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The role of cognitive emotion regulation strategies in health related quality of life of breast cancer patients

Značaj kognitivnih strategija emocionalne regulacije za kvalitet života obolelih od karcinoma dojke

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Abstract

Background/Aim. Breast cancer is often accompanied by patients' unpleasant emotional states, which can significantly affect both the undergoing treatment and the quality of life of patients. The aim of this study was to examine the mediating role of cognitive emotion regulation strategies in relation between emotional distress and various aspects of patients' quality of life, which would further indicate different psychotherapeutic interventions in psycho-oncological practice. **Methods**. The sample consisted of 97 breast cancer patients. Emotional distress was measured by the Depression Anxiety Stress Scale (DASS-21), cognitive emotion regulation strategies were measured using the Cognitive emotion Regulation Questionnaire (CERQ-36), while various aspects of health related quality of life were assessed using the Functional Assessment of Cancer Therapy-Breast (FACT-B) questionnaire. Multiple simultaneous mediations between variables were established using the process macro INDIRECT for SPSS**. Results.** Positive refocusing had positive effects both on physical [a = -0.83, b = 0.50, ab = -0.42, standard error (SE) = 0.14; 95% confidence interval (CI) = 0.17 – 0.83] and emotional well-being (a = -0.83, b = 0.29, ab = 0.24, SE = 0.13; 95% CI = -0.01 – 0.58) of the patients. Rumination negatively affected emotional well-being (a = -0.75, b = -0.33, ab = -0.25, SE = 0.16; 95% CI = -0.71 – -0.01) of the patients. Catastrophizing had a negative impact on social (a = 0.96, b = 0.12, ab = -0.12, SE = 0.13; 95% CI = -0.33 – -0.13) and functional well-being of the patients (a = 0.96, b = -0.16, ab = -0.15, SE = 0.09; 95% CI = -0.32 – -0.01). **Conclusion.** Positive refocusing, rumination and catastrophizing are significant cognitive coping strategies through which the intensity of emotional distress significantly changes, and this can be subsequently reflected in different aspects of patients' health related quality of life. The above mentioned implies potential benefits of implementation of cognitive-behavioral trainings and interventions directed towards acquiring adaptive cognitive emotion regulation strategies, in order to improve the quality of life of breast cancer patients.

Key words:
breast neoplasms; quality of life; cognitive remediation; treatment outcome.

Apstrakt

Uvod/Cilj. Karcinom dojke je oboljenje koje je često praćeno neprijatnim emocionalnim stanjima bolesnica i emocionalnim distresom, što značajno može da utiče kako na proces lečenja, tako i na kvalitet života obolelih. Stoga je cilj ove studije bio da ispita potencijalnu medijacionu ulogu strategija kognitivne emocionalne regulacije u relaciji između emocionalnog distresa i različitih aspekata kvaliteta života obolelih, što bi dalje indikovalo potencijalne psihoterapijske intervencije u kliničkoj psihoonkološkoj praksi. **Metode.** Istraživanje je dizajnirano kao studija preseka, u kojoj je učestvovalo 97 bolesnica sa dijagnozom karcinoma dojke. Emocionalni distres meren je Skalom depresivnosti, anksioznosti i stresa (DASS-21). Strategije kognitivne emocionalne regulacije merene su Upitnikom kognitivno emocionalne regulacije (CERQ-36), dok su različiti aspekti kvaliteta života procenjeni Upitnikom funkcionalne procene terapije karcinoma (FACT-B). Za utvrđivanje multiple simultane medijacije između varijabli korišćen je program makro INDIRECT za SPSS. **Rezultati.** Pozitivnim refokusiranjem bili su ostvareni pozitivni efekti kako na telesno [a = -0,83, b = 0,50, ab = -0,42, *standard error* (SE) = 0,14; 95% *confidence interval* (CI) = 0,17 – 0.83], tako i na emocionalno blagostanje

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bolesnica (a = -0,83, b = 0,29, ab = 0,24, SE = 0,13; 95% CI = -0,01 – 0,58). Ruminacije su se negativno odražavale na emocionalno blagostanje (a = -0,75, b = -0,33, ab = -0,25, SE = 0,16; 95% CI = -0,71 – -0,01) bolesnica. Katastrofiziranjem je bio ostvaren negativan uticaj na socijalno (a = 0,96, b = 0,12, ab = -0,12, SE = 0,13; 95% CI = -0,33 – -0,13) i funkcionalno blagostanje bolesnica (a = 0,96, b = -0,16, ab = -0,15, SE = 0,09; 95% CI = -0,32 – -0,01). **Zaključak.** Pozitivno refokusiranje, ruminacija i katastrofiziranje predstavljaju značajne kognitivne strategije prevladavanja posredstvom kojih se značajno menja intenzitet emocionalnog distresa, što se potom odražava i na različite aspekte kvaliteta života obolelih. Navedeno implicira potencijalne koristi od uvođenja kognitivno-bihejvioralnih intervencija, usmerenih na usvajanje adaptivnih strategija kognitivne regulacije afekta, a u cilju pospešivanja kvaliteta života obolelih od karcinoma dojke.

