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**DEVELOPMENT OF HEALTH PSYCHOLOGICAL INTERVENTION  
METHODS IN BREAST SURGERY CARE**

Summary of Ph.D. Thesis

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### List of publications on which the thesis is based:

- I. **Lévai, T.,** Lázár, G., Simonka, Z., Paszt, A., Horváth, Z., Otlakán, A., Holczer, A., Gönczö, A., Börcsök, N., Pipicz, G., & Látos, M. (2025). Body and Mind Programme for recovery from breast cancer: Evaluation of the impact of health promotion intervention carried out in a multidisciplinary team on health-promoting behaviours: a quasi-randomised-controlled clinical trial. *BMC Psychology*, *14*(1): 36.

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- I. **Lévai, T.,** Lázár, Gy., Krajinovic, E., Látos, M. (2023). A Betegségfolyamat Érzelmi Grafikonjának hazai adaptációja sebészeti beavatkozásokon átesett betegek körében: a grafikus technika alkalmazásának és pszichometriai összefüggéseinek ismertetése = = *The Hungarian adaptation of Emotional Graph of Illness Trajectory in operated patients: application of the graphical technique and psychometric correlates. MENTÁLHIGIÉNÉ ÉS PSZICHOSZOMATIKA*, *24*(3). pp. 227-249. ISSN 1419-8126.

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- II. **Lévai, T.,** Lázár, G., Simonka, Z., Paszt, A., Horváth, Z., Otlakán, A., Gönczö, A., Börcsök, N., Holczer, A., Látos, M. (2024). Test & Lélek Program az emlődaganatból történő felépülésért – A multidiszciplináris intervenció program alkalmazásának bemutatása és a hatásvizsgálat eredményeinek ismertetése malignus emlődaganattal operált nőbetegek körében. *MAGYAR SEBÉSZET*, *77*(4), 125–125.

- III. Csabai, M., Látos, M., Sándor, Z., & **Lévai, T.** (2023). Development of drawing test and intervention tools in clinical health psychology. In *QRMH9. Qualitative research in mental health. Budapest. 31.8.-2.9.2023. Abstract book* (pp. 37–37).
- IV. **Lévai, T.**, Lázár, Gy., Simonka, Zs., Paszt, A., Horváth, Z., Otlakán, A., Gönczö, A., Börcsök, N., Látos, M. (2023). Test & Lélek Program az emlődaganatból történő felépülésért – Multidiszciplináris intervenció hatásának komplex vizsgálata malignus emlődaganattal operált nőbetegek felépülésére. In *Találkozás a változásban - Változások a találkozásban*, (pp. 70–71).
- V. **Lévai, T.**, Sándor, Z., Martos, T., Dávid, A., Horvát, B., Njers, S., Simonka, Zs., Paszt, A., Horváth, Z., Otlakán, A., Gönczö, A., Börcsök, N., Lázár, Gy., Látos, M. (2022). Test & Lélek Program az emlődaganatból történő felépülésért - Multidiszciplináris intervenció alkalmazása a malignus emlődaganattal operált nőbetegek ellátásában. In *Táplálkozástudományi Szakemberek III. Országos Konferenciája*, (pp. 25–26).
- VI. **Lévai, T.**, Lázár, G., & Látos, M. (2021). Az egészségpszichológiai intervenció lehetőségei emlődaganattal operált betegek körében. In *Kárpát-medencei fiatal magyar kutatók konferenciája* (pp. 86–87).

## **Background**

### ***Breast cancer in the context of health promotion***

Breast cancer is the most common type of cancer in women and has the highest survival rate of all cancer types (Loh & Musa, 2015). Given this, psychosocial interventions in breast surgery care must be adapted to the changing needs of the recovery process and offer proactive tools for long-term survival (Boland et al., 2018; Loh & Musa, 2015; Pinto et al., 2022).

However, a new field of psychosocial support for breast cancer patients has been developing in recent years, driven by the dramatic increase in the number of breast cancer survivors due to early detection, effective, combined treatments, and various multidisciplinary rehabilitation methods (Kelly et al., 2020; Kim et al., 2025; Loh & Musa, 2015; Meade & Dowling, 2012). This new field is the health promotion intervention (Kelly et al., 2020; Runowicz et al., 2016; Torabi et al., 2025). The results of several studies support the view that comprehensive, effective postoperative breast cancer rehabilitation should include a patient self-management approach to lifestyle redesign and health promotion, furthermore optimal rehabilitation should include input from various health professionals to help remediate and restore impaired physical, psychosocial, and occupational functioning in women with breast cancer (Jia et al., 2022; Kelly et al., 2020; Kwan et al., 2012; Loh & Musa, 2015).

