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Comparison of Bioenergy Economy-based Health Improvement, Cognitive Behavioral Hypnotherapy, and Cognitive Behavioral Therapy on Emotional Capital in Women with Non-Metastatic Breast Cancer

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ABSTRACT

Objective: This randomized controlled trial compared the effects of bioenergy economy-based health improvement (BEHI), cognitive behavioral hypnotherapy (CBH), and cognitive behavioral therapy (CBT) on emotional capital in women with non-metastatic breast cancer.

Methods and Materials: Eighty women aged 20–45 years with a recent diagnosis of non-metastatic breast cancer were recruited in Isfahan, Iran, and randomly allocated to BEHI, CBH, CBT, or a no-treatment control group (n=20 each). Interventions followed standardized protocols (8 weekly sessions for BEHI; 10 for CBH and CBT). Emotional capital (positive affect, energy, happiness) was measured using the Emotional Capital Questionnaire at baseline, post-intervention, and 2-month follow-up. Data from 72 completers were analyzed using mixed-design ANOVA with Bonferroni-corrected post-hoc tests.

Findings: A mixed-design ANOVA revealed a significant time × group interaction effect (p = .017, ηp^2 = 0.117), indicating that emotional capital scores changed differently across groups over time. Bonferroni post-hoc comparisons showed that the BEHI group had significantly greater emotional capital scores than the CBH group at both post-test (p = .001) and follow-up (p = .003). Furthermore, at follow-up, the BEHI group also showed significantly higher scores compared to the CBT (p = .028) and control (p = .001) groups.

Conclusion: BEHI appears more effective than CBH and CBT in enhancing and maintaining emotional capital among women with non-metastatic breast cancer. By simultaneously targeting bodily, narrative, relational, and intentional "economies," BEHI may offer a promising integrative option for psycho-oncological care. Replication with larger samples, active control conditions, and longer follow-up is needed to clarify mechanisms and optimize implementation.

Keywords: Emotional capital, bioenergy economy, health, hypnotherapy, cognitive behavioral therapy, breast cancer.

Introduction

Cancer represents a substantial global health challenge (Bizuayehu et al., 2024). The hallmark of cancer is the uncontrolled growth and spread of abnormal cells, which can result in tumor development and pose a serious threat to individual health (Nenclares & Harrington, 2020). Among women, breast cancer is the most frequently diagnosed cancer and a major contributor to cancer-related deaths worldwide (Jassim et al., 2023). The psychological consequences of breast cancer are substantial, encompassing concerns regarding treatment effectiveness, financial burdens, alterations in body image, and changes in sexual desire. These factors contribute to the development of psychiatric disorders, including depression and anxiety, in a significant proportion (up to 70%) of affected women (Breidenbach et al., 2022). This psychological distress can lead to significant discomfort and functional impairment in approximately one-third of breast cancer patients (Park et al., 2024; Tao et al., 2024).

Given the prevalence and impact of such psychological distress, identifying and enhancing protective emotional resources has become an essential focus in psycho-oncological research. The effective management of emotional experiences through the development of emotional capacities is essential for enhancing patient's quality of life (Gil-Olarte et al., 2022). Among these emotional resources, emotional capital has gained increasing attention for its multidimensional role in psychological adjustment. Emotional capital is a multidimensional psychological resource that encompasses the ability to experience, manage, and sustain positive emotional states, contributing to well-being, adaptive functioning, and social engagement (Golparvar, 2016). These components can be translated into positive cognitive, behavioral, and emotional resources, enabling individuals to restore their social functioning through purposeful activities (Masihi et al., 2019). Positive affect encompasses emotions such as joy and contentment and is linked to factors such as adequate sleep, satisfying social relationships, and the pursuit of meaningful goals (Davoudi-Monfared et al., 2023). Energy, as conceptualized by (Quinn & Dutton, 2005), refers to a form of positive emotional arousal experienced in response to specific events or as part of enduring emotional states (Golparvar, 2016). Finally, happiness is defined as a general sense of satisfaction with life and the relative absence of negative affect (WARR, 2009). These dimensions collectively shape an individual's emotional capital, which can be cultivated to improve psychological resilience and overall quality of life, particularly in the context of chronic illness such as breast cancer (Zhao et al., 2024). Interventions designed to enhance positive affect through improved emotion regulation have also demonstrated efficacy in reducing anxiety and promoting overall well-being among cancer survivors. (Salsman et al., 2023).