Ključne reči:
dojka, neoplazme; kvalitet života; kognitivna terapija; lečenje, ishod.

Introduction

Breast cancer is a disease that is treated increasingly successfully, but at the same time introduces significant changes in a patient's life, provokes different types of loss (physical strength, body integrity, independency, sense of control, sexuality, temporary or permanent reorganization of family roles, etc.), involves demanding and long-term treatments with numerous side effects (e.g. hair loss, nausea, hormonal and body weight changes, difficulties in cognitive functioning) which can all initiate the painful and unpleasant emotional states of patients. The prevalence of emotional distress in patients suffering from malignant diseases in the first year after diagnosis is higher than 30% [1, 2], therefore the distress is often noticed as the "sixth vital sign", and there is an increasing emphasis on its timely screening and adequate treatment [3–5]. Emotional distress includes the continuum of negative affective states, from normal and common feelings such as worry, sorrow, anger and fear, to clinically more significant anxious and depressive symptomatology, and these affective states can interfere with the decision-making process [6] and a patient's compliance during treatment, including greater likelihood of a negative outcome [7, 8]. Thus, emotional distress affects and deteriorates the health related quality of life of patients [9]. Health related quality of life is a subjective perception of patients in terms of their overall state of physical, emotional, social and actual functional well-being, so the assessment covers key aspects of patients' lives [10], and one of the main aims of oncological treatment is to increase as much as possible, each of the stated aspects. As emotions are critical to the functioning and goal-oriented behavior and adaptation to the disease and its treatment, and are directly related to both mental and physical health, i.e. subjective well-being of patients, their regulation can significantly affect the quality of life of patients [11]. Emotion regulation involves processes that influence the emotions we have, when we have them, and how we experience and manifest them [12], so when we are faced with negative emotional states, we can use a number of regulation strategies to minimize or otherwise exacerbate their intensity and duration [13, 14]. Since the concept of emotion regulation is very broad and includes wide range of regulatory processes (e.g. biological, social, behavioral, as well as conscious and unconscious cognitive processes), particularly during the stressful situations when it is specified as a coping mechanism, as well as because of some limitations that earlier well- known models of stress and coping revealed (e.g. lack of distinction between behavioral and cognitive components of coping in the Lazarus and Folkman's model), Garnefski et al. [15] have tried to overcame these conceptual problems and they made a 'conceptually pure' measure of self-regulatory, conscious, cognitive aspects of emotion regulation. Therefore, one of the ways in which the regulation of emotions could be achieved, observing from the cognitive-oriented perspective, is through specific strategies of cognitive-emotion regulation or, in other words, through a specific way of thinking during or after a stressful situation itself [15]. This means that if we feel sadness or fear provoked by some event, we can intensify them by focusing on them, for example, through rumination, or further intensify them through catastrophizing, i.e. emphasizing the negative aspects of the event itself. Similarly, we can redirect thoughts to other contents instead of thinking about the event, specifically, positively refocus to possibly reduce the negative affect [16]. Above mentioned implies that some coping strategies are more adaptive than others, i.e. adaptive strategies decreases emotional distress, and lead to better psychological outcomes, while maladaptive strategies can intensify emotional distress and are associated with greater symptoms of psychopatology [16]. The dynamics of cognition and emotions are further clarified by results of neuroimaging studies indicating that in a neural basis, for example, of "reappraisal", as a cognitive aspect of emotion regulation, is the interaction not only of the prefrontal and cingular regions responsible for the cognitive control, but also the interaction of the amygdala and insula, systems involved in emotional reactions, and so, e.g. when we are thinking in a way that intends to intensify the emotional experience and the activity of the amygdala increases as a result, and *vice versa*, a cognitive strategy that aims to reduce the intensity of the emotions also results in decreased activity of the amygdala [17]. Previous studies, done with healthy population and breast cancer patients, have indicated positive effects of using adaptive strategies in reducing the negative affect, as well as in better functioning in interpersonal relations, and that they are beneficial for general psychological and physical well-being. On the other hand, the use of maladaptive strategies is associated with increased symptoms of anxiety and depression, prolonged and more pronounced distress, intensified pain, increased inflammation, higher blood pressure, and generally reduced quality of life [14, 18–21]. Cognitive emotion regulation

