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The Effect of Meaning-Centered Pain Coping Skills Training on Pain and Death Anxiety in Breast Cancer Patients

Mina. Ansari[1], Ghodratollah. Abbasi[2*], Ramazan. Hassanzadeh[3]

[1] Ph.D. Student, Department of Psychology, Sari Branch, Islamic Azad University, Sari, Iran
[2] Associate Professor, Department of Psychology, Sari Branch, Islamic Azad University, Sari, Iran
[3] Professor, Department of Psychology, Sari Branch, Islamic Azad University, Sari, Iran

*** Corresponding author email address**: gh_abbasi@iausari.ac.ir

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A B S T R A C T

Objective: The present study aimed to determine the effect of meaning-centered pain coping skills training on pain and death anxiety in women with breast cancer.
Materials and Methods: This study was conducted within an experimental framework with a pre-test, post-test, control group, and follow-up design. The statistical population of the present study included breast cancer patients who referred to the oncology and radiotherapy department of Bazarganan Hospital and Roshana Radiotherapy and Oncology Center in Tehran during the second half of 2022. Using convenience sampling, 30 individuals were selected and randomly assigned to two intervention groups and one control group. The intervention content of meaning-centered pain coping skills was delivered in 4 group sessions. Findings were collected using the Templer Death Anxiety Scale (1970) and the Brief Pain Inventory (Cleeland & Ryan, 1994) during pre-test, post-test, and two-month follow-up stages. The obtained data were analyzed using mixed ANOVA and Bonferroni post hoc tests in SPSS version 27.
Findings: The results indicated that meaning-centered pain coping skills training had a significant effect on reducing pain and death anxiety in breast cancer patients at post-test and two-month follow-up stages ($P < 0.001$).
Conclusion: Overall, based on the findings of the present study, it can be stated that meaning-centered pain coping skills training is a promising and feasible approach for improving pain management and psychological functioning in breast cancer patients. Therefore, specialists, researchers, and therapists in this field can utilize these interventions as effective therapeutic options to enhance the psychological functioning of breast cancer patients alongside their medical treatments.

Keywords: *Death Anxiety, Pain, Breast Cancer, Coping Skills, Meaning.*

1. Introduction

Breast cancer is the most recognized cancer in women worldwide, with its incidence continuously increasing (Sung et al., 2021). It is defined as a malignant tumor that originates from breast cells and may metastasize to distant areas of the body or invade surrounding tissues (Mills,

2017). In Iran, breast cancer is one of the most common malignancies among women. Its peak incidence in Iranian women occurs in the fourth and fifth decades of life, which is a decade earlier than the global incidence age. Individuals with cancer experience various symptoms due to their disease and related treatments (Ream et al., 2020). These symptoms include sleep disorders (Büttner-Teleagă et al., 2021), feelings of helplessness and hopelessness, chronic stress and distress (Antoni & Dhabhar, 2019), malnutrition (Muscaritoli et al., 2021), and severe pain caused by the disease and its treatments (Ośmiałowska et al., 2021).

Pain is one of the most common symptoms associated with cancer. The International Association for the Study of Pain defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage (Swarm et al., 2019). Cancer pain may result from pathology, disease progression, metastasis, tumor growth, or diagnostic and therapeutic methods. Scarborough and Smith (2018) found in their research that adequate pain assessment and management are crucial for improving quality of life and health outcomes in this population. Poor pain control is also associated with greater psychological distress and reduced social activities (Scarborough & Smith, 2018).

Previous studies (Loughan et al., 2021) have shown that cancer patients experience high levels of death anxiety. Death anxiety includes fear of the end of existence, fear of the dying process, fear of the unknown after death, and fear of the death of significant others (Draper et al., 2019). Low levels of death anxiety increase cancer patients' psychological readiness to accept death (Tong et al., 2016), while high levels are associated with decreased quality of life, especially among caregivers of cancer patients (Ośmiałowska et al., 2021). Although thoughts about death may occur at any stage of life, having a life-threatening illness can make one confront the concept of death more than ever. While some patients may feel hopeless and afraid, others may view death as a natural part of life, not fearing it and coping decisively (Sahan et al., 2018). Patients with limited life expectancy show high levels of existential distress and have specific concerns about death and dying (Tong et al., 2016).

