

## Psychological impact of clinical treatment after breast cancer diagnosis in younger patients (38–50 age range): An explorative 3-year observational study



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### ABSTRACT

**Objective:** Young women with breast cancer (BC) face emotional challenges as they deal with the disease and the related fear of adversity. This study evaluated the psychosocial complications experienced by younger women (38–50 age range) over a three year period after BC diagnosis.

**Method:** From an observational perspective, we detected late-stage complications involving psychological distress (variables included anxiety, anger, psychological distress, and depression) and sociodemographic influences on treatment and post-treatment paths for a 36-month period after diagnosis.

**Results:** Our data highlighted that good emotional regulation improved resilience in dealing with diagnoses and medical treatments. Findings highlighted that women with positive mental flexibility toward surgical and pharmacological treatments improved their resilience because they mentally focused on the medical treatments and following recovery periods. However, fragility was detected over a three-year period following diagnoses. Patients were mostly impacted around 12 months after diagnoses and soon after post-treatment paths (i.e., at 24 months and around 36 months after diagnosis).

**Conclusion:** Psychological status fluctuates among BC survivors. Here, resilience may be a useful trait in young patients by enabling them to regain normal lives. In fact, an increased likelihood of survival is strongly linked to the restoration of a normal life through modified and improved living. Our findings highlighted that young BC patients were emotionally challenged; a psychological resilience index can thus predict depression and/or anxiety patterns in dealing with adversity.

### 1. Introduction

Breast cancer (BC) diagnosis negatively impacts quality of life of women. Such diagnoses affect their relationships, sociality, work performance, family management, and personal expectations about life (Bennet, Lloyd, Webber, & Friedlander, 2012; Conley, Bishop, & Andersen, 2016; Costanzo et al., 2007; Gibbons, Groarke, & Sweeney, 2016; Guan Ng et al., 2015; Lester et al., 2015; Linley, 2006; Quattropiani, Lenzo, & Filastro, 2017). Cancer experiences can be distressing and disruptive. Here, demographic factors such as age, gender, and education and disease-related variables such as cancer type, treatment type, and disease stage were found to be associated with different levels of emotional maladjustment (Helgeson, Snyder, & Seltman, 2004). Parikh et al. (2015) indicated the following common symptoms after BC diagnosis: Fatigue, sexual problems, cognitive

dysfunction, a perceived fear of recurrence, intrusive thoughts about illness/persistent anxiety, issues in marital/partner communication about feelings of vulnerability, and existential concerns regarding mortality. Gibbons et al. (2016) identified illness perceptions and coping as significant variables resulting in psychological distress after cancer diagnosis. The authors revealed that women may be differently impacted by their experiences with BC; these differences are influenced by social factors, but are more greatly affected by personality traits and the patient self-identities. Gibbons et al. (2016) further suggested identity as a consistent predictor for adjustments and coping strategies aimed at confronting traumatic events requiring emotional adjustment and that “higher levels of fighting spirit predicted less depression” (p. 7).

BC more frequently occurs in menopausal women when compared to younger cohorts. Because the prevalence of BC increases with age,

