

**THE HEALING EFFECT OF PSYCHOSOCIAL
INTERVENTIONS IN BREAST CANCER - FROM SURGICAL
FEAR TO ENHANCED LONG-TERM QUALITY OF LIFE**

Summary of PhD Thesis

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List of publications providing the basis and related to the topic of the thesis

- I. Wittmann, V., Latos, M., Horvath, Z., Simonka, Zs., Paszt, A., Lazar, Gy. & Csabai, M. (2017). What contributes to long-term quality of life in breast cancer patients who are undergoing surgery? Results of a multidimensional study. *Quality of Life Research*, 26, 2189-2199.

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- II. Wittmann, V., Drótos, G., Csabai, M. & Lazar, Gy. (2018). A Sebészeti Beavatkozástól Való Félelem Kérdőív magyar nyelvű változatának reliabilitás-és validitásvizsgálata sebészeti beavatkozáson átesett páciensek körében. *Orvosi Hetilap*, 159, 1988-1993.

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- III. Wittmann, V., Latos, M., Horvath, Z., Simonka, Zs., Paszt, A., Lazar, Gy. & Csabai, M. (2019). Emlődaganatos nőbetegek komplex támogató terápiája. Egy pszichológiai intervenció kutatás előzetes eredményei. *Orvosi Hetilap* (Excepted)

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1.Introduction

1.1.Psychological distress in cancer patients

Most cancer patients experience some level of distress associated with cancer and its treatment at all stages of the disease. Studies have found that 20%–40% of cancer patients report significant levels of distress. According to the National Comprehensive Cancer Network (NCCN) guidelines, distress in cancer patients is defined as “a multifactorial unpleasant emotional experience of a psychological, social, and/or spiritual nature that may interfere with the ability to cope effectively with cancer, its physical symptoms, and its treatment”. Distress, as defined by the NCCN, extends along a continuum, ranging from normal feelings of vulnerability, sadness, and fears to problems that can become disabling, such as depression, anxiety, panic, social isolation, and existential crisis. This way the recognition, monitoring and treatment of distress at all stages of cancer is essential and requires screening for distress from the first visit through the course of disease and beyond.

1.2. Before surgery: surgical fear as a risk factor

Interdisciplinary studies have shown that preoperative or surgical fear is a common emotional state for many patients waiting for surgery and it is a risk factor for impaired psychosocial and physical recovery and can even lead to acute or chronic postoperative pain. Objects of surgical fear can be heterogeneous and varies from fear of the anaesthesia to fear of the surgical procedure itself or even dying. In a meta-analysis scientists have found a range of psychological mechanisms that could affect recovery after surgery. Firstly, negative emotions can enhance pain sensations. Secondly, cognitions and emotions influence behaviour (for example doing physiotherapy exercises) and are likely to influence pain and return to usual activities. Thirdly, stress has been linked to the slower healing of wounds through psychoneuroimmunological mechanism. It is therefore likely that psychological interventions that reduce negative emotions such as anxiety, worrying about surgery and perceptions of stress may lead to positive postoperative outcomes. In a review psychological preparation was found to be beneficial for a range of outcome variables that included negative affect, pain and length of hospital stay.

1.3. Psychological issues in breast cancer

Meta-analyses suggest that stress-related psychosocial factors and lower health-related quality of life (QoL) are associated with poorer survival among people with breast cancer. Depression and anxiety are typical responses after diagnosis and during the treatment phase, making psychological screening and intervention extremely relevant. QoL is an important outcome measure in all patients with breast cancer due to the complexity of the disease, with emotional, functional, physical, social and sexual factors all having an essential role. Regarding adaptation in breast cancer patient, three broad psychosocial responses have been identified to breast cancer: (1) psychological discomfort; (2) behavioral changes caused by physical discomfort and (3) fears related to body image, recurrence, or death. Although women today face very different treatment scenarios, the psychological concerns that affect adaptation remain the same. In addition to these variables, the age at which cancer occurs is of prime importance. Concerns about future health as well as fears of potential disfigurement, loss of femininity are common to all women diagnosed with breast cancer. Other variable affecting long-term QoL in breast cancer patients include the experience of posttraumatic growth (PTG). PTG is defined as perceived positive changes in previous levels of functioning following a traumatic life event. Following a diagnosis of breast cancer, many women report PTG in a variety of life domains (e.g. recognition of new possibilities in one's life). The frequent traumatic and disfiguring nature of breast cancer surgery can also lead to a series of psychological problems relating to body image, sexuality and femininity. The type of surgery can also influence the psychological well-being of breast cancer patients. Early studies showed that women having breast-conserving therapy (BCT) manifest better overall adjustment than those having mastectomy. Body change stress refers to subjective psychological stress that accompanies women's negative and distressing feelings, emotions, thoughts and behaviours originating from and connected to breast cancer and/or breast surgeries. Whereas, many of the symptoms that are associated with breast cancer and its treatment can last for several months or even years after treatment is complete, studies have shown that regular physical activity is beneficial in reducing and relieving cancer-related symptoms and improving QoL in cancer patients.