Based on the above, this research seeks to answer the question: Is there a difference in the effectiveness of meaning-centered pain coping skills training on pain and death anxiety in breast cancer patients?

2. Methods and Materials

2.1. Study design and Participant

This study is experimental research with a pre-test, post-test, follow-up, and control group design. The statistical population included breast cancer patients referred to the oncology and radiotherapy department of Bazarganan Hospital and Roshana Radiotherapy and Oncology Center in Tehran during the second half of 2022. From the eligible patients, a sample was selected using convenience sampling. To determine the sample size, the G*Power software was used based on the components of alpha ($\alpha = 0.05$), statistical power ($1-\beta = 0.80$), effect size above 0.60, three groups, and three measurements (pre-test, post-test, and follow-up). Thus, the sample size was determined to be 45 individuals, randomly assigned to two experimental groups and one control group (15 individuals each).

Inclusion criteria for participants included: patients diagnosed with stage III breast cancer based on clinical findings and cytology studies, those diagnosed more than six months prior, patients who had received standard treatments for breast cancer (surgery, chemotherapy, or radiotherapy), aged 30 to 60 years, having at least a high school diploma, fluent in the national language, and undergoing chemotherapy or radiotherapy. Exclusion criteria included: acute psychiatric features screened by psychological assessments and clinical records, seizures, neurological diseases, or acute medical conditions affecting cognitive and psychological function, communication and language issues hindering participation in MCPC sessions, alertness problems or inability to participate in assessment and intervention sessions, high risk of suicide, non-compliance with intervention and follow-up, participation in a concurrent psychotherapy program, absence from more than two treatment sessions, self-reported substance abuse, and having multiple types of cancer.

The first intervention group received four 45- to 60-minute sessions of meaning-centered pain coping skills training every two weeks, the second intervention group received eight weekly sessions of mindfulness-based stress reduction (1.5 hours each), and the control group was placed on a waitlist for intervention.

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2.2. Measures

2.2.1. Death Anxiety

The Death Anxiety Scale was developed by Templer in 1970 to measure the level of death anxiety in patients. It includes 15 questions with yes or no answers, scored 1 or 0 (1 indicating the presence of death anxiety and 0 indicating its absence). The total score ranges from 0 (no death anxiety) to 15 (high death anxiety), with higher scores indicating greater death anxiety (Salehi et al., 2019). This standard questionnaire has been used globally to measure death anxiety and has been translated and psychometrically validated in Iran. The construct validity of the tool was confirmed using factor analysis by Gholami et al., and its reliability was reported as 0.83 using the test-retest method (Gholami et al., 2020). In this study, the internal consistency of this scale was obtained using Cronbach's alpha ($\alpha = 0.85$).

2.2.2. Pain Inventory

The Brief Pain Inventory, developed by Cleeland in 1991, measures the intensity of chronic pain in cancer patients and other clinical patients with chronic pain. It consists of two subscales: pain intensity (items 2, 3, 4, and 5) and pain interference (items a-g from section 7). The pain intensity subscale assesses recent pain, least pain, worst pain, and average pain over the past week. The pain interference subscale measures the extent to which pain interferes with general functioning and daily activities. Items are scored from 0 (no pain or interference) to 10 (worst pain imaginable or complete interference), with higher scores indicating greater pain intensity. The reliability and validity of this questionnaire have been successfully established, demonstrating stable measurement properties across different languages and cultures (Cleeland et al., 1994; Wang et al., 1996; Keller et al., 2004). Vakilzadeh and Naghibi (2006) assessed the reliability and validity of this questionnaire in Iranian cancer patients, reporting Cronbach's alpha reliability coefficients of 0.87 for pain intensity and 0.89 for pain interference, and a construct validity of 0.87. In this study, the internal consistency of the subscales for pain intensity ($\alpha = 0.89$) and pain interference ($\alpha = 0.87$) was obtained using Cronbach's alpha (Asadi et al., 2023; Zamani & Zolfaghari, 2022).

2.3. Intervention

2.3.1. Meaning-Centered Pain Coping Skills

The intervention program in this study was conducted by two health and clinical psychology specialists with full knowledge of the interventions used in this study, based on theoretical discussions and practical exercises in a psychotherapy clinic in Tehran.