A growing body of evidence suggests that a healthy lifestyle, defined by adequate levels of physical activity, a healthy diet, appropriate weight control, and low stress, is strongly correlated with a better prognosis, fewer depressive symptoms, and lower mortality among patients with malignant breast cancer (Barbaric et al., 2010; McTiernan et al., 2010; Patterson et al., 2010; Pierce et al., 2007; Ramirez et al., 2016; Rock et al., 2015; Schmid & Leitzmann, 2014; Stagl et al., 2015). Although these recommendations, such as regular physical activity and a healthy, Mediterranean diet, may seem simple to follow, recent studies have found that breast cancer survivors struggle to adhere to them (Kwan et al., 2012; Liu et al., 2016; Pelucchi et al., 2011; Psaltopoulou et al., 2011; Ramirez et al., 2013). Despite the numerous benefits, the clinical application of lifestyle interventions in breast cancer survivors has been limited to date and the data on the effects of these behaviour change interventions in the survivor population are currently limited (Jameel et al., 2025; Montagnese et al., 2023; Rock et al., 2015; Reeves et al., 2014). However, studies have shown that physical activity and a healthy diet are safe, effective, and critical components of breast cancer survivorship planning: according to the most comprehensive systematic reviews, physical activity consistently improves metabolic health and body composition, while a healthy diet and optimal weight control lead to additional

benefits; together, they appear to have the broadest spectrum of beneficial effects (Buro et al., 2024; Jameel et al., 2025). Moreover, previous studies have identified time points throughout the trajectory of breast cancer treatment - especially prior to the initiation of chemotherapy - that have proven ideal for introducing healthy lifestyle behaviour interventions, because patients' health behaviour deteriorates most significantly during chemotherapy, and their psychological distress intensifies during this period (Kelly et al., 2020; Toohey et al., 2023).

One of the most influential theories in health promotion and behavioural change is the Health Promotion Model (HPM), developed by Nola Pender (Pender, 1996). The model considers individual characteristics and experiences as motivational, initial factors that influence the next level, which involves behaviour-specific factors. These variables form the critical "core" because they can be modified through interventions. They include perceived benefits, perceived barriers, perceived self-efficacy, activity-related affect, interpersonal influences, and situational influences (Pender et al., 2015).

### ***Exploring the subjective experience of illness: Focus on the Illness Narratives Theory***

According to Arthur W. Frank's guiding theory, illness narratives help us understand the subjective meanings constructed around illness (Frank, 1993; Frank, 1995; Frank, 1998). Based on Frank's definition, three illness narratives can be distinguished (Frank, 1993; Frank, 1995).

The *chaos narratives* portray individuals as passive victims of illness, emphasizing experiences of vulnerability, powerlessness, and futility (Frank, 1995). Within this narrative form, illness is experienced as empty, purposeless, and stripped of meaning, offering little sense of direction or agency. In contrast, the *restitution narrative* centers on illness, suffering, and medical intervention, emphasizing recovery and the restoration of health through treatment. This narrative reflects a distinctly modernist worldview, grounded in the expectation that every form of suffering has a remedy and that illness represents a temporary malfunction of the body rather than a fundamental existential disruption (Frank, 1995; Frank, 1998; Whitehead, 2006). The third type of story is *quest*, which frames illness as a meaningful journey or mission through which insight, transformation, and knowledge may be gained. Within this narrative, illness becomes a condition from which lessons can be learned and subsequently shared with others, positioning the individual as an active and engaged agent in their own experience (Frank, 1995; Frank, 1998). Rather than focusing solely on recovery, the quest narrative is future-oriented and socially generative, portraying illness as a catalyst for personal growth (Frank, 1995; Frank, 1998).

A multifaceted understanding of the subjective experience of somatic illness and its physical and psychological characteristics can be facilitated by a narrative psychology approach, in which narrative serves as a tool for studying complex psychological processes (Bruner, 1991; Charon, 2001; Chocinov et al., 2005; Freydell et al., 2022; Thygesen et al., 2011; Thomas-MacLean, 2004; Pennebaker et al., 1999; Whitehead et al., 2006). Graphic and visual elicitation methods can access—and, in some cases, actively elicit—previously unarticulated or implicit aspects of experience, thereby facilitating the construction of narratives. When using these techniques, the subject is asked to create a visual artwork, usually a picture or drawing (Leung, 2010; Orr et al., 2020; Thygesen et al., 2011).

