

# Personality traits as predictors of the affective state in patients after breast cancer surgery

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**Background.** Breast cancer diagnosis is an extremely stressful life event that brings a number of physical and psychological challenges. Studies show that there is a high prevalence of psychological distress and symptoms of anxiety and depression among the diagnosed individuals. Although it is known that personality traits are strong predisposing factors for elevated experience of distress, research in oncology continues to be more focused on disease-related variables. In order to explore the role of personality traits in the experience of distress, the aim of our study was to examine the predictive value of personality characteristics such as neuroticism, hope, and optimism regarding the affective state of the patients after breast cancer surgery. **Methods.** The study was conducted on 40 women who had undergone breast cancer surgery, aged from 33 to 69 years (Mean = 55.02, SD = 9.18). The participants completed the following measures: Basic Demographic Data Questionnaire, The Positive and Negative Affect Schedule (PANAS), Life Orientation Test – Revised (LOT-R), Adult Hope Scale (AHS) and Neuroticism subscale from Big Five Inventory (BFI). **Results.** Two multiple regression analysis were performed, with the participants' age, level of hope, optimism and neuroticism as predictors and positive/negative affect as the criteria variables. In the first analysis, a statistically significant model was obtained ( $F_{4,35} = 3.05, p = 0.03$ ), with optimism being the only significant predictor of positive affect. The second analysis also yields a statistically significant model ( $F_{4,35} = 3.32, p = 0.02$ ), where neuroticism, and, marginally, optimism turned out to be significant predictors of negative affect. **Conclusion.** Our study showed that optimism and neuroticism may be important predictors of the affective state after breast cancer surgery. Therefore, it is important to include these factors in the screening batteries for early detection of vulnerable individuals and to take them into account when planning psychological interventions.

**Key words:** affect, personality, breast cancer, hope, optimism, neuroticism

## INTRODUCTION

Breast cancer is one of the most common forms of malignant disease in women. The diagnosis of breast cancer in itself is an extremely stressful life event, and the medical procedures that follow, including the long-lasting and demanding process of oncological treatment, are additional sources of stress. Facing the diagnosis and treatment of breast cancer not only brings many physical, but also psychological threats, losses and challenges.

Previous research in psycho-oncology has shown that the prevalence of psychological distress among the breast cancer patients is very high, which can lead to an increased risk of developing serious symptoms of anxiety and depression as well as mood disorders (1-3). The prevalence of depression among individuals who had breast cancer was approximately 32.8% (4), while 40% of those with recurrent disease experienced symptoms of anxiety and depression (5). Other studies have shown that prevalence of depression in women who had undergone mastectomy is 22% (6), while the prevalence of symptoms of anxiety and depression five years after the primary treatment of breast cancer (with modified radical mastectomy or partial mastectomy with radiotherapy) is 30% (7). Although the prevalence of depression may vary due to the evaluation period and the type of the examined population, it is clear that the rate of affective disorders in women treated for breast cancer is high. However, these symptoms often remain unrecognized (8). Untreated, they can significantly reduce the quality of the patient's life, threaten the

medical compliance during an oncological treatment, and thus reduce the survival rate (9). Therefore, psychological distress and affective disorders in women treated for breast cancer are relevant subjects that deserve special attention from all members of the oncology team.

With regard to measurement of distress and emotional vulnerability, negative affect is a frequently evaluated variable in studies that examine the adaptation of people to stressful life events. Negative affect can be defined as the general dimension of subjective distress, which includes various unpleasant moods, such as fear, anxiety, guilt, tension, hostility, etc. (10). Previous studies have shown that negative affect correlates positively with a subjective experience of stress, as well as with maladaptive coping strategies (11-13). Those individuals high in negative affect generally manifest elevated levels of distress, anxiety, dissatisfaction, and a tendency toward focusing on the unpleasant aspects of themselves, other people, the world / life and the future (14). On the other hand, positive affect reflects the degree to which a person feels enthusiastic, active, confident and energetic (10). Positive affect is traditionally associated with subjective well-being and personal resources such as a supportive social network, optimism, adaptive coping strategies (15) and resilience in general. Negative and positive affect can be measured as both trait and state (16).

