

Predictors of psychological distress in breast cancer patients after surgery

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Objective: The purpose of this study was to examine the relationship between psychological distress and patient psychological traits (i.e., trait anxiety, life change events, and emotional suppression) in breast cancer patients after surgery.

Methods: A total of 33 breast cancer patients enrolled in this study completed the State-Trait Anxiety Inventory, the Life Experiences Survey, and the Courtauld Emotional Control Scale at their first visit and the Profile of Mood States after surgery.

Results: Trait anxiety, life change events, and emotional suppression, measured from the first visit were positively associated with psychological distress and predictors of psychological distress.

Conclusions: Trait anxiety, life change events, especially those perceived negatively, and emotional suppression were potential risk factors for psychological distress in patients with breast cancer after surgery.

Key words: breast cancer, psychological distress, trait anxiety, life change event, emotional suppression

Abbreviations: CECS, Courtauld Emotional Control Scale; LES, Life Experiences Survey; POMS, Profile of Mood States; STAI, State-Trait Anxiety Inventory; TMD, Total Mood Disturbance

Introduction

Breast cancer is one of the most important types of cancer among women worldwide.¹ According to Friedman et al., a diagnosis of breast cancer and its treatment are stressful events that affect the long-term functioning of patients.² Other investigators suggest that a breast cancer diagnosis is one of the most devastating events that can befall a woman and is frequently associated with anxiety and depression.³ The psychological burdens of long-term postoperative treatment also cause psychological distress in patients with breast cancer.⁴ Many patients with breast cancer undergo treatments including chemotherapy, radiotherapy, and endocrine treatment that are not free of side effects.⁵⁻¹⁰

Although breast cancer patients are at a high risk of

experiencing psychological distress, most patients gradually return to their former daily lives. Patients' lives after surgery, as early as one postoperative year, are marked with persisting physical and treatment-related problems including "tightness or tenderness in the chest wall or breast," "less energy due to fatigue," and "difficulty in sleeping".¹¹ Moreover, 20%–30% of breast cancer patients suffer from psychiatric morbidity, such as anxiety and/or depression, during the first postoperative year.^{12,13} Accordingly, an examination of psychological distress after surgery should be included in the therapeutic process.

There are, however, interpersonal differences in the extent to which breast cancer patients are vulnerable to psychological distress. One psychological trait that influences patient susceptibility to psychological distress is emotional suppression. Watson et al. reported that

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breast cancer patients with emotional suppression tended to feel hopelessness and had a fatalistic attitude.¹⁴ In our previous study, breast cancer patients with emotional suppression exhibited higher levels of psychological distress and expressed more negative emotions than patients with emotional expression after receiving the diagnosis.¹⁵

Our previous study also showed that trait anxiety and life change events, especially those perceived negatively, were important predictors of psychological distress in patients with benign breast problems after a breast cancer diagnosis.¹⁶ Bleiker et al. reported that trait anxiety could predict high levels of long-term distress in breast cancer patients.¹⁷ Furthermore, some studies showed that people who perceived life changing events negatively tended to suffer from anxiety and depression.^{18,19}

To date, only a few studies have focused on trait anxiety, life change events, and emotional suppression collectively as predictors of psychological distress in breast cancer patients. In our previous study,¹⁶ we focused on these psychological traits, but the examination was performed only after diagnosis. Therefore, in the present study, we examined the relationship between psychological distress and patient psychological traits (i.e., trait anxiety, life change events, and emotional suppression) after surgery.

Patients and Methods

We recruited 242 patients to participate in this study. All patients provided written informed consent at their first visit to the breast cancer outpatient clinic at Kitasato University Hospital between November 2004 and January 2007. Seventy-four patients were diagnosed with breast cancer, and 34 of them were interviewed for this study after their surgeries. One patient was excluded due to an incomplete questionnaire, giving a total of 33 patients enrolled in the study (mean age \pm SD, 57.36 \pm 12.01 years). This study was approved by the Ethics Committee of the Kitasato University School of Medicine.