### **Aims and hypothesis**

In this doctoral dissertation, two studies were conducted to develop a health psychological intervention for breast surgery patients. This thesis aimed to address two main objectives. In the first study, we assessed the effectiveness of a multidisciplinary health promotion intervention programme, developed by our research team, for patients recovering from malignant breast cancer. In the second study, we examined the illness narratives of patients undergoing surgery for chronic disease or cancer, in relation to their postoperative psychological state, using the Emotional Graph of Illness Trajectory visual elicitation technique, developed by our research team.

(H1) The multidisciplinary health-promoting intervention results in positive changes in patients' health-promoting behaviours at the time points examined after surgery.

(H2) Patients who narrate the chaos narrative are characterized by the most negative psychological status, and they are the most likely to show psychological burden as a result of the illness.

(H3) The restitution narrative would be characterized by a moderate psychological state compared to the other two narrative types, with these patients showing less psychological distress than the chaos narrative.

(H4) The quest narrative is characterised by the most positive psychological state, with the least psychological burden caused by the disease compared to the other two narrative types.

### **Description of the studies**

## **Study 1: Body and Mind Programme for recovery from breast cancer: Evaluation of the impact of the health promotion intervention carried out in a multidisciplinary team on health-promoting behaviours: a quasi-randomised-controlled clinical trial**

### **Material and methods**

- To test the effects of the multidisciplinary intervention, our research took the form of a quasi-randomized controlled trial, with a treatment group receiving a health promotion intervention and a control group matched for diagnosis, medical treatment process, age, and gender, with no intervention
- This clinical trial was selected through purposive sampling. Our study included 80 women with malignant breast cancer who underwent primary breast surgery and adjuvant oncologic treatment. All participants are female, aged 18–65, recently diagnosed with a primary malignant breast tumor without neoadjuvant therapy or metastasis, tumor stage ranging from in situ (DCIS) to TIIIA, Grade I–III.
- It is a single-centre, clinical trial, conducted in accordance with the Declaration of Helsinki and approved by the Regional Research Ethics Committee (RKEB) at the University of Szeged, Albert Szent-Györgyi Health Centre (World Medical Association, Helsinki, 2013). The approval number is 50/2020-SZTE.
- In our study, randomization was based on scheduling in the surgical calendar. Patients were operated on according to their position on the waiting list. Patients scheduled for surgery on the first day (Day A) were assigned to the intervention group, while those scheduled for the second day (Day B) were assigned to the control group. The scheduling of each patient was determined solely by surgical capacity; the patient's clinical characteristics did not influence the scheduling decision. This method of surgical assignment served as the basis for the patient-level random allocation in our study sample. New patients were enrolled weekly, with each week treated as one block, aiming for a 1:1 group ratio.
- The Health-Promoting Lifestyle Profile II (HPLP II) questionnaire was used to assess the *health-promoting lifestyle behaviours* (Walker & Hill-Polrecky, 1996).
- We assessed patients' *state anxiety* using the Spielberger State-Trait Anxiety Inventory (Spielberger et al., 1970).
- We assessed *depression* level using the Beck Depression Inventory 9-item shortened version (Beck et al., 1961).

- We measured *stress levels and subjective stress perception* using a shortened 10-item version of the Perceived Stress Scale (Cohen et al., 1983).
- We assessed the *quality of life* of our study participants using the Functional Assessment of Cancer Therapy - Breast scale (Brady et al., 1997).
- We measured the *impact of breast treatment* in our study sample, using the Breast-Impact of Treatment Scale (Frierson et al., 2006).
- We assessed our patients' psychological state five times, scheduled to coincide with the intervention sessions.
- Our longitudinal study, conducted in a quasi-randomised-controlled trial design, employed a treatment-control pre-post-follow-up (TCPPF) design to describe the data obtained (Sharpe & Cribbie, 2023). Statistical analyses were performed using SPSS version 25.0 (IBM Corp., 2017). The limit of statistical significance was set at  $p < 0.05$ . We chose to implement a multilevel model in order to optimally handle missing data (Sharpe & Cribbie, 2023; Krueger et al., 2004).

