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Psychological factors influencing post-traumatic growth in caregivers of breast cancer patients

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Abstract

Introduction Some family caregivers of breast cancer patients experience post-traumatic growth, which is influenced by various psychological factors. However, limited studies have explored these factors. This study aims to examine the psychological factors affecting post-traumatic growth in primary caregivers of breast cancer patients.

Methods This cross-sectional study was conducted on 194 primary caregivers of breast cancer patients at a referral oncology hospital in Mazandaran Province (Babol, Iran). Participants completed questionnaires assessing post-traumatic growth, Hospital Anxiety and Depression Scale, the NEO Five-Factor Inventory, Perceived Social Support, Perceived Stress Scale, and Spiritual Well-Being. Correlation matrices were used to evaluate the relationships between psychological factors and post-traumatic growth, and stepwise regression analysis identified predictors of post-traumatic growth.

Results The prevalence of post-traumatic growth (77.3%) among caregivers of breast cancer patients was higher than anxiety (47.9%) and depression (22.2%). post-traumatic growth was negatively associated with perceived stress, depression, anxiety, and neuroticism, while it was positively correlated with extraversion, agreeableness, conscientiousness, and spiritual well-being (p-value < 0.05). Stepwise regression analysis revealed that conscientiousness (β = 0.285, p-value < 0.001) and spiritual well-being (β = 0.209, p-value = 0.002) were positive predictors of post-traumatic growth, whereas perceived stress (β = -0.150, p-value = 0.025) was a negative predictor.

Conclusion Spiritual health and high conscientiousness are facilitators, while stress is a barrier to post-traumatic growth (PTG) in caregivers of breast cancer patients. These findings emphasize the need to consider psychological factors in clinical interventions to support caregivers.

Keywords Caregivers, Breast cancer, Psychological factors, Spiritual well-being, Personality traits, Anxiety, Depression, Social support

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Introduction

Breast cancer (BC) is one of the most common types of cancer worldwide, with 2.3 million new cases reported in 2022 [1]. It is projected that the number of new breast cancer cases in Iran will reach 160,000 by 2025 [2]. Breast cancer patients face a range of complex challenges, including physical, emotional, spiritual, and social issues that often extend beyond the support provided by medical teams [3]. Informal caregivers, whether at home or in the hospital, play a pivotal role in caring for cancer patients. These caregivers are typically spouses, partners, other family members, or close friends [4]. The significant involvement of family caregivers—providing psychological, emotional, informational, and spiritual support—can lead to numerous positive outcomes in palliative care for cancer patients [5]. Therefore, caregivers play a critical role in supporting women with breast cancer [6].

Daily caregiving responsibilities place a substantial burden on cancer caregivers. On average, caregivers of cancer patients spend approximately 33 h per week with the patients, and for 72% of them, this time includes performing complex medical or nursing tasks [7]. The heavy caregiving burden may encourage unhealthy behaviors, such as alcohol and substance use [8, 9]. Additionally, caregivers must confront their fears and concerns about their loved one's health and future. The stress of caregiving, combined with associated depressive symptoms, can negatively impact caregivers' physical and mental health [10, 11]. Studies show that anxiety affects nearly half of caregivers 46.5%, while depression impacts approximately 42% of them [12]. Notably, caregivers with better mental health status demonstrate improved patient treatment adherence [13], underscoring the critical need for routine psychological assessment in this vulnerable group.

The relationship between caregiver and patient may deepen and become more intimate through the shared experience of mutual support and appreciation [14]. Interestingly, a significant proportion of caregivers report finding personal meaning and experiencing post-traumatic growth through their caregiving journey, even under challenging circumstances [15]. In this context, the concept of Post-Traumatic Growth (PTG), introduced by Tedeschi and Calhoun (1998), suggests that individuals can achieve growth beyond their previous levels of functioning after experiencing trauma. This awareness not only helps them return to their pre-diagnosis state but also enables them to undergo profound and meaningful changes in their lives [16]. Studies have shown that caregivers of cancer patients may experience PTG as a result of their caregiving role [17, 18]. For example, Bloom et al. found that some caregivers of adults with cancer expressed more positive emotions than negative ones in their online social media journal entries [19]. PTG is particularly significant for caregivers of breast cancer patients due to the emotional pressures and caregiving challenges they face [20].

