



Secondary lymphedema of the arm, the perception of the disease, self-efficacy and depression as determinants of quality of life in patients with breast cancer

Sekundarni limfedem ruke, percepcija bolesti, samoefikasnost i depresija kao determinante kvaliteta života obolelih od karcinoma dojke

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Abstract

Background/Aim. Secondary lymphedema of the arm is one of possible side-effects and complications of breast cancer and its treatment which can contribute and precipitate to a number of new psychosocial problems. The aim of this study was to examine the differences in quality of life of patients suffering from breast cancer, with arm lymphedema and those without lymphedema, and to determine the significance of the perception of the disease, depressive symptoms and self-efficacy contribution to overall quality of life. **Methods.** The research was designed as a cross-sectional study, which included 64 patients – 34 with arm lymphedema and 30 without lymphedema. Questionnaire FACT-B + 4 was applied to assess the quality of life, BIPQ for the perception of the disease, depression was measured by DASS-21 scale, while self-efficacy was tested by SGSE scale. *T*-test, Mann Whitney U Test, χ^2 test and hierarchical regression analysis were applied to data processing. **Results.**

There was not any significant difference between the groups in the total score of quality of life ($t = 0.469, p > 0.05$), or in the individual subscales: physical well-being ($t = 0.535, p > 0.05$), social/family well-being ($t = 1.43, p > 0.05$), emotional well-being ($t = 1.35, p > 0.05$), functional well-being ($z = -0.243, p > 0.05$), breast cancer scale ($t = -0.839, p > 0.05$) and arm scale ($t = -0.514, p > 0.05$), while the perception of the disease ($\beta = -0.603, t = -5.958, p < 0.001$) and depression ($\beta = -0.411, t = -4.101, p < 0.001$) proved to be significant predictors of quality of life and explain 50.2% variance of overall quality of life. **Conclusion.** The results of our study indicate the importance of a comprehensive rehabilitation program, directed both at functional and psychosocial aspects.

Key words:
breast neoplasms; women; upper extremity;
lymphedema; quality of life; perception; depression.

Apstrakt

Uvod/Cilj. Sekundarni limfedem ruke je jedan od mogućih neželjenih efekata i komplikacija karcinoma dojke kao i lečenja karcinoma dojke, koji može doprineti i dovesti do većeg broja novih psiholoških problema. Cilj ove studije bio je da se ispita postojanje razlika u kvalitetu života bolesnica sa karcinomom dojke koje imaju sekundarni limfedem ruke u odnosu na one koje ga nemaju i da se utvrdi značaj percepcije bolesti, depresivnih simptoma i samoefikasnosti za ukupni kvalitet života. **Metode.** Sprovedeno istraživanje je dizajnirano kao studija preseka, sa odgovarajućim kliničkim uzorkom kojeg su činile 64 bolesnice, od kojih 34 sa limfedemom ruke i 30 bez limfedema. Za procenu kvaliteta života primenjen je upitnik FACT-B+4, za percepciju bole-

sti BIPQ; depresivnost je merena skalom DASS-21, dok je samoefikasnost ispitana skalom SGSE. Za obradu podataka korišćeni su *t*-test, Mann Whitney U Test, χ^2 test i hijerarhijska regresiona analiza. **Rezultati.** Nije utvrđena značajna razlika između grupa kako u ukupnom skoruu kvaliteta života ($t = 0.469, p > 0.05$), tako ni u pojedinačnim domenima: fizičko blagostanje ($t = 0.535, p > 0.05$), socijalno/porodično blagostanje ($t = 1.43, p > 0.05$), emocionalno blagostanje ($t = 1.35, p > 0.05$), funkcionalno blagostanje ($z = -0.243, p > 0.05$), simptomi izazvani karcinomom dojke ($t = -0.839, p > 0.05$), te tegobama ruke ($t = -0.514, p > 0.05$), dok su se percepcija bolesti ($\beta = -0.603, t = -5.958, p < 0.001$) i depresivnost ($\beta = -0.411, t = -4.101, p < 0.001$) pokazali kao značajni prediktori kvaliteta života i objašnjavaju 50,2% varijanse ukupnog kvaliteta života. **Zaključak.** Rezultati naše

studije ukazuju na značaj sveobuhvatnog programa rehabilitacije, usmerenog kako na funkcionalne tako i na psihosocijalne aspekte.