Several psychological interventions have been developed to enhance these emotional resources, with cognitive behavioral therapy (CBT) being one of the most widely studied and empirically supported. CBT is a well-established intervention comprising three core components: coping skills training, problem-solving techniques, and cognitive restructuring (Dobson & Dozois, 2021). Focusing on the interplay between cognition and behavior, CBT employs various techniques within these components. Cognitive restructuring aims to modify maladaptive thought patterns, while coping skills training enhances patients' ability to manage stressful situations. Problem-solving therapy integrates elements of both cognitive restructuring and coping skills training. CBT has been shown to improve psychosocial adjustment in breast cancer patients by promoting cognitive and emotional flexibility (Mazloom et al., 2023).

In addition to CBT, integrative approaches such as cognitive behavioral hypnotherapy (CBH) have also gained attention for their potential to alleviate emotional distress and strengthen psychological resilience in cancer patients. Recognizing the importance of addressing patient distress and emotional well-being (Cornelis et al., 2020), integrative medicine has endorsed hypnotherapy, particularly CBH (Enitan et al., 2023). CBH can facilitate the development of coping mechanisms for managing stress, anxiety, and emotional distress (Grégoire et al., 2023; 2021). Furthermore, hypnosis has been associated with increased self-esteem, enhanced resilience, and improved overall emotional well-being (Redemptus & Roga, 2023). Combining hypnosis with cognitive techniques can further enhance emotional intelligence, communication skills, and conflict resolution strategies (Grégoire et al., 2022).

Beyond conventional psychological therapies, emerging integrative models such as Bioenergy Economy-Based Health Improvement (BEHI) offer a novel perspective on health by addressing both cognitive and non-cognitive dimensions of human functioning. Bioenergy Economy approach, which is commonly called Bioenergy Economy-Based Health Improvement (BEHI) in the literature, incorporates a biosemiotic perspective on health by combining elements of psychodynamics, behavioral economics, and transpersonal psychology. For consistency, BEHI will be used throughout this manuscript in place of the BEE approach. BEHI improves biosemiotics by refining meaning-making systems that range from the molecular to the interpersonal level (Goli, 2025). These systems function across both cognitive and non-cognitive domains (Hayles, 2019). BEHI views the body, mind, society, and culture as interconnected, multiversal systems of meaning-making, offering an evolutionary approach to health and well-being (Goli, 2025).

BEHI redefines pleasure, power, and meaning as interconnected attractors that aim to reduce prediction errors and optimize energy investment. The economic models within BEHI help regulate energy flow, stabilize the reward system, and balance dopaminergic functions, which may improve emotional capital by enhancing the body's pleasure system (Friston, 2010). The BEHI focuses on integrity of energy investments in four fields: body economy, narrative economy, relational economy, and intention economy. Each of these areas contributes to a person's ability to face complex life challenges and maintain well-being. The body economy is based on the brain's ability to forecast internal bodily states by combining sensory input with prior beliefs, showing a core mechanism of cognition and emotion (Seth, 2013). The key economics in this area include muscle economy, tensegrity, interoceptive homogeneity, and a shift in attention from external objects toward the body. A moderate level of internal attention may help enhance emotional capacity (Li et al., 2024). The BEHI model emphasizes the concept of a nondual narrative. This narrative refers to the alignment and integration of bodily and symbolic processes of meaning-making, and includes the experience of pleasure through caring for others and developing spiritual connections (Goli, 2016). Several studies have supported the positive effect of communication ability on happiness (Caraballo-Arias et al., 2024; Torres-Reynoso et al., 2025). In the relational economy, individuals explore their relational body through the nonduality of self and others, as well as through full-body experience in communicative interactions (Goli, 2016). The fourth area, the intention economy, defines intention as a mental assignment that helps individuals make sense of their inner world. Each intention is related to a specific bodily state, which can either motivate or inhibit a person's action toward a focused object. To improve emotional capital, it is important to direct attention toward more positive experiences (Golparvar, 2016).