1.4. Psychological preparation for surgery

Some evidence supports the role of preoperative psychological interventions in patients waiting for surgery, for example in decreased cortisol levels and enhanced wound healing. According to the review of Tsimopoulou et al. psychological interventions before surgery proved the most efficient if one of the following psychological methods were

involved: training the patients (1) in relaxation techniques such as breathing, progressive muscle relaxation, and meditation; (2) in „guided imagery,” with participants asked to imagine stages before and after the operation to control anxiety; and (3) in problem-solving and coping strategies.

1.5. Psychological interventions in breast cancer patients after surgery

Early studies address the great importance of psychological intervention before and after surgery as well. Among breast cancer patients a major decrease in state anxiety can appear after surgery, which can be explained by the immediate relief and decrease in fear after surgery. However, after the operation, many patients have to understand that their cancer treatment is far from over. Increased fear and uncertainty about cancer and its therapy can remain making the assessment of psychological interventions after surgery extremely relevant.

2.Aims

The main aim of our study was to gain a more complete understanding of the key determinants of QoL in cancer patients undergoing surgery. The 3 studies involved were:

1. The reliability and validity of the Hungarian version of the Surgical Fear Questionnaire
2. The effect of pre- and post-operative psychological interventions on breast cancer patients undergoing surgery- a preliminary study
3. Pre- and post-operative psychological characteristics and long-term quality of life in breast cancer patients who are undergoing surgery (measuring anxiety, depression, posttraumatic growth, body image, and physical activity)

3. The reliability and validity of the Hungarian version of the Surgical Fear Questionnaire

3.1. Methods and measures

We conducted the reliability and validity analysis of the Hungarian version of the Surgical Fear Questionnaire. Prior to their surgery for cancer, the patients were assessed in the Department of Surgery at the University of Szeged. Psychological assessments were conducted one day prior to surgery and two days after surgery. The final sample comprised

149 cancer patients waiting for surgery (47 male, mean age 62.74 years, SD = 12.30; 102 female, mean age 55.61 years, SD = 13,51). From which 63 patients had breast surgery (37 excision, 26 mastectomy), 38 patients had abdominal surgery (26 laparoscopy, 12 laporotomy), 36 patients had lung surgery (24 thorocoscopy, 12 thorocotomy) and 12 patients had other types of surgery. The Surgical Fear Questionnaire (SFQ) was used to measure fear regarding surgery and was used 1 day before surgery. The questionnaire comprises 10 items. The SFQ consists of two subscales: fear of the short-term consequences of surgery (SFQ-s) and fear of the long-term consequences of surgery (SFQ-l). To establish the reliability and validity of the Hungarian version of the SFQ, 3 independent translators translated the SFQ into Hungarian and a fourth translator translated the SFQ into English. After analyzing the original and translated version of the SFQ a final version of the Hungarian questionnaire was made. Other measures used were the Spielberger State and Trait Anxiety Inventory (STAI-S; STAI-T), the Beck's Depression Inventory (BDI) and the Visual Analog Scale (VAS). To check the validity of the questionnaire principal component analyses (EFA) was performed.

3.2. Results

3.2.1. Factor analysis

The EFA identified two factors together explaining 75.3% of the total variance. One factor contained items related to fear of short-term consequences of surgery (items 1-4) with eigenvalue 4.98 and one factor contained items related to long-term consequences of surgery (items 5,6,9,10) with eigenvalue 1.043. However, two items (item 7 and 8) did not load above the cut-off of > 0.40 on either of the two factors. These were also the two items that had the lowest factor loading in the original study. Based on the factor loadings, the SFQ can be used best as an eight-item scale with two subscales, each consisting of four items (Table 1).