It is interesting that studies which compared psychosocial outcomes of mastectomy and breast-conserving surgery found little differences in the presence of affective disorders between these two groups (17, 18).

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Psychosocial risk factors for impaired mental health seem to be more related to patients' adaptation to disease, rather than to demographic or clinical factors (19). Research has shown that lower quality of life in breast cancer patients is more associated to premorbid psychological features and coping strategies than to cancer-related variables such as severity of illness or type of treatment (20). It is also known that personality traits are among the most important factors that may predispose a person for the development of depression and anxiety (21, 22). Having this observation in mind, we find it necessary to examine in more detail the role of the personality traits such as neuroticism, dispositional optimism and hope, in the context of breast cancer treatment. Why do we consider these personality traits as particularly important when it comes to the psychological adaptation to illness? Findings of numerous studies have shown that neuroticism is a personality trait that is especially relevant for disorders such as depression and anxiety. Neuroticism implies a general tendency of a person to experience anxiety, fear, hostility, irritability, impulsivity, social withdrawal, depression, guilt, vulnerability, and low self-esteem. Various cross-sectional and longitudinal studies confirmed the relationship between neuroticism and the symptoms of depression and anxiety (23-25). However, there is a growing interest of researchers in those constructs that aim to explain the process of positive thinking, with optimism and hope being particularly important. Optimism can be defined as a stable tendency towards the belief that good rather than bad things will happen (26), and hope is conceptualized as a construct consisting of a motivational aspect that is aimed at achieving goals, and perceived possibilities to find the ways of realizing these goals (27). The difference between these two constructs is largely reflected in the fact that hope represents individual motivation and the observed possibility of finding successful paths to achieve the goal, whereas with optimism, a greater focus is placed on the expectation of a positive outcome (26). In literature, hope and optimism are often considered to be factors of psychological resilience among oncology patients. Research has shown that hope and optimism are associated with adaptive mechanisms of coping with malignant disease, psychological well-being and less severe symptoms of anxiety and depression (28-31).

During everyday work, a psycho-oncologist is faced with making an efficient screening and early recognition of vulnerable individuals as well as applying effective interventions in order to reduce distress in patients. In oncology, however, when exploring the process of adaptation to malignant disease, the emphasis still remains largely on the variables related to the disease itself and/or oncological treatment, although these factors are not always necessarily associated with successful or less successful adaptation outcomes (20). Therefore, psycho-oncology must strive for a better understanding of psychological factors that are potentially relevant in explaining the process and outcomes of patients' adaptation to illness. Consequently, the aim of this research was to examine the predictive value of dispositional personality characteristics, such as neuroticism, optimism and hope, in relation to the affective state of the patients, i.e. the presence of positive or negative affect as distress indicators at an early stage of oncological treatment, after breast cancer surgery.

## MATERIAL AND METHODS

This cross-sectional study was conducted with the approval of the Ethical Committee of the Oncology Institute of Vojvodina. Data were collected from inpatients during the first contact with a psychologist, on the second postoperative day, in the morning, during the inclusion in the program of early psycho-oncology rehabilitation. Before completing the questionnaires, participants were informed in detail about the purpose of the research. Taking part in the research was voluntary, and all individuals signed an informed consent.

### Sample

The study was conducted on 45 women who were diagnosed with breast cancer and hospitalized for surgical treatment at the Clinic for Operative Oncology at the Oncology Institute of Vojvodina. The conditions for taking part in the research were: that participant had never been previously diagnosed with a malignant disease, that the presence of metastases was not registered at the time of psychological assessment, and that the subjects had not previously undergone any procedure of oncological treatment (e.g. neoadjuvant chemotherapy). The mentioned factors were taken into account in order not to significantly affect the patient's affective state at the time of psychological evaluation. Therefore, 3 patients who were hospitalized for reconstructive surgical intervention after completed oncological treatment and 2 patients who underwent surgical intervention due to relapse of the disease were excluded from the initial sample. In addition, before completing the questionnaires, all patients had been checked for severe postoperative pain or any other somatic difficulties that could have a significant impact on the results of the study. In situations where this was the case, the patients approached the research after the symptoms had been reduced. Thus, the study was conducted on the final sample of 40 women, aged from 33 to 69 years (Mean = 55.02, SD = 9.18). Regarding the educational structure of the sample, 5% of participants have finished only elementary school, 45% secondary school, 15% graduated from a college and 35% had a university degree. Furthermore, 30% of participants were employed, 22.5% were unemployed, and 47.5% were retired. With regard to marital status, 65% of the patients report that they were married, 5% were in a common-law relationship, 7.5% were divorced, while 22.5% were widowed. Finally, 95% of the participants had children.

