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Development of a Mindfulness-Based Psychological Coping Skills Training Package for Cancer

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ABSTRACT

The aim of the present study was to develop a mindfulness-based psychological coping skills training package for women with breast cancer. The study was conducted in both qualitative and quantitative phases using a mixed-methods approach. In the qualitative phase, thematic analysis and in-depth interviews with 12 patients were employed to identify and code concepts and themes related to patients' lived experiences. Subsequently, the content and structure of the protocol were developed and validated with input from 15 experts. The final package consisted of ten training sessions focused on understanding psychological, social, cultural, and economic factors; strengthening coping skills; teaching mindfulness practices; and stress-management strategies. The results indicated that the mindfulness-based training package significantly reduced stress, decreased cortisol levels, and enhanced psychological self-efficacy in women with breast cancer. The findings highlight the importance of designing mindfulness-based interventions to promote mental health and improve quality of life among patients.

Keywords: Mindfulness-based psychological coping skills training package for cancer, breast cancer.

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Introduction

Breast cancer remains one of the most psychologically, physiologically, and socially demanding illnesses faced by women worldwide, exerting profound pressures on emotional stability, biological functioning, and overall quality of life. Women diagnosed with breast cancer often navigate a complex interplay of chronic stress, fear of recurrence, altered identity, and disruptions in interpersonal relationships, all of which can significantly undermine adaptive coping and psychological well-being. A growing body of evidence indicates that stress responses in these patients are deeply intertwined with neuroendocrine changes, particularly fluctuations in cortisol—an established biomarker of stress physiology (1, 2). Persistently elevated cortisol levels are associated with heightened emotional distress, impaired immune responses, and diminished treatment tolerance, suggesting a need for interventions that simultaneously address psychological and physiological domains of distress.

Among contemporary approaches to psychosocial oncology, mindfulness-based interventions (MBIs) have emerged as one of the most empirically supported modalities for reducing stress, enhancing coping resources, and improving overall psychological functioning. Mindfulness fosters present-moment

awareness, emotional regulation, and non-judgmental acceptance, enabling women with breast cancer to manage intrusive worries, fear of recurrence, and disruptions in daily functioning more effectively (3-5). Extensive research across different clinical populations underscores the role of mindfulness in increasing psychological resilience, distress tolerance, and emotion regulation capacity (6-8). These findings converge with cognitive-behavioral and emotion-focused frameworks suggesting that enhancing attentional control, self-efficacy, and acceptance can profoundly influence the psychological recovery trajectory of cancer patients (9, 10).

In breast cancer care specifically, mindfulness-based programs such as MBSR (Mindfulness-Based Stress Reduction) have demonstrated benefits in reducing perceived stress, managing emotional pain, promoting psychological well-being, and improving sleep quality (11-13). These interventions also contribute to reductions in depressive symptoms, enhancement of social support, and strengthening of emotional resilience, positioning mindfulness as a protective factor against the chronic psychological burden associated with cancer diagnosis and treatment (14-16). Parallel studies further highlight that mindfulness can modulate biological stress markers, including cortisol levels, thereby creating a synergistic effect between psychological intervention and physiological outcomes (17, 18).

Yet despite the substantial evidence base supporting MBIs, many women with breast cancer continue to face challenges in accessing structured psychosocial care due to financial constraints, limited availability of specialized therapists, cultural stigmas, or healthcare system limitations (19-21). These barriers underscore the importance of culturally sensitive, locally tailored, and clinically validated intervention protocols that consider both the psychological and contextual realities of patients. Research emphasizes that adaptive coping—whether through mindfulness, social support, or acceptance—is shaped not only by individual psychological resources but also by socioeconomic, familial, and cultural contexts (22-24). Therefore, designing interventions that explicitly address these contextual factors is essential for maximizing treatment adherence, practical relevance, and therapeutic outcomes.

Moreover, coping strategies in cancer populations vary widely, ranging from adaptive mechanisms—such as acceptance, emotional regulation, positive reappraisal, and help-seeking—to maladaptive responses such as avoidance, rumination, emotional withdrawal, and catastrophic thinking (25-27). Patients who rely heavily on maladaptive coping often experience higher levels of anxiety, depression, insomnia, and psychosomatic symptoms, which exacerbate illness burden and impair treatment engagement (28-30). Empirical studies consistently demonstrate that enhancing coping skills—particularly through mindfulness-based training—can reduce psychological distress and promote a more adaptive relationship with pain, uncertainty, and bodily changes associated with breast cancer (3, 13, 31).

One of the key mechanisms through which mindfulness exerts its therapeutic effects is by increasing distress tolerance and mental toughness, both of which are crucial for navigating the emotional turbulence of cancer diagnosis and treatment (6, 31). Increased distress tolerance has been linked to improved capacity for emotional regulation, reduced reliance on maladaptive coping strategies, and improved psychological flexibility—outcomes directly relevant to women coping with breast cancer (11, 32). At the same time, resilience–another outcome consistently associated with mindfulness practice—serves as a buffer against depressive symptoms, fear of recurrence, and the psychological effects of uncertainty (5, 18, 33).

