12.505	1.516	0.462	0.645
Hormone-sensitive cancer					
yes	78.75	12.480	1.471		
no	86.92	10.407	2.139	-2.955	0.004
Time since diagnosis, months					
< 6	78.93	11.638	1.503		
≥ 6	85.73	14.032	2.502	-2,437	0017
Pathohistological type					
ductal	79.53	11.597	1.330		
lobular	77.67	9.903	2.859	0.525	0.601
HER2					
positive	82.59	11.899	2.041		
negative	76.53	11.902	1.931	2.158	0.034
Number of children					
without	77.43	6.630	1.772		
one	82.60	12.792	2.023		
two	78.83	13.405	1.977	1.185	0.319
three or more	83.83	14.440	4.168		
Level of education					
primary	73.00	13.357	5.453		
secondary	79.25	11.718	1.853		
bachelor	81.75	14.839	2.142	1.161	0.328
master/doctoral	82.67	6.633	1.563		
Occupational status					
employed	79.93	12.271	1.584		
unemployed	78.28	10.839	2.013	1.953	0.147
retiree	84.96	15.242	3.178		

**EMS – early maladaptive schema; HER2 – human epidermal growth factor receptor 2; SD – standard deviation; SE – standard error.**

#### *Correlation analysis of QoL and the tested variables*

A statistically significant negative correlation was found with the emotional state indicators, i.e., anxiety score ( $p = 0.022$ ), depression score ( $p < 0.001$ ), total stress ( $p = 0.011$ ), and physical aggression score ( $p = 0.024$ ), while the positive correlation of QoL was found with all subscales of PSS (Table 4).

#### *Multiple linear regression*

Multiple linear regression was done, and after the exclusion of co-linear variables in the final analysis, the following was included: depression score, total stress score, the average score of physical aggression, a score of perceived support, and satisfaction with the partnership. The model was

**Table 4****Correlation analysis of quality of life and the tested variables**

Parameter	Pearson's correlation/ Spearman's rho	<i>p</i> -value
Age	-0.068	0.479
Anxiety	-0.216	0.022
Depression	-0.358	< 0.001
Stress	-0.238	0.011
Aggression – total	-0.059	0.541
Anger – mean score	0.002	0.987
Physical aggression – mean score	-0.214	0.024
Verbal aggression – mean score	0.076	0.432
Hostility – mean score	-0.070	0.470
Locus of control	-0.108	0.257
Perceived social support	0.505	< 0.001
Need for support	0.358	< 0.001
Support seeking	0.263	0.006
Received social support	0.258	0.007
Satisfaction with partnership	0.450	< 0.001

**Table 5****Multiple linear regression**

Parameter	Standardized coefficients beta	<i>p</i> -value	F	<i>p</i> - value	Adjusted R <sup>2</sup>
Depression - score	-0.356	< 0.001			
Total stress - score	-0.193	0.022			
Average score of physical aggression	-0.245	0.004	16.425	<0.001	0.459
Score of perceived support	0.305	< 0.001			
Satisfaction with partnership	0.216	0.010			

statistically significant  $F(5,86) = 16.425$ ,  $p < 0.001$ , and based on adjusted R square, explains 45.9% of the variance of QoL in women with BC. Depression and PSS had the highest share (Table 5).

**Discussion**

Considering the results of our study, the average person from our sample is female, between 53 and 54 years old, with a bachelor degree, employed, in a relationship, mother of two children, and satisfied with her partnership. She is verbally rather aggressive, without anxiety or depression. She perceives herself as a strong and independent woman (low need for support, low level of support seeking, rarely present schema “dependence on others”). She tends towards self-sacrifice (frequent schema “self-sacrifice”) and perfectionism, rigid rules, “having to do something”, and is concerned with efficiency (frequently present schema “unrelenting standards”). However, when it comes to her health, she predominantly sees her illness as something that is “a set of external circumstances” such as good or bad luck and fate, and that predominantly depends on others and not on herself (high average score of locus of control). The time since diagnosis is less than six months, and she has ductal, hormone-sensitive BC that is HER2 negative. There is no family inheritance of BC.

Other studies have reported similar profiles of women with BC. In a recent study<sup>23</sup>, the average age of women was 52.4 years; most of them lived in cities and were in a rela-

tionship (66.1%), with an average (35.2%) and higher education (33.3%). Age, relationship status, education level, and financial situation influenced the QoL of women with BC. A higher QoL was found in patients in partnerships, with higher education, and with a subjective assessment of a very good financial situation<sup>23</sup>.