strategies such as greater acceptance, positive refocusing, and positive reappraisal were associated with fewer depressive symptoms one month after initial assessment in the study done with women newly diagnosed with breast cancer [20]. The results of another study showed that compared with healthy women, women newly diagnosed with breast cancer reported more frequent use of catastrophizing, a maladaptive cognitive emotion regulation strategy, and less frequent use of adaptive strategies such as positive refocusing, refocusing on planning, and positive reappraisal [21]. Furthermore, self-blame, rumination, and catastrophizing negatively affected their overall quality of life, while on the contrary, acceptance and positive reappraisal had positive effects on the quality of life of breast cancer patients [21].

Considering the importance of cognitive emotion regulation strategies not only for the mental but also for the physical health, and as the topic is still insufficiently explored, especially in the context of clinical psycho-oncology, the aim of this study was to examine the potential mediating role of cognitive emotion regulation strategies in relation between emotional distress and various aspects of the quality of life of breast cancer patients. The assumption is that through adaptive strategies such as planning, acceptance, positive reappraisal, positive refocusing and putting into perspective [16] it is possible to reduce the symptoms of emotional distress, while maladaptive strategies, i.e., catastrophizing, rumination, self-blame and blaming others [16] intensify the symptoms of emotional distress, which then, positively or negatively, reflects on the patients' health related quality of life in its various domains. The findings of the study could provide a clearer insight into the ways in which breast cancer patients regulate their affect, and possibly offer implications for clinical practice, particularly indicating the potential benefits of implementing different cognitive-behavioral interventions in oncological treatment, because one of the main aims of cognitive behavioral therapy is to alleviate distress and foster adaptive emotions and behavior by accomplishing the change in maladaptive cognitions, i.e. how we feel and behave dependent on our thoughts and beliefs about stressful situation itself; the key is in overcaming cognitive distortion and dysfunctional thoughts by facilitating more effective and rational thinking.

Methods

The research was conducted during the 2016 and 2017 year and it was designed as a cross-sectional study, consisting of 97 breast cancer patients with average age of 57.43 years (range 29–78 years), who underwent breast cancer surgery, and who had one of the integrated psychological treatment with psychologist at the Institute of Oncology of Vojvodina. The study did not include those patients who were currently on chemotherapy and/or radiotherapy, as well as those in whom the disease was progressed (presence of distant metastases), in order to eliminate possible confounding effects on patients' health related quality of life. Most women (65%) were married and had secondary school (51%) and faculty (34%) as the level of education.

For the emotional distress, the total score of the Depression Anxiety Stress Scale (DASS-21) [22] was used, and included assessment of the level of depression (e.g. 'I couldn't seem to experience any positive feeling at all', 'I felt that I had nothing to look forward to', 'I felt that life was meaningless'), anxiety (e.g. 'I was aware of dryness of my mouth', 'I experienced trembling','I felt I was close to panic') and stress (e.g. 'I tended to over-react to situations', 'I found myself getting agitated', 'I found it difficult to relax') during the previous week. The internal consistency of the scale in our sample was high and ranged from $\alpha = 0.83$ to $\alpha = 0.89$ for subscales, and $\alpha = 0.93$ for the total score, which is a measure of emotional distress.

Specific cognitive emotion regulation strategies, that is, specific ways of thinking that are usually activated after the experience of a negative life event in order to regulate emotions, were measured by the Cognitive Emotion Regulation Questionnaire (CERQ) [23]. The questionnaire consists of 9 subscales: Self-blame (the tendency of a patients to blame themselves for a stressful life event), Acceptance (accepting thoughts and feelings about a stressful event), Rumination (intense thinking and preoccupation with thoughts and feelings related to a stressful event), Positive refocusing (redirecting thoughts from a stressful event to positive content), Planning (thinking about what to do to influence the possible consequences of a stressful event), Positive reappraisal (seeing the positive aspects of a stressful event), Putting into perspective (relativizing and decreasing the significance of the event itself), Catastrophizing (emphasizing negative aspects and consequences of a stressful event), and Other-blame (blaming others and the circumstances that led to the event itself). The internal consistency of the scale in our sample was high and ranges from $\alpha = 0.75$ to $\alpha = 0.81$.

