

Positive Psychological Intervention to Promote Character Strengths, Well-Being, and Resilience Among Breast Cancer Patients

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Abstract

The present study evaluated the efficacy of positive psychological intervention in promoting character strengths, well-being and resilience among breast cancer patients. A purposive sample of 110 breast cancer patients aged 19-75 years participated, with 49 assigned to the experimental group and 61 to the control group. The study followed a two-group, non-randomized controlled trial design. The intervention incorporated techniques like mindfulness practices, visualization techniques, character strengths-building exercises and Yoga Nidra. The participants completed self-report measures assessing positive and negative emotions, character strengths, health locus of control, optimism, pessimism, quality of life, and resilience both before and after the intervention. ANCOVA and t-tests were carried out to analyze the data. Results indicated significant improvements in psychological well-being, positive emotions, and specific character strengths like love, kindness, and self-regulation, alongside reductions in negative emotions. However, the intervention did not significantly influence the individual's locus of control or resilience. These findings highlight the importance of targeted psychological strategies focusing on emotional well-being and empowering patients to navigate their cancer journey with greater resilience and positivity.

Keywords: Breast cancer patients, psychological well-being, resilience, character strength

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Breast cancer can impact women globally at any age following adolescence, but its occurrence increases as women get older (WHO, 2024). Globally, 2.3 million women were diagnosed with breast cancer in 2020, resulting in 685,000 deaths (WHO, 2023). Since the 1990s, early detection and comprehensive treatment programs have significantly improved survival rates (WHO, 2023). Breast cancer impacts patients' overall well-being, including physical, mental, and social factors, while also posing challenges related to treatment side effects and bodily changes. Additionally, the patients experience changes in their roles, employment, and financial situation (Campbell-Enns & Woodgate, 2015). During diagnosis and treatment, patients often experience intense negative emotions like sadness, anger, and worry, which disrupt daily activities and hinder healthy behaviors (Cerezo et al., 2020).

Surgical procedures have significantly improved survival rates (Veronesi et al., 2002). However, breast surgeries can alter women's physical form, cause scars, and affect their self-perception, leading to severe psychological impact on their body image (Shekhar et al., 2023). There is an increasing need to identify the positive factors that could alleviate the emotional turmoil experienced by women with cancer (Cerezo et al., 2022). Various interventions help women manage the physical and psychological side effects of diagnosis and treatment, offering coping strategies and support to enhance their quality of life period (Barlow et al., 2002; Cobeau & David, 2018). Positive psychological interventions (PPIs) refer to various practical activities aimed at enhancing positive resources (Duan et al., 2022). PPIs represent a form of psychosocial intervention designed to enhance positive emotions, thoughts, and behaviours by engaging in specific, meaningful activities (Seligman et al., 2005).

An individual's psychological well-being is linked to positive character traits (Peterson & Seligman, 2004). They are believed to be universally applicable and relatively consistent but can be altered through psychological treatments (Park et al., 2004). Focusing

on strengths enables individuals to concentrate on more than just avoiding distress or disorder (Seligman, 2011). Character strengths are linked to better quality of life, well-being, happiness, and overall health (Shimai et al., 2006). Hope, gratitude, zest, curiosity, and love (Park & Peterson, 2006) are powerful qualities of the heart that have been linked to higher life satisfaction (Ovejero et al., 2016) and lower levels of depression, anxiety and stress (Haridas et al., 2017).

Breast cancer patients with a stronger internal locus of control and lower levels of external locus of control report a higher quality of life (Sharif, 2017). People with an internal Health Locus of Control (HLC) believe their actions shape their health, while those with an external HLC see it as influenced by chance or doctors (Wallston, 2020). Optimistic women tend to worry less about a possible cancer diagnosis than pessimistic women (McGregor et al., 2004). Women with higher optimism scores showed better social and mental functioning on the quality of life (QoL) than those with lower optimism scores (Colby & Shifren, 2013). Though most women with breast cancer have poor QoL, it is found that a better QoL is associated with more prolonged survival of patients (Chen et al., 2018).