### ***The Health Promotion Intervention Programme***

The foundation of our intervention was based on the *Health Promotion Model* (HPM) developed by Nola Pender (Hirschey et al., 2017; Aycinena et al., 2017; Pudkasam et al., 2018; Pender, 1996). A five-session, multidisciplinary, health-promoting intervention designed to support recovery from breast cancer by enhancing the patient's physical and mental activity and by awakening their motivation and ability to change their lifestyle and improve their health. The structure of the intervention is based on psychological, dietetic, and physiotherapeutic theoretical and practical content. The intervention process spans three weeks, comprising two pre-operative and three post-operative sessions, conducted in both individual and group settings.

### **Results**

- The mean age of the total sample (n=80) was 52.63 years (SD: 8.88, range: 30.00-65.00 years), and the mean age of both the intervention (n=40) and control (n=40) groups was 52.63 years ( $p = 1.00$ )
- No significant differences were found between the intervention and control groups for sociodemographic factors ( $p > 0.05$  in all cases), health behaviours ( $p \geq 0.05$  in all cases), and clinical data ( $p > 0.05$  in all cases).

- In our analysis, we examined the main effect of Group (intervention and control) as a between-subject factor and Time (baseline and four additional measurement occasions) as a within-subject factor, along with the Group-by-Time interaction, for the values of the health behaviour and psychological variables assessed.
- There were no significant main effects for Group and Time on the *Physical activity* dimension. However, significant Group-by-Time interaction appeared for this dimension,  $F(3, 141.78) = 3.88, p = 0.01$ , which means that the changes in the value of physical activity were significantly different between the two groups; an increase was observed in the intervention group, and no changes in the control group over time
- Examining the *Spiritual growth* dimension, there was a significant Group main effect,  $F(1, 80.578) = 5.528, p = 0.02$ , indicating that the intervention group had a significantly higher level of spiritual growth experience than the control group. No significant main effect of Time was found. However, a significant Group-by-Time interaction was found for this dimension,  $F(3, 129.664) = 2.697, p = 0.049$ , which means that the changes in the value of spiritual growth were significantly different between the two groups, whereby an increase was observed in the intervention group, as opposed to decreasing or no changes in the control group over time.
- When assessing the *Total value of the health promotion lifestyle*, this value was significantly higher in the intervention group than in the control group, because a significant Group main effect was found,  $F(1, 82.63) = 6.263, p = 0.014$ . In addition, no significant main effect of Time was found. Still, the Group-by-Time interaction was significant,  $F(3, 132.142) = 4.170, p = 0.007$ , which means that the changes in the value of the total value of health promotion lifestyle were significantly different between the two groups, whereby an increase was observed in the intervention group, as opposed to decreasing or no changes in the control group over time
- A significant Time main effect was found for the *emotional well-being dimension of Quality of life*,  $F(4, 204.828) = 11.568, p < 0.001$ , which means that for this factor, significantly different results were obtained at the different time periods assessed, but this main effect was not confirmed for the Group. However, significant Group-by-Time interaction appeared for this dimension,  $F(4, 204.828) = 2.807, p = 0.02$ , which means that the changes in the value of emotional well-being were significantly different between the two groups, whereby an increase was observed in the intervention group, as opposed to decreasing or no changes in the control group over time.

## Study 2: Examining illness narratives in the context of postoperative psychological state

### Materials and methods

- Our study included 140 patients who had undergone surgery and had a chronic disease or malignancy. The subjects were diagnosed with the disease 2.62 years ago on average (SD: 5.05) and were classified into five main groups according to their diagnosis: (1) breast cancer, (2) gastrointestinal tract disease, (3) and cancer, (4) vascular disease, (5) lung cancer or chronic lung disease.
- Inclusion criteria were: successful elective postoperative status; our sample did not include inoperable patients, a diagnosis of chronic illness or malignant tumor, surgery within the last five days for a chronic disease or cancer, over 18 years of age, and literacy skills to read and write. The exclusion criterion was a severe psychiatric or neurological illness.
- Participation in the study was voluntary and was carried out with the patient's written informed consent. The research was conducted in accordance with the Declaration of Helsinki (1964) and was approved by the Regional Research Ethics Committee of the University of Szeged, Albert Szent-Györgyi Health Centre, approval number: 145/2020-SZTE.
- Our research took the form of an observational cross-sectional study and followed a qualitatively driven mixed-methods design, simultaneously utilizing qualitative and quantitative measurement tools.
- The study took place at the University of Szeged, Albert Szent-Györgyi Health Centre, Department of Surgery, with data collected by the clinic's psychologists.
- The test session included completing a questionnaire package assessing postoperative psychological status, followed by a semi-structured interview using the Emotional Graph of Illness Trajectory, a graphical elicitation technique that explored the emotion-focused illness narrative.
- The Emotional Graph of Illness Trajectory was used to identify the *type of emotion-focused illness narrative* and to explore its content. The technique can identify the dominant emotion characterizing the disease process and the emotional impact of disease-related events (Thygesen et al., 2011).
- The technique used by our research team was based on the graphical procedure of Thygesen and colleagues (2011): a graphical elicitation technique with a timeline