Importantly, mindfulness-based interventions have been shown to influence not only emotional resilience but also psycho-social variables such as body image, interpersonal trust, spirituality, and perceived social support—all factors known to predict psychological adjustment in breast cancer populations (3, 12, 19, 24). The relationship between stress physiology, emotional well-being, and social functioning highlights the multidimensional nature of coping in breast cancer, necessitating interventions capable of addressing these interconnected domains (7, 28, 34). Research supports the idea that the integration of mindfulness into psycho-oncological care enhances self-efficacy—an essential predictor of health-related behaviors and recovery outcomes (14, 15, 35). Self-efficacy supports emotional regulation, encourages adherence to treatment, and contributes to a greater sense of agency in managing the illness experience (8, 16, 29).

The transformative potential of MBIs has been further evidenced in digital and technology-assisted adaptations. Internet-delivered mindfulness programs, virtual reality–assisted mindfulness, and mobile-based self-help tools have produced significant improvements in stress, anxiety, emotional pain, and body image among women with cancer (3, 22, 30). These technological innovations point toward accessible and scalable models of mindfulness training, aligning with global efforts to reduce disparities in psychosocial cancer care.

Despite robust evidence supporting mindfulness-based interventions, gaps remain concerning the development of culturally contextualized and clinically structured mindfulness-centered coping packages tailored specifically for women with breast cancer in diverse sociocultural settings. Studies from different countries highlight that cultural beliefs, illness perceptions, and stigma fundamentally alter coping behaviors and influence patient receptivity to psychological interventions (13, 17, 36). Therefore, developing a structured, evidence-based, and culturally attuned protocol is imperative for addressing the psychological and physiological needs of this population.

Given the demonstrated relationship between mindfulness, stress reduction, neuroendocrine regulation, resilience, coping, and psychological well-being, designing a comprehensive mindfulness-based coping skills package for women with breast cancer represents a critical advancement in integrative psycho-oncology. Such a program can simultaneously address emotional suffering, biological stress markers, and functional impairment—thereby contributing to improved quality of life, mental health, and long-term adaptation to chronic illness (4, 5, 18, 31).

Therefore, the aim of this study is to develop and validate a mindfulness-based psychological coping skills training package designed to reduce stress, lower cortisol levels, and enhance psychological self-efficacy in women with breast cancer.

Methods and Materials

In this study, the development of a mindfulness-based educational package for patients with breast cancer was conducted using a mixed-methods approach that comprised two main stages: first, qualitative content analysis through thematic analysis inspired by the coding procedures of grounded theory in order to identify the key dimensions and components of the educational package; and second, validation of the package using the Delphi technique. Accordingly, the data obtained from semi-structured in-depth interviews with patients and experts (purposeful sampling until theoretical saturation), as well as a review of specialized literature, were analyzed based on Colaizzi's seven-step method, and major themes were extracted. Data were coded

through open, axial, and selective coding consistent with grounded theory procedures to achieve a rich and data-driven conceptual structure. After preliminary development of the educational package based on the extracted themes, the Delphi technique was implemented in two rounds with the participation of 15 experts in clinical and health psychology to evaluate and revise the session content and overall structure. In the first round, expert opinions regarding the session content were collected and necessary revisions were applied; in the second round, the final version of the package, along with a revised questionnaire, was submitted to the same experts and the coefficient of expert agreement was calculated. This methodological integration enabled data-driven extraction of educational content and scientific validation of the developed package in accordance with standards of mixed-methods studies and action research. Based on the qualitative findings, the following steps were carried out.

To design the questions, a qualitative approach was used. The steps were as follows:

First step: interviewing experts, specialists, and patients, and reviewing texts to extract relevant concepts and themes;

Second step: categorizing (coding) the content collected in the first step and forming conceptual –content subcategories;

Third step: developing conceptual–content subcategories formed in the second step and preparing an initial set of questions;

Fourth step: submitting the questions to 15 experts and requesting evaluation of the structure, process, and content of the questions through a survey questionnaire presented alongside the questions. In addition, an open-ended feedback form was provided to allow each expert to offer suggestions and revisions aimed at improving the content and structure of the questions;

Fifth step: reviewing the specialized opinions of the 15 experts, applying the required revisions, and preparing the final version of the questions;

Sixth step: submitting the revised questions again to the same 15 experts along with the final survey form and calculating the expert agreement coefficient.

The statistical population of the first research domain consisted of scientific and specialized texts related to mindfulness-based psychological coping skills for cancer, and the second domain included psychology specialists and women with breast cancer (for needs assessment).

The qualitative sample consisted of individuals diagnosed with breast cancer who participated in in-depth interviews. Sampling continued until data saturation was achieved. Therefore, the qualitative sample size was determined after interviews had begun and saturation was reached at 12 participants. Phenomenological studies differ from quantitative research in sampling procedures. Qualitative research provides the researcher with sufficient flexibility in developing methods for exploring phenomena and in sampling to attain deeper insight. Sampling was conducted purposefully using criterion-based selection, which requires choosing individuals who meet essential criteria and may include exceptional, desirable, and typical cases. Criterion-based desirable cases include individuals who exhibit the phenomenon of interest frequently rather than exceptionally (Flick, 2006). In addition, 18 printed scholarly articles related to the psychological condition of patients with breast cancer were used in drafting the intervention protocol (details provided in the appendix). Another group of participants in the qualitative phase consisted of 15 specialists in psychology and counseling selected via snowball sampling. The drafted intervention protocol was provided to them for

the purpose of validating the developed protocol. These individuals were doctoral students or holders of a PhD in health or clinical psychology with experience in implementing clinical psychological interventions with patients.