Different aspects of patients' health related quality of life (physical well-being, social well-being, emotional well-being and functional well-being, i.e. state of being healthy and satisfied in those domains) were measured by the Functional Assessment of Cancer Therapy – Breast (FACT-B) [24], a questionnaire specified for the evaluation of breast cancer patients' health related quality of life. The internal consistency of this scale in our sample is also high and ranges from $\alpha = 0.72$ to $\alpha = 0.93$.

Data processing was performed using a macro INDIRECT for SPSS [25], which serves to determine multiple simultaneous mediations between variables. The method allows conducting an analysis of the total indirect effect, i.e. the join effect of all mediation variables included in the research and analysis of specific indirect effects, i.e. the effect of each mediator separately. It is possible to examine the total effect of the predictor variable on the criterion variable (c), and the direct effect of the predictor variable on the criterion variable when the mediators are controlled (c'), and the indirect effect, that is, the individual mediator effect of each mediator separately on the relationship between the predictor and mediator (ab). In addition to simultaneous introduction of a larger number of mediators in the analysis, this procedure also covers a bootstrapping method for calculating the confidence interval of an indirect effect. The logic behind this method is reflected in the inclusion of a larger number of

repetitions of the sampling itself, and the assessment of the indirect effect for each sample separately. Repeating this process 1,000 times, bootstrapping allows empirical approximation of sample distribution to the real population, and corrected bias builds confidence intervals for the indirect effect of the predictor on the criterion variable. The lower limit [lower 95% confidence interval (LCI)] represents the lowest value of the indirect effect (ab), and the upper limit represents the highest value (95% HCI). In order for the mediating effect to be significant, zero should not be included in the CI [25].

Results

Table 1 includes descriptive indicators of the variables used in the research and the Cronbach's alpha for each of the subscales. As the Other-blame subscale deviated from normal distribution, it was not included in further analysis. Patients showed a tendency to use adaptive cognitive emotion regulation strategies (planning, acceptance, positive reformulation, positive refocusing, putting into perspective), while maladaptive strategies were less pronounced. Among maladaptive strategies, ruminations and catastrophizing stood out. Table 2 shows results of the mediating analysis. Emotional distress was a predictor variable, various aspects of quality of life were criterion variables, while cognitive emotion regulation strategies were potential mediators of the relationship. In the relation between emotional distress and physical well-being, the total effect [ab = -0.46, standard error (SE) = 0.30; 95% LCI = 0.14, 95% HCI = 1.06] and the indirect effect of positive refocusing (a = -0.83, b = 0.50, ab = -0.42, SE = 0.14; 95% LCI = 0.17, 95% HCl = 0.83) were significant. Since the direct effect was not significant, positive refocusing was a complete mediator and has a positive effect on physical well-being (Figure 1).

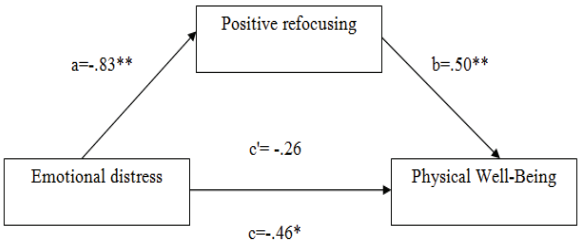

Fig. 1 – Relationship between emotional distress and physical well-being mediated by positive refocusing.

a – effect of predictor variable on mediator; b – effect of mediator variable on criterion; c' – direct effect of predictor variable on criterion variable when the effect of mediator is controlled; c – total effect.
***p* < 0.05; ****p* < 0.001.**