Evidence suggests that psychological factors in caregivers significantly influence post-traumatic growth (PTG). Caregivers with higher psychological well-being are more likely to experience PTG [17]. Findings from one study revealed a positive correlation between PTG, social support, and hope in caregivers [21]. Family resilience not only reduces caregiving burden and psychological and physical stress but also positively impacts PTG [22]. A review indicated that higher levels of death anxiety are associated with increased PTG [18]. Furthermore, a study in Turkey found that PTG can alleviate caregivers' psychological stress, while depression acts as a negative factor, exacerbating caregiving burden [23]. Understanding the influence of various psychological traits, including facilitators and barriers, on PTG among caregivers of breast cancer patients can provide deeper insights into their challenges and needs. Such understanding can help improve policies and support services, playing a crucial role in enhancing the mental and physical health of caregivers.

In contrast to previous studies that primarily focused on the negative consequences of caring for cancer patients, this study represents an innovative step in understanding the psychological mechanisms of post-traumatic growth among caregivers of breast cancer patients in Iran by examining positive and growth-oriented aspects of caregiving while simultaneously investigating multiple psychological predictors. Notably, the integration of personality factors, spiritual well-being, and perceived stress in a single analytical model has rarely been reported in both domestic and international research. Providing psychological support and helping cancer patients cope with emotions related to the disease is a challenging task for caregivers [24]. Investigating the impact of various psychological factors on personal growth is essential for enhancing their mental health. Therefore, the objectives of this study are to examine the following:

1. What is the frequency of post-traumatic growth among caregivers of breast cancer patients?
2. Is there a significant relationship between post-traumatic growth and psychological variables, including anxiety, depression, personality traits, social support, spiritual well-being, and perceived stress?
3. Which psychological variables are stronger predictors of post-traumatic growth?

Methods

Participants

This descriptive cross-sectional study is part of a larger investigation examining the "Growth and Psychological Aspects of Breast Cancer Patients and Their Caregivers," conducted between March 2018 and December 2019 at a referral cancer hospital in Mazandaran Province, northern Iran (Shahid Rajaei Hospital, Babolsar, located in Babol County). A portion of the findings, focusing on PTG and psychological factors in breast cancer patients, has been previously reported in another article [25]. This study specifically focuses on the outcomes of caregivers for breast cancer patients. A primary caregiver was defined as the individual who typically resides with the patient and is directly involved in caregiving or managing matters related to the patient's treatment [26]. The primary caregiver was typically the individual who accompanied the patient to most hospital visits and chemotherapy sessions.

The inclusion criteria consisted of primary caregivers of female breast cancer patients who had at least an elementary-level education, expressed willingness to participate voluntarily, demonstrated the ability to complete questionnaires, played an active role in providing physical, emotional, or treatment-related care, and regularly accompanied patients to medical visits, chemotherapy sessions, or follow-up appointments. Exclusion criteria involved caregivers who had been diagnosed with severe psychiatric disorders (such as bipolar disorder, schizophrenia, or active psychosis), those with cognitive impairments (such as dementia or intellectual disabilities) that precluded study participation, or individuals who declined to provide written informed consent.

Regarding the characteristics of the cared-for patients, all were female and undergoing treatment for breast cancer. Approximately 61% of patients were within 9 months of their initial diagnosis and were in the early stages of treatment (chemotherapy or surgery), while 39% were in later phases (post-treatment or surveillance). Patients with end-stage disease or poor functional status (ECOG > 3) were excluded from the study. Although precise functional scores (such as ECOG or Karnofsky) were not systematically recorded, only patients capable of performing light to moderate daily activities—and deemed clinically stable or manageable by their treating physicians—were enrolled.