Meaning-centered pain coping skills training consists of four educational sessions based on the protocol by Winger et al. (2022). The training is delivered step-by-step in six 45- to 60-minute weekly sessions. The educational content includes conceptualizing meaning and pain, guided imagery for relaxation, re-experiencing meaningful moments, seeking sources of meaning, planning meaningful activities, the activity-rest cycle to expedite meaningful activities, responding to suffering (physical, emotional, spiritual), coping statements, short relaxation techniques, living legacy (past, present, future), goal setting based on values, and planning for continued skills practice (Winger et al., 2021).

Session 1: Establishing Connection and Introduction

In the first session, the focus is on establishing a connection and introducing the participants to the objectives of the treatment. The meaning-centered pain coping skills program is introduced, and the principles of the intervention are explained. The four main pillars of the intervention—connection, confidentiality, adherence to treatment guidelines, and the intervention timeline—are emphasized. This session sets the foundation for the therapeutic process, ensuring that participants understand the structure and goals of the program.

Session 2: Meaning and Cancer

The second session begins with a review of the previous session and introduces the concept of meaning in the context of cancer and suffering. Guided imagery techniques are used to promote relaxation, allowing participants to re-experience meaningful moments. This session highlights the importance of finding meaning amidst pain and suffering. Participants are assigned homework to practice guided imagery at home, reinforcing the techniques learned during the session.

Session 3: Connection with Life

In the third session, participants explore meaningful moments and sources of meaning in their lives. They are guided to plan meaningful activities and understand the activity-rest cycle to enhance engagement in meaningful activities. This session aims to deepen the participants' connection with life and encourages them to integrate meaningful activities into their daily routines. Homework

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involves continued practice of guided imagery to reinforce relaxation and connection with meaningful moments.

Session 4: Orienting to Limitations

The fourth session focuses on addressing meaningful activities within the constraints of physical, emotional, and spiritual suffering. The activity-rest cycle is revisited, and coping statements are introduced to help manage pain and suffering. Short relaxation techniques are practiced to provide quick relief from distress. Homework assignments include practicing previously learned skills and using coping statements and relaxation techniques to manage pain and discomfort.

Session 5: Life as a Dynamic Story

In the fifth session, participants reflect on their life legacy, considering the past, present, and future. Goal setting based on personal values is introduced, and problem-solving skills are developed to help participants navigate challenges. The session also involves planning for continued practice of current skills, ensuring that participants can maintain their progress. Homework includes the continuous use of coping skills, integrating them into daily life to foster resilience and meaning.

Session 6: Final Summary

The final session involves a comprehensive review of all previous sessions, summarizing the key learnings and providing feedback. Participants are encouraged to reflect on their journey and the progress they have made. This session aims to consolidate the skills and knowledge gained, ensuring that participants feel equipped to continue using the coping strategies independently. Feedback is gathered to understand the participants' experiences and to make any necessary adjustments for future interventions.

2.4. Data Analysis

For statistical analysis of the collected data, descriptive statistics (mean and standard deviation) and inferential statistics (univariate ANOVA and mixed ANOVA) were used. Univariate ANOVA was used to examine the homogeneity of demographic variables among the three groups. Mixed ANOVA was used to analyze changes in participants' scores over time, time*group interactions, and group effects using SPSS version 27.

3. Findings and Results

The demographic characteristics of the participants were analyzed across different groups. Age distribution showed that in the MCPC group, 50% were aged 30 to 40 years, 43% were aged 40 to 50 years, and 7% were aged 50 to 60 years. In the control group, 33% were aged 30 to 40 years, 60% were aged 40 to 50 years, and 7% were aged 50 to 60 years, with no significant difference between groups ($F(2, 42) = 0.34$, $p = 0.72$). Marital status indicated that 43% of the MCPC group and 60% of the control group were married, while 57% of the MCPC group and 40% of the control group were single, showing no significant difference ($\chi^2 = 2.38$, $p = 0.30$). Regarding education level, 28% of the MCPC group and 40% of the control group had an associate degree, 65% of the MCPC group and 40% of the control group had a bachelor's degree, and 7% of the MCPC group and 20% of the control group had a master's degree, also with no significant difference ($\chi^2 = 3.17$, $p = 0.53$).