Table 1

Descriptive statistics and Cronbach's alpha coefficients (α) for study variables

Questionnaries	Subscale	Min	Max	M	SD	Sk	Ku	α
CERQ-36	Self- blame	4	18	9.14	3.73	0.57	-0.55	0.75
	Acceptance	5	20	14.40	3.72	-0.45	-0.44	0.76
	Rumination	4	20	10.70	3.95	0.11	-0.80	0.75
	Positive refocusing	5	20	13.76	4.14	-0.41	-0.83	0.80
	Planning	7	20	15.07	3.50	-0.42	-0.55	0.75
	Positive reappraisal	4	20	14.39	3.88	-0.26	-0.64	0.80
	Putting into perspective	4	20	13.70	3.67	-0.47	-0.07	0.69
	Catastrophizing	4	20	8.86	4.08	1.05	0.43	0.81
	Other-blame	4	18	6.90	3.03	1.69	3.36	0.76
	Physical well-being	0	28	12.35	9.01	0.34	-1.29	0.93
FACT-B	Social well-being	10	24	19.56	3.37	-0.35	-0.72	0.72
	Emotional well-being	0	24	12.04	6.76	0.21	-1.26	0.85
	Functional well-being	10	28	19.94	4.53	-0.16	-0.86	0.78
	Emotional distress	0	50	15.58	12.6	0.75	-0.06	0.94
DASS-21	Depression	0	16	4.75	4.10	0.65	-0.31	0.86
	Anxiety	0	18	4.26	4.02	1.00	0.70	0.83
	Stress	0	19	6.88	4.92	0.63	-0.27	0.89

CERQ – Cognitive Emotion Regulation Questionnaire; FACT-B – Functional Assessment of Cancer Therapy-Breast; DASS – Depression Anxiety Stress Scale; Min – minimum; Max – maximum; M – mean value; SD – standard deviation; Sk – skewness; Ku – kurtosis.

Table 2
Cognitive emotion regulation strategies as mediators between emotional distress and different aspects of health related quality of life in breast cancer patients

Cognitive emotion regulation strategies	Basic parameters			95% CI	
	Coefficient ab (SE)	Coefficient a	Coefficient b	Lower	Upper
Distress and Physical well-being					
Mediators and effects					
Direct effect (*c'*)	-0.26 (0.23)			-0.19	0.72
Total effect (*c*)	-0.46 (0.30)*			0.14	1.06
Indirect – Self-blame	0.01 (0.05)	0.18	0.08	-0.22	0.38
Indirect – Acceptance	0.02 (0.07)	0.08	0.30	-0.11	0.71
Indirect – Rumination	-0.20 (0.17)	0.75**	-0.27	-0.69	0.15
Indirect – Positive refocusing	-0.42 (0.14)**	-0.83**	0.50**	0.17	0.83
Indirect – Planning	0.03 (0.07)	-0.08	-0.31	-0.83	0.21
Indirect – Positive reappraisal	-0.04 (0.18)	-0.58**	0.07	-0.44	0.58
Indirect – Putting into perspective	0.10 (0.11)	-0.38*	-0.26	-0.69	0.17
Indirect – Catastrophizing	0.30 (0.19)	0.96**	0.32	-0.08	0.71
Distress and Social well-being					
Mediators and effects					
Direct effect (c')	-0.04 (0.16)			-0.35	0.28
Total effect (c)	-0.28 (0.12)*			-0.52	-0.030.
Indirect – Self-blame	-0.02 (0.04)	0.12*	-0.16*	-0.33	-0.01
Indirect – Acceptance	0.01 (0.03)	0.23	0.04	-0.20	0.27
Indirect – Rumination	-0.03 (0.12)	0.77**	-0.04	-0.19	0.20
Indirect – Positive refocusing	-0.05 (0.07)	-0.76**	0.07	-0.11	0.25
Indirect – Planning	-0.01 (0.04)	-0.05	0.13	-0.16	0.42
Indirect – Positive reappraisal	-0.05 (0.08)	-0.52**	0.09	-0.18	0.35
Indirect – Putting into perspective	0.00 (0.05)	-0.28	-0.01	-0.27	0.25
Indirect – Catastrophizing	-0.12 (0.13)*	0.96**	-0.12*	-0.33	-0.13
Distress and Emotional well-being					
Mediators and effects					
Direct effect (c')	-0.53 (0.27)*			0.01	1.06
Total effect (c)	-0.32 (0.20)*			0.07	0.72
Indirect – Self- blame	0.01 (0.04)	0.18	0.05	-0.21	0.32
Indirect – Acceptance	0.02 (0.05)	0.08	0.24	-0.12	0.61
Indirect – Rumination	-0.25 (0.16)*	0.75**	-0.33**	-0.71	-0.01
Indirect – Positive refocusing	0.24 (0.13)*	-0.83**	0.29*	0.01	0.58
Indirect – Planning	0.01 (0.05)	-0.08	-0.15	-0.62	0.32
Indirect – Positive reappraisal	-0.05 (0.16)	-0.58**	0.09	-0.37	0.55
Indirect – Putting into perspective	0.06 (0.09)	-0.38*	-0.16	-0.54	0.23
Indirect – Catastrophizing	0.23 (0.17)*	0.96**	0.24	-0.11	0.60
Distress and Functional well-being					
Mediators and effects					
Direct effect (c')	-0.19 (0.08)			-0.44	0.01
Total effect (c)	-0.53 (0.27)**			-0.73	-0.33
Indirect – Self- blame	0.01 (0.02)	0.18	0.04	-0.09	0.16
Indirect – Acceptance	-0.01 (0.02)	0.08	-0.09	-0.26	0.08
Indirect – Rumination	-0.07 (0.06)	0.75**	-0.09	-0.27	0.08
Indirect – Positive refocusing	-0.04 (0.08)	-0.83**	0.05	-0.09	0.19
Indirect – Planning	-0.02 (0.04)	-0.08	0.21*	0.01	0.42
Indirect – Positive reappraisal	-0.06 (0.07)	-0.58**	0.10	-0.11	0.31
Indirect – Putting into perspective	-0.01 (0.03)	-0.38**	0.01	-0.17	0.19
Indirect – Catastrophizing	-0.15 (0.09)*	0.96**	-0.16*	-0.32	-0.01