structure, using a grid-graphic tool that includes a horizontal axis representing events in chronological order and a vertical axis with a 0-100% coverage to assess the intensity of the emotion experienced. The Hungarian adaptation of the Emotional Graph of Illness Trajectory was conducted by our research team (Lévai et al., 2023).

- During the test session, the responder creates his/her emotional graph: by naming the dominant emotion of the disease process, the events of the disease process in chronological order, and evaluating the emotional intensity associated with the events on a scale of 0-100%, then connecting the points on the grid area used to create the graph.
- While the patient was making the graph and sharing information about it, the investigator took notes of this information on a marking sheet.
- The investigator can calculate and record the average value of the emotional intensity from the emotion intensity scores given by the subject, on the marking sheet. In this way, the quantification of the Emotional Graph of Illness Trajectory, as the average value of the emotional intensity of the graph, is obtained (Lévai et al, 2023).
- To measure *anxiety levels*, we applied the Spielberger State-Trait Anxiety Inventory (Spielberger et al., 1970).
- The Beck Depression Inventory 9-item shortened version was used to measure *depression levels*(Beck et al., 1961).
- The shortened 10-item version of the Perceived Stress Scale was used to measure *stress levels and subjective stress perception* (Cohen et al., 1983).
- The *overall quality of life* was measured by calculating the EQ-5D index of the European Quality of Life questionnaire (EuroQol Group, 2006).
- We explored *attitudes to illness* using the Brief Illness Perception Questionnaire (Broadbent et al., 2006).
- Statistical analyses were performed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA, 2013). The limit of statistical significance was set at  $p < 0.05$ . For comparisons of several independent groups, after performing Levene's test, one-way ANOVA and Kruskal-Wallis H test were used, Post hoc pairwise comparisons of groups were performed using Hochberg's GT2, Mann-Whitney U test, and Bonferroni test.
- We conducted content analysis on the following information from the subject: the dominant emotion of the illness trajectory and its justification, the main events of the illness process, their content, their description, and finally, the responses to the questions

asked during the post-test. The analysis involved two independent coders. Our research team considered the aspects of Frank's concept of illness narratives (Frank, 1995, 1998) as characteristic of illness narratives and as the content criteria for content analysis, thereby forming the theoretical basis for the categorization that helped create the experimental groups and for coding. Coding was conducted by two independent coders as part of the content analysis. As a result, the subject's illness narrative was the most frequently occurring type in the verbal content.

## Results

- The sample of 140 individuals consisted of 87 women (62.14%) and 53 men (37.86%). The mean age of the sample was 53.1 years (SD: 12.03).
- While analysing the verbal content recorded using the graphic elicitation technique, we identified the illness narratives defined by A. W. Frank and classified each subject into the corresponding narrative type group (Frank, 1995, 1998).
- The three types of illness narratives in the overall study sample were distributed as follows: 60.7% restitution story (85 individuals), 24.3% chaos story (34 individuals) and 15% quest story (21 individuals).
- In our hypothesis testing, we used one-way ANOVA to compare scores across the three narrative-type groups for normally distributed variables, and the Kruskal-Wallis H test to compare scores of the depression, illness perception, and EQ-5D index scales for non-normally distributed variables.
- Our analysis showed a small effect with a significant difference in the mean intensity of the graphically depicted emotion across the three narrative types ( $F(2, 137) = 3.472$ ,  $MSE = 422.168$ ,  $p = 0.034$ ,  $\eta^2 = 0.05$ ). Furthermore, perceived stress ( $F(2, 137) = 7.471$ ,  $MSE = 38.362$ ,  $p = 0.001$ ,  $\eta^2 = 0.1$ ), state anxiety ( $F(2, 137) = 4.124$ ,  $MSE = 121.538$ ,  $p = 0.018$ ,  $\eta^2 = 0.06$ ), trait anxiety ( $F(2, 137) = 5.796$ ,  $MSE = 103.403$ ,  $p = 0.004$ ,  $\eta^2 = 0.08$ ), depression ( $H(2) = 7.946$ ,  $p = 0.019$ ,  $\eta^2 = 0.05$ ) and perception of illness ( $H(2) = 12.577$ ,  $p = 0.002$ ,  $\eta^2 = 0.08$ ) also showed significant differences with small and medium effects between the three groups of narrative types.
- Thus, our results show that the type of illness narrative has a small effect size, with a significant impact on the mean intensity of the emotion depicted in the Emotional Graph of Illness Trajectory and on the depression score, and a medium effect size, with a