The therapeutic components of BEHI, such as relaxation techniques (Sundharamoorthi et al., 2023) and body-bioenergy psychotherapy Walter (1977), have been shown to improve well-being in cancer patients (Farzanegan et al., 2022). BEHI is designed to support sustainable happiness, which is considered an important part of emotional capital, by helping individuals manage and optimize their energy use (Goli, 2016). In addition, research by Pirzadeh & Abotalebi (2023) has confirmed the effectiveness of BEHI in increasing overall happiness.

While each of these approaches contributes uniquely to psychological well-being, their specific impact on emotional capital remains underexplored. Despite the established benefits of BEHI, cognitive behavioral therapy, and cognitive hypnotherapy for other aspects of well-being in cancer patients, a significant gap exists in the literature regarding their effects on emotional capital in women with non-metastatic breast cancer. This study addresses this gap by comparing the effectiveness of these three interventions on emotional capital in this specific population.

Methods and Materials

Study Design and Participants

This randomized controlled trial (RCT) was conducted between June and October 2024 to evaluate the effects of cognitive behavioral therapy (CBT), cognitive behavioral hypnotherapy (CBH), and bioenergy economy-based health improvement (BEHI) approach on emotional capital in breast cancer patients. Eighty participants residing in Esfahan, Iran (participant demographics are presented in Table 1), were recruited through the Iranian Health Control Institute. The center's physician reviewed medical records and determined the

eligibility of enrolled patients according to the following inclusion criteria: (1) age between 20 and 45 years; (2) diagnosis within the past one to six months; (3) absence of acute or chronic psychological disorders; and (4) completion of -senior high school. Exclusion criteria included: (1) withdrawal from the study; (2) concurrent psychological or psychiatric treatment; (3) disease recurrence requiring hospitalization; and (4) absence from more than three sessions.

Sample Size and Participant Flow

After providing informed consent, participants randomly entered one of four groups: CBT, CBH, BEHI, or control. The study initially aimed to recruit 80 individuals (20 per group), based on methodological recommendations for semi-experimental designs and to account for possible attrition during the intervention process (Delavar, 2007). During the study, eight participants were excluded from analysis, primarily due to voluntary withdrawal or missing more than three sessions. Therefore, only participants who completed the full intervention protocol were included in the final analysis (n=72).

Randomization and Blinding

Participants were randomly assigned to groups using a simple random number table by an independent researcher who was not involved in the intervention or outcome assessment, ensuring allocation concealment. To reduce performance bias associated with therapist variability, a single trained therapist, who were proficient in all three therapeutic modalities, delivered the interventions according to standardized protocols. Additionally, the study followed a single-blind design, where participants were unaware of the theoretical background and nature of the assigned intervention until the first session. Emotional capital was measured using the Emotional Capital Questionnaire (ECQ) at three time points: baseline, immediately after the intervention (following ten weekly sessions for CBT and CBH, and eight sessions for BEHI), and again at a two-month follow-up.

Data Collection Tools

Emotional capital was assessed using the Emotional Capital Questionnaire (Golparvar, 2016), a 20-item instrument comprising three subscales: positive emotion (10 items), energy (5 items), and happiness (5 items). Items are rated on a five-point Likert scale ranging from 1 (never) to 5 (always). In this study, emotional capital scores were calculated as raw total scores by summing the responses to all 20 items (each rated 1 to 5), yielding a possible score range of 20 to 100. This approach was used to enhance interpretability and to capture greater variability across participants and groups. The ECQ's face and content validity has been established (Golparvar & Zareiy, 2018). Construct validity has been supported by exploratory factor analysis, and internal consistency (Cronbach's alpha) has been reported between 0.8 and 0.96 (Masihi et al., 2019).

Interventions

CBT Group: The cognitive behavioral therapy (CBT) intervention was adapted from a protocol developed by Moorey & Greer, (2011) for cancer patients (Moorey & Greer, 2011), which has demonstrated efficacy in reducing depression and anxiety among cancer survivors, as well as mitigating psychological symptoms in breast cancer patients (Akkol-Solakoglu & Hevey, 2025; Kinjo et al., 2021). Each 90-minute CBT session followed a structured format, incorporating: (1) review of previous assignments; (2) application of tailored cognitive-behavioral techniques, including reality testing, alternative belief search, task ranking, behavioral technique training, emotion acceptance and facilitation of emotional expression, and training in "breathing space" and reassignment with the goal of experiencing feelings of happiness; and (3) introduction of new assignments.