Table 1. Exploratory factor analysis

Items	Factors	
	SFQ-s	SFQ-l
4. I am afraid of the unpleasant side effects (like nausea) after the operation	0.903	
3. I am afraid of the pain after the operation	0.887	
2. I am afraid of the anaesthesia	0.808	
1. I am afraid of the operation	0.781	

9. I am afraid that I won't recover completely from the operation	0.939
6. I am afraid the operation will fail	0.924
10. I am afraid of the long duration of the rehabilitation after the operation	0.680
5. I am afraid my health will deteriorate because of the operation	0.506

3.2.2. Reliability analysis

The internal consistency of the two scales were appropriate. The Cronbach's alpha of the SFQ-s was 0.878 and Cronbach's alpha of the SFQ-l was 0.885 (Table 2).

3.2.3. Convergent validation

In terms of convergent validity the STAI-S was significantly related to SFQ-s ($r = 0.49, p < 0.001$) and SFQ-l ($r = 0.42, p < 0.001$). The correlation between STAI-T and SFQ-s ($r = 0.32, p < 0.001$) and SFQ-l ($r = 0.39, p < 0.001$) was significant but weaker compared to state anxiety. The SFQ-s ($r = 0.35, p < 0.001$), and SFQ-l ($r = 0.44, p < 0.001$) appeared to be significantly related to the BDI as well. Furthermore, the subscales of SFQ showed a significant correlation with expected pain before surgery (SFQ-s: $r = 0.52, p < 0.001$; SFQ-l: $r = 0.48, p < 0.001$), but not pain after surgery ($p > 0.05$).

3.2.5. Connections between SFQ and sociodemographic factors

There were no significant differences between the SFQ subscales regarding gender and sociodemographic factors ($p > 0.05$). However, the SFQ-l subscale had a significant but weak correlation with educational level ($r = -0.181, p = 0.029$).

3.2.6. Connections between pain and type of surgery

In our research, there were no significant differences between type of surgery and expected pain (before surgery) or pain (after surgery) among patients ($p > 0.05$).

4. The effect of pre- and post-operative psychological interventions on breast cancer patients - a preliminary study

4.1. Methods

4.1.1. Study design and sample

Prior to their surgery for breast cancer, the patients were assessed in the Department of Surgery at the University of Szeged. The final sample comprised 50 female patients. Patients were divided into 2 groups: (1) intervention group (IG) (n=20), (2) control group (CG) (n=30). The intervention group received psychological intervention once before the surgery and six times after the surgery. The intervention lasted 60 minutes each time. The control group did not receive any kind of psychological intervention. Every participant could decide freely on which group to join. The data were assessed at 3-time points: 1 day before surgery (T1), 3 days after surgery (T2) and 6 weeks after surgery (T3) (Table 2).

Table 2. Study design

	CG	IG
1 day before surgery	Sociodemographic factors Medical parameters Spielberger State and Trait Anxiety Inventory Beck's Depression Inventory Surgical Fear Questionnaire Functional Assessment of Cancer Therapy-Breast Visual Analog Scale	Sociodemographic factors Medical parameters Spielberger State and Trait Anxiety Inventory Beck's Depression Inventory Surgical Fear Questionnaire Functional Assessment of Cancer Therapy-Breast Visual Analog Scale Psychological preparation for the surgery PRISM-D
2 days after surgery	Spielberger State and Trait Anxiety Inventory Visual Analog Scale	Spielberger State and Trait Anxiety Inventory Visual Analog Scale
6 weeks after surgery	Spielberger State Anxiety Inventory Beck's Depression Inventory Functional Assessment of Cancer Therapy-Breast Breast Impact of Treatment Scale Visual Analog Scale	Spielberger State Anxiety Inventory Beck's Depression Inventory Functional Assessment of Cancer Therapy-Breast Breast Impact of Treatment Scale Visual Analog Scale PRISM-D Psychological Intervention (Week 1-6) Body sculpture technique (Week 4)

4.1.2. Measures

The Spielberger State and Trait Anxiety Inventory (STAI-S; STAI-T) was administered to measure the level of anxiety.

Beck's Depression Inventory (BDI) was used to assess the severity of depressive symptoms.

The FACT-Breast (FACT-B) was used to assess QoL, as it was designed specifically for breast cancer patients.