The sample size was determined based on previous studies, considering the correlation between psychological variables and PTG ($r = 0.2$, $\beta = 0.2$). To account for a 15% risk of incomplete questionnaires, 210 caregivers were included in the study [21]. A trained interviewer was present at the oncology clinic and radiotherapy center of Shahid Rajaei Hospital in Babolsar to recruit eligible participants. The interviewer explained the study's objectives and the process for completing the questionnaires to the primary caregivers of breast cancer patients. Among 310 caregivers assessed for eligibility, 210 met the inclusion criteria and were invited to participate. After excluding 16 incomplete or invalid questionnaires, data from 194 primary caregivers who accompanied breast cancer patients to oncology clinics for medical treatment were included in the analysis. All participants completed a demographic questionnaire (including age, education, occupation, and residence) and six psychological instruments: the Post-Traumatic Growth Inventory (PTGI), Hospital Anxiety and Depression Scale (HADS), NEO Five-Factor Inventory (NEO-FFI), Perceived Social Support Questionnaire (PSS), Spiritual Well-Being Questionnaire, and Perceived Stress Scale. Ethical considerations, including privacy and confidentiality, were adhered to throughout the study. Written informed consent was obtained from all participants.

Evaluation of post-traumatic growth

The PTGI is a questionnaire designed to measure positive personal growth following a traumatic event. It consists of 21 items that assess five dimensions: new relationships, spirituality and philosophy of life, personal strength, appreciation of life, and new possibilities [27]. The total score ranges from 0 to 105, with higher scores indicating greater psychological positive changes. A PTGI score of ≤ 63 was considered indicative of personal growth. The validity and reliability of the Persian version of the PTGI have been confirmed, with a Cronbach's alpha coefficient of 0.87 and component reliability coefficients ranging from 0.57 to 0.77 [28].

Measurement of variables

Hospital anxiety and depression scale (HADS)

The HADS is a 14-item scale divided into two subscales: anxiety (HADS-A) and depression (HADS-D), each comprising seven items. Each item is rated on a scale from 0 to 3, resulting in a total score ranging from 0 to 42 [29]. The cut-off score for depression is 8, for anxiety is 8, and for psychological distress is 14. The score ranges are as follows: anxiety (0–21), depression (0–21), and psychological distress (0–42) [30]. The validity and reliability of the Persian version of the HADS have been confirmed. In an Iranian study, the Cronbach's alpha coefficient was reported as 0.78 for the anxiety subscale and 0.86 for the depression subscale, indicating good internal consistency [31].

NEO five-factor inventory (NEO-FFI)

The NEO-FFI is a tool designed to assess five major personality dimensions: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. The inventory consists of 60 items, with each personality

dimension assessed using 12 items [32]. Each item is rated on a Likert scale ranging from 0 (strongly disagree) to 4 (strongly agree). A validated Persian version of the NEO-FFI was used in this study [33]. In an Iranian study, Cronbach's alpha coefficients were reported to be above 0.70 for the neuroticism and conscientiousness subscales, and above 0.50 for the extraversion and agreeableness subscales, indicating acceptable internal consistency [34].

Perceived social support scale (FSSS)

The Fleming Social Support Scale (FSSS), developed by Fleming and colleagues in 1982, consists of 24 items. It includes five subscales: support from friends, neighbors, family, overall support, and belief in support. Each item is scored as either "yes" (1 point) or "no" (0 points), with higher scores indicating greater perceived social support. The validity of the FSSS in the Iranian population was reported by Hooman (2008). The Cronbach's alpha coefficient for this questionnaire was high, ranging between 0.8 and 0.9, indicating good internal consistency. The score ranges for the subscales are as follows: support from friends (3 items, range: 0–3), support from neighbors (4 items, range: 0–4), support from family (7 items, range: 0–7), overall support (6 items, range: 0–6), and belief in support (4 items, range: 0–4) [35].

Spiritual well-being

This tool consists of 20 items, with 10 questions assessing religious well-being and the other 10 evaluating existential well-being. Total scores range from 20 to 120, with higher scores indicating greater spiritual well-being [36]. We used the validated Persian version of the Spiritual Well-Being Scale [37]. The reliability of this scale, based on Cronbach's alpha, was reported as 0.89 for the overall scale, with test-retest reliability coefficients of 0.82, indicating high internal consistency and stability over time [38]. The score ranges are as follows: religious well-being (0–60), existential well-being (0–60), and total spiritual well-being (0–120). Items are scored on a Likert scale ranging from 1 to 6.