Table 1

Descriptive Statistics of Pain Levels and Death Anxiety by Group

Variable	Group	Pre-test	Post-test	Follow-up
Pain Level	Experimental	14.50 (2.93)	9.93 (2.20)	10.57 (2.56)
	Control	14.27 (3.83)	14.40 (3.70)	14.00 (3.16)
Death Anxiety	Experimental	9.29 (1.44)	6.07 (1.27)	6.64 (1.08)
	Control	8.93 (1.28)	8.73 (1.34)	9.07 (1.16)

After descriptively examining the distribution of the primary research variables (Table 1), normality was assessed using skewness and kurtosis indices and the Shapiro-Wilk test. The results indicated that the skewness and kurtosis for the research variables were within the acceptable range of -2 to +2, and none showed severe deviation from normality. Additionally, the Shapiro-Wilk test results for the research variables were not statistically significant ($P > 0.05$), indicating that the variables were normally distributed in the research population. Therefore, the normality assumption for the research variables was met. We will proceed to test the research hypotheses while considering the relevant assumptions.

As shown in Table 1, there are differences in the mean pain levels between the two groups—those who received meaning-centered pain coping skills and those who received

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mindfulness-based stress reduction—at the pre-test, post-test, and follow-up stages. However, it is unclear whether these differences exceed chance and probability. Therefore, a mixed ANOVA was used to examine the observed changes.

Initially, we examined the assumptions of the mixed ANOVA test, including the independence of errors due to the random assignment of participants to groups, individual intervention, and individual response to tests. Additionally, the normality assumption for the variable pain level was confirmed using skewness and kurtosis indices and the Shapiro-Wilk test, as discussed previously.

To assess the homogeneity of error variances for pain level and death anxiety across groups, Levene's test was used. The results indicated that the assumption of homogeneity of variances was met for both variables across different stages of the study ($P > 0.05$). Mauchly's test of sphericity was also used to verify the assumption of covariance matrix sphericity, which was confirmed for the study data ($P > 0.05$). The Box's M test showed that the covariance matrices' equality assumption over time for pain level and death anxiety was met. Overall, the results confirmed that the assumptions for the mixed ANOVA were met, allowing us to proceed with the analysis.

Furthermore, the results of the multivariate test, Pillai's trace, showed a significant difference in pain levels over time ($\eta^2 = 0.32$, $F = 9.32$, $p < 0.001$) and in the interaction between time and group ($\eta^2 = 0.19$, $F = 4.79$, $p < 0.01$). This means that from pre-test to post-test and follow-up, there were significant differences between the intervention and control groups. The mixed ANOVA results for examining between-group differences in pain levels and death anxiety are reported in Table 4.

Table 2

Mixed ANOVA Results for Between-Group Differences in Pain Levels and Death Anxiety

Variable	Source of Variation	Sum of Squares	dF	Mean Square	F	p	Eta Squared
Pain Level	Time	249.50	2	124.75	18.08	0.001	0.31
	Time*Group	127.91	4	31.98	4.62	0.002	0.19
	Group	56.97	2	28.48	5.25	0.01	0.21
Death Anxiety	Time	62.18	2	31.08	23.70	0.001	0.37
	Time*Group	40.79	4	10.20	7.77	0.001	0.28
	Group	20.79	2	10.40	14.49	0.001	0.35

According to Table 2, the mixed ANOVA results indicated that the main effect of the group on pain level was significant ($\eta^2 = 0.21$, $F = 5.25$, $p < 0.01$), suggesting a significant difference in mean pain scores between the two groups. The intervention explained 21% of the variance in pain level changes among women with breast cancer at the post-test stage. The repeated measures ANOVA also showed a significant effect of time on pain levels ($\eta^2 = 0.31$, $F = 18.08$, $p < 0.001$), indicating significant changes in mean scores from pre-test to post-test and follow-up, regardless of the group. Furthermore, the interaction effect of group and time on pain level was significant ($\eta^2 = 0.19$, $F = 4.62$, $p < 0.01$), indicating significant differences in pain scores across the three stages when considering the intervention and control groups.