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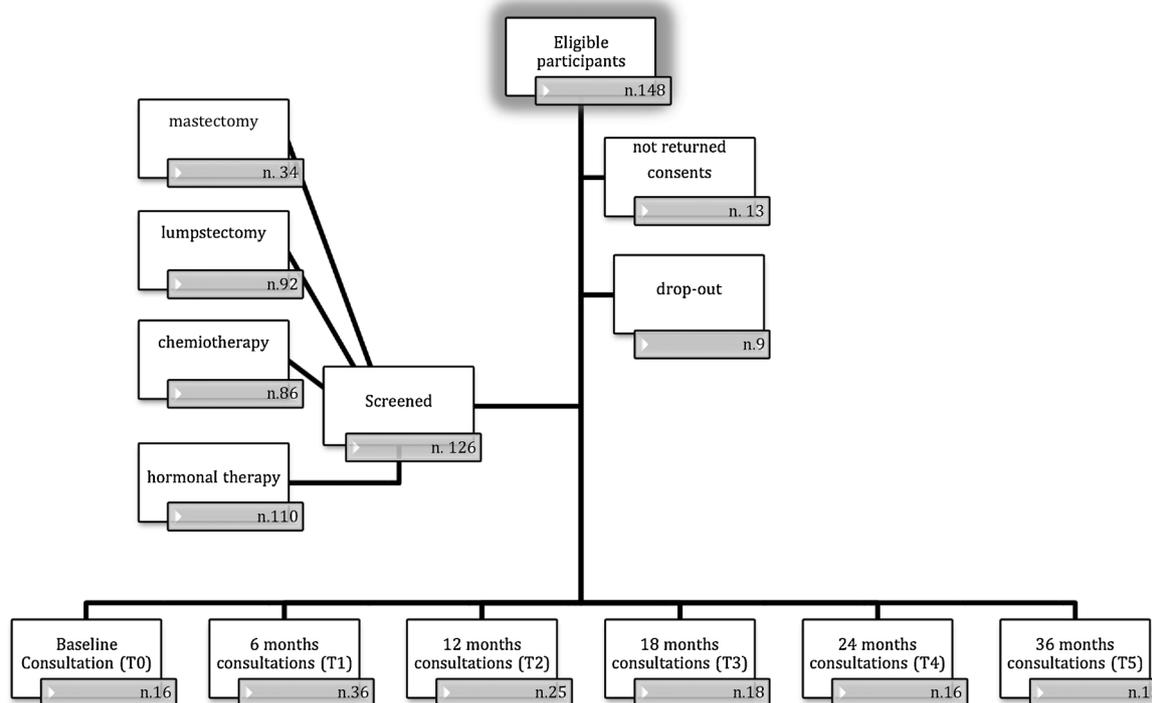


Fig. 1. Flow chart of the participants.

most studies have been conducted among older patients (i.e., those > 50 years of age). Few studies have focused on younger populations when evaluating the influence of BC diagnoses during medical treatments (2018, Di Giacomo et al., 2016; Liu et al., 2018; Martino, Gargiulo, Lemmo, & Margherita, 2019). This is because the frequency of BC is lower among younger age groups. However, BC diagnoses are becoming more common. This is due to the implementation of national screening policies designed as preventive interventions to increase the number of BC survivors. Indeed, early screening has increased the rate of early BC diagnoses among younger women; this has positively resulted in increased survival rates (Parks, Derks, Bastiaannet, & Cheung, 2018). In a sense, medical success has created new challenges. There is growing recognition that cancer treatments affect many patients not just physically but also mentally and socio-economically. BC diagnosis marks an unexpected shift in the life trajectories of younger women. This also often marks their first experience navigating healthcare, which is also frequently an isolated one. That is, these women may not have any peers with BC.

Hubbeling et al. (2018) found that many young women experienced the psychosocial impacts of their BC diagnoses. They had increased rates of depression and worse quality of life compared to women who were diagnosed during middle age. This was partly due to the treatment effects. Breast removal especially caused negative feelings, particularly in younger women.

Young BC patients tend to experience lower quality-of-life levels when compared to older patients in both the short and long terms, with increased treatment intrusiveness contributing to their psychological fragility (Avis et al., 2013; Howard-Anderson, Ganz, Bower, & Stanton, 2012; Ruddy et al., 2013)

Quattropani et al. (2017) demonstrated the role of negative belief as a predictor of anxiety and psychological distress in patients undergoing chemotherapy. Their results indicated an association between meta-cognition and emotional distress, thus verifying that negative beliefs were particular predictors for negative anxiety, depression, and overall distress (Quattropani et al., 2017). Despite great interest in the psychological impacts of BC diagnosis and treatment, care priorities are actively being redefined. An increasingly achievable and necessary goal

also involves meeting the comprehensive needs of cancer survivors.