To measure stress from body change related to breast cancer surgery, the Breast Impact of Treatment Scale (BITS) was used.

The SFQ was used to measure fear regarding surgery and it was used 1 day before surgery.

The Visual Analog Scale (VAS) was used to measure expected pain before surgery and pain after surgery using a 10-point Likert-scale (104).

To measure the patient's perceived burden of suffering due to his/her illness, the Pictorial Representation of Illness and Self-Measure D (PRISM-D) was used.

In our study the *Body Sculpture Technique* was used which is a procedure in which patients create a three-dimensional model of their own body with modelling clay. This technique offers a diagnostic and also therapeutic approach to body image.

Patients in the IG were involved in a psychological preparation one day before surgery in which patients had the opportunity of a psychosocial intervention, taking into account the personal needs of each participant. These interventions lasted approximately for one hour.

Patients in the IG took part in 6-part psychological interventions on the course of the first 6 weeks after surgery. These interventions were 60-minute long and took place weekly and were conducted by the same psychologist. The interventions were semi-structured, consisting of the body sculpture technique and the PRISM-D (Table 2).

4.2. Results

4.2.1. Sociodemographic and medical characteristics in the IG and CG

Except mean age ($p < 0.05$), there were no significant differences between the two groups regarding sociodemographic and medical characteristics ($p > 0.05$) (Table 3).

Table 3. Sociodemographic and medical characteristics (N = 50)

Characteristics	IG (n = 20)	CG (n = 30)	p
Mean age (SD)	48.3 (10.22)	58.03 (14.05)	0.011*
Marital status (N,%)			
Married	13 (65)	21 (70)	0.7
Not married	7 (35)	9 (30)	
Educational level (N,%)			
Primary qualification	0	1 (3.3)	0.11
Higher secondary qualification	7 (35)	16 (53.3)	
University qualification	13 (65)	13 (43.4)	

Type of surgery (N,%)			
Excision	13 (65)	18 (60)	0.72
Mastectomy	7 (35)	12 (40)	
Grade (N,%)			
I.	3 (15)	2 (6)	0.11
II.	9 (45)	11 (36)	
III.	4 (20)	12 (40)	
Tumor size (Mean,SD)	22 (19.7)	19.50 (19.3)	0.7
Neoadjuvant treatment (N,%)			
Yes	5 (25)	3 (10)	0.16
No	15 (75)	27 (90)	
Side of tumor (N,%)			
Right	10 (50)	15 (50)	0.86
Left	10 (50)	15 (50)	

* $p < 0.05$

Significant differences were found in age among the two groups. Regarding the IG we found that age had a significant negative correlation with social ($r = -0.487, p < 0.05$), functional ($r = -0.526, p < 0.05$) and overall well-being ($r = -0.497, p < 0.05$) one day before surgery, and a positive correlation with SFQ-1 ($r = 0.456, p < 0.05$) one day before surgery. In the CG we found significant negative correlations between age and social ($r = -0.523, p < 0.05$), functional ($r = -0.482, p < 0.05$) and overall well-being ($r = -0.464, p < 0.05$) one day before surgery, and a positive correlation with SFQ-1 ($r = 0.396, p < 0.05$) one day before surgery. Furthermore, patients in the IG undergoing excision reported better emotional well-being 6 weeks after the surgery than patients undergoing mastectomy (20.23 vs. 15.14, $p = 0.02$). Moreover, patients undergoing mastectomy in the IG reported tendentially higher levels of stress regarding changed body image than patients undergoing excision in the IG (42.86 vs. 25.23, $p = 0.08$). Patients undergoing mastectomy in the CG reported significantly higher levels of stress regarding changed body image than patients undergoing excision in the CG (50 vs. 23.75, $p < 0.01$).

4.2.2. Differences between intervention and control group at all 3 time points (T1, T2, T3)

Before the surgery, both the IG and the CG showed differences in scores regarding the SFQ total ($F(1, 43) = 3.699, p = 0.61$) and the SFQ short term consequences scale ($F(1, 43) = 7.446, p = 0.09$). The IG reported tendentially lower levels of overall surgical fear than the control group (28.95 vs. 39.37). Furthermore, the IG experienced lower levels of fear regarding short term consequences of the surgery than CG (17.63 vs. 29.37). Additionally, the groups significantly differed in the level of state anxiety at all 3 time points, meaning that while the IG's state anxiety level decreased gradually, patients' state anxiety level in the CG

decreased until the second day after surgery and started to increase again by the time of 6 weeks later after surgery ($p = 0.02$) (Table 4).