### Instruments

**Basic demographic data questionnaire.** This questionnaire was designed *ad hoc* in order to collect data about the age of the participants, their educational level, working, marital and birth status. In addition, information about patients referential diagnosis, upon their admission to the Clinic for Operative Oncology was obtained.

**The Positive and Negative Affect Schedule - PANAS** (10) was used as a measure of positive and negative affect. It is a self-reporting questionnaire which consists of 20 items, 10 of which refer to positive, and 10 to negative affect. Participants respond to items on a five-point Likert scale. Positive affect implies the presence of emotional experiences such as joy, excitement, enthusiasm, alertness, interest, etc. On the other hand, negative affect indicates the presence of subjective distress and unpleasant

emotional experiences. In this study, participants were given a „state“ version of the instrument, instructing them to answer how they felt „right now, at the given moment“.

**Life Orientation Test - Revised - LOT-R (26)** is an instrument used for assessment of optimism as a dispositional personality trait. This scale consists of the total of 10 items (e.g. „In uncertain times, I usually expect the best“), 4 of which are fillers and do not enter the final score. The answers are given on a five-point Likert scale.

**Adult Hope Scale - AHS (27)** is a self-report measure used for the assessment of hope as a personality disposition. The instrument contains two subscales corresponding to Snyder's cognitive model of hope - Agency (goal-oriented energy) and Pathways (perceiving and planning ways to achieve goals). The scale has the total of 12 items. Each of the two subscales consists of 4 items, while the remaining 4 items are fillers. In the original version of the questionnaire, answers are given on an eight-point Likert scale. In our research scores on subscales were not used in order to avoid the problem of multicollinearity. A four-point Likert scale was introduced in order to make answering easier for senior participants, although this act consequently increased a risk of affecting variability and reliability of the measure.

**Big Five Inventory - BFI (32)**. For the assessment of neuroticism, we used the Neuroticism subscale from the BIF - a 44 items questionnaire which is designed to measure the traits based on the Big-Five personality dimensions. The Neuroticism subscale consists of 8 items with a five-point Likert scale. Elevated neuroticism implies a tendency towards frequent experiences of anxiety, dysphoria, hostility, irritability, vulnerability, low self-esteem and withdrawal. Diminished neuroticism implies emotional stability.

## RESULTS

Table 1 shows the descriptive statistical data, as well as Cronbach's alpha coefficients for all applied scales. It can be seen that reliability is good for the measures of negative affect, positive affect and hope, whereas it is weaker for optimism and neuroticism, yet acceptable.

**Table 1** Descriptive statistics and reliability coefficient for all variables/scales

Variables	Mean	SD	Skewness	Kurtosis	Reliability of the scale (Cronbach's alpha)
Positive affect	31.42	6.83	0.00	-0.15	0.84
Negative affect	16.65	5.11	0.69	-0.50	0.84
Hope	25.92	3.44	-0.68	0.84	0.82
Optimism	23.92	3.74	-0.37	-0.22	0.69
Neuroticism	21.26	3.99	-0.35	-0.51	0.62

Based on Pearson correlations shown in Table 2, we can see that positive affect correlates positively with optimism ( $p < 0.01$ ) and hope ( $p < 0.05$ ). Furthermore, negative affect is positively related to neuroticism, and negatively to optimism ( $p < 0.05$ ). Finally, optimism and hope correlate negatively with neuroticism ( $p < 0.01$ ;  $p < 0.05$ ), and are significantly positively related to one another ( $p < 0.01$ ).