This exploratory study evaluated the psychosocial complications experienced by younger women (i.e., those aged 38–50 years) over a three-year period after BC diagnosis. From an observational perspective, our goal was to detect late stage complications resulting from psychological distress and sociodemographic influences on treatments and post-treatment paths over a 36-month period.

## 2. Methods

### 2.1. Ethical approval

This study was approved by the Institutional Review Board of the University of L'Aquila, Italy (Prot. No. 30259/2017) and S. Salvatore Hospital, L'Aquila (IT), from which participants were recruited.

### 2.2. Participants

Eligible women aged 38–50 years (a mean age of 44.3 years  $SD \pm 6.2$ ) who were diagnosed with BC and living in central Italy were recruited for participation. The inclusion criteria were as follows: Participants were a) 35–50 years of age, b) female, c) in cancer stages 0–III, and d) had no recurrence. The exclusion criteria were as follows: Patients with a) recurrent or metastatic cancer, b) pre-morbid depression and/or anxiety, and c) alcohol or substance abuse problems. All participants were recruited at the Medical Oncology Division of S. Salvatore Hospital in L'Aquila (Italy).

We contacted 148 eligible patients, 126 of whom provided informed consent (13 did not consent to participate in the experimental protocol, while nine others signed the informed consent form, but declined further involvement (dropped out) after their first session experience). The reasons provided for nonparticipation included disinterest in research participation (41.3%) and time constraints (29.8%).

Participant enrolment was conducted according a fixed follow-up of their clinical paths, as follows: Within 1 month after diagnosis (T0), six months (T1), 12 months (T2), 18 months (T3), 24 months (T4), and 36 months (T5). This was arranged to detect issues of adjustment and

adaptation as well as later-onset psychosocial issues.

Sociodemographic data were collected based on the following elements: Education, marital status, occupation, adjuvant treatments, and surgical intervention (lumpectomy/mastectomy). Medical staff determined patient cancer stages according to the tumour, nodes, and metastasis (TNM) classification of malignant tumours system (a cancer staging system developed by the American Joint Committee on Cancer and the Union for International Cancer Control (UICC)).

Fig. 1 presents a flow chart describing this process for all participants.

### 2.3. Procedure

Participants were recruited through the S. Salvatore Hospital (IT). Medical staff identified eligible patients, who were invited to participate in interviews after their appointments. Informed Consent was mandatory. Trained clinical psychologists were blinded to this study's objectives while conducting psychological evaluations in a quiet, dedicated room. Each evaluation lasted 40 min. Participants completed the measures during their scheduled follow-up appointments. Data were collected anonymously.

## 3. Measures

### 3.1. Sociodemographic and clinical characteristics

We used the double collecting procedure when obtaining sociodemographic data (i.e., patient self-reporting and clinical data). First, demographic data were provided through participant self-reports. We selected independent variables for inclusion in the analyses if they were characteristic relevant to age/life stage (e.g., having children, employment, and marital status) and cancer.

Second, clinical data were obtained by examining medical records of participants' BC stages, treatments, and therapies.

### 3.2. Psychological tests

Psychological self-reports were used to evaluate the four emotional variables of anger, anxiety, psychological distress, and depression. Participants completed relevant paperwork after individual clinical interviews.

A variety of psychological tests were conducted, as follows: The State Trait Anger Expression Inventory (STAXI-2) was used to measure anger, the State Trait Anxiety Inventory form Y (STAI-Y) was used to evaluate anxiety, the Psychological Distress Inventory (PDI) was used to assess distress, and, finally, the Beck Depression Inventory version 2 (BDI-II) was used to detect depression. The Italian versions of all tests were applied (data reliability was confirmed).