Mindfulness-based techniques, expressing positive emotions, spiritual interventions, hope therapy, and interventions focusing on finding meaning improved quality of life, well-being, hope, benefit finding, and optimism in breast cancer patients (Casellas-Grau et al., 2013). Positive affect can help people deal with ongoing stress and improve their mental health (Folkman & Moskowitz, 2000). It was also found that a program to enhance positive thinking skills effectively improved the well-being of women with metastatic breast cancer (Cheung et al., 2017).

Effective coping strategies help cancer patients adapt to the disease's physical and psychological effects. Healthcare providers prioritize patients' issues over their strengths and abilities (Rotegård et al., 2012). Psychological treatments reduce distress, improve quality of

life, and help extend disease-free survival while lowering recurrence and death rates in breast cancer patients (Ashton & Oney, 2024). Developing interventions to equip patients with coping skills is essential for significantly improving their quality of life (Kershaw et al., 2004). This study examines the impact of positive psychological interventions using techniques such as mindfulness, visualization, character-strength exercises, and yoga nidra on resilience and quality of life in breast cancer patients.

Method

Research design

In the present study, a two-group, non-randomized controlled trial was employed to examine the efficacy of the positive psychological intervention in promoting character strength, well-being and resilience among breast cancer patients.

Participants

This study employed purposive sampling, and one hospital from the Coimbatore district of Tamil Nadu was selected for the study. The sample included women with a diagnosis of breast cancer, aged over 18-75 years, and willing to participate in the study. Patients suffering from one or more life-threatening diseases other than the diagnosis cited above and those with psychiatric concerns were excluded from the study. The experimental group consisted of 49 breast cancer patients who consented to participate in both the psychological intervention program and the pre-and post-assessments. The control group comprised 61 breast cancer patients who consented only to the pre-and post-assessments but did not take part in the intervention program. Both groups received standard medical care. A total of 110 participants completed the pre-test survey (49 in the experimental group and 61 in the control group). However, the post-test survey was completed by only 64 participants, 37 from the experimental group and 27 from the control group.

Measures

Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). The scale has 20 items, measuring both positive and negative affect. Each subscale contains ten adjectives defining positive and negative emotions. Participants rated their feelings on a 5-point scale over the past few days, ranging from 1 (*very slightly or not at all*) to 5 (*extremely*).

Cronbach's alpha was .78 for positive affect and .75 for negative affect in this sample.

Values in Action Inventory of Strengths-Mixed (VIA-IS-M; McGrath, 2019). This study used 12 of the 24 subscales Bravery, Forgiveness, Gratitude, Hope, Kindness, Love, Perseverance, Perspective, Prudence, Self-regulation, Spirituality, and Zest, rated on a 5-point scale ranging from 1 (*very much like me*) to 5 (*very much unlike me*). The Cronbach's alpha was found to be .32, .30, .38, .34, .29, .47, .35, .38, .55, .36, .37, .39 respectively, for the 12 character strength, namely Bravery, Forgiveness, Gratitude, Hope, Kindness, Love, Perseverance, Perspective, Prudence, Self-regulation, Spirituality, and Zest on the present sample.

Multidimensional Health Locus of Control –Form C (MHLC-C; Wallston et al., 1994).

This scale is used to measure internal and external locus of control beliefs, which is applicable to various health conditions and intended for individuals with a pre-existing health/medical condition, such as breast cancer, and is crafted to be "condition-specific." It has 18 items across four subscales: internal, chance, doctors, and other people. Each subscale is rated on a 6-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*).

Cronbach's alpha was found to be .52, .75, .25, and .74, respectively, for internal dimensions, chance, doctors, and other people in the present sample.

Life Orientation Test- R (LOT-R; Scheier et al., 1994). The 10-item scale assesses optimism and pessimism, with three items each targeting optimism and pessimism and four serving as fillers. Participants evaluated each item using a 5-point scale, ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). The revised version of the original LOT, LOT-R, also

consists of 12 items, with four phrased positively, four phrased negatively, and four fillers.