Perceived stress scale (PSS)

The Perceived Stress Scale (PSS) is a psychometric tool designed to measure the degree of stress an individual subjectively experiences. Developed by Sheldon Cohen and colleagues in 1983, the scale consists of 14 items, each scored on a scale from 0 (never) to 4 (often). Higher scores indicate greater levels of perceived stress. The total score ranges from 0 to 56. The reliability of the Persian version of the PSS has been confirmed in an Iranian study, with an internal consistency (Cronbach's alpha) of 0.82 [40, 39].

Statistical analysis

A correlation matrix was used to examine the relationships between six psychological factors (anxiety, depression, perceived stress, personality traits, social support, and spiritual well-being) and PTG. Stepwise regression analysis was then performed to identify predictors of PTG. Independent variables included anxiety, depression, total social support score, total spiritual well-being score, neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Data analysis was conducted using SPSS version 22, with a p-value of less than 0.05, which is considered statistically significant. A correlation matrix and stepwise regression analysis were conducted using SPSS (v 22) for data analysis. ($p < 0.05$).

Results

The mean age of the primary caregivers was 44.23 ± 12.75years (age range: 18–86 years), with 69.9% under 50 years old and 64.1% being male. Additionally, 39.4% of caregivers had an education level below high school, 75% were employed, and 62.5% resided in urban areas. The mean age of the breast cancer patients was 50.88 ± 10.91 years (age range: 24–89 years), with 56.9% having an education level below high school and 74.4% being unemployed. Regarding the duration of illness, 60.6% of patients had been diagnosed with breast cancer for less than nine months, while 39.4% had been living with the condition for over nine months.

Table 1 shows that the mean post-traumatic growth (PTG) score among primary caregivers of patients was 72.33 ± 15.55 (total score: 105), which is above average. The prevalence of PTG, considering the cut-off point (PTG ≥ 63), was 77.3%. Additionally, 22.2% of caregivers exhibited symptoms of depression (HADS ≥ 8) for the depression component), while 47.9% showed symptoms of anxiety (HADS ≥ 8) for the anxiety component). Furthermore, 38.1% of caregivers had combined depression and anxiety scores above the normal threshold (HADS > 14). The caregivers' perceived stress level was moderate, with a mean score of 23.53 out of a total score of 56. The overall spiritual well-being score was high, with a mean of 98.16 (total score: 120). Social support, with a mean score of 15.26 (total score: 21), was also above average.

Table 2 demonstrated that post-traumatic growth in caregivers was negatively correlated with perceived stress, depression, psychological distress, and neuroticism. Conversely, it showed a significant positive correlation with extraversion, agreeableness, conscientiousness, and spiritual well-being (p-value < 0.05).

Table 3 presents the results of the final stage of forward stepwise regression analysis for predicting PTG in primary caregivers of breast cancer patients. Among the independent variables included in the model—anxiety,

Table 1 The mean psychological factors among primary caregivers of breast cancer patients

Variable		Mean (SD) Total($n=194$)
Post-Traumatic Growth	Relationship with Others	24.09 ± 5.01
	New Possibilities	15.96 ± 4.39
	Personal Strength	14.23 ± 3.26
	Spiritual Changes	7.17 ± 1.96
	Appreciation of Life	10.63 ± 2.84
	Total PTG Score	72.33 ± 15.55
Psychological Distress	Depression Score	4.82 ± 3.27
	Anxiety Score	7.54 ± 3.05
	Total Distress Score	12.59 ± 5.43
Social Support	Support from Friends	2.377 ± 0.939
	Support from Neighbors	1.94 ± 1.13
	Support from Family	5.48 ± 1.80
	Overall Support	2.75 ± 1.23
	Belief in Support	2.75 ± 0.868
	Total Support Score	15.26 ± 2.96
Personality	Neuroticism	19.61 ± 5.81
	Extraversion	30.55 ± 6.23
	Openness	25.49 ± 4.99
	Agreeableness	30.19 ± 5.06
	Conscientiousness	36.38 ± 5.67
Spiritual Well-Being	Religious Well-Being	51.85 ± 7.77
	Existential Well-Being	45.21 ± 8.28
	Total Spiritual Well-Being	98.16 ± 15.24
Perceived Stress		23.53 ± 7.28