Research Instruments

Demographic data included age, occupation, and education, recorded in a pre-designed checklist.

Semi-structured interview questions included: What is the definition of breast cancer? What do you see as the cause of this disease? What physical, psychological, and social problems does this disease create for patients? What impact has the disease had on patients' quality of life? Why do you think individuals develop this disease? What strategies and coping mechanisms do these patients use to adapt to the illness? What have been the consequences of the disease (physical, psychological, social)? What strategies do these patients use in response to disease symptoms? What factors contribute to better or worse adjustment to this disease? To evaluate the validity of the interview questions, the Content Validity Ratio (CVR) was used. Because CVR values greater than .62 indicate acceptable validity, and a value of 1 denotes complete content validity, all questions yielded a CVR above .62.

Research Implementation Procedure

First, individuals diagnosed with breast cancer were identified based on inclusion and exclusion criteria and were purposively included in the study. Data collection methods included interviewing, deep conversation, and note-taking. After selecting participants through purposeful sampling, they underwent in-depth interviews. Data collection continued until data saturation was achieved, resulting in a final sample of 12 participants. Additionally, 18 articles related to the psychological status of breast cancer patients were reviewed. After saturation, the collected data were analyzed using Colaizzi's seven-step method. The steps were as follows:

Reviewing all information: in this stage, written transcripts of interviews were read several times to gain an overall understanding of the content. This process was accompanied by listening to recorded segments. Printed academic texts were also examined.

Extracting significant statements: phrases, sentences, or paragraphs related to the interview questions were isolated and saved in separate files to avoid losing potentially important information. Sections of printed articles relevant to the psychological status of patients were also extracted and noted.

Formulating meanings: for each significant statement, a brief description of the underlying meaning was written. This process was performed independently by two individuals, after which the meanings derived from interview data and printed articles were combined to form shared meanings.

Organizing formulated meanings into categories and developing themes within categories: themes in this stage consisted of short expressions derived from formulated meanings. Themes were independently developed by each person who completed step four and were subsequently discussed. Repetition of themes served as an indicator of credibility. To ensure credibility at this stage, a qualified individual compared the extracted themes to the data (the research supervisor).

Creating a concise narrative description: key concepts selected through consensus among researchers were summarized in narrative form to present the findings clearly. The summary was written by the researcher and reviewed jointly with a second researcher.

Returning to participants for validation: findings were explained to participants, and they were asked to provide feedback and reactions to the results.

Ensuring auditability: to ensure auditability, a written record of the researcher's daily activities during the research process and personal reflections when interacting with participants was documented. Throughout the study, questions were added or removed from interviews whenever necessary. Data collection and analysis were conducted concurrently. As noted, Colaizzi's seven-step method was used for the entire process.

To assess the content validity of the developed intervention protocol for individuals with breast cancer, the protocol was first provided to 15 experts prior to its implementation. They were asked to review the package and comment on the structure, process, and content of each session through a survey questionnaire attached to the protocol. Additionally, an open-ended feedback form was provided to collect suggestions and corrective comments aimed at enhancing the content, structure, and process of the intervention protocol. Next, the experts' feedback was reviewed and applied to the protocol. Finally, the revised intervention protocol and the final survey form were sent back to the same experts, and their final comments were incorporated. The expert agreement coefficient was then calculated for the structure, process, and content of the developed intervention protocol. After validation, the protocol was pilot-tested on four individuals with breast cancer.

In the qualitative section, to determine inter-rater agreement and ensure the content validity of the educational package, the Content Validity Ratio (CVR) and the Content Validity Index (CVI) were used.

Findings and Results

In the present study, a total of 15 interviews were conducted until saturation was reached, and in the final three interviews no new concepts emerged; the data in those interviews repeated previously obtained information, and sampling was therefore terminated. Among the conducted interviews, 12 initial interviews that did not contain repetitive data were selected and analyzed for coding frequently occurring concepts to determine the core categories influencing stress reduction, cortisol levels, and psychological self-efficacy in women with breast cancer, based on the following questions: What are the components and structure of the mindfulness-based psychological coping skills educational package in reducing stress, blood cortisol levels, and psychological self-efficacy in women with breast cancer in Bandar Abbas? Does the mindfulness-based psychological coping skills educational package for patients with breast cancer demonstrate acceptable validity?

In the data analysis process, 110 open codes were initially obtained, of which 48 were repetitive. After removing the duplicates, 62 open codes remained for the study. In the axial coding stage, after identifying conceptual labels during open coding and condensing and integrating the initial codes, 11 axial codes were identified. Finally, in the selective coding stage, through synthesizing and refining the open and axial codes, 6 selective codes were determined within the theoretical framework.