Questionnaires

The State-Trait Anxiety Inventory (STAI) is a standardized questionnaire for measuring both "state anxiety" (a temporary condition) and "trait anxiety" (a more general and long-standing quality). We used the Japanese version of the 20-item Trait Anxiety Scale to evaluate generalized anxiety in this study.²⁰

The Life Experiences Survey (LES) includes 47 questionnaire items rated on a 7-point scale from -3 (extremely negative impact) to +3 (extremely positive

impact). A positive life change score is an absolute value derived by summing the impact ratings of those events reported to be positive. Similarly, a negative life change score is an absolute value derived by summing the impact ratings of those events reported to be negative. Adding these two values gives a total life change score. A balance life change score is obtained by subtracting the positive life change score from the negative life change score. We used the Japanese version of the LES¹⁹ in this study to score life events experienced during the 12 months prior to the first outpatient visit.

Watson and Greer developed the Courtauld Emotional Control Scale (CECS) to measure the extent of suppressed anger, depression, and anxiety in addition to total negative emotions in daily life. This self-rating questionnaire consists of 17 items scored from 1 (not at all) to 4 (very much so). The Japanese version consists of 6 anger subscales, 5 depression subscales, and 6 anxiety subscales.²¹

The Profile of Mood States (POMS) includes 65 items rated on a 5-point scale from 0 (not at all) to 4 (very much so). This self-rating scale includes 6 subscales: Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia, and Confusion-Bewilderment. The Total Mood Disturbance (TMD) score is calculated as the sum of these 6 subscales, with Vigor-Activity negatively weighted to provide a global measure of affective state. We used the Japanese version of the POMS for this study²² to measure psychological distress.

Procedure

The patients completed the four questionnaires themselves, the STAI, LES, and CECS, at their first visit to the outpatient clinic, and the POMS, after surgery.

Statistical analysis

We first assessed the scores and means for the STAI, LES, CECS, and POMS (TMD and 6 subscales). Then, to explore the relationship between psychological distress and patient characteristics, we calculated Pearson correlation coefficients between the "POMS (TMD and the 6 subscale scores)" and the "STAI score, each LES score, each CECS score, and age." Finally, to determine possible predictors of psychological distress after surgery, we performed multiple regression analyses with the STAI-Trait score, LES score, CECS score, and age as independent variables, and POMS TMD and 6 subscale scores as dependent variables. We excluded the LES total life change score, balance life change score, and CECS subscale scores from the analysis to avoid

Table 1. Descriptive characteristics of breast cancer patients (N = 33)

Category	N
Age (Mean ± SD)	57.36 ± 12.01
Days after surgery (Mean ± SD)	296.35 ± 100.84
Stage	
I	18
II	11
III	1
IV	1
Tis	1
Unknown	1
Education	
University	2
Junior college	6
Vocational school	1
High school	18
Junior high school	1
Unknown	5
Surgery	
Breast-conserving surgery	23
Mastectomy	10
Past treatment history (including the current treatment)	
Chemotherapy	20
Radiotherapy	21
Hormonal therapy	24
Herceptin	1
Unknown	1
Courtauld Emotional Control Scale (Mean ± SD)	
Anger suppression	14.09 ± 3.86
Depression suppression	13.03 ± 3.05
Anxiety suppression	14.45 ± 4.11
Emotional suppression	41.58 ± 9.84
Life Experiences Survey (Mean ± SD)	
Positive life change	1.55 ± 2.44
Negative life change	4.39 ± 4.73
Total life change	5.94 ± 5.78
Balance life change	2.85 ± 4.82
Trait anxiety (Mean ± SD)	42.12 ± 7.72
Profile of Mood States (Mean ± SD)	
TMD	35.67 ± 34.11
Tension-Anxiety	11.21 ± 6.62
Depression-Dejection	10.21 ± 8.50
Anger-Hostility	8.36 ± 7.51
Vigor-Activity	11.94 ± 6.81
Fatigue-Inertia	9.33 ± 7.21
Confusion-Bewilderment	8.48 ± 5.08

Tis, carcinoma in situ; TMD, Total Mood Disturbance

multicollinearity and chose a high standard of representation based on the previous results, such as those from precedent studies. We performed multiple regression analyses using the STAI-Trait score, negative life change score (LES), positive life change score (LES), total emotional suppression score (CECS), and age as independent variables, and POMS TMD and subscale scores as dependent variables.