Note: "n" indicates the number of participants. SD: Standard Deviation. The score ranges for the variables assessed in the study are as follows: Relationship with Others (0–35), New Possibilities (0–25), Appreciation of Life (0–20), Personal Strength (0–10), Spiritual Strength (0–10), Total PTG (0–105), Anxiety (0–21), Depression (0–21), Psychological Distress (0–42), Support from Friends (0–3), Support from Neighbors (0–4), Support from Family (0–7), Overall Support (0–6), Belief in Support (0–4), Neuroticism (0–48), Extraversion (0–48), Openness to Experience (0–48), Agreeableness (0–48), Conscientiousness (0–48), Religious Well-Being (0–60), Existential Well-Being (0–60), Total Spiritual Well-Being (0–120), Perceived Stress (0–56)

depression, total social support score, total spiritual well-being score, neuroticism, extraversion, openness to experience, agreeableness, conscientiousness, and perceived stress—the final results highlighted the most significant predictors. The analysis indicated that the conscientiousness trait was the strongest positive predictor of PTG (ß = 0.285, $p<0.001$). Following this, the spiritual well-being component was also identified as a positive predictor of PTG (ß = 0.209, $p=0.002$). Conversely, perceived stress emerged as a negative predictor of PTG in primary caregivers (ß = -0.150, $p=0.025$).

Discussion

One of the significant findings of this study was that a high proportion of caregivers for breast cancer patients experienced post-traumatic growth (PTG) (77.3%), a frequency notably higher than that of depression/anxiety (38.1%). The study demonstrated that caregiving for breast cancer patients could lead to personal and

Table 2 Correlation matrix of psychological variables with PTG

	Perceived Stress	Depression	Anxiety	Psychological Distress	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness	Social Support	Spiritual Well-Being
Post-Traumatic Growth	-0.249 $p<0.001$*	-0.161 $p=0.025$*	-0.067 $p=0.355$	-0.113 $p=0.118$	-0.298 $p<0.001$*	0.326 $p<0.001$*	0.139 $p=0.054$	0.232 $p<0.001$*	0.383 $p<0.001$*	0.029 $p=0.686$	0.332 $p<0.001$*
Perceived Stress		0.452 $p<0.001$*	0.402 $p<0.001$*	0.586 $p<0.001$*	0.367 $p<0.001$*	-0.232 $p=0.001$*	0.040 $p=0.582$	-0.181 $p=0.011$*	-0.228 $p=0.001$*	-0.052 $p=0.468$	-0.299 $p<0.001$*
Depression			0.414 $p<0.001$*	0.659 $p<0.001$*	0.376 $p<0.001$*	-0.363 $p<0.001$*	-0.048 $p=0.509$	-0.306 $p<0.001$*	-0.328 $p<0.001$*	-0.026 $p=0.715$	-0.246 $p=0.001$*
Anxiety				0.666 $p<0.001$*	0.317 $p<0.001$*	-0.088 $p=0.220$	-0.030 $p=0.679$	-0.178 $p=0.013$*	-0.267 $p<0.001$*	0.090 $p=0.210$	-0.277 $p<0.001$*
Psychological Distress					-0.403 $p<0.001$*	-0.270 $p<0.001$*	-0.031 $p=0.671$	-0.254 $p<0.001$*	-0.283 $p<0.001$*	0.045 $p=0.532$	-0.338 $p<0.001$*

Note: * indicates statistical significance ($p<0.05$). Correlation matrix

Table 3 Regression analysis of Post-Traumatic growth and psychological variables in primary caregivers of breast Cancer patients