Table 4. Differences between intervention and control group at all 3 time points (T1, T2, T3)

	Before surgery (T1)		2 days after surgery (T2)		6 weeks after surgery (T3)		p
	IG	CG	IG	CG	IG	CG	
Stai-T	46.35	45.43					0.74
Stai-S	54.73	52.11	44.5	43.66	40.4	46.33	0.02*
BDI	10.25	11.2			9.8	12.96	0.26
Fact-B							
Emotional well-being	17	17.46			18.45	18.53	0.7
Physical well-being	24.8	23.5			22.2	20.34	0.7
Functional well-being	17.15	16.96			17.9	16.23	0.34
Social well-being	21.9	20.69			21.75	20.76	0.86
Breast well-being	25.55	25.11			25.5	23.46	0.59
Fact-B total	106.3	102.73			105.8	99.46	0.58
VAS	4.26	4.29	3.87	3.74	1.31	2.07	0.39
SFQ							
Short-term consequences	17.63	29.37					0.005**
Long-term consequences	13.53	16.16	14	15.75	14.8	17.5	0.91
SFQ total	28.95	39.37					0.06
BITS							
Intrusive thoughts					22.2	25.19	0.52
Avoidance					9.1	9.26	0.94
BITS total					31.4	34.44	0.61

IG = intervention group; CG = control group

* $p < 0.05$; ** $p < 0.01$

4.2.3. Experiences with the PRISM-D

Using the PRISM-D as an interventional tool has turned out to be a really useful, quick and easy method for acquiring additional informations about the patients' illness perception, family background and emotional well-being. The test also helps patients in visualising their current life situation and becomes this way more approachable and understandable.

4.2.4. Experiences with the Body Sculpture Technique

Using qualitative analysis we have found that the sculptures created by the intervention group reflected the patient's attitude towards their illness and body image. The projective nature of the method helped patients to reveal individual contents of consciousness such as childhood memories (regression), sensations of grief (the loss of a body part, the loss of health), problems in connection with body image, coping strategies (acceptance) and positive changes due to illness.

5. Long-term QoL in breast cancer patients

5.1. Methods

5.1.1. Study design and sample

Prior to their surgery for breast cancer, the patients were assessed in the Department of Surgery at the University of Szeged. The final sample comprised 63 female patients. Psychological assessments were conducted by a trained health psychologist who did not have access to medical data about the patients. The data were assessed at 3-time points: 1 day before surgery (T1), 3 days after surgery (T2) and 18 months after surgery (T3). The mean age of the 63 breast cancer patient was 56.1 years (SD = 11.92). In addition, 52.4% of the patients had a secondary school qualification, and 73% of them were married. Most of the patients had an excision (75%), and the mean tumour size was 21.61 mm (SD = 21). Only five of the patients received neoadjuvant treatment, and 59.7% of them were physically active.

5.1.2. Study measures

Beck's Depression Inventory (BDI) was used to measure the severity of depressive symptoms.

The Spielberger State and Trait Anxiety Inventory (STAI-S; STAI-T) was used to measure the level of anxiety before and after.

The FACT-Breast (FACT-B) was used to assess QoL, as it was designed specifically for breast cancer patients.

To measure stress from body change related to breast cancer surgery, the Breast Impact of Treatment Scale was used (BITS).

We administered the Posttraumatic Growth Inventory (PTGI) 18 months after surgery, which was designed to assess positive outcomes following a struggle with highly challenging life circumstances.

5.2. Results

No significant correlations were found between sociodemographic factors and BDI scores ($p < 0.05$). Similarly, no significant correlations were found between sociodemographic factors and STAI scores ($p < 0.05$). However, age significantly correlated with the PTGI ($r = -0.275$, $p < 0.05$) and FACT-B ($r = -0.276$, $p < 0.05$) scores 18 months after the operation. Education level was significantly associated with the FACT-B ($H(2) = 8.175$, $p < 0.05$) and PTGI ($H(2) = 6.292$, $p < 0.05$) scores 18 months later after the operation. Patients with a lower education level had a lower FACT-B score (89 vs. 113.8) and PTGI score (54.6 vs. 74.8) than patients with high qualification 18 months later after the operation.