Table 1. Open, Axial, and Selective Codes

Detailed description and analysis	Interview excerpts	Code (category)	Participant(s)
Most participants described severe anxiety, worry about the future,	"After my mother died in a car accident, my anxiety got much worse... I'm constantly worried	Anxiety, worry, stress	9, 14, 8

intrusive thoughts, and panic attacks. This anxiety was associated with grief, financial strain, fear of recurrence, and observing illness in significant others, and in many cases exacerbated physical symptoms.	the disease will come back. I can't sleep at night.""Whenever my stress increased, all my symptoms intensified; I even had panic attacks and felt out of control.""Life stress makes my body hurt. It's like the more anxious I am, the worse the disease gets."		
Feelings of hopelessness, anhedonia, and worthlessness after diagnosis were common. This depression reduced motivation for treatment and worsened physical symptoms.	"I fell into severe depression. I had no interest in anything, I even hated treatment.""When my anxiety rises, I freeze; I just want to be alone and do nothing."	Depression and low mood	7, 12
Many patients described obsessive attention to symptoms and catastrophic predictions. Fear of death was one of the central aspects of their anxiety.	"My mother's death and then my own illness made me think about death constantly and fear another tragedy.""Every symptom I see in my body makes me think the disease is back and death is near."	Fear of death and catastrophic thinking	9, 11
Anger and irritability were evident in family relationships and during periods of intensified physical symptoms. Irritability worsened symptoms and contributed to psychological exhaustion.	"I would get angry because of problems with my husband, and then my symptoms got worse. Anger directly affects my body.""I get angry easily over small issues, and afterward my body hurts and I feel drained."	Anger, frustration, irritability	1, 9
Some participants described obsessive tendencies, severe anxiety patterns, catastrophic thinking, and low resilience.	"I always think something bad is about to happen, even when there is no sign; I truly feel psychologically weak.""I went through periods of panic attacks that paralyzed my life—I felt like the world was against me."	Personality and psychiatric problems	2, 4
Emotional divorce, infidelity, lack of support, and being forced to continue in the relationship contributed to feelings of loneliness and reduced mental health.	"When I learned about my husband's infidelity, my world collapsed... I stayed only because of my children and feel utterly unprotected.""Financial disputes with my husband made me feel like I had no emotional support."	Family problems and marital conflict	8, 7
Experiences of losing a spouse or parents and exposure to traumatic events were associated with heightened anxiety, depression, and physical symptoms.	"After my husband died, I constantly worried about myself and my children. My life stress increased a hundredfold."	Grief, loss of loved ones, traumatic events	12
Financial pressure, economic hardship, and lack of support led to chronic stress, reduced self-esteem, and increased dependency.	"I had no financial support and my family didn't help—I survived only to stay alive.""My financial situation prevented me from continuing my education; I had no escape from an unsupportive family."	Economic problems and lack of financial support	8, 3
Cultural differences, social discrimination, and being forced to live an undesired life reduced life satisfaction.	"In the new environment, I always felt out of place. Society constantly judged me."	Environmental pressure and cultural differences	3
Lack of emotional connection with family caused feelings of isolation, sadness, and worsening symptoms.	"My parents were far away, and I always felt a sense of loneliness."	Distance from family and lack of emotional support	9
Infidelity, emotional failures, and loss of loved ones were triggers for psychosomatic symptoms and heightened anxiety.	"After my husband cheated, I developed insomnia, stomach pain, and severe stress, and my illness worsened.""The end of a close friendship caused so much stress that my illness returned. I don't feel safe at all.""After my father passed away, I experienced depression and physical pain; life became unbearable for me."	Stressful life events and emotional failures	5, 10, 6
High anxiety and stress impaired cognitive functioning and concentration.	"When my worry increases, I lose focus and forget what I was doing halfway through tasks."	Reduced concentration and memory	12
Doubt, fear of making mistakes, and distrust in personal judgment were consequences of psychological pressure.	"I'm afraid to make decisions and always worry I'll make the wrong one."	Decision-making difficulties	11
Nightmares, frequent awakenings, and insomnia followed periods of intense stress.	"I wake up several times during the night and start the day exhausted."	Sleep disturbance	8
Stress triggered physical pains such as stomachaches, headaches, and abdominal pain.	"Whenever I feel upset, my body hurts—it's like my emotional pain shows up physically."	Physical pain	9
Energy depletion, psychological burden, and chronic fatigue were common symptoms.	"It feels like I'm always carrying a weight on my shoulders; I'm tired even after resting."	Lethargy and chronic fatigue	12