Coefficient ab – indirect effect of mediator in relation between predictor and criterion variable; a – effect of predictor variable on mediator; b – effect of mediator variable on criterion; c' – direct effect of predictor variable on criterion variable when the effect of mediator is controlled; c – total effect (all effects are non-standardized regression coefficients); CI – confidence interval.
***p* < 0.05; ****p* < 0.001.**

In the relation between emotional distress and social well-being, the total effect (ab = -0.28, SE = 0.12; 95% LCI = -0.52, 95% HCI = -0.03) and the indirect effect of catastrophizing (a = 0.96, b = 0.12, ab = -0.12, SE = 0.13; 95% LCI = -0.33, 95% HCI = -0.13) were significant. As the direct effect was not significant, catastrophizing was a complete mediator of the relation and negatively affected social well-being (Figure 2).

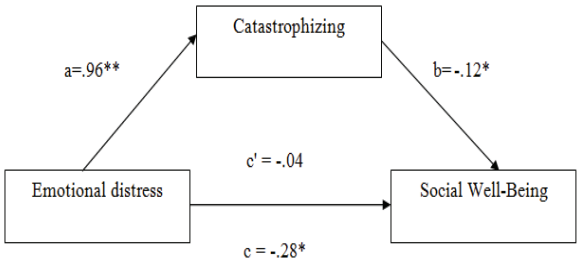

Fig. 2 – Relationship between emotional distress and social well-being mediated by catastrophizing.

a – effect of predictor variable on mediator; b – effect of mediator variable on criterion; c' – direct effect of predictor variable on criterion variable when the effect of mediator is controlled; c – total effect.
***p* < 0.05; ***p* < 0.001.**

When it comes to the relation between emotional distress and emotional well-being, significant were both the direct effect (ab = -0.53, SE = 0.27; 95% LCI = 0.01, 95% HCI = 1.06) and the total effect (ab = -0.32, SE = 0.20, 95% LCI = 0.07, 95% HCI = 0.72), as well as indirect effects of rumination (a = -0.75, b = - .33, ab = -0.25, SE = 0.16; 95% LCI = -0.71 , 95% HCI = -0.01) and positive refocusing (a = -0.83, b = 0.29, ab = 0.24, SE = 0.13; 95% LCI = -01, 95% HCI = 0.58). Given that both direct and total effects were significant, mediation was partial, i.e. distress remained a significant predictor of emotional well-being along with rumination that negatively affected emotional well-being and positive refocusing that positively affected the emotional well-being of patients (Figure 3).

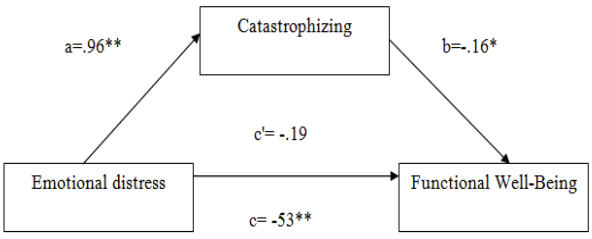

Fig. 3 – Relationship between emotional distress and functional well-being mediated by catastrophizing.

a – effect of predictor variable on mediator; b – effect of mediator variable on criterion; c' – direct effect of predictor variable on criterion variable when the effect of mediator is controlled; c – total effect.
***p* < 0.05; ***p* < 0.001.**

Finally, in the relation between emotional distress and functional well-being, the total effect (ab = -0.53, SE = 0.27; 95% LCI = -0.73, 95% HCI = -0.33) and the indirect effect of catastrophizing (a = 0.96, b = -0.16, ab = -0.15, SE = 0.09; 95% LCI = -0.32, 95% HCI = -0.01) were significant. As the direct effect was not significant, catastrophizing was a complete mediator of the relationship and negatively affected the functional well-being of patients (Figure 4).