CBH Group: The cognitive behavioral hypnotherapy (CBH) intervention employed hypnotic induction and deepening techniques, followed by therapeutic suggestions tailored for individuals with cancer. These suggestions were developed through the integration of principles and techniques from several sources, including Hammond, (2010) work on hypnotic induction and suggestion, Téllez et al., (2020) clinical approach to hypnosis in cancer care, and Silvester, (2010) framework for cognitive hypnotherapy. Each 90-minute CBH session followed a structured format, comprising: (1) review of previous assignments and inter-session experiences; (2) application of specific cognitive behavioral hypnotherapy techniques, including externalization of negative emotions, the ideal ego technique, minimizing the perceived impact of the disease, sensory change techniques to evoke pleasant emotions, ego strengthening through autosuggestion and visualization of positive emotions with post-hypnotic suggestions to

enhance positive affect, ego strengthening to facilitate pursuit of personal goals, and modifying self-perception in the context of illness with post-hypnotic suggestions; and (3) introduction of new assignments.

BEHI Group: The BEHI intervention employed in this study was developed from a protocol registered at the American University of Energy Medicine (Bizuayehu et al.). Comprehensive details of this protocol are available in the book "Behi Program: Lectures on Bioenergy Economics." (Goli, 2010, 2025). The efficacy of this protocol for enhancing well-being in breast cancer patients has been demonstrated by (Farzanegan et al., 2022). Each BEHI session followed a structured format, comprising: (1) review of previously assigned tasks; (2) application of specific BEHI techniques, including muscle economy, body-emotion-thought cycle exercises, vibration exercises, addressing energy blockages and non-economic empowerment, internal and external guidance of attention exercises, attention economy techniques, exploring the importance of body integrity and safety in narratives, enhancing body awareness, and forgiveness practice; and (3) a session summary, including the assignment of new homework.

The number of sessions varied across interventions in accordance with the original standardized protocols. Specifically, the CBT and CBH programs each consisted of 10 weekly sessions, while the BEHI program included 8 weekly sessions. No modifications were made to the content, structure, or duration of these protocols. All interventions were delivered by the same trained psychologist, who was proficient in all three approaches and adhered strictly to the original protocols. Therapist adherence was monitored throughout the intervention period under the supervision of the study supervisor. After each session, the therapist documented session content based on protocol structure, and regular supervisory meetings ensured consistency and fidelity across all three approaches.

Ethics

The study was ethically approved by the Ethics Committee of Khorasgan Branch of Azad University (Reference number: *IR.IAU.KHUISF.REC.1403.100, Date: 25-05-2024*) and the trial was registered with the Iranian Registry of Clinical Trials (IRCT) under *IRCT20250410065275N1*. The whole procedure was performed in accordance with the Declaration of Helsinki and its later amendments. Prior to enrollment, written informed consent was obtained from all eligible patients.

Analysis

Data were analyzed using SPSS (version 26). Continuous variables were reported as mean ± standard deviation (SD), while categorical variables were presented as frequency (percentage). Normality was assessed with the Shapiro-Wilk test. Between-group differences in age were examined using one-way ANOVA, while Chi-square tests were used to evaluate differences in education and marital status across the four study groups (BEHI, CBH, CBT, and control).

To assess changes in emotional capital over time and between groups, a mixed-design ANOVA was conducted with one between-subjects factor (group) and one within-subjects factor (time: pre-test, post-test, follow-up). Assumptions for the analysis were checked prior to interpretation. The Shapiro–Wilk test was used to evaluate normality of emotional capital scores at each time point, and Levene's test assessed the homogeneity of variances across groups. Box's M test examined the equality of covariance matrices, and Mauchly's test was conducted to assess the assumption of sphericity. In cases where sphericity was violated, the Greenhouse–Geisser correction was applied. While this correction reduces degrees of freedom and statistical power, it was used to ensure valid inference under assumption violations. Statistical significance was set at $p < .05$ for all analyses.