Stress, depression, and marital conflicts led to reduced libido and emotional distance.	"After all the fights, I have no feelings for my husband anymore; our relationship has become cold and forced."	Sexual and relational problems	8
Initial denial and resistance in accepting the disease increased feelings of failure and lack of motivation.	"Many times I didn't want to believe I was ill; I felt defeated."	Challenge of accepting the illness	9
High expenses, financial pressure, and fear of poverty had severe psychological impacts.	"For the sake of my children and with no financial safety net, I was forced to endure everything; I was constantly worried about costs."	Economic worries and stress	8
The high cost of psychotherapy and lack of insurance coverage were major barriers to improvement.	"It's hard to find a good psychologist—and their fees are so high, I just can't go."	Limited access to psychological services	8
The cultural taboo surrounding cancer and cultural pressure on women prevented emotional expression and receiving support.	"In my family, talking about illness was taboo; everything had to remain hidden."	Family culture surrounding illness	3
Parental and family support reduced anxiety and increased hope.	"My parents always supported me, and that helped me cope better with stress."	Facilitators: family support	3
Connecting with others who share the same illness created a sense of belonging and mutual understanding.	"I talk to other patients in online groups—it gives me energy and calms me down."	Facilitators: support groups	12
Learning mindfulness techniques and relaxation practices reduced psychological pressure.	"I learned mindfulness exercises in classes, and my nerves became calmer."	Facilitators: coping skills training	1
Consulting with a counselor increased emotional awareness and self-regulation.	"Counseling sessions helped me get through crises more easily."	Facilitators: psychological care	6
Rumination and fear of recurrence led to insomnia and psychological fatigue.	"My worries never end—I have nightmares and no energy to do things."	Barriers: excessive worry	1
Uncertainty about the nature of the illness and fear of treatment caused additional anxiety.	"No one explains clearly what awaits me, and this lack of awareness is distressing."	Barriers: lack of information	6
Negative beliefs and fear of judgment prevented seeking psychological help.	"I thought only weak people go to psychologists, and that misconception made me worse."	Barriers: resistance to psychological treatment	11
Unhealthy diet and irregular sleep worsened symptoms.	"Lack of sleep and eating fast food ruined my mood."	Barriers: unhealthy lifestyle	2
Chronic hopelessness led to low motivation toward treatment and the future.	"I have no motivation for treatment; I'm just passing the days."	Barriers: lack of motivation	13
Focusing on the present moment and controlling negative thoughts helped reduce anxiety.	"Focusing on the present helped me become less overwhelmed by stress."	Adaptive strategy: mindfulness	1
Accepting the reality of the illness reduced denial and lowered anxiety.	"I learned to live with my situation; acceptance made me calmer."	Adaptive strategy: acceptance	8
Receiving empathy from others created a sense of belonging and hope.	"When I talk to others, the loneliness goes away."	Adaptive strategy: social support	11
Trusting the counselor and physician increased psychological focus and stability.	"Talking to my counselor reduced my mental burden."	Adaptive strategy: consultation with specialists	9
Light physical activity promoted relaxation and improved mood.	"Daily walking is the best way for me to control stress."	Adaptive strategy: appropriate physical activity	2
Using coping techniques reduced anxiety and improved emotional regulation.	"With relaxation training, I learned to overcome my fear."	Positive outcome: reduced anxiety	5
Stress reduction led to deeper and more restful sleep.	"I sleep comfortably now; my stress is lower."	Positive outcome: improved sleep quality	4
A more positive outlook on life and improved family relationships were reported.	"I learned to enjoy even the small things."	Positive outcome: increased life satisfaction	2
Anger decreased and inner calm increased.	"I no longer lose my temper quickly—I feel much more at peace."	Positive outcome: improved mood	9

Patients felt stronger and more resilient when facing problems.	"I've become stronger and can handle difficulties more easily."	Positive outcome: enhanced resilience	3
Social support and psychotherapy reduced depressive symptoms.	"I used to cry all the time, but now I'm much calmer."	Positive outcome: reduced depression	1
Training in communication skills increased family intimacy.	"I communicate better now, and my relationship with my sister has become closer."	Positive outcome: improved social and family relationships	8
Relaxation training increased pain tolerance and symptom management.	"With mental focus, my pain and anxiety have decreased."	Positive outcome: improved pain tolerance and physical symptoms	2

Based on qualitative data analysis, the causal conditions included psychosocial factors such as experiences of persistent anxiety and worry, fear of the future and death, feelings of loneliness and isolation, depressed mood, and high levels of stress across various life domains, as well as pressures arising from changes in social roles and communication and family challenges. In terms of physical conditions, participants reported symptoms such as fatigue, pain, sleep disturbances, nausea, and hormonal changes, all of which influenced their mood and thoughts.

In the central conditions, the main problems included reduced concentration and memory, bodily pain, sleep disturbances, lethargy and chronic fatigue, sexual and relational difficulties, challenges in accepting the illness, and the psychological and physical effects of the disease on daily functioning. In the contextual conditions, financial and economic issues such as concerns about treatment costs and limited access to psychological services, unemployment or compromised work status, and family culture regarding cancer were identified as major challenges.

In the intervening conditions, facilitators such as family support and support groups, coping-skills training, and continued psychological care played a positive role, whereas barriers such as excessive worry, lack of information, resistance to psychological treatments, and unhealthy lifestyle habits hindered effective coping. Coping strategies included both adaptive methods—such as mindfulness, acceptance, consultation with professionals, appropriate physical activity, and social support—and maladaptive methods, such as avoidance, denial, neglecting health, isolation, and withdrawal from social interactions. Ultimately, the identified outcomes included improved quality of life, reduced anxiety, increased psychological satisfaction and resilience, better sleep quality and mood, enhanced family and social relationships, and facilitated coping with pain and physical symptoms of the disease, indicating the significant role of positive coping strategies and environmental support in adapting to the illness.