**Table 2.** Pearson's correlation coefficients (r) between variables

	Positive affect	Negative affect	Optimism	Hope
<b>Negative affect</b>	-0.20			
Optimism	<b>0.48**</b>	<b>-0.35*</b>		
Hope	<b>0.314*</b>	0.03	<b>0.43**</b>	
Neuroticism	-0.31	<b>0.39*</b>	<b>-0.48**</b>	<b>-0.32*</b>

\*\* Correlation is significant at the 0.01 level.

\* Correlation is significant at the 0.05 level.

In order to answer our research question - whether certain personality traits are significant predictors of a patients affective state after breast cancer surgery, two multiple regression analysis were conducted in IBM SPSS Statistics 21.0 software package. Research generally shows that older women manifest less psychological distress such as anxiety, depression and posttraumatic symptoms (33), and therefore we included the age of participants in the regression analysis. In the first regression analysis, the criterion variable was score on positive affect, while the predictor variables were: age of participants, total score on the hope, measure of optimism and, finally, neuroticism. In the second regression analysis, the criterion variable was result on negative affect, while set of predictors was the same as in the previous analysis.

In the first regression analysis, a statistically significant model was obtained ( $F_{4,35} = 3.05$ ,  $p = 0.03$ ). The coefficient of determination ( $R^2$ ) indicates that 25.9% of the variance of the criterion variable is explained by the given model. In Table 3, we can see that optimism turned out to be the only statistically significant predictor of positive affect in patients ( $p = 0.03$ ). Hence, those women who manifest higher dispositional optimism have a greater tendency to experience positive affect in the period after breast cancer surgery. The participants' age, hope and neuroticism did not appear to be significant predictors of positive affect in patients.

**Table 3.** Prediction of positive affect based on age and personality characteristics

Predictor variables	Standardized coefficient $\beta$	t	p
(Constant)		0.49	0.63
Age	0.10	0.64	0.52
Hope	0.12	0.72	0.47
<b>Optimism</b>	<b>0.40</b>	<b>2.27</b>	<b>0.03</b>
Neuroticism	-0.09	-0.57	0.57

In the second regression analysis, a statistically significant model was also obtained ( $F_{4,35} = 3.32$ ,  $p = 0.02$ ). The coefficient of determination shows that with this regression model it is possible to explain 27.5% of the total variance of the criterion variable. As seen in Table 4, statistically significant predictors of negative affect following breast cancer surgery are neuroticism ( $p = 0.049$ ), and marginally significant, in the negative direction, optimism ( $p = 0.06$ ). This result suggests that patients with highly expressed trait of neuroticism, and a low tendency towards optimism, are more likely to manifest a negative affect in the postoperative period. The age of the participants and hope again did not turn out to be significant predictors.

**Table 4. Prediction of negative affect based on age and personality characteristics**

Predictor variables	Standardized coefficient $\beta$	t	p
(Constant)		1.28	0.21
Age	-0.18	-1.24	0.22
Hope	0.27	1.65	0.11
<b>Optimism</b>	<b>-0.35</b>	<b>-1.98</b>	<b>0.06</b>
<b>Neuroticism</b>	<b>0.34</b>	<b>2.04</b>	<b>0.049</b>

## DISCUSSION

This study has shown that some dispositional personality characteristics may be important predictors of affective state of patients after the breast cancer surgery. In first regression model, optimism proved to be the only significant predictor of positive affect, which suggests that optimistic individuals tend to experience more positive emotions in the post-operative period. Our finding goes in line with the results of previous studies which report that optimism is a significant factor of resilience in the process of women's adaptation to breast cancer (34). Our result is also in accordance with earlier findings which show that optimism plays an important role in predicting emotional well-being in oncology patients (31, 35-37). Previous research suggests that optimism is an important factor in predicting not only short-term, but also long-term subjective well-being (36, 38). This implies that measure of optimism is a valuable indicator which should be included in the screening battery for early detection of protective and risk-factors significant for mental health of oncology patients. In addition, our finding is relevant because it indicates that in the early stage of breast cancer treatment, it is meaningful to focus special attention to the appropriate encouragement of the optimistic perspective, as an important psychological resource for adaptive coping strategies, such as acceptance, positive reinterpretation, social support, etc.