The Cronbach's alpha was found to be .45 and .25, respectively, for pessimism and optimism for the present scale.

Quality of Life-Patient/ Cancer Survivor Version (Ferrell et al., 1995; 2012): The scale has 41 items that assess the Quality of Life of cancer patients, covering four areas: physical, psychological, social, and spiritual well-being. In this study, only 12 items (6 related to psychological well-being and six related to social well-being), selected through a lottery method, were used. The rating ranges from 0 (*no problem*) to 10 (*severe problem*). The Cronbach's alpha was found to be .34 and .44, respectively, for psychological well-being and social well-being for the present sample.

Bharathiar University Resilience Scale (BURS; Annalakshmi, 2009): This scale measures the resilience of an individual, i.e., an individual's ability to handle stress and withstand future negative events. The short form of the BURS scale consisting of ten items was used and scored on a five-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's alpha for the scale was found to be .41 in the present sample.

The scales were translated into vernacular language for ease of understanding.

Procedure

Approval to conduct research on cancer patients was granted by the Ethics Committee of the hospital where the study participants were recruited. Before data collection, written informed consent was secured from the patients. The participants were assured about the confidentiality and privacy of the information provided and were informed about their rights to withdraw from the study at any time. Baseline assessments of positive and negative affect, character strengths, health locus of control, optimism, pessimism, quality of life, and resilience were conducted prior to implementing the intervention program, followed by post-intervention assessments upon its completion.

Intervention

The positive psychological intervention (PPIs) in this study was delivered online to breast cancer patients, with a total of 48 sessions (6 sessions per week) spread over 8 weeks held weekly for 30 minutes daily. Participants received home assignments for the remaining day of the week, with daily prompts to complete each day's assignment. The intervention included exercises to enhance positive emotions, mindfulness, internal locus of control, and optimism while reducing negative emotions. The intervention also incorporated visualization techniques for stress reduction and taught and encouraged participants to practice Yoga Nidra. Photovoice was used in the intervention; participants were encouraged to capture or visualize positive aspects of their lives, reflecting on how they contribute to their happiness and strength.

Statistical analysis

Analysis of Covariance (ANCOVA) compared pre-test and post-test scores of breast cancer patients in experimental (EG) and control (CG) groups, while paired t-tests analyzed intervention effectiveness for variables not meeting ANCOVA assumptions.

Result

Table 1

Summary of Analyses of Covariance on Positive Affect

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1169.82	1	1169.82	14.29	0.001	0.22
Group	390.10	1	390.10	4.77	0.03	0.08
Error	4255.78	52	81.84			

ANCOVA was conducted to examine the significance of the difference between scores on the positive affect of breast cancer patients in the experimental group ($M_{adj}=34.54$) and the control group ($M_{adj}=29.17$). After adjusting for pre-test scores, there was a statistically significant difference between the scores of the patients in the experimental group and the control group on positive affect, $F(1, 52) = 4.77$, $p = 0.03$, partial $\eta^2 = 0.08$. Adjusted mean scores suggest that the intervention was effective. The EG exposed to the intervention had a higher score on the positive affect subscale of PANAS than the CG.

Table 2

Summary of Analyses of Covariance on Negative Affect

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2141.03	1	2141.03	34.98	0.001	0.40
Group	283.14	1	283.14	4.63	0.04	0.08
Error	3182.48	52	61.20			

ANCOVA was conducted to examine the significance of the difference between scores on the negative affect of breast cancer patients in the experimental group ($M_{adj}=24.09$) and the control group ($M_{adj}=28.63$). After adjusting for pre-test scores, there was a statistically significant difference between the scores of the patients in the experimental group and the control group on negative affect, $F(1,52) = 4.63$, $p=0.04$, partial $\eta^2=0.08$. Adjusted mean scores suggest that the intervention was effective. The EG that was exposed to the intervention had a lower score on the negative affect subscale of PANAS compared to the CG.