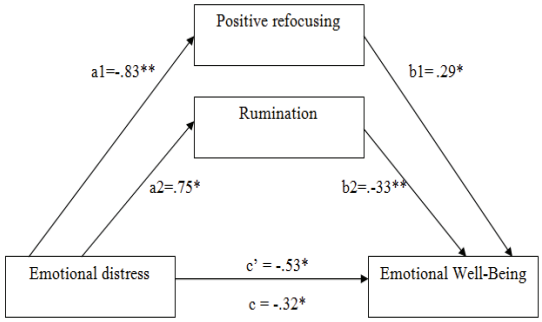

Fig. 4 – Relationship between emotional distress and emotional well-being mediated by rumination and positive refocusing.

a – effect of predictor variable on mediator; b – effect of mediator variable on criterion; c' – direct effect of predictor variable on criterion variable when the effect of mediator is controlled; c – total effect.
***p* < 0.05; ***p* < 0.001.**

Discussion

According to the aim of our study we started from the assumption that breast cancer, as one of the leading stressful events, provokes various unpleasant emotional states of patients, that, depending on the cognitive strategies used for regulation of the affect, can be intensified or mitigated, which then differently reflects on the physical, social, emotional and functional well-being of patients. Of particular interest to us was the cognitive aspect of emotion regulation, because it is an aspect that relates to conscious processes, including the perception of the situation itself, i.e. disease and treatment, which can be influenced by the training of patients in constructive techniques, or in other words, those that would allow them to make a successful adaptation to malignant disease and its treatment [26]. The obtained findings revealed that out of nine cognitive emotion regulation strategies, three strategies emerged as significant cognitive mediators of the relationship, and partially or completely changed the relationship between the negative emotional experience and the quality of life of patients.

Positive refocusing, a strategy that represents the redirection of thoughts, or the distraction of attention, from a stressful event to neutral or more enjoyable contents, proved to be beneficial for the emotional and physical well-being of patients. This means that when patients use positive refocusing, they reduce emotional distress by not focusing on it, but turning to positive stimuli, which positively reflect on the emotional well-being of patients, and it is also a strategy which reduces the influence of negative emotions on the perception of physical state caused by malignant disease. The obtained relation is also confirmed by the findings of earlier

studies which have showed that this technique of distraction, which is very often applied in health settings, is useful in the reduction of chronic pain and anxiety provoked by painful conditions [27], as well as in the induction of a positive affect [28], and that the application of this strategy over time can contribute to the reduction of depressive and anxious symptomatology [29], which all suggests that insisting on its use can be beneficial both to the emotional and physical well-being of patients.

On the other hand, rumination, or an alternative strategy to the previous one, which represents an intense focus on and preoccupation with one's own thoughts and feelings in relation to a stressful event, negatively affects the emotional well-being of patients. Therefore, those patients who tend to intensively deal with what they are currently experiencing, and even if their aim is to help themselves through better understanding what actually happened to them, leads to the escalation of emotional distress and contributes to even more negative evaluation of one's own emotional well-being. These are the most commonly intrusive thoughts in the form of brooding that lead to the intensification of the symptoms of anxiety, depression and stress [30], they inhibit effective problem solving and aim-oriented (instrumental) behavior [31], and rumination is significant cognitive factor that represents vulnerability for the development, maintenance, intensity and recurrence of depression [32, 33].

The tendency of patients to catastrophize or to overestimate the horror they have experienced, the negative aspects and possible consequences of a stressful event, negatively affects their functional and social well-being. This finding is not surprising, since catastrophizing is irrational and maladaptive thinking typical especially for the cognitive style of patients with anxious and depressive disorders, it is linked to intensification and maintenance of emotional distress [34, 35] and it is also related with experience of increased pain which may cause functional disability and impaired daily activities [35, 36]. Furthermore, the patients who tend to catastrophize, due to their social information-processing biases, will not usually notice supportive social relationships, nor the way in which the social environment accepts the disease positively, but will be sensitive to the negative interactions and they will overestimate non-acceptance and rejection [36], therefore, their health related quality of life in the social domain will be poorly perceived.