The second finding which we obtained refers to the fact that increased neuroticism, and, marginally, decreased optimism, are important predictors of negative affect in the post-operative period. More specifically, those patients with both high neuroticism and pessimistic orientation are more likely to experience a greater amount of unpleasant emotions after breast cancer surgery. Our results are in accordance with the fact that neuroticism is indeed a factor with significant predictive power when it comes to psychological distress, which confirms the status of this personality trait as a risk factor for emotional disturbances (23) also in oncology patients. For the mental health professionals who work within the oncology context, this finding is important because it shows that by measuring neuroticism (and optimism) it is possible to detect vulnerable individuals in the early stages of breast cancer treatment. This is a particularly important practical guideline when taking into account the findings of other studies which indicate that those who report short-term distress are also more likely to report an elevated distress in the long-term perspective (36, 37). Based on the obtained results, it seems that in order to reduce distress in patients with increased neuroticism, it would be more beneficial to alleviate the pessimistic attitude, instead of a direct emphasis on optimism, as this could potentially increase the sense of guilt and the inadequacy of these patients.

However, it is important to additionally consider the specificity of our findings for the breast cancer patients in post-surgical period. It seems

that our results offer implications on a more global level, meaning that permanent personality characteristics, such as psychological resilience or vulnerability, are of great importance for coping with stress (39) most likely in a wide range of life domains, and not only in the context of malignant disease.

Although neuroticism and optimism turned out to be significant predictors of the affective state in patients after the breast cancer surgery, this was not the case with the construct of hope. At first, this result seems to be surprising, given that the hope is cited as one of the most prominent factors of psychological resilience in oncology (28-30). One possible explanation of this result could be that Snyder's definition of hope is not adequately adjusted to the oncological context. Seemingly, for measurement of hope in oncology, the scale with more specified items is needed, with greater focus on the perception of disease than on the general personality disposition. An alternative explanation might lie in the perception of breast cancer as an event that compromises the sense of control, and therefore the items referring to the motivation and effectiveness in achieving personal goals may not give significant information in prediction of the affective states in patients.

Finally, we will comment on the finding that the age of participants did not show to be a significant predictor of the affective state immediately after the surgery. This result is inconsistent with previous research which shows that younger women with breast cancer exhibit greater psychological distress than the older ones (40). One of possible explanations for the absence of statistically significant association between age and emotional distress in our research could be found in the work of Compas *et al.* (41) who showed that age differences in manifestation of distress are the most prominent in the period close to setting-up the diagnosis. Authors explain this finding with more frequent use of emotional ventilation in younger women, while with the flow of time these differences disappear (41). This seems to be a plausible explanation for our finding since time from setting-up the diagnosis varied in our sample from a few weeks up to a several months, so the age differences were likely to fade away.

For future research it would be very informative to take into account the temporal changes during the recovery period, drawing on the longitudinal approach. Furthermore, it would be highly recommended to include larger sample size, knowing that some of the predictors in current study were significantly correlated, while some of the measures showed moderate reliability. It would also be of interest to explore if similar results could be obtained among other oncology patients, to examine gender differences, and to use age as covariate in further studies.

## CONCLUSION

The results of our research have shown that neuroticism and pessimism are significant risk factors for enhanced distress during the early stage of breast cancer treatment, while optimism is associated with indicators of successful adaptation to initial curing phase. These results are significant for psycho-oncological practice as they indicate the need for evaluation of these characteristics among patients in order to detect vulnerable individuals with an increased risk of less successful outcomes of psychological adaptation to illness. Our findings also provide important practical guidelines for psychological support to patients in the post-operative

period, as they indicate that, depending on the expression of neuroticism, engagement in fostering optimism or merely reducing the pessimistic attitude could buffer the maladaptive psychological reactions of patients in the early phases of adaptation.

### Conflict of Interest

We declare no conflicts of interest

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