Table 3*Summary of Analyses of Covariance on Optimism*

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	113.30	1	113.30	23.67	0.001	0.31
Group	7.07	1	7.07	1.48	0.23	0.03
Error	248.92	52	4.79			

ANCOVA was conducted to examine the significance of the difference in scores on optimism among breast cancer patients belonging to the experimental group and the control group. The results showed no significant difference between the experimental and control groups on optimism ($1, 52$) = 1.48, $p = 0.23$, partial $\eta^2 = 0.03$.

Table 4*Summary of Analyses of Covariance on the Character Strength Perseverance*

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	147.26	1	147.26	19.49	0.001	0.27
Group	28.06	1	28.06	3.71	0.06	0.07
Error	392.90	52	7.56			

ANCOVA was conducted to examine the significance of the difference between scores on perseverance among breast cancer patients in the experimental and control groups. The results showed that there was no significant difference found between the experimental group and the control group on character strength perseverance, $F(1, 52) = 3.71$, $p = 0.06$, partial $\eta^2 = 0.07$.

Table 5*Summary of Analyses of Covariance on the Character Strength Zest*

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	215.93	1	215.93	25.30	0.001	0.33
Group	11.56	1	11.56	1.35	0.25	0.03
Error	443.89	52	8.54			

ANCOVA was conducted to examine the significance of the difference between scores on virtue-zest of breast cancer patients belonging to the experimental group and the control group. The results show no significant difference between the scores of the patients in EG and CG on character strength zest, $F(1, 52) = 1.35$, $p = 0.25$, partial $\eta^2 = 0.03$.

Table 6*Summary of Analyses of Covariance on the Character Strength Prudence*

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	646.98	1	646.98	52.45	0.001	0.50
Group	56.21	1	56.21	4.56	0.04	0.08
Error	641.40	52	12.34			

An ANCOVA test was conducted to examine the significance of the difference between scores on the prudence of breast cancer patients in the Experimental Group ($M_{adj}=9.39$) and Control Group ($M_{adj}=11.41$). After adjusting for pre-test scores on character strength prudence, there was a significant difference between scores of the breast cancer

patients in EG and CG on $F(1, 52) = 4.56, p=0.04$, partial $\eta^2 = 0.08$. Adjusted mean scores suggest that intervention was not effective. The EG exposed to the intervention had a lower score on prudence than the CG.

Table 7

Summary of Analyses of Covariance on the Character Strength Spirituality

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	287.87	1	287.87	19.91	0.001	0.28
Group	44.03	1	44.03	3.05	0.09	0.06
Error	751.79	52	14.46			

ANCOVA was conducted to examine the significance of the difference between scores on spirituality among breast cancer patients belonging to the experimental group and the control group due to the intervention. The results showed no significant difference between the experimental and control groups on character strength spirituality, $F(1, 52) = 3.05, p = 0.09$, partial $\eta^2 = 0.06$.

Table 8

Summary of Paired Sample t-test Showing the Differences between Pre-test and Post-test Scores among Breast Cancer Patients on Various Study Variables

	EG			CG		
	Pre-test	Post-test	t	Pre-test	Post-test	t
Variables	M(SD)	M(SD)		M(SD)	M(SD)	

Variables	EG			CG		
	Pre-test	Post-test	t	Pre-test	Post-test	t
	M(SD)	M(SD)		M(SD)	M(SD)	
<i>Life Orientation Test</i>						
<i>Pessimism</i>	5.28 (1.44)	5.62 (2.29)	-0.92 ^{ns}	4.92 (1.81)	5.88 (2.14)	-1.55 ^{ns}
<i>Quality of life</i>						
<i>Psychological wellbeing</i>	25.31 (7.51)	33.10 (13.89)	-2.99**	27.50 (8.29)	34.73 (13.68)	-2.57*
<i>Social well-being</i>	32.00 (9.36)	28.14 (11.56)	1.37 ^{ns}	32.35 (9.17)	29.54 (10.65)	1.61 ^{ns}
<i>Health Locus of Control</i>						
<i>Internal</i>	23.03 (5.36)	25.93 (7.23)	-1.90 ^{ns}	23.23 (6.00)	23.27 (6.45)	-0.02 ^{ns}
<i>Chance</i>	24.21 (5.88)	25.03 (7.55)	-0.66 ^{ns}	21.65 (7.70)	23.12 (6.49)	-0.75 ^{ns}
<i>Doctors</i>	15.31 (1.65)	15.52 (2.54)	-0.37 ^{ns}	14.48 (3.48)	12.60 (4.33)	1.41 ^{ns}