Results

Patient demographics

The mean \pm SD of days after surgery for the participants of the present study (N = 33) were 296.35 ± 100.84 days (range: 117–461 days; data unknown for two patients). Eighteen patients were classified as stage I, 11 as stage II, and 1 each as stages III, IV, Tis, and unknown. Past treatment history included chemotherapy in 20 patients, radiotherapy in 21, and hormonal therapy in 24 (including the current treatment). Descriptive patient characteristics, as well as demographic and medical information, are presented in Table 1.

Relationship between psychological distress and patient characteristics

Table 2 shows Pearson correlation coefficients between psychological distress and trait anxiety, life change events, emotional suppression, and age. We found that a higher TMD score was associated with higher STAI-Trait and

LES subscale scores other than positive life change ($r \geq 0.523$, $P < 0.01$). In addition, higher POMS Tension-Anxiety and Anger-Hostility scores were associated with higher STAI-Trait, negative life change, balance life change ($r \geq 0.452$, $P < 0.01$), and total life change scores ($r \geq 0.426$, $P < 0.05$). Furthermore, our analyses revealed that a higher Depression-Dejection score was associated with higher negative life change, balance life change ($r \geq 0.477$, $P < 0.01$), STAI-Trait, total life change, and anxiety suppression scores ($r \geq 0.386$, $P < 0.05$). A higher Fatigue-Inertia score was associated with higher STAI-Trait, LES subscale scores except positive life change, anxiety suppression ($r \geq 0.461$, $P < 0.01$), depression suppression, and total emotional suppression scores ($r \geq 0.354$, $P < 0.05$). A higher Confusion-Bewilderment score was associated with higher negative life change and total life change scores ($r \geq 0.384$, $P < 0.05$). A higher Vigor-Activity score was associated with lower total life change ($r = -0.443$, $P < 0.01$), and negative life change scores ($r = -0.409$, $P < 0.05$).

Predictors of psychological distress

Table 3 shows possible predictors of psychological distress. We found that STAI-Trait and negative life change scores were statistically significant predictors of the TMD score (adjusted $R^2 = 0.366$, $F [5,27] = 4.692$, $P < 0.01$). Similarly, regarding each POMS subscale score, we observed that the predictors of the Anger-Hostility score followed the same pattern of significant results

Table 2. Pearson correlation coefficients between the POMS (TMD and 6 subscale scores) and the patients' characteristics

Characteristics	Profile of Mood States						
	TMD	Tension-Anxiety	Depression-Dejection	Anger-Hostility	Vigor-Activity	Fatigue-Inertia	Confusion-Bewilderment
Age	-0.218	-0.124	-0.173	-0.199	0.115	-0.325 ⁺	-0.102
Courtauld Emotional Control Scale							
Anger suppression	0.094	0.068	0.172	0.141	0.121	0.236	-0.127
Depression suppression	0.248	0.074	0.339 ⁺	0.17	-0.122	0.354 [*]	0.088
Anxiety suppression	0.289	0.073	0.386 [*]	0.125	-0.078	0.469 ^{**}	0.244
Emotional suppression	0.234	0.08	0.333 ⁺	0.16	-0.023	0.398 [*]	0.079
Life Experiences Survey							
Positive life change	0.099	0.058	-0.012	-0.057	-0.258	0.128	0.165
Negative life change	0.588 ^{**}	0.490 ^{**}	0.480 ^{**}	0.551 ^{**}	-0.409 [*]	0.536 ^{**}	0.385 [*]
Total life change	0.523 ^{**}	0.426 [*]	0.387 [*]	0.427 [*]	-0.443 ^{**}	0.492 ^{**}	0.384 [*]
Balance life change	0.527 ^{**}	0.452 ^{**}	0.477 ^{**}	0.570 ^{**}	-0.271	0.461 ^{**}	0.295 ⁺
Trait anxiety	0.550 ^{**}	0.540 ^{**}	0.433 [*]	0.591 ^{**}	-0.297 ⁺	0.477 ^{**}	0.319 ⁺