According to our results, state anxiety was significantly higher before the operation than 3 days later after the operation (51.46 vs. 39.72, $p > 0.01$). Furthermore, state anxiety was significantly higher 18 months later after the operation than 3 days after the operation (41.52 vs. 39.72, $p > 0.01$). The patients reported better *functional well-being* (19.31 vs. 17.45, $p = 0.05$) and *physical well-being* (23.87 vs. 20.33, $p > 0.01$) 18 months after the operation compared to pre-operation.

QoL before surgery and the subscales of QoL (except social well-being) before surgery had a significant negative correlation with depression and anxiety ($p > 0.05$). QoL 18 months after surgery and the subscales of QoL 18 months after surgery had a significant negative correlation with depression and trait anxiety ($p > 0.05$). The statistical measures showed that PTG had a significant negative correlation with depression ($r = -0.255$, $p > 0.05$) 18 months after surgery. A significant positive correlation was found between body change stress and depression ($r = 0.556$, $p > 0.05$). The statistical measures indicated significant positive correlation between QoL 18 months after surgery and the following PTG subscales: relating to others ($r = 0.255$, $p > 0.05$), new possibilities ($r = 0.311$, $p > 0.05$), personal strength ($r = 0.388$, $p > 0.05$), and spiritual change ($r = 0.276$, $p > 0.05$). A negative association was found between body change stress and QoL 18 months after surgery ($r = -0.435$, $p > 0.05$). There was no significant association between body change stress and PTG ($p > 0.05$).

In our study, mean number of hours of physical activity per week was measured ($M = 3.02$, $SD = 2.19$). Statistical analyses showed no significant association between physical activity and psychological distress or QoL before the operation ($p > 0.05$). However, patients who were engaged in physical activity had significantly lower mean scores on depression (7.15 vs. 12.62, $p < 0.05$) and state anxiety (37 vs. 47.87, $p < 0.05$) 18 months after the surgery.

Patients who were engaged in physical activity reported higher QoL 18 months after the operation (112.8 vs. 94.18, $p < 0.05$).

Patients who were engaged in physical activity had higher scores on the *new possibilities* (13.88 vs. 9.62, $p < 0.05$) and *personal strength* (13.88 vs. 9.12, $p < 0.05$) subscales. No significant association was found between body change stress and physical activity ($p > 0.05$).

6. Discussion

Summarising the results of the PhD thesis it can be seen that a multidimensional and psychosocial approach has been made to identify and analyse the most important factors improving health-related QoL in breast cancer patients.

The aim of the first study was to assess the reliability and validity of the Hungarian version of the SFQ in cancer patients. In our research psychological characteristics, expected and postoperative pain of cancer patients were measured. According to our results the psychometric characteristics of the SFQ were appropriate, internal consistency and reliability of the scales turned out to be excellent. The Hungarian version of the SFQ showed a similar internal structure compared to the original questionnaire, with two subscales measuring fear of the short-term and long-term consequences of surgery. Sociodemographic factors did not alter significantly the outcomes of the SFQ. The SFQ scores moderately correlated with anxiety, depression and expected pain, but not postoperative pain. These results indicate that patients' fear regarding short-term and long-term consequences of the surgery can have a massive effect on the emotional well-being of patients, but it does not necessarily forecast postoperative pain and it is rather a subjective matter. The type of surgery did not affect postoperative pain. The Hungarian version of the SFQ turned out to be a useful psychometric tool in the measurement of surgical fear.

In the second study we measured the overall effect of a pre- and post-operative psychological intervention on breast cancer patients and which theoretical background was based on the third part of our study. As this part of the research is still in progress our results are considered preliminary.

Firstly, pre-surgery interventions revealed that age had a notable influence on overall quality of life and anticipations about the long-term consequences of surgery in our research (regardless of being in the IG or CG), indicating that elder patients experienced lower levels of QoL and greater fears in connection with the long-term consequences of the surgery than younger patients before surgery.