Variables	EG			CG		
	Pre-test	Post-test	t	Pre-test	Post-test	t
	M(SD)	M(SD)		M(SD)	M(SD)	
<i>Other people</i>	12.86 (3.26)	12.07 (4.53)	0.84 ^{ns}	12.23 (3.40)	12.42 (3.14)	-0.23 ^{ns}
<i>VIA-Character strength</i>						
<i>Perspective</i>	9.17 (2.36)	9.55 (3.71)	-0.47 ^{ns}	8.85 (2.82)	10.96 (3.49)	-2.74 ^{**}
<i>Bravery</i>	10.66 (3.14)	11.69 (3.36)	-1.15 ^{ns}	9.27 (3.01)	12.04 (3.29)	-3.74 ^{***}
<i>Love</i>	6.72 (1.44)	9.55 (3.87)	3.82 ^{***}	7.42 (2.12)	10.15 (3.38)	-3.26 ^{**}
<i>Kindness</i>	8.48 (2.63)	11.10 (3.87)	-2.66 ^{**}	9.62 (2.06)	9.88 (3.02)	-0.36 ^{ns}
<i>Forgiveness</i>	11.48 (2.20)	11.38 (2.58)	0.19 ^{ns}	11.12 (2.90)	12.35 (2.83)	-1.48 ^{ns}
<i>Self-regulation</i>	8.41 (2.16)	10.97 (3.62)	-3.12 ^{**}	9.46 (3.41)	10.62 (2.86)	-1.41 ^{ns}
<i>Gratitude</i>	10.28 (1.85)	11.41 (2.53)	-1.95 ^{ns}	9.42 (2.49)	11.27 (2.57)	-2.60 [*]
<i>Hope</i>	9.41	10.52	-1.37 ^{ns}	10.23	11.00	-0.96 ^{ns}

	EG			CG		
	Pre-test	Post-test	t	Pre-test	Post-test	t
Variables	M(SD)	M(SD)		M(SD)	M(SD)	
	(2.73)	(3.53)		(2.66)	(2.98)	
Resilience	34.03	36.93	-1.95 ^{ns}	36.19	35.08	0.61 ^{ns}
	(6.34)	(6.20)		(6.32)	(6.84)	

The paired sample t-test comparing the scores obtained by breast cancer patients showed no significant difference between pre-test and post-test conditions on dimension pessimism of life orientation test in the experimental and control groups.

The paired sample t-test comparing the scores obtained by breast cancer patients in the experiment group before and after the intervention showed a significant difference in the dimension psychological well-being of Quality of life [t (52) = -2.990, p = 0.006]. In the psychological well-being dimension of quality of life, the scores of patients were lower during the pre-test (M = 25.31, SD = 7.51) than in the post-test (M = 33.10, SD = 13.89). The paired sample t-test comparing the scores obtained by breast cancer patients in the control group before and after the intervention showed a significant difference in the dimension 'psychological well-being' of Quality of life [t (52) = -2.568, p = 0.017]. In the psychological well-being dimension of quality of life, the scores of patients were lower during the pre-test (M = 27.50, SD = 8.29) than in the post-test (M = 34.73, SD = 13.68). The other dimension of quality of life, social well-being, did not significantly differ between the experiment and control group.