POMS, Profile of Mood States; TMD, Total Mood Disturbance

** $P < 0.01$, * $P < 0.05$, + $P < 0.10$

(adjusted $R^2 = 0.407$, $F [5,27] = 5.396$, $P < 0.01$). In addition, STAI-Trait and negative life change scores were predictors of the Tension-Anxiety score (adjusted $R^2 = 0.273$, $F [5,27] = 3.406$, $P < 0.05$), the negative life change score was a predictor of Depression-Dejection (adjusted $R^2 = 0.233$, $F [5,27] = 2.942$, $P < 0.05$), and negative life change and total emotional suppression scores were predictors of the Fatigue-Inertia score (adjusted $R^2 = 0.378$, $F [5,27] = 4.894$, $P < 0.01$). The remaining subscales, Confusion-Bewilderment and Vigor-Activity scores were not significant ($F [5,27] = 1.210, 1.452$, $P = ns$).

Table 3. Multiple regression analysis of factors predicting psychological distress

	β	t	P
(A) Tension – Anxiety (Adjusted $R^2 = 0.273$, $F (5, 27) = 3.406$, $P < 0.05$)			
Age	0.067	0.393	0.697
Emotional suppression	-0.074	-0.442	0.662
Positive life change	-0.089	-0.536	0.596
Negative life change	0.322 ⁺	1.869	0.073
Trait anxiety	0.459 [*]	2.44	0.022
(B) Depression – Dejection (Adjusted $R^2 = 0.233$, $F (5, 27) = 2.942$, $P < 0.05$)			
Age	-0.009	-0.052	0.959
Emotional suppression	0.225	1.306	0.203
Positive life change	-0.063	-0.366	0.717
Negative life change	0.378 [*]	2.135	0.042
Trait anxiety	0.217	1.121	0.272
(C) Anger – Hostility (Adjusted $R^2 = 0.407$, $F (5, 27) = 5.396$, $P < 0.01$)			
Age	-0.019	-0.124	0.902
Emotional suppression	-0.059	-0.391	0.699
Positive life change	-0.23	-1.532	0.137
Negative life change	0.409 [*]	2.629	0.014
Trait anxiety	0.451 [*]	2.654	0.013
(D) Fatigue – Inertia (Adjusted $R^2 = 0.378$, $F (5, 27) = 4.894$, $P < 0.01$)			
Age	-0.149	-0.944	0.354
Emotional suppression	0.317 ⁺	2.04	0.051
Positive life change	0.087	0.565	0.577
Negative life change	0.414 [*]	2.597	0.015
Trait anxiety	0.142	0.815	0.422
(E) TMD (Adjusted $R^2 = 0.366$, $F (5, 27) = 4.692$, $P < 0.01$)			
Age	-0.024	-0.152	0.881
Emotional suppression	0.103	0.658	0.516
Positive life change	-0.018	-0.113	0.911
Negative life change	0.439 [*]	2.726	0.011
Trait anxiety	0.325 ⁺	1.851	0.075

Discussion

Correlation and multiple regression analyses revealed an association between psychological distress and psychological traits in patients with breast cancer. Our previous study identified only trait anxiety as a predictor of psychological distress after a breast cancer diagnosis.¹⁶ The results of our present study suggest, however, that possible predictors of psychological distress after surgery include not only trait anxiety but also life change events, especially those perceived negatively, as well as emotional suppression. Thus, these three psychological traits are potential risk factors for psychological distress in patients with breast cancer after surgery.

Okazaki et al. reported that breast cancer patients with high trait anxiety experienced more psychological distress, such as anxiety and depression, than did patients with low trait anxiety after receiving a diagnosis.²³ In the present study, trait anxiety was also a significant predictor of psychological distress after surgery. Some studies suggested that trait anxiety was a significant predictor of depressive symptoms, fatigue, and sleep quality in patients with breast cancer or benign breast problems before diagnosis and at 1, 3, 6, 12, and 24 months post-diagnosis and after surgery.^{24,25} Our results also revealed that depression and fatigue were associated with psychological distress. Furthermore, by examining POMS subscales, we showed that trait anxiety was a significant predictor of psychological distress, especially anger and anxiety. Iwamitsu and Buck reported that higher trait anxiety was associated with greater levels of psychological distress, including anger and anxiety, in breast cancer patients after discharge.²⁶ After receiving a breast cancer diagnosis, patients with high trait anxiety expressed more negative emotions such as anxiety and concerns about cancer than did patients with low trait anxiety.²³ Trait anxiety is defined as relatively stable, individual differences in anxiety proneness and refers to a general view in which a wide range of stimulus situations are perceived as dangerous and threatening and where the general tendency is to respond with anxiety to perceived threats in the environment.²⁷ Thus, the mood status of patients with high trait anxiety likely worsens (e.g., expressing more anger and anxiety) as they progress through the disease course from diagnosis to treatment, compared to patients with low trait anxiety. Therefore, trait anxiety is the first key predictor of psychological distress that affects the mood status of breast cancer patients after surgery.