Where significant main or interaction effects were observed, post hoc pairwise comparisons were performed using the Bonferroni correction to control for Type I error. Despite its conservative nature, this correction was selected due to its wide acceptance and interpretability in psychological and clinical research. Effect sizes were calculated using partial eta squared (ηp^2) for all main and interaction effects. Interpretation followed Cohen's conventional guidelines: small (≈ .01), medium (≈ .06), and large (≥ .14). Effect size magnitudes are reported alongside p-values to aid in the interpretation of practical significance.

Findings and Results

The study included 72 eligible patients, randomly assigned to four groups: BEHI (n=17), CBH (n=17), CBT (n=18), and a control group (n=20). Demographic data

for these participants, including age, education (Diploma or higher), and marital status, are presented in Table 1. The mean age of BEHI, CBH, CBT, and control group was 40.12± 5.09, 39.61± 3.63, 39.76± 5.76, and 41.4± 3.25 years, respectively. No statistically significant differences were observed in age, education, and marital status among the groups.

Table 1

Demographic data of participants. Data are presented as mean ± SD or frequency (percentage)

Characteristics	BEHI group	CBH group	CBT group	Control group	*p*-value
Age (years)	40.12± 5.09	39.61± 3.63	39.76± 5.76	41.4± 3.25	0.599
Education					
Diploma	9 (52.9%)	9 (52.9%)	7 (38.9%)	11 (55%)	0.056
Higher degree	8 (47.1%)	8 (47.1%)	11 (61.1%)	9 (45%)	
Material status					
Single	4 (23.5%)	5 (29.4%)	8 (44.5%)	5 (25%)	
Married	8 (47.1%)	5 (29.4%)	6 (33.3%)	6 (30%)	0.390
Divorced	2 (11.8%)	2 (11.8%)	4 (22.2%)	4 (20%)	
Unknown	3 (17.6%)	5 (29.4%)	0	5 (25%)	

The emotional capital scores of participants at each time point were shown in Table 2. To investigate the effects of treatment group and time on emotional capital scores, a mixed-design ANOVA was done, with results represented in Table 2. A summary of statistical tests performed to check underlying assumptions of a mixed-design ANOVA was reported in Table 3. These results revealed that the assumptions of normality, homogeneity of variances, and homogeneity of covariance matrices were met. However, the assumption of sphericity was violated, so we applied the Greenhouse-Geisser correction to adjust our results.

Table 2

Emotional capital scores (presented as Mean ± SD) for BEHI, CBH, CBT, and Control Groups at pre-test, post-test, and follow-up, and results of mixed-design ANOVA.

Group	Time point	Emotional capital score
BEHI	pre-test	58.82± 13.34
	post-test	65.70± 13.88
	Follow-up	63.11± 11.63
CBH	pre-test	49.58± 10.18
	post-test	54.52± 8.67
	Follow-up	52.17± 7.29
CBT	pre-test	53.55± 13.11
	post-test	57.77± 10.88
	Follow-up	56.44± 10.44
Control	pre-test	54.85± 7.63
	post-test	53.55± 7.72
	Follow-up	53.15± 7.76
Mixed-design ANOVA results		
Time (Main Effect)	*$F(1.51, 109.51) = 11.61$, $p < .0001$, $\eta p^2 = .146$ (95% 1.23: to 17.65)*	
Time × Group (Interaction)	*$F(4.54, 109.51) = 3.00$, $p = .017$, $\eta p^2 = .117$ (95% 2.86: to 14.45)*	
Group (Main Effect)	*$F(3, 68) = 3.78$, $p = .014$*	

Note: *Values represent raw total scores on the Emotional Capital Questionnaire (ECQ), with a possible range of 20 to 100.*
BEHI: *Bioenergy Economy-based Health Improvement;* ***CBH:*** *cognitive behavioral hypnotherapy;* ***CBT:*** *cognitive behavioral therapy*
Note: *See* ***Table 3*** *for assumption testing results and* ***Table 4*** *for Bonferroni post-hoc comparisons.*

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Table 3

Assumption testing results for mixed-design ANOVA.