The conceptual model of the study derived from selective and axial coding is presented as follows:

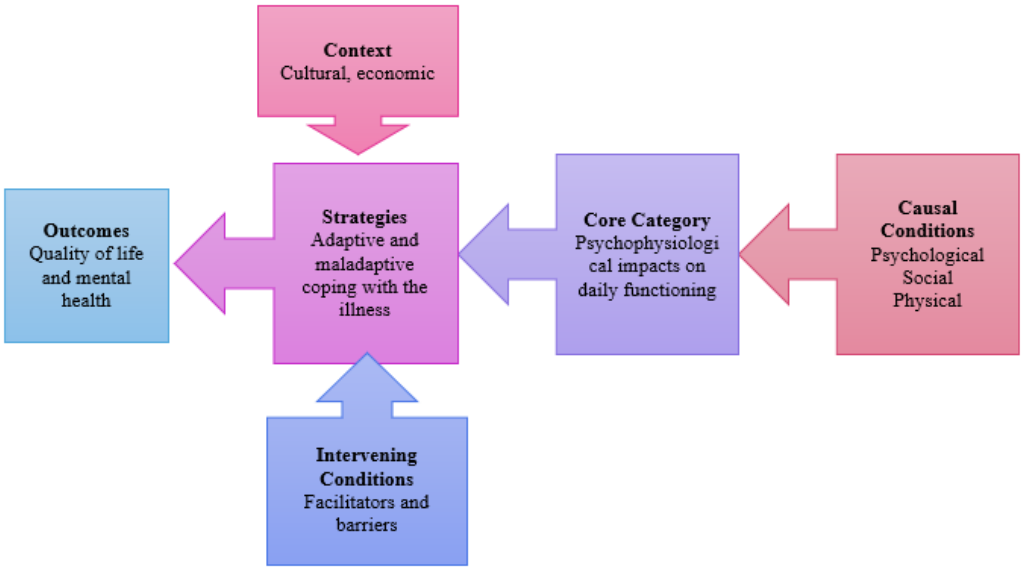

Figure 1. The model of factors influencing stress reduction, blood cortisol levels, and psychological self-efficacy in women with breast cancer

In the data analysis process, 110 open codes were initially obtained, of which 48 were repetitive. After removing them, 62 open codes remained for the present study. In axial coding, after identifying conceptual labels during open coding and integrating and condensing the initial codes, 11 axial codes were identified. In the final stage of selective coding, through synthesizing and refining the open and axial codes, 6 selective codes within the theoretical framework were identified, and the results are presented in Table 2.

Table 2. Summary of the Designed Protocol in the Present Study

Session	Session Topic	Summary of Session Content	Session Assignments
1	Understanding the psychological, social, and physical impacts of cancer	Examination of psychological effects such as anxiety, fear, and depression; physical impacts of illness and treatment on the body; social aspects including role changes and feelings of loneliness	Recording daily emotions and thoughts related to the illness; writing down worries and concerns
2	Psychophysiological effects of illness on daily functioning	Explanation of problems such as reduced concentration, sleep disturbances, chronic fatigue, sexual dysfunction, challenges in accepting the illness, and effects on quality of life	Monitoring and recording how physical and psychological symptoms affect daily activities
3	Exploring cultural and economic effects on coping with illness	Introduction to financial difficulties and economic constraints during treatment; understanding family beliefs and cultural perspectives regarding cancer and related social challenges	Identifying personal cultural–economic barriers and drafting simple solutions to manage them
4	Barriers and facilitators in coping with illness	Understanding facilitators such as family support and support groups, and barriers such as lack of information, excessive worry, and resistance to psychological treatment	Talking to a family member or friend about available support; writing strengths and weaknesses of current coping strategies
5	Introduction to mindfulness principles and beginning basic practices	Definition of mindfulness, its principles, and benefits in stress reduction; mindful breathing exercises and present-moment awareness	Practicing mindful breathing for 5 minutes daily and recording experiences
6	Deepening mindfulness practices and applying them to symptom management	Training in body-scan meditation, nonjudgmental awareness, communicating with pain and bodily symptoms through mindfulness, and consciously responding to stress and anxiety	Performing a 10-minute body scan and recording sensations and experienced changes
7	Adaptive and maladaptive coping strategies for dealing with illness	Introduction to adaptive behaviors such as acceptance and social support; identifying maladaptive behaviors such as denial, avoidance, and isolation, and strategies for modifying them	Identifying one maladaptive behavior and planning to replace it with an adaptive one; documenting progress

8	Managing stress and anxiety with mindfulness techniques	Training in present-moment awareness, managing negative thoughts, and mindful breathing techniques to reduce anxiety and enhance calmness	Practicing a 10-minute daily meditation and recording its effect on stress levels
9	The importance of social support and improving communication	Examination of the role of family and support groups in coping; techniques to improve communication skills for receiving effective support	Talking with a family member or friend about emotions and needs; practicing clear emotional expression
10	Evaluating progress and planning for maintaining learned skills	Reviewing all learned skills; evaluating stress reduction and improved quality of life; designing a personalized plan for maintaining and strengthening coping skills	Creating a weekly plan to continue mindfulness and coping practice; setting short-term personal goals

To examine the validity of the mindfulness-based psychological coping skills training package for patients with cancer, and its effectiveness in reducing stress, blood cortisol levels, and psychological self-efficacy in women with breast cancer in Bandar Abbas, the session descriptions (developed using interviews and analysis of printed literature) were submitted along with two evaluation forms to 15 experts in psychology and counseling. In one form, an overall evaluation of the content of the mindfulness-based psychological coping skills training package was assessed, and in the following table, each expert's opinion on the content of each session was examined. Expert responses were scored on a scale from 1 to 10.