Ključne reči:

dojka, neoplazme; žene; ruka; limfedem; kvalitet života; percepcija; depresija.

Introduction

Breast cancer, although one of the leading causes of morbidity and mortality in the world and in our country, due to the modern oncological treatment which in recent decades has given more positive outcomes, provides us with new approaches to dealing with patients, and primarily with focus on rehabilitation and promotion of quality of life of patients.

Health-related quality of life (HRQOL) refers to an individual's perception on impact which the disease and treatment may have on his/her functioning; considering the fact that it is a multidimensional construct, quality of life includes physical, functional, psychological and social aspects of life¹.

One of the possible side-effects and complications of breast cancer and its treatment, which can contribute and precipitate to a number of new psychosocial problems, is the occurrence of secondary lymphedema of the arm (SLEA).

SLEA is the result of a functional overload of the lymphatic system when the volume of lymph exceeds the existing transport capacity of the lymphatic system of the arm, caused by a mechanical insufficiency of the lymphatic system, usually as a result of surgery, radiation therapy, infection or trauma². It occurs in 10%–30% of patients undergoing therapy for the treatment of breast cancer^{3,4}. Given the high incidence of this type of complication, increasingly longer life expectancy of women with breast cancer, and in connection with it, a tendency to improve quality of their life, there are more and more rehabilitation programs aimed at preventing and minimizing risk factors for the occurrence of secondary lymphedema of the arm, or treatment when already occurred⁵⁻⁹.

SLEA is accompanied by subjective symptoms, increased risk of infection and damage of the brachial plexus. Swelling of the arm impedes the performance of activities of daily living, followed by changes in physical appearance, which can precipitate dissatisfaction with personal appearance, decline in self-esteem and self-confidence, increase of sexual problems. In fact, many patients associate swelling of the arm with malignant disease and previous or current experience¹⁰. This implies the reason why in dealing with these patients more attention is paid to their assessment of their quality of life and the psychological aspects of the disease (adaptation, distress, body image, etc.)¹¹.

It has been pointed out that the quality of life in the patients with lymphedema is significantly lower when compared to the patients who did not develop lymphedema¹²⁻¹⁴, especially in the functional and physical domains. However, there are also studies that have indicated¹⁵ that quality of life of women with lymphedema depended more on certain psychological factors such as coping with and experienc-

ing lymphedema, social support and pain, than on the volume of swelling.

For successful adaptation to the disease, and thus the quality of life, the perception of the illness, or a way in which a patient sees the cause of the disease, its duration, symptoms and consequences of the disease influencing the emotional state, etc., is of a great importance. People with the same disease often have different perception of their disease which largely depends on the personality traits, age, cultural context, the importance of social support, marital status; the experience of illness is significantly influenced by comorbidity¹⁶. According to the cognitive model of health, the common-sense model (CSM) of self-regulation¹⁷, depending on the way the disease is represented in the mind of the patient, the person will use different strategies to cope with the disease and these strategies determine the outcome of adaptation. For successful adaptation to the chronic illness, it is of a great importance a positive perception of their personal capacities, that is, it is necessary for an individual to realize his/her personal capabilities to cope with various life situations¹⁸. The current findings suggest a positive relationship between quality of life and self-efficacy, and a negative relationship between self-efficacy and depression^{19,20} as well as longer life expectancy for those breast cancer patients who perceived their own efficiency higher^{21,22}. Further, maladaptive psychological conditions, such as depression, show undeniable influence on the quality of a person's life. Research conducted with women suffering from breast cancer showed a correlation between mild and moderate depression characteristics and a lower quality of life in all spheres, including sexual functioning^{23,24}.