The paired sample t-test comparing the scores obtained by breast cancer patients in the experimental and control groups showed no significant difference between the pre-test

and post-test conditions on health locus of control subscales such as internal, chance, doctors, and other people.

In the experimental group, the paired sample t-test comparing the scores obtained by breast cancer patients before and after the intervention showed a significant difference in character strengths such as love [$t(52) = -3.815, p=0.001$], kindness [$t(52) = -2.662, p=0.013$], and self-regulation [$t(52) = -3.120, p=0.004$]. For the character strength love, the scores obtained by breast cancer patients before and after the intervention were higher during the post-test ($M = 9.55, SD = 3.87$) than the pre-test ($M = 6.72, SD = 1.44$) in the experimental group. For the character strength kindness, scores of breast cancer patients were higher during the post-test ($M = 11.10, SD = 3.87$) than the pre-test ($M = 8.48, SD = 2.63$). For the character strength self-regulation, scores obtained by breast cancer patients were higher during the post-test ($M = 10.97, SD = 3.62$) than the pre-test ($M = 8.41, SD = 2.16$). Other character strengths, such as perspective, bravery, forgiveness, gratitude, and hope, did not significantly differ between the scores before and after intervention in the experimental group.

In control group, the paired sample t-test comparing the scores obtained by breast cancer patients before and after the intervention showed a significant difference in character strengths such as perspective [$t(52) = -2.736, p=0.011$], bravery [$t(52) = -3.739, p=0.001$], love [$t(52) = -3.256, p=0.003$], gratitude [$t(52) = -2.601, p=0.015$]. For the character strength perspective in the control group, the scores obtained by breast cancer patients before and after the intervention were higher during the post-test ($M = 10.96, SD = 3.49$) than the pre-test ($M = 8.85, SD = 2.82$). For the control group's character strength bravery, breast cancer patients' scores were higher during the post-test ($M = 12.04, SD = 3.29$) than the pre-test ($M = 9.27, SD = 3.01$). For the character strength love, scores obtained by breast cancer patients in the control group were higher during the post-test ($M = 10.15, SD = 3.38$) than the pre-test (M

=7.42, SD =2.12). For the character strength gratitude, scores of breast cancer patients were higher during the post-test ($M = 11.27$, $SD = 2.57$) than the pre-test ($M = 9.42$, $SD = 2.49$). For character strength hope, scores obtained by breast cancer patients were higher during the pre-test ($M = 10.23$, $SD = 2.66$) than in the post-test ($M = 11.00$, $SD = 2.98$) in the control group. Other character strengths like kindness, hope, forgiveness, and self-regulation did not show any significant differences in the scores of the control group.

The paired sample t-test comparing the scores obtained by breast cancer patients showed no significant difference between the pre-test and post-test scores on resilience in the experimental and control groups.

Discussion

The present study examined the efficacy of positive psychological interventions among breast cancer patients in improving character strength, well-being and resilience by employing mindfulness, visualization and yoga nidra exercises.

The intervention in the present study resulted in a significant increase in positive affect and a decrease in negative affect in the participants. The intervention sessions included exercises like positive reminiscence, which is thinking about a positive event from the past, reliving the positive experience, writing about an intensive positive experience, identifying everyday activities that bring pleasure, photo-voice technique, exercise on benefit finding that focuses on the positive aspects of the experience, and exercises like replacing the negative thoughts with positive thoughts. The present results are consistent with the study by Novakov et al. (2019), which also found a statistically significant increase in positive affect and a significant decrease in negative affect following the integrative psychological group intervention for women who underwent breast cancer surgery.

The findings of the study show that the interventions have an effect on the dimension 'psychological well-being' of quality of life (QoL). After the intervention, patients in the

experimental group showed significant improvement in psychological well-being.

Mindfulness practice techniques like mindful breathing, visualization for reducing stress and Yoga Nidra might have contributed to reducing stress and promoted the dimension 'psychological well-being' of quality of life. Effective coping mechanisms can reduce stress and improve overall well-being (Lazarus & Folkman, 1984). The positive psychological intervention in this study might have improved the coping mechanisms used by breast cancer patients, helping them to effectively manage the psychological stress related to cancer and aiding in improving their overall quality of life.