Table 3. Overall Evaluation of the Developed Intervention Protocol by 15 Experts in Psychology and Counseling

Experts	Content alignment of planned sessions with the psychological status of patients	Suitability of sessions with required psychological and physical structure and steps	Adequacy of time allocated for intervention steps and skills	Adequacy of developed intervention protocol	Overall evaluation of the developed intervention protocol
First	1	1	1	1	1
Second	1	0.9	0.9	0.9	1
Third	0.9	1	1	1	0.9
Fourth	1	0.8	0.9	1	1
Fifth	0.8	1	0.7	1	1
Sixth	1	0.8	0.7	0.9	0.9
Seventh	0.8	1	1	1	1
Eighth	0.6	0.5	0.9	0.8	1
Ninth	1	0.7	1	1	0.9
Tenth	0.9	1	1	1	0.9
Eleventh	1	0.8	1	0.7	1
Twelfth	1	1	1	1	0.7
Thirteenth	1	0.7	0.7	0.9	0.9
Fourteenth	0.6	1	1	0.7	1
Fifteenth	0.9	1	1	0.8	1
CVR	0.733	0.60	0.60	0.733	0.866
CVI	0.866	0.80	0.80	0.866	0.933

The results presented in Table 3 indicate that experts' overall evaluations confirm that the mindfulness-based psychological coping skills training package for patients with cancer possesses appropriate content validity. It is important to note that, considering 15 evaluators, an acceptable CVR value must be above 0.49 and an acceptable CVI value above 0.70. After content validation of the mindfulness-based psychological coping skills training package, the package was implemented in a preliminary study on four women with breast cancer, and the results are presented in Table 4.

Table 4. Descriptive Findings from the Preliminary Study of the Mindfulness-Based Psychological Coping Skills Training Package

Variables	Phase	N	Mean	Standard deviation
Stress	Pretest	4	51.5	1.73
	Posttest	4	40	2.16
	Follow-up	4	41	2.16
Blood cortisol level	Pretest	4	342.7	4.92
	Posttest	4	299	14.8
	Follow-up	4	298	14.8
Psychological self-efficacy	Pretest	4	40	2.94
	Posttest	4	55	5.12
	Follow-up	4	52.2	4.99

The results in Table 4 indicate that the developed training package was able to change the mean scores of stress, blood cortisol level, and psychological self-efficacy among patients; however, the significance of these changes must be examined using inferential statistical tests. The direction of the effect suggests that the developed educational package successfully reduced mean stress scores and blood cortisol levels while increasing psychological self-efficacy in women with breast cancer.

Discussion and Conclusion

The purpose of this study was to develop and validate a mindfulness-based psychological coping skills training package for women with breast cancer, with the intention of reducing stress, lowering cortisol levels, and increasing psychological self-efficacy. The findings indicated that the intervention produced meaningful improvements in emotional well-being, stress biomarkers, and perceived coping competence. Analysis of the qualitative data revealed a constellation of psychological, social, cultural, economic, and physiological factors contributing to distress, while the intervention's preliminary quantitative results demonstrated measurable reductions in stress and cortisol levels coupled with increases in psychological self-efficacy. These outcomes align with a substantial body of research demonstrating the effectiveness of mindfulness-based approaches for cancer patients and individuals experiencing chronic stress.

The significant reduction in stress levels following the intervention parallels findings from previous studies indicating that mindfulness practices can effectively regulate emotional arousal, reduce worry, and decrease physiological stress responses (3, 4, 11). Women with breast cancer frequently report chronic psychological strain characterized by fear of recurrence, intrusive thoughts, and loss of perceived control, all of which contribute to heightened emotional vulnerability (13, 23). The results of this study suggest that focusing attention on present-moment awareness, emotional regulation, and acceptance may be instrumental in alleviating these core sources of distress. The observed reduction in stress levels closely reflects the improvements reported in mindfulness-based stress reduction interventions among women with breast cancer and chronic illness populations (5, 12, 31).

The notable decrease in cortisol levels further supports the neurobiological benefits of mindfulness training. Cortisol is a key biomarker of stress reactivity, and elevated cortisol in women with breast cancer has been linked to more severe psychological symptoms, greater emotional instability, and impaired immune function (1, 18). The decline in cortisol levels observed in the preliminary implementation is highly consistent with previous evidence showing that mindfulness can influence the hypothalamic–pituitary–

adrenal (HPA) axis and reduce physiological stress markers (17, 30). These findings support the interaction between psychological and biological domains of well-being, demonstrating how emotional regulation techniques can lead to measurable changes in stress-related physiology.

The improvement in psychological self-efficacy reported by participants represents another critical outcome. Self-efficacy plays a central role in shaping how patients perceive their ability to cope with illness, manage symptoms, make treatment decisions, and persist through emotionally challenging experiences. Increased self-efficacy is linked to better treatment adherence, lowered fear responses, and more adaptive coping strategies across chronic illness populations (14, 16, 33). In women with breast cancer, this construct is particularly important because psychological resilience, as well as a sense of mastery over thoughts and emotions, predicts better mental health and improved quality of life (13, 15). The psychological coping package in the present study—which emphasized emotional awareness, acceptance, communication skills, and mindful engagement—appears to have strengthened participants' perceived capacity to handle cancer-related challenges, echoing earlier findings that mindfulness-based programs can enhance confidence in emotional regulation and adaptive coping (26, 28, 32).