Assumption (test used)	*p*-value
Normality (Shapiro-Wilks)	
Pre-test	.407
Post-test	.464
Follow-up	.509
Homogeneity of variances (Levene's)	
Pre-test	.052
Post-test	.465
Follow-up	.245
Homogeneity of covariance matrices (Box's M)	.459
Sphericity (Mauchly's)	<.0001 (Greenhouse-Geisser correction applied)

The mixed-design ANOVA analysis revealed a significant main effect of time on emotional capital scores, F (1.51, 109.51) =11.61, p<.0001, $\eta p2$=.146 (95% 1.23 to 17.65), indicating a large effect. Emotional capital scores changed significantly over time across all participants. Time accounted for 14.6% of the variance in emotional capital (power = 97.7%). Furthermore, a significant interaction effect between time and treatment group was observed, F (4.54, 109.51) =3.00, p=.017, $\eta p2$=.117 (95% 2.86: to 14.45), indicating a moderate-to-large effect. This interaction accounted for 11.7% of the variance in emotional capital scores ($\eta p2$=.117, power = 82.0%). This indicated the change in emotional capital scores over time significantly differed across the four treatment groups. Finally, there were significant differences in emotional capital scores among the four treatment groups (F(3, 68)= 3.78, p=.014).

Bonferroni post-hoc pairwise comparisons were performed to further examine the significant interaction effects, with results summarized in Table 4. Following the interventions, a significant difference was found between BEHI and CBH (MD = -10.94, SE = 3.22, p = .001). No other comparisons were statistically significant at the post-test. At the follow-up assessment, the emotional capital score of BEHI group were significantly higher than those in the CBH (MD = -11.76, SE = 3.58, p = .003), CBT (MD = 7.92, SE = 2.53, p = .028), and control groups (MD = 12.15, SE = 3.44, p = .001). Given that higher scores indicate better emotional capital, these results indicated that BEHI had a more sustained positive effect over time compared to the other interventions.

Table 4

Results of the Bonferroni post-hoc test

Time point	Pairwise comparison	Mean differences	Standard error	95 % CI	*p*-value
Pre-test	BEHI vs. CBH	9.23	3.91	1.41 to 17.04	.021
	BEHI vs. CBT	5.26	3.86	-2.43 to 12.97	.177
	BEHI vs. Control	3.97	3.76	-3.45 to11.48	.295
	CBH vs. CBT	-3.96	3.86	-11.76 to 3.73	.308
	CBH vs. Control	-5.26	3.76	-12.77 to2.25	.167
	CBT vs. Control	-1.29	3.70	-8.69 t0 6.10	.728
Post-test	BEHI vs. CBH	11.17	3.58	4.20 to 18.33	.003
	BEHI vs. CBT	7.92	3.53	0.872 to 14.98	.028
	BEHI vs. Control	12.15	3.44	5.27 to 19.39	.001
	CBH vs. CBT	-3.24	3.53	18.33 to -4.20	.003
	CBH vs. Control	-0.979	3.44	-5.90 to 7.86	.777
	CBT vs. Control	4.22	3.39	-2.55 to 11.00	.218
Follow-up	BEHI vs. CBH	10.94	3.22	5.50 to 17.37	.001
	BEHI vs. CBT	6.73	3.17	.331 to 13.01	.039
	BEHI vs. Control	9.96	3.10	3.78 to 16.15	.002
	CBH vs. CBT	-4.26	3.17	-10.16 to 2.07	.184
	CBH vs. Control	-.974	3.10	-7.16 to 5.21	.754
	CBT vs. Control	3.29	3.05	-2.79 to 9.38	.284

BEHI: Bioenergy Economy-based Health Improvement; **CBH:** cognitive behavioral hypnotherapy; **CBT:** cognitive behavioral therapy 95% CI: 95% confidence interval