The aim of this study was to determine differences in quality of life in women with breast cancer-related lymphedema currently undergoing a rehabilitation program and those women with breast cancer without lymphedema. The aim was also to determine the contribution of psychological factors like perception of the disease, depression, and self-efficacy, in order to adapt a rehabilitation program to include interventions focused on the improvement of psychological status of such patients.

Methods

The research was designed as a cross-sectional study, with appropriate clinical sample consisting of 64 women suffering from breast cancer who underwent breast cancer surgery and who were at the time of the study (from December 2015 to May 2016) at rehabilitation treatment for SLEA (34 patients), or at one of the regularly scheduled controls of specialist physiatrist (30 patients) at the Oncology Institute of Vojvodina.

Study did not include patients treated with chemotherapy or radiotherapy at the moment of assessment, and patients with progressive disease (metastases) in order to eliminate the possibility of the impact of the underlying disease or side effects of therapy on the quality of life assessment.

Breast cancer-related lymphedema was quantified as mild, moderate, or severe (a difference of size in at least one measured level of arm was up to 3 cm, from 3.1 cm to 5 cm, at least 5.1 cm or more, respectively).

Functional Assessment of Cancer Therapy – Breast (FACT – B+4) was applied for assessment of quality of life of our patients. The questionnaire measured four domains of quality of life (physical well-being – PWB, social/family well-being – SWB, emotional well-being – EWB and functional well-being – FWB), a domain that includes symptoms and concerns related to breast cancer – BCS, as well as an additional domain which included difficulties caused by lymphedema – ARM. The respondents gave answers to a five-point Likert scale, where 0 meant – not at all, while 4 meant – very much. Internal consistency of this scale proved to be excellent both for the whole scale and for its subscales²⁵.

Perception of the illness was assessed using the Brief Illness Perception Questionnaire (BIPQ)²⁶. The questionnaire measured 9 different domains of perception of disease, which respondent assessed by answering to a 0-to-10 scale (in the case of the first eight domains related to the impact of the disease on life, duration, control, treatment, symptoms, concern, understanding and impact of the disease on the emotional state), or by writing answers in case of the last domain that was qualitative and related to the perception of the causes of the disease. The perception of the disease can be measured individually by domain, and can be seen as a total score, or, as a measure that indicated perception of the disease as threatening²⁶. In our research, we observed the total score of perception of the disease where a higher score indicated more negative perception of the disease. Metric characteristics of the scale in previous studies proved to be satisfactory²⁷.

Depression was assessed by using a questionnaire Depression Anxiety Stress Scale (DASS-21)²⁸ which measured the symptoms of depression, anxiety and stress, and can be used as a measure of distress if it is regarded as a total score, or as an individual measure of depression, anxiety, stress, if referring to subscales. The task of respondent was to assess the level of these affective states in the previous week on a four-point Likert type scale where 0 indicates no, and 3 mainly or almost always. In our research related to the assessment of depression we used scores of a subscale of depression. Internal consistency of the total scale and subscales proved to be acceptable, both in foreign and domestic research²⁹.

Self-efficacy was assessed by the General Self-Efficacy Scale (SGSE)³⁰. This one-dimensional instrument consisted of 10 questions on a four-point Likert type scale from 0 (completely false) to 3 (completely true). This scale also showed good metric properties in previous studies³¹.

Data was analyzed by using a statistical software package SPSS 21.0. The Student *t*-test, Mann Whitney *U* test, and χ^2 test were used to test differences between groups while

Pearson product-moment correlation was used to test the correlation between the examined variables. To test the individual and the total contribution of psychological variables in prediction of quality of life, hierarchical regression analysis was conducted. In all analyzes, differences were interpreted as statistically significant if $p < 0.05$ and $p < 0.01$.