Secondly, we found that IG patients operated with excision or mastectomy differed in level of anticipated pain before surgery, as well as emotional well-being 6 weeks after surgery. What is more, type of surgery tendentiously influenced perceived body change stress in patients involved in psychological interventions. Meaning that patients in this group undergoing mastectomy anticipated higher levels of pain before surgery and lower emotional well-being and possibly higher body change stress 6 weeks after surgery than patients undergoing excision. The level of body change stress was even higher in the CG among patients who underwent mastectomy, this way indicating that perceived body change stress is a widespread psychological problem among breast cancer patients worth treating and screening, especially in case of mastectomy. Furthermore, comparing the psychological characteristics and analysing the changes of anxiety and surgical fear between the IG and CG we have found that psychological preparation before surgery had a beneficial effect on participants. Patients in the IG reported lower levels of fear in connection with surgery and experienced a decrease in state anxiety after the sixth week of taking part in our psychological intervention. However, this type of change did not occur in the CG indicating that our psychological intervention may have an instant stress-relieving and calming effect on our patients, this way providing social support before and 6 weeks after surgery. Moreover, the Body Sculpture Technique turned out to be a useful and practical tool, providing health care professionals additional information about the patient's mental state, and attitudes toward their illness and changed body image.

The aim of our third study was to identify and interpret the interrelationships among the most important factors that influence long-term QoL in breast cancer patients who are undergoing surgery. Sociodemographic factors such as age, education level and marital status influenced QoL in our research. As other studies have suggested, married patients reported better social well-being than patients who were living on their own.

Before surgery patients reported relatively low levels of depression and trait and state anxiety as well as high QoL. No changes were found in the level of depression before the surgery and 18 months after it. In our study, state anxiety decreased from pre-surgery to 18 months post-surgery; however, there was a greater decrease immediately after surgery and then anxiety increased again 18 months later. The immediate relief and decrease in fear patients experience after surgery can explain the major decrease in state anxiety after surgery. However, after the operation, many patients have to face the fact that their cancer treatment is far from over. Increased fear and uncertainties about cancer and its therapy can remain, which explains the increase in state anxiety 18 months after surgery.

Furthermore, patients reported better functional and physical well-being 18 months after the surgery. This change might be partially explained by the decrease in unpleasant physical symptoms and wound healing after surgery. However, a negative relationship was also observed between QoL, depression and anxiety before surgery and 18 months after surgery. In our study, the patients who reported a higher level of psychological distress experienced lower QoL.

The patients in our sample who had difficulties with accepting their changed body image experienced higher levels of depression and trait anxiety 18 months after the surgery. Moreover, patients with severe body image problems experienced lower emotional and physical well-being in our research. An exploration of social support and body image perception before surgery might help to identify vulnerable women who can benefit from additional psychological help.

In our study, PTG was relatively high among the breast cancer patients. Patients with lower depression, lower trait anxiety and higher QoL 18 months after the operation reported greater PTG. In our research, an association between regular physical activity and reduced psychological distress was found 18 months after surgery.

All in all, the main aim of our research was to provide detailed and up-to-date information about the ways health care professionals can provide appropriate psychosocial support to breast cancer patients before and after surgery as well.

7. Conclusion and implications for practice

7.1. Conclusion

In conclusion, the aim of the first study was **to create a reliable and valid version** of the **Surgical Fear Questionnaire** in Hungarian, this way providing the possibility of measuring surgical fear in Hungarian population.

In the second part of our research we present the preliminary results of our intervention program, highlighting the importance of psychological intervention before surgery. Our results highlight **the importance of early psychological screening among breast cancer patients**, with emphasis on body image, perceived surgical fear and type of breast surgery.

The results of our third study have shown that overall QoL in breast cancer patients is a multidimensional domain that is influenced by several factors such as psychological distress, PTG, and body image. **Psychosocial assessment** among breast cancer patients who are undergoing surgery should be multidimensional and **simultaneously include an evaluation**

of long-term QoL, reduction in emotional distress and negative body image and the facilitation of PTG. Based on our results a **theoretical basis** for the second study (pre- and post-operative psychological interventions on breast cancer patients) has been created.

7.2 Implications for practice

The growing trend for psychosocial care to be included in standards for quality cancer care represents an important step toward its greater availability and routine use. With our results a complex, evidence-based psychological intervention programme was created, highlighting the importance of psychological care before and long after breast cancer surgery. Surgical fear correlated with many aspects of emotional well-being, therefore the measurement of this construct proved to be useful at examining health behaviors before surgery. Our pre- and postoperative intervention used in the second step of our study could be an effective method in programs facilitating QoL enhancement among breast cancer patients. Our third research underlines the importance of long-term psychological monitoring of breast cancer patients.

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