significant impact on the levels of trait anxiety, state anxiety, illness perception, and perceived stress.

- According to the pairwise comparisons of the groups, results revealed a significant difference in perceived stress between the chaos story and restitution story groups ( $p = 0.013$ ) and between the chaos story and quest story groups ( $p = 0.001$ ). There was also a significant difference in state anxiety between the chaos story and quest story groups ( $p = 0.022$ ), in trait anxiety between the chaos story and quest story groups ( $p = 0.005$ ), and between the chaos story and restitution story groups ( $p = 0.03$ ).
- Post hoc Mann-Whitney U tests indicated a significant difference in depression scores between the chaos story and restitution story groups ( $p = 0.01$ ) and between the chaos story and quest story groups ( $p = 0.018$ ). Furthermore, for illness perception, there was a significant difference between the chaos story and restitution story ( $p = 0.045$ ), between the restitution story and quest story groups ( $p = 0.011$ ), and between the chaos story and quest story ( $p = 0.001$ ).
- According to the hypothesis testing in the context of investigation of illness perception's structure across illness narrative types, our results showed that in addition to the significant difference in the overall illness perception scores described above, significant differences were showing medium effect in the three dimensions of illness perception: treatment control ( $H(2) = 7.479, p = 0.024, \eta^2 = 0.06$ ), illness-related concern ( $H(2) = 10.116, p = 0.006, \eta^2 = 0.08$ ) and the dimension of emotional representation ( $H(2) = 13.182, p = 0.001, \eta^2 = 0.1$ ).

## Discussion

The purpose of the doctoral research was to develop a health psychological intervention for breast surgery patients. In the STUDY 1, we conducted a quasi-randomised-controlled trial to investigate the impact of a multidisciplinary health promotion intervention on health-promoting lifestyle behaviours in patients recovering from malignant breast cancer. The primary hypothesis (H1)—that the multidisciplinary health-promoting intervention will result in positive changes in patients' health-promoting behaviours at the assessed time points after surgery (2 weeks, 3 months, and 6 months postoperatively)—was supported by the findings. According to the present results, the change in the level of summated health-promoting behaviour differed significantly between the two groups, with a significant increase in the intervention group over the six months following surgery. Across the dimensions of health-promoting behaviour, the same pattern was observed for physical activity and spiritual growth:

changes in these factors differed significantly between the two groups, with significant increases in the intervention group and no significant positive change over time in the control group. Regarding the examined psychological factors, the change in the emotional well-being dimension of quality of life differed significantly between the two groups: the intervention group showed a significant increase in the three months following surgery, whereas the control group showed no significant positive change over time.

Our most outstanding finding is that the overall mean score for *health-promoting behaviours* in the intervention group was higher than in the control group. This finding aligns with previous research demonstrating the effectiveness of interventions based on Pender's HPM (Carreno et al., 2006; Mohebi et al., 2013). Earlier studies and systematic reviews have consistently shown that HPM provides a comprehensive theoretical framework for promoting and maintaining healthy behaviours across a range of chronic conditions (Chen et al., 2021; Farsi et al., 2019; Karataş & Polat, 2021; Masoudi et al., 2020; Mohammadipour et al., 2015; Omididi et al., 2016; Vakilian et al., 2021; Zhong et al., 2023). The present study adds to this body of evidence by confirming the model's applicability in the context of postoperative breast cancer recovery.