These findings are more than significant because they imply potential benefits of the implementation of cognitive behavioral therapy programs and interventions directed at rumination and catastrophizing as key mediators through which the negative impact of emotional distress is maintained and intensified, where insisting on positive refocusing can act therapeutically on the quality of life of breast cancer patients. For example, rumination-focused cognitive behavioral therapy, which starts from the assumption that rumination is a normal and understandable process that can be useful if used properly, through which patients are trained how to recognize ruminative thoughts related to the stressful event, which aspects of thoughts represent helpful, and which represent unhelpful thinking, how that reflects on their emotions and behavior, and how they can develop healthy alternatives in thinking (through relaxation, assertiveness, imagination, behavioral experiments), shows more and more importance and confirmation [37, 38]. Similarly, mindfulness-based cognitive therapy, which combines mindfulness-based stress reduction and cognitive behavioral therapy and implies awareness and nonjudgmental attitude as well as the acceptance of catastrophic and ruminative thoughts and negative mood, and then fostering to overcame them through the process of decentring and education, shows particular success in physically and chronically ill patients such as cancer patients, since focus is placed not only on emotions but also on painful bodily sensations [39, 40]. When it comes to positive distraction as a cognitive behavioral intervention, i.e., the effectiveness of the positive refocusing strategy, we proceed from the point that its application may be beneficial when it is followed by the acceptance of the disease and when it is used for the treatment of unhealthy rumination, and not when it represents an avoiding strategy that in long term can have a negative impact on emotional well-being, because a precondition for emotional well-being is contact with emotions, their acceptance, and understanding the meaning of unhealthy emotions [41]. Previous studies done with cancer patients have confirmed the effectiveness of cognitive behavioral interventions aimed at reducing the emotional distress and improving mental health [26, 42, 43], likewise, in controlling pain and painful conditions [44], as well as in optimizing functional status and reducing post-cancer fatigue [45], i.e. cognitive behavioral therapy shows beneficial effects for the overall health-related quality of life of breast cancer patients years after oncological treatment [46].

Given the fact that this study offers really significant implications for oncology settings, there are a few unanswered questions that at the same time represent a recommendation for the future research. Firstly, it was a cross-sectional study, so we can not suggest with certainty on the direction of the obtained relations, therefore the longitudinal monitoring of patients is indicated. Furthermore, it would be useful to examine the patients at different stages of malignant disease and its treatment, but also to compare the sample with those in different health situations in which the stressor at the time of the assessment is more controllable, since it is possible that the cognitive strategies, such as positive refocusing, in the regulation of the current distress, came to the fore because of the context itself, when the situation can be perceived as still uncertain and uncontrollable, and maybe it is still early for the more complex strategies such as positive reappraisal and putting into perspective. Also, it is very possible that female gender had an impact on the activation of these strategies, as earlier studies have shown that women are more likely to use rumination, catastrophizing and positive refocusing when dealing with stressful events [47]. Finally, we do not know how much the contribution is and whether this relation is moderated by neuroticism and a negative affect as personality traits in our sample, because these personality traits, along with the previous life experience are predispositions for the use of maladaptive cognitive strategies such as ruminations and catastrophizing [48], and therefore more intense emotional distress, so these variables should be also included and controlled in some of the future research.

Conclusion

Positive refocusing, rumination and catastrophizing are significant cognitive mediators of the relation between negative emotional experience and various aspects of the quality of life of breast cancer patients. Implementation of cognitive-behavioral interventions directed towards acquiring adaptive cognitive emotion regulation strategies would have positive effects on the improvement of the health related quality of life of breast cancer patients. For example, for patients who tend to use rumination, i.e. have intrusive thoughts such as 'Why the cancer has happened to me', 'What are the reasons that I deserve it', 'How will I cope', the interventions should be directed at refocusing attention on the present moment, accepting that disease has happened as also as the thoughts and feelings related to it, fostering healthy cognitions, finding solutions and planning the actions to manage possible consequences of cancer and its treatment. For patients who tend to catastrophize, e.g. 'My life is over, I won't succeed', 'When I lose my hair everyone will pity me', 'After mastectomy, I feel like I am not a whole person anymore', interventions should be directed at recognising the overestimation of negative predictions, relativizing and decreasing them through the prediction of possible positive outcomes, finding the meaning of stressful experience, increasing self- efficacy, self- esteem and self-confidence, fostering positive social support and relationships. These interventions are necessary part of oncological treatment and they are certainly more than beneficial for coping with malignant disease and the breast cancer patients' health related quality of life improvement.

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