Results

Table 1 shows the sociodemographic data of our sample. As we can see, the sample of the patients with lymphedema differed due to the severity of lymphedema. There was no statistically significant difference between the groups when the age of patients was taken into consideration (*t*-test, $p > 0.05$). We examined the possible existence of the intergroup differences related to the level of education and the presence of other chronic diseases, and there was also no statistically significant difference (χ^2 test, $p > 0.05$). The differences between the two groups in all aspects of quality of life, the perception of the disease, depression and self-efficacy are shown in Table 2. As we can see, there was no statistically significant difference not only in the assessment of the total quality of life of women with lymphedema and those without it but also on individual subscales (*t*-test, Mann Whitney *U* test, $p > 0.05$), with having been noted that the scores of the patients in the control group were slightly higher on the scale referring to symptomatology related to breast cancer and problems with the arm. Table 3 shows simple correlations between the scales relating to the quality of life and the scales that measured the psychological status of the examined patients. Since all three psychological variables showed significant correlation with the total quality of life, we examined their role in prediction of quality of life. It is noticeable that there are three blocks of predictors (Table 4). In the first one, we examined the contribution of the perception of the disease in predicting quality of life. In the second block of predictors, we also added the condition of depression to the perception of disease while in the third one we added self-efficacy to the existing predictor variables. The first model was significant ($F = (1.62) = 35.50$, $p < 0.001$), and explained 36.4% of variance, and the perception of the disease proved to be an important predictor variable ($\beta = -0.603$, $t = -5.958$, $p < 0.001$). The second model was significant ($F = (1.61) = 30.68$, $p < 0.001$), and explained 50.2% of variance and the depression proved to be a significant predictor of quality of life ($\beta = -0.411$, $t = -4.101$, $p < 0.001$). The third model was also significant ($F = (1.60) = 20.20$, $p < 0.001$), and explained 50.3% of variance; however, self-efficacy did not prove to be a significant predictor variable ($\beta = 0.035$, $t = 0.346$, $p > 0.05$). We noted that the percentage of explained variance changed through the steps, that is, the first model explained only 36.4% ($F_{change} = 35.50$, $p = 0.001$, $p < 0.001$), while after introducing depression, the percentage of the explained variance increased to 50.2% ($F_{change} = 16.81$, $p = 0.001$, $p < 0.001$), and after introducing self-efficacy, the percentage of variance remained almost unchanged ($F_{change} = 0.120$, $p = 0.730$, $p < .0001$).

Table 1

Characteristics	Breast cancer patients		<i>p</i>
	Lymphedema group (n = 34)	Control group (n = 30)	
Degree of SLEA, n (%)	mild 24 (73) moderate 4 (12) severe 5 (15)		
Age (years), mean ± SD (min-max)	60.20 ± 8.82 (39–75)	56.16 ± 10.18 (29–74)	0.316
Education (%)			
primary school	9	17	0.624
secondary school	53	47	
higher school	9	3	
college	29	33	
Other chronic disease (%)	56	47	0.462

t-test; χ^2 test; SD – standard deviation.

SLEA – secondary lymphedema of the arm.

Table 2

Quality of life scales	Breast cancer patients		<i>t</i> (<i>Z</i> *)	<i>p</i>
	Lymphedema group (n = 34)	Control group (n = 30)		
Total, mean ± SD	117.90 ± 19.85	115.48 ± 21.38	0.469	0.641
Physical well-being, mean ± SD	21.47 ± 5.04	20.80 ± 4.97	0.535	0.595
Social/family well-being, mean ± SD	22.60 ± 4.29	21.04 ± 4.42	1.428	0.158
Emotional well-being, mean ± SD	18.47 ± 4.69	16.83 ± 5.03	1.346	0.183
Functional well-being, mean ± SD; Med (min-max)	20.08 ± 3.68 20 (13–27)*	19.80 ± 4.85 20 (10–28)*	-	0.243*
Breast cancer scale, mean ± SD	22.79 ± 6.48	24.10 ± 5.89	-0.839	0.405
Arm scale, mean ± SD	12.47 ± 3.48	12.90 ± 3.15	-0.514	0.609

t-test; *Mann Whitney *U* Test; Med (min-max) – median (minimum-maximum); SD – standard deviation.