The qualitative findings revealed that participants initially struggled with a wide range of emotional and psychological burdens, including anxiety, intrusive thoughts, fear of death, depressive symptoms, and disrupted communication in relationships. These themes mirror the psychological challenges documented among breast cancer survivors in other contexts, where uncertainty, stigma, and emotional instability frequently exacerbate stress levels (8, 20, 21). As in prior qualitative studies, patients' narratives pointed to the compounding effects of family conflict, financial pressure, lack of social support, and cultural beliefs surrounding cancer on their emotional adjustment (19, 22, 27). These contextual burdens reinforce the necessity of interventions that do not merely teach coping skills but are sensitive to social and economic realities that shape psychological well-being.

Importantly, mindfulness practices appeared to reduce avoidance, emotional withdrawal, and catastrophic thinking in participants—maladaptive coping tendencies commonly identified in cancer populations (9, 11, 25). Enhancing adaptive coping strategies such as acceptance, positive reframing, and present-focused attention aligns closely with research showing that individuals who cultivate mindfulness exhibit higher levels of resilience, lower rumination, and greater psychological flexibility (5, 6, 13). The study's findings support the idea that mindfulness-based coping skills may reduce emotional reactivity by improving attentional control and decreasing the frequency of negative automatic thoughts, thereby reducing stress and improving daily functioning.

The intervention also appeared to strengthen interpersonal functioning among participants. Social support plays a vital role in recovery, emotional stability, and treatment engagement among women with breast cancer, and mindfulness-based programs have been shown to facilitate relationship repair and more effective communication by fostering emotional clarity and non-reactivity (16, 24, 32). Many participants reported improved communication with family members, reduced interpersonal conflict, and increased ability to express needs—representing meaningful psychosocial gains. These improvements are consistent with findings that mindfulness enhances empathy, decreases interpersonal avoidance, and strengthens relational resilience (3, 30).

Physically, participants' reports of improved sleep quality, reduced bodily tension, and decreased psychosomatic symptoms complement extensive literature showing that mindfulness can attenuate pain, improve sleep, and mitigate somatic manifestations of stress (12, 13, 18). Women with breast cancer frequently experience fatigue, insomnia, and chronic pain, and these symptoms are often exacerbated by emotional distress. The reduction of these symptoms in the present study parallels other interventions that integrate body awareness techniques, mindful breathing, and somatic tracking (9, 31). These improvements may reflect reduced sympathetic arousal and increased parasympathetic activation—mechanisms through which mindfulness is believed to influence physical well-being.

Furthermore, the prominence of contextual and structural barriers highlighted in this study—including financial strain, limited access to psychological services, cultural stigma, and lack of supportive communication—resonates strongly with earlier work documenting how non-psychological burdens exacerbate emotional suffering in cancer patients (19-21). Addressing these issues is essential for promoting equitable psychological care. In line with previous findings, the facilitators identified in this study—family support, supportive peer groups, accessible psychoeducational resources, and continued counseling—predict better emotional outcomes and greater treatment engagement (16, 17, 24).

Overall, the study's results reinforce the view that mindfulness is not only an intervention for reducing stress but a comprehensive coping framework that enhances emotional adaptability, strengthens physiological stability, and fosters meaningful improvements in perceived self-efficacy. The findings are consistent with global evidence recognizing MBIs as effective, low-risk, and scalable interventions for individuals coping with cancer (3, 4, 13). The positive preliminary outcomes of this intervention underscore the potential value of integrating structured mindfulness-based coping programs into oncology care, particularly in settings where psychological resources are limited or unevenly distributed.

This study had several limitations. First, the preliminary implementation of the intervention involved a very small sample size, limiting the generalizability of the quantitative findings. Second, the study relied on self-report measures for psychological variables, which may be influenced by individual biases or momentary emotional fluctuations. Third, the cultural context in which the intervention was developed may limit its applicability to populations with different backgrounds, beliefs, or healthcare systems. Fourth, the absence of a randomized control group in the preliminary phase prevents strong causal inferences regarding the effectiveness of the intervention. Fifth, the follow-up period was short, making it difficult to determine whether the observed improvements would be sustained over time.

Future studies should include larger sample sizes and adopt randomized controlled trial designs to strengthen the validity of findings. Longitudinal research is needed to examine the long-term sustainability of improvements in stress, cortisol levels, and self-efficacy. Future work should also explore the integration of digital or technology-assisted mindfulness tools to enhance accessibility. Additionally, comparative studies between mindfulness-based programs and other psychological interventions could elucidate which components are most effective for different patient populations. Researchers should also investigate how cultural, socioeconomic, and familial factors influence both the feasibility and effectiveness of mindfulness-based interventions in diverse communities.

Healthcare providers should consider implementing structured mindfulness-based coping programs as part of integrative oncology care. Psychoeducational sessions can be incorporated into treatment pathways

to normalize emotional challenges and provide patients with practical coping tools. Hospitals and cancer treatment centers may benefit from offering group-based or digital mindfulness sessions to improve accessibility. Clinicians should tailor interventions to cultural and individual needs while encouraging family involvement to strengthen social support. Finally, regular monitoring of psychological well-being and stress biomarkers can help practitioners personalize intervention strategies and optimize patient outcomes.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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