The mixed ANOVA results also indicated a significant main effect of the group on death anxiety ($\eta^2 = 0.35$, $F = 14.49$, $p < 0.001$), suggesting a significant difference in mean death anxiety scores between the two groups. The intervention explained 35% of the variance in death anxiety changes among women with breast cancer at the post-test stage. The repeated measures ANOVA showed a significant effect of time on death anxiety ($\eta^2 = 0.37$, $F = 23.70$, $p < 0.001$), indicating significant changes in mean scores from pre-test to post-test and follow-up, regardless of the group. Furthermore, the interaction effect of group and time on death anxiety was significant ($\eta^2 = 0.28$, $F = 7.77$, $p < 0.001$), indicating significant differences in death anxiety scores across the three stages when considering the intervention and control groups.

4. Discussion and Conclusion

The results showed a significant reduction in mean pain and death anxiety levels after receiving meaning-centered pain coping skills training. This indicates that the interventions effectively created significant differences between the experimental and control groups' scores at the post-test and follow-up stages. These findings align with the growing body of literature on the accessibility and feasibility of cancer pain management and mindfulness interventions to enhance coping and adaptability, reducing pain and death

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anxiety in cancer patients. The results of this study support the findings of Winger et al. (2022) and Fischer et al. (2023), which demonstrate the effectiveness of this intervention in enhancing psychological well-being and the search for meaning in life among cancer patients (Fisher et al., 2023; Winger et al., 2021).

Theoretically, MCPC combines evidence-based pain coping skills training and meaning-centered psychotherapy, two influential psychosocial interventions addressing pain and spiritual well-being (i.e., achieving peace) in cancer patients (Fisher et al., 2023). MCPC's effectiveness is attributed to preparing patients to manage pain through systematic training in cognitive-behavioral skills (e.g., guided imagery, selecting activity steps), meaning-seeking, problem-solving coping, and gaining insight and awareness of pain and illness by connecting disease to life meaning. Finding meaning in the psychological pain and suffering caused by cancer leads to psychological integration and a spark of hope and vitality in these patients, enhancing their coping strategies and adaptability.

Clinically, proper cognitive representations of the disease enable individuals to adopt appropriate coping strategies, such as consulting a doctor, taking medication, adhering to dietary regimens, and participating in psychotherapy sessions. Positive evaluations and outcomes from these actions encourage continued treatment adherence. Thus, patients with adequate cognitive functioning will self-regulate, adopting appropriate coping behaviors that increase their self-control and self-regulation.

Given the positive results of meaning-centered pain coping skills training in reducing pain and death anxiety in breast cancer patients, short-term and effective interventions can be utilized by nurses, psychotherapists, and mental health researchers to reduce the psychological burden of this disease, improving mental health indicators and quality of life, and enhancing the effectiveness of medical treatments. Moreover, the success of these intervention methods suggests their applicability in reducing mental health problems among other cancer patients and those with chronic diseases.

5. Limitations and Suggestions

This study's findings are based on self-reported data, raising the potential for self-reporting bias. The study population was limited to breast cancer survivors referred to two hospitals in Tehran, selected through convenience sampling, and may not generalize to other diagnostic or cancer population groups, indicating a sampling method limitation. The diagnosis and treatment of breast cancer can lead to highly stressful experiences, with patients experiencing high levels of stress, anxiety, depression, fear of recurrence, insomnia, and fatigue, significantly impacting their quality of life and mental health. Future research should consider the role of cognitive, emotional, and neuropsychological variables in the course, treatment, and stability of this disease through structural equation modeling and longitudinal studies to enhance our understanding of predictive variables and outcomes for these patients.

Meaning-centered pain coping skills training integrates psychological and spiritual issues into cancer pain management. Individuals living with breast cancer face unique challenges, such as integrating their experience into a coherent personal narrative. Persistent cancer-related symptoms, like pain, pose formidable challenges to finding meaning and fostering a sense of peace and coherence amidst severe illness. Therapists should assess how pain impacts patients' spiritual well-being, mindfulness, and acceptance and explore using coping skills, such as engaging in meaningful activities, to help patients connect with what matters most to them. Additionally, MCPC approaches are simple, brief, accessible, and cost-effective, potentially deliverable by various practitioners (e.g., nurses, psychotherapists, advanced care providers, social workers).

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. This study was approved by the Ethics Committee of Islamic Azad University, Sari Branch, with ID IR.IAU.SARI.REC.1401.258, and registered in the clinical trial system with number IRCT20230303057600N1. Participants were randomly assigned to three groups of 15 individuals each using simple randomization through a lottery.

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