The success of the intervention may also be attributed to its *optimal timing*. Kelly and colleagues (2020) showed that there are time points during the breast cancer trajectory when it is appropriate to introduce healthy lifestyle interventions. Before the start of chemotherapy, researchers may consider introducing health behaviour interventions, as the lowest levels of health promotion behaviours and the highest levels of psychological distress among breast cancer patients were observed. Providing support to patients before this critical phase can help them maintain optimal health-promoting behaviours during chemotherapy (Kelly et al., 2020; Mukherjee et al., 2017).

In our study, *physical activity* emerged as one of the most responsive components of the health-promoting lifestyle. A statistically significant difference in the trajectory of physical activity was observed between the intervention and control groups, with the most pronounced improvement occurring between the preoperative assessment and the six-month postoperative follow-up. These results are consistent with prior evidence indicating that targeted health behaviour interventions can effectively increase physical activity among breast cancer patients (Torabi et al., 2025).

Another key outcome was a significant improvement in *spiritual growth* among participants in the intervention group. Patients receiving the intervention showed significantly greater positive change in spiritual growth than controls. This effect may be explained by the

programme's emphasis on empowerment during the preoperative phase and sustained psychological support in the postoperative period. Such support appears to facilitate adaptive psychological changes that foster resilience and inner growth. Qualitative and quantitative studies in oncology have highlighted spirituality as a vital coping resource for women diagnosed with breast cancer (Leão et al., 2021; Wang et al., 2024). The present findings reinforce the notion that addressing spiritual needs as part of a structured health promotion programme can yield meaningful psychological benefits.

Among the examined psychological factors, the change in the emotional well-being dimension of quality of life differed significantly between the two groups: the intervention group showed a significant increase, whereas the control group showed no significant positive change over time. This result suggests that the intervention's supportive elements effectively addressed patients' heightened emotional needs during the vulnerable postoperative period. Breast surgery represents a psychologically sensitive phase in the cancer trajectory, often accompanied by anxiety, emotional burden and uncertainty (Fong et al., 2017; Grocott et al., 2023). The intervention's long-term impact on emotional well-being may reflect patients' openness to receiving psychological and social support during this critical time window. Moreover, the observed increase in emotional well-being may be partly mediated by improvements in physical activity. A growing body of evidence indicates that physical activity plays a crucial role in enhancing emotional and psychological health among breast cancer survivors (Aguñaga et al., 2018; Courneya et al., 2014). The study also assessed various psychological factors — including anxiety, depression, perceived stress, and treatment-related concerns — at each measurement point to ensure that changes in health behaviour were not confounded by psychological deterioration.

We consider the following limitations to be significant for our research: (1) The small group sizes and the participant drop-out rate may have negatively affected the power of the statistical analyses conducted. (2) Due to the form of randomisation used, we cannot claim that the only systematic difference between the two conditions is the intervention. (3) The study does not have randomisation protection, as participants were informed during recruitment which group they would be assigned to, which may have had an implicit effect on their decision to participate, behaviour, and responses to the questionnaires, and may have influenced the composition of the groups. Additionally, (4) the risk of Type 1 error is quite high due to the large number of statistical tests performed; however, we carefully selected all questionnaires used. Finally, (5) the health promotion intervention we employed did not address all six dimensions of health promotion behaviour equally.

In STUDY 2 of the present thesis, we applied the Emotional Graph of Illness Trajectory to explore the illness narratives of patients who had undergone surgery in the context of their postoperative psychological state. The starting point of the study was the results of the method validation research of this graphical elicitation technique related to postoperative psychological state (Lévai et al., 2023). The aim of this study was to investigate whether the Emotional Graph of Illness Trajectory is suitable for exploring emotional aspects of patients' illness narratives. Following the implementation of Hungarian validation, we applied this technique to map the emotional aspects of disease narratives from the preoperative period of 140 patients with chronic diseases or malignancies who underwent surgery, along with quantitative questionnaires to assess their postoperative emotional and mood states, perceived stress levels, illness perception and quality of life. Our results showed significant differences among the three types of illness narratives in the mean values of intensity of the graphically depicted emotion, trait and - state anxiety, depression, perceived stress, and illness perception. Using this visual technique, we learned about the emotional aspects of patients' illness narratives, the individual characteristics of the disease process and the patients' characteristics and experiences that influenced their coping with the illness and their emotional changes. Therefore, we effectively used this visual technique during the preoperative phase of the health promotion intervention, as presented in the first study.