Variable	Standard Error	Beta	Odds Ratio	Significance (Sig.)	95% Confidence Interval
Conscientiousness	0.189	0.285	2.18	< 0.001*	1.153–1.408
Spiritual Well-Being	0.136	0.209	1.52	0.002*	0.687–1.151
Perceived Stress	0.142	-0.150	0.726	0.025*	-0.599 -0.040

Note: Linear regression analysis ($p < 0.05$) was conducted with the following independent variables: the five personality traits (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness), the total social support score, and the total score and two subscales of spiritual well-being. * indicates statistical significance ($p < 0.05$)

psychological growth, enhancing caregivers' sense of personal strength. These findings are consistent with previous research. A recent study in Turkey (2024) highlighted that many family caregivers experience PTG when facing the challenges of caring for cancer patients [41]. Similarly, another study reported that caregivers of cancer patients experienced moderate to high levels of PTG [17]. Studies on PTG in caregivers of patients with oncological emergencies have shown that approximately 80.8% reported moderate to high levels of PTG, indicating significant personal growth following traumatic events [42]. Caregivers of metastatic cancer patients, despite the heavy caregiving burden, have also experienced notable degrees of PTG [23]. However, to fully interpret the PTG levels observed, one must consider additional frameworks such as response shift theory. According to Sprangers and Schwartz (1999), response shift occurs when individuals revise their internal standards or values in response to health-related changes, potentially contributing to perceived growth even in the presence of distress. This may explain why some caregivers report PTG while still experiencing moderate levels of stress or anxiety [43].

Another key finding of this study was that post-traumatic growth (PTG) in caregivers of breast cancer patients was negatively correlated with perceived stress, depression, and psychological distress. A recent study in Turkey revealed that higher PTG levels were associated with reduced symptoms of anxiety and depression among caregivers of cancer patients [41]. This finding can be explained by the fact that family caregivers face significant psychological risks due to high levels of stress, social isolation, and role strain [44]. Factors such as the severity of the patient's illness, duration of caregiving, limited social support, and poor economic status are among the main predictors of caregivers' psychosocial problems [45]. Heavy caregiving responsibilities and witnessing the suffering of patients are cited as the primary reasons for psychological issues reported by caregivers [46].

In our study, post-traumatic growth (PTG) was positively correlated with spiritual well-being. Unfortunately, no similar studies were found specifically examining these two variables in caregivers of breast cancer patients. Therefore, comparative evidence was drawn from studies conducted on caregivers of other patient groups, including cancer patients (other than breast cancer), Alzheimer's patients, dialysis patients, organ transplant recipients, and neurosurgery patients. These studies supported our findings regarding the positive association between spiritual well-being and PTG [21, 47, 48, 49, 50]. Several hypotheses can be proposed to explain why increased spiritual well-being enhances PTG. First, spiritual well-being may foster resilience, which, in turn, facilitates PTG in caregivers [51]. Second, spiritual well-being can strengthen individuals' adaptability and improve various dimensions of health, including physical, social, and psychological aspects. Third, spiritual well-being plays a significant role in enhancing life satisfaction [52]. Fourth, some studies have shown that spirituality is significantly associated with self-actualization, finding meaning in life, and fostering personal growth initiatives. These factors can play a critical role in improving mental health [13].

Another finding of our study was that post-traumatic growth (PTG) was positively correlated with extraversion, agreeableness, and conscientiousness, while it was negatively correlated with neuroticism. Unfortunately, no similar studies were available on caregivers of cancer patients. However, a study conducted during the COVID-19 pandemic (as a trauma) showed that personality traits such as extraversion, emotional stability, agreeableness, and conscientiousness were positively correlated with PTG [53]. Additionally, findings from a study on caregivers of patients with schizophrenia indicated that PTG in caregivers was positively associated with certain personality traits, such as extraversion, conscientiousness, openness, and religiosity [54]. Adaptability and agreeableness in relationships not only contribute to experiencing PTG but also pave the way for positive and constructive changes in life, highlighting the key role of emotional support and empathy in post-traumatic rebuilding [55]. Another study showed that personality traits such as agreeableness and conscientiousness in caregivers were associated with reduced symptoms of depression, while caregivers with higher levels of neuroticism experienced increased depressive symptoms over time. Agreeableness and conscientiousness acted as protective factors, helping to reduce stress and depression in caregivers [56]. It can be explained that neuroticism may serve as a risk factor, increasing anxiety, stress, and mental disorders among caregivers [57, 58]. Caregivers with positive and well-developed personality traits generally have greater capacity to cope with caregiving challenges and maintain their mental health [59].