The intervention improved character strength love among participants in experimental group. The exercises aimed at enhancing positive affect helped to cultivate love, coupled with loving-kindness meditation practices that focused on wishing loving-kindness towards oneself and others, resulting in an enhancement of the character strength associated with love. This focus helped in promoting participants' ability to form and maintain relationships and show caring towards others.

The intervention in the present study had an effect on the character strength self-regulation. Based on the Control Theory of Self-regulation, people seek to uphold consistency and stability in their actions and thoughts (Bandura, 1986). Interventions focusing on exercises like mindful breathing practice, Yoga Nidra, replacing negative thoughts with positive thoughts, exercises on regulating strength, and visualization for stress reduction have helped in improving the character strength self-regulation in breast cancer patients in the present study. The intervention in the present study improved self-regulation by concentrating on alleviating stress and coping methods through mindful and non-evaluative awareness of the present moment. Yoga Nidra has proven to significantly lower stress levels in women receiving curative radiotherapy for cervical cancer (D'cunha et al., 2021). In the present study, Yoga Nidra potentially aided self-regulation in breast cancer

patients by fostering deep relaxation, lessening stress, and improving emotional stability via guided meditation techniques. Training in positive thinking effectively lowered perceived stress, metacognitive beliefs, and death anxiety among women with breast cancer (Barjoe et al., 2022). Relaxation and Visualization Therapy (RVT) proved effective in decreasing stress, anxiety, and depression in breast cancer patients receiving radiotherapy (Nunes et al., 2007). It is likely that the intervention motivated and helped the patients to set realistic health-related goals and track their progress, fostering a sense of accountability and empowerment.

Based on the findings of the present study, the intervention had a positive effect on character strength kindness in the experimental group. Breast cancer patients mentioned various character strengths they relied on or hoped for during their recovery, such as gratitude, hope, humility, kindness, humor, honesty, and forgiveness (Yan et al., 2022). The interventions were effective enough to foster the character strength kindness in breast cancer patients in the experimental group by making them perform acts of kindness and providing home activities on kindness, mindful breathing practice, and loving-kindness meditations, which led to an improvement in the character strength kindness in the experimental group.

The intervention in the present study did not have an effect on optimism. Individuals adapt to their new reality when experiencing life transitions, like being diagnosed with a chronic illness (Taylor, 1983). This means that people respond to health risks by creating their ways of dealing with them, which could lessen the impact of new interventions. The impact of interventions that focus on optimism may be overshadowed by the distress and uncertainty brought about by cancer diagnosis and treatment.

Similarly, the intervention did not have an effect on pessimism. Prolonged exposure to uncontrollable and negative events in the diagnosis and treatment phase could have resulted in feelings of helplessness among cancer patients (Seligman, 1972).

The findings of the present study show that the intervention did not have an effect on improving character strength perseverance. People have inherent tendencies for development and specific psychological needs such as autonomy, competence, and relatedness. When these needs are met, it leads to autonomous motivation, well-being, and personal growth (Deci & Ryan, 2000). In breast cancer patients, the challenging and exhausting aspects of their situation can outshine the impact of the intervention. Their main emphasis is frequently on dealing with the disease and its treatment, potentially straining their feelings of competence and autonomy.

Based on the findings of the present study, the intervention did not have an effect on character strength zest. Zest is crucial in diminishing pain in individuals with breast cancer (Givi et al., 2022). Zest is linked to enhanced life satisfaction as people with this quality concentrate on "here and now" (Park et al., 2004). Zest is typically viewed as a consistent characteristic of a person's personality rather than a temporary state that can be quickly changed with short-term measures. In the present study, there was no significant difference between the control group and the experiment group; it may be because of the enduring nature of personality traits, which implies that it is improbable for zest to undergo substantial changes in a brief period despite intervention.