The present study examined differences in postoperative psychological state and illness perception across Frank's three illness narrative types - chaos, restitution and quest - and partially confirmed the proposed hypotheses. The second hypothesis (H2) of the doctoral dissertation; patients who narrate the chaos narrative are characterised by the most negative psychological status, and they are the most likely to show psychological burden as a result of the illness, was partially supported. Patients narrating the chaos story reported significantly more negative illness perceptions and higher levels of recent depression, anxiety and perceived stress than those narrating either restitution or quest stories, confirming the association between chaos narratives and heightened psychological distress. The third hypothesis (H3), proposing that the restitution narrative would be characterised by a moderate psychological state compared to the other two narrative types, with these patients showing less psychological distress than the chaos narrative, was also partially supported. Across all examined psychological variables, restitution narrators consistently scored in the intermediate range. They showed significantly lower levels of depression, trait anxiety, perceived stress and illness perceptions than chaos narrators, yet did not reach the more favourable psychological profile observed among quest narrators. This pattern suggests that restitution narratives reflect partial psychological

adaptation without the deeper meaning-making processes characteristic of quest narratives (Frank, 1995; Frank, 1998; Nettleton et al., 2004; Thomas-MacLean, 2004; Whitehead, 2006). Fourth hypothesis (H4), which states that the quest narrative is characterised by the most positive psychological state, with the least psychological burden caused by the disease compared to the other two narrative types, was likewise partially confirmed. Patients narrating the quest story reported more controllable illness perceptions, fewer perceived symptoms, reduced illness-related concerns and lower emotional distress compared to both chaos and restitution narrators.

A clear trend emerged for all psychological factor measures: chaos narrators scored highest, restitution narrators intermediate, and quest narrators lowest, indicating progressively more adaptive psychological functioning. In contrast, emotional intensity did not follow this linear pattern. Emotional intensity was highest among quest narrators, nearly equivalent among chaos narrators (only 1.73% lower), and substantially lower—by approximately 10%—among restitution narrators. This dissociation suggests that high emotional intensity does not necessarily indicate psychological burden but may instead reflect emotionally engaged and adaptive processing. These findings are consistent with the assumption that quest narratives are associated with more effective emotion regulation processes (Bakken et al., 2023; Whitehead, 2006).

Analysis of illness perceptions revealed significant differences among the three narrative types in three dimensions: treatment control, illness-related concern and emotional representation. In summary, the Emotional Graph of Illness Trajectory used in this study may serve as a clinically valuable tool for restructuring illness experiences, restoring narrative continuity, and reducing the negative emotional impact of illness, which are skills considered essential in health psychology patient care (Charon et al., 2001; Chocinov et al., 2005; Garnefski et al., 2009; Levine et al., 2010).

## **Conclusions and main findings**

Our results from STUDY 1 suggest that the period before adjuvant oncological treatment, following primary breast surgery, is an optimal time window to implement a multidisciplinary health promotion intervention for malignant breast cancer patients. The findings of this study highlight the complex role and impact of a multidisciplinary health promotion intervention, emphasising its educational value and its support for improving patients' health behaviours during recovery from malignant breast cancer. Our results from STUDY 2 provide evidence

that the illness narratives interpreted within Frank's theoretical framework include the patient's emotions about the disease process, his or her activity or lack of activity in the recovery process, in other words, the patient's psychological adjustment, which is related to emotional and mood states, stress levels, and perceptions of the illness, all of which are specific to the recovery process, in this case, to the postoperative state. The Emotional Graph of Illness Trajectory explores and constructs an emotion-focused disease narrative, by which can help to restore a sense of personal control and reduce feelings of suffering, which are intrapersonal needs that are fundamentally damaged when facing a severe illness.

Main findings: (1) The multidisciplinary, health-promoting intervention (Body and Mind Programme) was effective in increasing health-promoting behaviours in breast cancer patients in the six months following surgery. (2) Three weeks surrounding breast surgery is an effective time window for health promotion for patients recovering from malignant breast cancer. (3) Due to the multidisciplinary perspective of the intervention, it was able to influence behavioural and psychological factors simultaneously. (4) The Emotional Graph of Illness Trajectory is an effective emotion-focused exploratory and intervention tool for exploring Frank's illness narratives in the patient's recovery process. (5) The patient's emotion-focused illness narrative has an impact on the postoperative psychological state.

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