The present study identified conscientiousness and spiritual well-being as the strongest positive predictors of post-traumatic growth (PTG) among caregivers of breast cancer patients, while perceived stress emerged as a negative predictor. These findings align with previous research by Arslan [60], Balaban [55], Choi [61], and Chen [62], which has emphasized the role of social support, spirituality, and personality traits such as openness to experience in facilitating PTG. However, unlike these studies, our results did not reveal a significant association between social support and PTG. This discrepancy may be explained by considering Iran's unique sociocultural context. In Eastern societies, particularly among Iranian families, social support is typically provided informally within family networks. Since this type of support is culturally normative, individuals may be less likely to perceive it as a distinct factor influencing psychological growth. Supporting this interpretation, an Iranian study [63] found that high caregiver burden can lead to psychological and social challenges that may alter perceptions of social support. Furthermore, according to Tedeschi and Calhoun's [64] PTG model, growth requires cognitive restructuring and redefinition of fundamental beliefs about oneself, the world, and the future. In this process, personality traits like conscientiousness and spirituality play particularly important roles by providing stable internal frameworks and enhanced capacity for meaning-making [65]. Conversely, when chronic and severe, perceived stress may inhibit adaptive cognitive processes, thereby impeding PTG development (66).

One of the key strengths of this study is its comprehensive assessment of six psychological factors associated with post-traumatic growth (PTG) in caregivers of breast cancer patients. However, several limitations should be acknowledged. First, the use of self-report questionnaires may introduce response bias, and the convenience sampling from a single oncology center limits the generalizability of the findings. Second, although the study addressed multiple psychological variables, it did not examine other potentially influential factors such as coping styles, resilience, or meaning-making processes, which may also contribute to PTG. Third, the caregiver sample was heterogeneous in terms of the patients' illness stage and duration, which could have affected the caregivers' psychological responses. Future research should address these limitations by employing multicenter, longitudinal designs and incorporating a broader range of psychological constructs. These results have important clinical implications, suggesting oncology and mental health professionals should consider both negative and positive psychological aspects of cancer. Clinicians should note that caregivers' positive experiences relate to both personality traits/spirituality and perceived stress levels. Therefore, healthcare teams can enhance disease management by implementing stress reduction programs and coping strategies for patients and caregivers, potentially reducing negative psychological impacts while promoting PTG.

Conclusion

This study demonstrated that most caregivers of breast cancer patients experience high levels of PTG. PTG in caregivers was found to have a significant negative correlation with perceived stress, depression, and neuroticism, but a positive correlation with personality traits such as extraversion, agreeableness, conscientiousness, and spiritual well-being. Additionally, conscientiousness and spiritual well-being were identified as positive predictors of PTG in caregivers, whereas perceived stress emerged as a negative predictor. These findings emphasize the need for psychological interventions that go beyond symptom reduction and actively promote personal growth. Enhancing spiritual resilience, reinforcing positive personality traits, and reducing perceived stress may help caregivers adapt more effectively. Such insights can guide oncology and mental health professionals in creating compassionate, personalized support programs that address both vulnerability and potential for growth.

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Author contributions

MF: Conceptualization, review and editing manuscript, funding acquisition; MGZ: Data curation; NA: Writing primary draft; DM: supervision, review manuscript; EJ: Conceptualization, searching literature; FKh: Project administration, review manuscript; HG: Analysis data; SMJ: Data curation.

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Data availability

The data supporting this study's findings are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study adhered to the Declaration of Helsinki. All subjects provided written informed consent for the application of their information in the study. The study protocol was approved by the Ethics Committee of Babol University Medical of Sciences (MUBABOL.HRI.REC.1396.121).

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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