In our group, patients with higher scores for depression, physical aggression, stress, and anxiety, as well as clinically significant anxiety scores, had a poorer QoL. Our results are primarily in line with other studies dealing with the QoL of BC patients. In a study of 120 patients aimed at identifying risk factors for lower QoL in nonmetastatic BC patients, it was found that lower global QoL was associated with major depressive disorder, presence of personality disorder, greater pain, self-blame, lower levels of positive reframing coping strategies, and lack of hormone therapy. The authors also pointed out that lower QoL was strongly associated with variables related to the person's premorbid psychological characteristics and how the person was coping with cancer (e.g., depression, personality, and coping) than with cancer-related variables (e.g., type of treatment, cancer severity)<sup>24</sup>.

If we want to take personality into consideration, a better QoL was observed in patients with a positive early maladaptive schema “emotional deprivation”. This schema includes the general expectation that basic emotional needs are not met or perceived. The three main forms of emotional deprivation include deprivation of care, protection, and empathy<sup>14</sup>. The same is true for respondents who exhibited an early maladaptive schema of “a sense of entitle-

ment/narcissism". This schema is related to the belief in a person's superiority over others or the general belief that one is entitled to special privileges, rights, or exemptions. There may be a tendency to exert power over others, to impose one's views on others, or to try to control the behavior of others in a self-serving way<sup>14</sup>. In contrast to the maladaptive schemas mentioned above, the presence of the "emotional inhibition" schema was associated with poorer QoL. A limited number of studies have been made on the relationship between the QoL of BC patients and EMS<sup>25,26</sup>. As a result of the investigation, Katebi et al.<sup>26</sup> stated that dysfunctional schemas and personality traits predict the QoL in women with BC. Based on multiple correlation coefficients, 54% of changes in the QoL among women with BC were dependent on EMS and their personality traits. At the same time, when we discuss EMS in BC patients, we should bear in mind that there is a particular link between EMS and the immune response. In BC patients with a poor immune profile, two schemas were found to be activated: a schema of mistrust and a schema of emotional inhibition<sup>27</sup>.

Strong social relationships and support among patients with BC can reduce stress and improve the effectiveness of treatment, psychological functioning, survival, and QoL. Furthermore, it prevents cancer recurrence. In the opposite direction, long-term psychological distress increases the risk of BC progression as well as recurrence and mortality. For patients with BC, spouses or intimate partners and family members are perceived as the most essential persons in social support<sup>28</sup>. In our study, QoL was worse if the patient had a partner. Even more important was whether the woman was satisfied with her relationship with her partner – the lower the satisfaction, the worse the QoL. At the same time, QoL was positively correlated with PSS. The lower the PSS, the poorer the QoL of these patients. In one of the studies, information on social support status was collected from 1,160 women newly diagnosed with BC. The results were consistent with our findings, i.e., adequate social support from family members, friends, and neighbors and higher scores on PSS were associated with better QoL in BC patients<sup>29</sup>.

Lower QoL scores were associated with specific oncological parameters – patients with hormone-sensitive cancer, the time since diagnosis of less than six months, and HER2-negative tumors had poorer QoL.

However, in our research, five variables proved to be of particular importance for the final QoL score in subjects with BC. Those are depression score, PSS, physical aggression score, satisfaction with partnership, and stress score. This model explains 45.9% of variances in QoL in women with BC. It means that the selected predictors accounted for a substantial amount of the variance in QoL. Depression (negative correlation) and PSS (positive correlation) have a particularly significant share.

If we look at the results of our research, i.e., the variables related to QoL, we will see that some of them cannot be

changed (e.g., if the tumor is hormone-sensitive and HER2 positive). However, some variables can be influenced and changed (e.g., anxiety, depression, aggression, PSS). Considering the information we received during the current research, it is important to carry out a psychological exploration during clinical work with patients who have BC in order to find potential MH problems that are connected to the QoL of the examinees<sup>30</sup>. If changeable MH issues are present, we can apply some of the psychological or psychiatric interventions and influence the improvement of the QoL by controlling those variables<sup>31</sup>.

For instance, interventions for depression (cognitive-behavioral therapy and/or medications), improvement of PSS (psychotherapy, social skills training, assertiveness training), reduction of aggression (dominantly psychotherapy, possibly medications), improvement of satisfaction with partnership (couples therapy, assertiveness training), and stress reduction (cognitive-behavioral therapy, relaxation training, assertiveness training), or even stress prevention (stress inoculation training) could be included<sup>32-36</sup>.

#### *Study limitations*

The present study has some limitations. We did not collect information on actual therapy and the time elapsed since the last therapy, as well as the breast reconstruction after mastectomy. These factors may impact QoL in BC survivors.

#### **Conclusion**

Quality of life in breast cancer patients, as one of the important predictors of the outcome in chronic illnesses, is associated with numerous variables, predominantly with emotional state and patient's PSS. The highest percentage of the tested variables is changeable and can be influenced. For that reason, and to adequately assist these patients, the introduction of screenings that would identify those patients who are at risk or already have problems that could have a negative impact on the quality of life, as well as targeted work with them, is proposed.

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#### **Conflict of interest**

The authors declare no conflict of interest.



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