Table 3

Correlations between quality of life (QOL) subscales and possible QOL predictors			
QOL Scales	Potential predictors scales	<i>r</i>	<i>p</i>
QOL (total)	illness perception	-0.603**	0.000
	depression	-0.594**	0.000
	self-efficacy	0.338*	0.006
Physical well-being	illness perception	-0.609**	0.000
	depression	-0.496**	0.000
	self-efficacy	0.205	0.103
Social/family well-being	illness perception	-0.219	0.082
	depression	-0.293*	0.019
	self-efficacy	0.240	0.056
Emotional well-being	illness perception	-0.608**	0.000
	depression	-0.573**	0.000
	self-efficacy	0.418**	0.001
Functional well-being	illness perception	-0.346*	0.005
	depression	-0.495**	0.000
	self-efficacy	0.270*	0.031
Breast cancer scale	illness perception	-0.433**	0.000
	depression	-0.443**	0.000
	self-efficacy	0.229	0.069
Arm scale	illness perception	-0.369*	0.003
	depression	-0.225	0.074
	self-efficacy	0.069	0.585

r – Pearson product-moment correlation coefficient; **p* < 0.05; ***p* < 0.001.

Table 4

Hierarchical regression analysis: Illness Perception, Depression, and Self-efficacy as potential predictors of Quality Of life in breast cancer patients

Model	Predictors	B	SE B	β	R	R ²	F	<i>p</i>
1	Illness perception	-0.854	0.143	-0.603**	0.603	0.364	350.50	0.000
2	Illness perception	-0.604	0.142	-0.427**	0.708	0.502	160.82	0.000
	Depression	-10.984	0.484	-0.411**				0.000
3	Illness perception	-0.597	0.144	-0.422**	0.709	0.503	0.12	0.000
	Depression	-10.920	0.521	-0.397**				0.000
	Self-efficacy	0.088	0.253	0.035				0.730

Dependent variable: Quality of life (*p* < 0.001).**

Discussion

The first aim of this study was to examine whether there was a difference in the quality of life in the patients who developed lymphedema compared with those who also suffered from breast cancer, but with no swelling of the arm. According to the findings of the previous studies, the patients with lymphedema show significantly lower quality of life compared with those patients who did not develop it, both at the global level as well as in individual domains, particularly in the domain related to physical condition¹²⁻¹⁴. However, due to the fact that sometimes obtained findings were contradictory, several studies underlined the importance of the way in which the influence of lymphedema was measured and suggested to take into account during research both objective measures of lymphedema (the diagnosis of lymphedema and the size of the swelling) and subjective measures (symptoms that patients manifest as pain, mobility difficulties, bodily sensations, perceptions of lymphedema)^{32, 33}. Our research did not show a significant difference in the quality of life of the patients diagnosed with lymphedema. There are a number of possible explanations for such a finding. First of all, for years, we were the only one in the country who implemented a program of early rehabilitation⁹, through which, among other things, the patients were trained to prevent and recognize the symptoms, and, as quickly as possible, began treatment of secondary lymphedema if noticed, which probably led to early detection and prevention of severe forms of swelling of the arm. Therefore, our sample consisted mostly of the patients with mild lymphedema. Secondly, considering the fact that patients had been repeatedly on physical treatments of Complex Decongestive Physical Therapy (CDPT), we assume that they were automatically exposed to a smaller number of problems, due to the size of a reduction of the swelling and also because they were educated and encouraged how and in what way to use the swollen arm in their daily activities, and therefore, they adapted to their condition and successfully cope with it. Previous studies showed the benefits of participation in lymphedema treatment, in terms that physical treatment and size reduction of the swelling had an impact on physical condition, but a more positive assessment of the quality of life and the other aspects were probably influenced by the education of the patients³⁴⁻³⁷. Finally, in order to gain a clearer insight into the impact of lymphedema on quality of life and the effects of the treatment, future research should take into ac-

count the subjective symptoms and ailments caused by lymphedema and the perception of lymphedema, especially in the patients who have just faced the diagnosis of lymphedema. It would enable us to make more credible comparison and explanation of the reason why our patients do not experience any significant difference in quality of their life.