Discussion and Conclusion

To our knowledge, this study represents the first investigation of the isolated effects of cognitive behavioral therapy (CBT) on emotional capital. This lack of prior research precludes direct comparison and highlights the novelty of our findings. While (Golparvar & Zareiy, 2018) explored the impact of a combined acceptance and commitment therapy (ACT)-CBT intervention on emotional capital, their results differ from those observed in the present study (Golparvar, 2016). This discrepancy likely stems from the inclusion of ACT, suggesting that the combined approach influences emotional capital differently than CBT alone., as defined by (Golparvar, 2016), Emotional capital is a multifaceted construct encompassing positive affect, feelings of energy, and happiness, representing an individual's emotional resources for coping with challenges, fostering relationships, and achieving goals. Women with breast cancer frequently experience significant detriments to their emotional capital due to disease- and treatment-related challenges. The numerous physical side effects associated with breast cancer treatment, including fatigue, nausea, pain, numbness, hot flashes, sleep disturbances, digestive issues, cognitive impairment, and sexual dysfunction, negatively impact the quality of life, personal relationships, and goal pursuit, consequently affecting emotional capital. Our findings suggest that while CBT may offer some benefits, enhancing emotional capital in this population likely requires a more holistic approach. Given the significant impact of physical symptoms and related stressors, interventions addressing social, financial, and physical needs, in addition to psychological interventions like CBT, may be necessary to achieve substantial improvements in emotional capital (Keane et al., 2023; Sebri et al., 2022; Zyzniewska-Banaszak et al., 2021). Furthermore, while emotional capital has cognitive and behavioral components, it is not solely a cognitive-behavioral construct (Golparvar & Zareiy, 2018). This suggests that relying solely on cognitive-behavioral interventions may not be sufficient for optimizing emotional capital in this population

In the present study, the cognitive hypnotherapy intervention incorporated ego-strengthening autosuggestion, positive emotion imagery, and posthypnotic suggestions to enhance positive emotions. However, these suggestions were delivered in only three of ten treatment sessions. This limited exposure, without spaced repetition or reinforcement across multiple sessions, may have contributed to the observed lack of significant improvement in emotional capital within this group. Furthermore, the physical challenges associated with breast cancer and its treatment pose additional complexities. Some hypnotic suggestions may have conflicted with patients' lived experiences of treatment side effects, potentially diminishing the intervention's effectiveness. This highlights the importance of carefully tailoring hypnotic suggestions to address the specific physical and emotional context of individuals undergoing cancer treatment (Çınaroğlu & Çınar, 2024). Finally, pre-existing patient expectations regarding hypnosis may have influenced treatment outcomes. Given the context of cancer and potential limitations in perceived recovery and life expectancy, the changes resulting from the intervention may not have aligned with patients' expectations, leading to a sense of dissatisfaction. This underscores the importance of managing patient expectations prior to and during hypnotherapy interventions, particularly in the context of serious illness (Gardner et al., 2024). Future research should explore the optimal dosage and delivery of cognitive hypnotherapy for enhancing emotional capital, while also considering the impact of patient expectations and the interaction between hypnotic suggestions and physical symptoms.

BEHI focuses on cultivating awareness and interpretation of bodily sensations. Through this process, individuals learn to identify, value, and interpret their physical states, using metaphors and constructing a chronological narrative of their experiences. This process contributes to self-construction, with greater coherence from more harmonious body rhythms and meaningful connections between life events (Goli, 2016). To encourage a state of intrinsic well-being and deeply integrated understanding, BEHI centers on how energy and information are handled within the realms of bodily

experience, personal narratives, relational dynamics, and intentional focus (Goli, 2025). In this model, the will-to-power is understood as a means of accessing and optimizing energy information resources, which helps alleviate psychological tension, reduce uncertainty, and enhance the potential for pleasure (Goli, 2025). In the present study, the combination of mental and physical exercises within the bioenergy economy care framework, coupled with patients' expectations of receiving physical support for a physically based illness (cancer), appears to have contributed to its observed effectiveness (Bailey & Morris, 2024; Sebri et al., 2024). BEHI reconceptualizes pleasure, power, and meaning as interconnected forces that aim to reduce prediction errors, optimize energy investment, and regulate dopaminergic functions. Pleasure, as a component of emotion, can be viewed as the outcome of reducing prediction errors within the brain's reward circuitry (Maurer, 2021).