Smith et al. reported that life changes, when perceived negatively, were related to psychological distress.²⁸ Some

studies suggested that people who perceived life events negatively tended to suffer from anxiety and depression.^{18,19} In our previous study, life change events were important predictors of psychological distress in patients with benign breast problems after a breast cancer diagnosis.¹⁶ This was also the case after surgery. Furthermore, life change events, especially those perceived negatively, were associated with all POMS subscales, and significantly predicted not only psychological distress such as anxiety and depression but also anger and fatigue. Iwamitsu et al. reported that people who perceived life events negatively tended to be more anxious and score high on neuroticism.¹⁹ The results of the present study suggest the tendency among patients who perceive life events negatively to respond to the slightest events and perceive various situations more negatively throughout the course of their breast cancer diagnosis and treatment. Thus, life change events can have a psychological distress-enhancing effect.

Previous studies reported that emotional suppression was a psychological trait that influences the level of psychological distress in patients with breast cancer.^{15,29-31} Iwamitsu et al. reported that breast cancer patients with anxiety and total emotional suppression experienced more psychological distress than did patients with anxiety and total emotional expression after a breast cancer diagnosis.²⁹ In addition, breast cancer patients with emotional suppression reportedly experienced more psychological distress than did those with emotional expression post-diagnosis and after surgery up to three months after discharge.^{30,31} The results of the present study are consistent with these reports. In particular, our findings suggest that greater depression and fatigue are associated with more emotional suppression. The scores of Depression-Dejection in breast cancer patients with emotional suppression were higher after discharge.³² Breast cancer patients with emotional suppression felt fatigue after receiving a diagnosis.³¹ Schultz et al. showed that cancer related fatigue was not relieved by sleep or rest.³³ Nakatani et al. reported that breast cancer patients with emotional suppression tended to experience higher levels of psychological distress because they were incapable of dealing with stressful situations, such as a cancer diagnosis, with their negative emotion-suppressing coping style.¹⁵ Therefore, in the present study, patients who suppressed their emotions might have experienced psychological distress, such as depression and fatigue, because they suppressed their emotions through the course of their breast cancer and side effect treatments, not only after the diagnosis but also after surgery. Collectively, this suggests that emotional suppression is another

important determinant of psychological distress in breast cancer patients.

The present study identified three predictors of psychological distress in patients with breast cancer after surgery: high trait anxiety, life change events, especially those perceived negatively, and emotional suppression. Furthermore, we add that trait anxiety is a strong predictor of psychological distress, both post-diagnosis and after surgery. Iwamitsu and Buck found that breast cancer patients with high trait anxiety and emotional suppression were sensitive to stressful situations and experienced higher levels of psychological distress than did patients with low trait anxiety and emotional expression.³¹ These findings demonstrate that the extent of psychological distress in patients after surgery can be predicted based on their psychological traits from the first visit. This underscores the importance of understanding the psychological traits of patients from an early stage. Questionnaires may serve as a means to predict patient psychological distress without imposing a burden.

There are three limitations to this study. The first limitation is that there was a small sample population of patients (N = 33) who received various treatments. The second limitation is that the patients' life events were not examined from the time of their breast cancer surgery until when the answers to the questionnaires were obtained. The third limitation is that we only examined psychological distress in patients after their surgeries for breast cancer. A longitudinal study with a larger study population is therefore warranted in order to provide more comprehensive support for breast cancer patients.

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