When the psychological aspects are taken into account, we obtained more than expected findings, which is that the perception of the disease and depression contribute greatly to the quality of life while the self-efficacy, which although did show significant correlation with the functional and emotional state, did not prove to be a significant predictor of quality of life. We already know that the perception of the disease, that is, developed beliefs that include knowledge about the disease and the symptoms manifested by the disease, cause, duration, consequences and controllability and emotions associated with them, contribute to the physical and psychosocial response to the disease, by encouraging the use of certain coping strategies¹⁷. The perception of the disease proved to be important for the the patient to cooperate during drug treatment, for any psychopathological manifestations as a response, and in population of patients suffering from breast cancer it proved to be an important predictor of quality of life up to 15 months after diagnosis of malignancy³⁸. This indicates the importance of recognizing the way in which the patient perceive the disease in order to implement the earliest possible interventions aimed at a refutation of irrational or maladaptive beliefs and cognitive representations which patients may have regarding malignant diseases. When we talk about depression and depressive symptoms such as rumination, fatigue, problems with concentration, insomnia and general dysphoric mood, there are countless studies that indicate the impact of this emotional states on the decline in the quality of life in cancer patients³⁹. Therefore, a successful treatment and promotion of quality of life in our patients critically depend on early recognition of symptoms and timely response. Within a program of early rehabilitation of patients with breast cancer, for few years now, our institute has been providing postoperative psychooncological support, which among others includes the distress screening and education of the patients about the early recognition of depression and anxiety symptoms. In this way, our patients get the possibility of treatment of possible maladaptive responses to the disease. Self-efficacy, or confidence of a person in his/her own capacity to overcome difficulties and to adequately manage the situation, proved to

be an important factor in adaptation to cancer and quality of life⁴⁰ and is associated with a lower intensity of negative emotions in threatening situations⁴¹. In our study, the predictive power of self-efficacy in improving quality of life was minor. Considering the fact that its importance for the quality of life is indisputable, it is assumed that it probably has a greater impact on the emotional and functional status than on the total quality of life, and produces more significant effect through the coping strategies and affect, which should be investigated by a mediation analysis in future research. These findings suggest that it is very important to take into account the psychological status of the patients (especially the way in which the cancer itself is experienced) when making a plan of rehabilitation treatment in order to promote quality of life of our patients. This is utterly important, because it is then, when their future quality of life is determined: a manner in which they would cope with the new stressful situation, the way he/she would feel, how they would evaluate their self-efficacy in further struggle with malignant disease and how much they would cooperate during the treatment. Given the fact that all of these psychological factors can be influenced in educational and supportive way as well as through cognitive-behavioral therapy, within rehabilitation treatment that focuses on the physical and functional status of our patients, from the very moment when faced the diagnosis of malignancy and the first responses to the disease are formed, it is indicative to conduct psychological assessment and support, and psychological support and continuous monitoring of those who are more vulnerable, thus improving quality of life

of our patients in all aspects and at all stages of the disease and treatment.

Recommendations that may be suggested for the future research refer to providing a larger sample and a prospective monitoring of patients in the context of adaptation to the disease, depression and quality of life, assessing not only vulnerability factors but also factors of resilience and multidimensional observation of lymphedema, including both objective and subjective measures of lymphedema, with the ultimate goal to set up the most efficient program of oncological rehabilitation and providing preconditions for quality of life.

Conclusion

The perception of the disease and depression determine to a great extent quality of life of the cancer patients. Quality of life in patients with diagnosed lymphedema did not differ from patients without lymphedema. Our findings indicate the importance of a comprehensive rehabilitation program, primarily preventive rehabilitation program, both aimed at the functional and psychosocial aspects.

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