In the BEHI model, the body economy allows the individual to connect with present values and internal resources. Redirecting attention away from this connection may reduce the perception of happiness. Maintaining a nonjudgmental attitude, which is promoted through the narrative economy, helps synchronize and integrate thoughts and emotions, which can support the development of positive attitudes and emotional states. When individuals experience their emotions within a new, supportive context—through expanded bodily awareness—they may find opportunities to heal from past traumas and manage dysfunctional relational patterns, which can contribute to greater emotional capital. Practicing acceptance, as emphasized in the intention economy, can also lead to increased positive emotions and happiness.

Future research should investigate the specific mechanisms through which bioenergy economy-based health improvement (BEHI) impacts cancer-related fatigue and explore its potential synergistic effects with other interventions. Further studies with larger sample sizes and control groups are needed to confirm these preliminary findings and to establish the efficacy of BEHI in this population.

Clinical implications

The findings of this study underscore the importance of integrating mental health support into routine breast cancer care. Facilitating patients' return to pre-diagnosis life roles, such as work, is a critical component of comprehensive recovery. Multidisciplinary approaches that adopt a holistic perspective, addressing both psychological and physical well-being, can support this process. In this context, emotional capital, including positive affect, energy, and happiness, is a valuable psychological resource that may decline during the course of cancer treatment. In the present study, participation in the BEHI intervention was associated with improvements in emotional capital compared to other groups. However, given the relatively small sample size and the exploratory nature of the analysis, these findings should be interpreted with caution. The results may inform future research into the potential benefits of integrative, body-based therapies within oncology settings. Broader implementation of such interventions should be pursued only after replication in larger and methodologically rigorous studies.

Limitations

This study has several limitations that should be acknowledged. First, consistent with prior research, disease stage and history of mastectomy were not controlled as covariates. These clinical factors may have influenced participants' psychological states and responses to the interventions. Future studies should consider stratifying or statistically controlling for these variables to better delineate intervention effects across different subgroups within the breast cancer population. Second, although group sizes were determined based on methodological guidance for quasi-experimental studies and anticipated attrition (Delavar, 2007), no formal a priori power analysis was conducted. Future research is encouraged to perform statistical power calculations to ensure sufficient sample size and maximize the ability to detect meaningful effects.

A further limitation concerns the unequal number of sessions across intervention groups, which was based on the original structure of each therapeutic protocol. While this reflects real-world implementation rather than a design flaw, it introduces a potential confound in comparing treatment efficacy. Notably, the BEHI intervention, despite having fewer sessions, showed comparable or even superior outcomes—suggesting that therapeutic content may have had a greater impact than session frequency. From a statistical perspective, although the Greenhouse–Geisser correction was used to adjust for violations of sphericity, this approach reduces

degrees of freedom and may lower statistical power, potentially obscuring smaller but meaningful effects. Additionally, the Bonferroni correction, despite its rigor in controlling for Type I error, may have further limited the sensitivity of post hoc comparisons. To address these limitations, effect sizes were also reported and interpreted using Cohen's conventional benchmarks, allowing for a more comprehensive understanding of the findings. Moreover, the use of a per-protocol analysis rather than an intent-to-treat (Salsman et al.) approach may limit the generalizability of the results to broader clinical populations.

Finally, the control group used in this study was passive and did not receive any form of placebo or standard psychological intervention. Therefore, the observed treatment effects may partially reflect non-specific influences such as participant expectations, therapist attention, or contextual factors. Employing an active control condition in future studies would allow for a more precise estimation of the specific effects attributable to each intervention.

In conclusion, this study suggests that BEHI may offer a promising approach for enhancing emotional capital in women with non-metastatic breast cancer. The observed effect sizes indicate potential clinical relevance in fostering positive emotions and psychological resilience during a difficult phase of illness. Integrating such interventions into broader psycho-oncological care may help address emotional needs and improve overall quality of life. However, these findings should be interpreted with caution given the modest sample size, the use of a passive (non-active) control group, and the variability in session numbers across intervention arms. These limitations notwithstanding, the results highlight the importance of a holistic approach to cancer treatment, in which psychological well-being is prioritized alongside physical care. While this study focused on patients in earlier stages of disease, future research may explore the applicability of BEHI in palliative or end-of-life care settings, particularly in supporting emotional resilience and adaptive coping.

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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. Ethical considerations in this study were that participation was entirely optional.

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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Authors' Contributions

All authors equally contribute to this study.

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