The findings of the study show that the intervention did not have an effect on character strength spirituality. The integration of the physical, emotional, and spiritual aspects is regarded as a distinct and significant spiritual dimension (Reinert & Koenig, 2013; Hawthorne et al., 2011; Leão et al., 2022). The intervention may not have influenced character strength spirituality since spirituality usually comes from deeply rooted beliefs and experiences in life, especially in breast cancer patients who may already have this deep-rooted belief of their own. The Short-term Existential Group Therapy Program (Short-term EGP) for cancer patients has shown the potential to effectively alleviate existential distress

(Nakamura & Kawase, 2021). It is possible that short-term programs can provide some temporary relief from the problems faced by patients throughout their cancer journey. However, they may not be sufficient to foster long-lasting spiritual growth and well-being.

The findings of the study show that the intervention did not have an effect on character strength prudence in the experimental group. Cognitive functions and decision-making skills will be impaired during high-stress periods, which may lead to less prudence. High-stress periods can impair cognitive functions and decision-making skills, leading to reduced prudence. Breast cancer patients who are already experiencing significant stress might be under a cognitive strain, negatively impacting their prudence.

The findings of the present study show that there was an increase in character strength gratitude in the control group with time among breast cancer patients. The assistance and compassion provided by family, friends, and medical professionals throughout treatment can lead to a sense of gratitude as patients acknowledge and value the support and generosity they receive. The idea is that when experiencing major life difficulties like a cancer illness, feeling grateful comes naturally and can greatly improve one's overall well-being. Participants in the experimental group probably exhibited higher baseline levels of gratitude, which made it difficult to demonstrate significant improvement.

Based on the findings of the present study, the intervention did not have an effect on the health locus of control, which includes four subscales: internal, chance, doctors, and other people. Similarly, the intervention did not have an effect on resilience among the breast cancer patients. The baseline scores of both experimental and control groups might be similar at the beginning, making it difficult to produce a significant impact in the experimental group. Locus of control is considered a relatively stable personality trait. So, long-term and more focused interventions are essential for improving locus of control and resilience among breast cancer patients.

Conclusion

The present study revealed intriguing findings regarding the impact of positive psychological intervention among breast cancer patients, such as increased positive affect, reduced negative affect, and enhanced psychological well-being. Improvements in character strength such as love, kindness, and self-regulation were also observed, likely due to components like mindfulness training and positive emotion exercises. Character strengths like perseverance, zest, prudence, spirituality, bravery, forgiveness, gratitude, and hope, as well as optimism, pessimism, resilience, and locus of control, did not show any notable changes or significant improvement after the intervention. This discrepancy could be attributed to fatigue frequently associated with cancer and its treatment, which is the most commonly mentioned adverse effect of cancer treatment (Morrow et al., 2001). The progressive nature of the disease, fatigue, lack of family support, and financial difficulties might lead to challenges for positive psychological interventions to be effective. Long-term interventions involving family members, individual counseling sessions from the cancer screening stage, and awareness about intervention programs can aid in dealing with the cancer journey. The healthcare system should create more customized psychological services that directly target patients' requirements for utilizing their unique character strengths.

Limitations and Implications of the study

Although the study addressed crucial areas, it is necessary to acknowledge some limitations, including small sample size, limited generalizability of results, and reduced participation due to missed intervention sessions. The individualized format of the sessions meant that participants attended varying sessions and may have received different content accordingly. The intervention's broad focus on multiple areas could explain why the expected results were not achieved consistently across various variables. Including several factors within the scope of the intervention could have resulted in the intervention not bringing a

significant change in a few factors as anticipated. Future researchers could consider extending the duration of interventions. The lack of notable changes in certain areas may be attributed to treatment-related fatigue, emphasizing the necessity for interventions to manage such symptoms. The healthcare system should develop personalized mental health services and inclusive approaches to improve the overall quality of life of patients. Policies promoting patient-centered care encourage healthcare providers to tailor treatments and interventions to the individual needs of patients.

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