The State-Trait Anger Expression Inventory-2 (STAXI-2; [Spielberger, 2004](#)) is a self-administrated questionnaire that measures emotional states and personality traits. In particular, it evaluates experiences, expressions, and anger control. The STAXI-2 items are categorized according to six scales (i.e., five subscales and an Expression Index). Experience of anger is conceptualized as having two components (i.e., State Anger (S-Ang) and Trait Anger (T-Ang)). S-Ang is considered situational. It refers to the level of anger that one experiences during the assessment. T-Ang is defined as a predisposition to experiencing anger. The expression and control of anger are conceptualised as having four components (i.e., Anger Expression-Out (AX-O), Anger Expression-In (AX-I), Anger Control-Out (AC-O), and the Anger Expression Index (AX Index), which provides an overall estimate of anger expression and the control scales). Scores indicate the different personality traits involved in anger risk. In this study, internal reliability was  $\alpha = 0.83$  for the patient group and  $\alpha = 0.61$  for the control group.

The State-Trait Anxiety Inventory-Form Y (STAI; [Spielberger & Sydeman, 1994](#)) is a 40-item self-reporting test that measures state and

trait anxiety. Scoring is based on standard procedure. Internal reliability was  $\alpha = 0.62$  for the patient group and  $\alpha = 0.73$  for the control group.

The Psychological Distress Inventory (PDI; [Morasso, Costantini, Baracco, Borreani, & Capelli, 1996](#)) is a self-administrated questionnaire that measures the impact of psychological distress and related therapies. It consists of 13 questions that are answered according to a 5-point Likert-type scale. The standard score estimates the presence/absence of psychological distress for measuring global distress. The inventory demonstrated good reliability ( $\alpha = 0.86$ ).

The Beck Depression Inventory-II (BDI-II; [Beck, Steer, & Brown, 1996](#)) is a 21-item self-administered test that assesses the intensity of depression in clinical and non-clinical populations. Each test item lists four statements that are arranged in order of increasing severity about a particular symptom of depression. Scores indicate the presence/absence and related degree of depression (i.e., from minimal to severe depression signs). Internal reliability was good for both the participant ( $\alpha = 0.81$ ) and control ( $\alpha = 0.76$ ) groups.

### 3.3. Study design

We conducted a three-year cross-sectional study to evaluate the prevalence of certain psychological traits among a young BC population. Data were collected six separate times following initial BC diagnoses, as follows: Baseline/T0 (one month), T1 (six months), T2 (12 months), T3 (18 months), T4 (24 months), and T5 (36 months). Descriptive statistics for baseline characteristics and outcome measures were calculated at each timepoint. ANOVA statistical analyses were conducted to verify the effects of sociodemographic variables on emotional traits, followed by post-hoc Tukey tests. A one-way ANOVA (followed by Duncan post-hoc analyses) was conducted to detect the statistical significance of the overall differences across the psychological variables, while a MANOVA was performed to calculate the significant differences according to disease stage and patient age.

Data analyses were performed using SPSS with a fixed  $\alpha$ -value  $\leq 0.05$ .

## 4. Results

### 4.1. Descriptive statistics

A total of 85% (i.e., 126 of 148) of eligible women completed the psychological evaluations at the different aforementioned timepoints (i.e., T0, T1, T2, T3, T4, and T5) (n. 13 women declined to participate (no returned consent form), while n. 9 women dropped out after signing a consent form (they did not complete procedures at any timepoint)).

Descriptive data for the sociodemographic variables are shown in [Table 1](#). Mean participant age was 44.3 (SD = 6.2) (an age range of 38–50 years). The majority of patients were married (74%), had high school education levels (58,1%), and were employed (53,5%). A total of 47.7% of all participants had been diagnosed with cancer at stage I, while 59.3% had undergone lumpectomies, and 40.7% had endured mastectomies.

### 4.2. Analysis of emotional traits and sociodemographic variables

The means (and standard deviations) of the raw scores for emotional traits are shown in [Table 2](#).

An ANOVA was conducted to compare patient sociodemographic variables (e.g., education, marital status, and maternity) with emotional traits. A one-way ANOVA showed that marital status influenced depression ( $F(2, 122) = 6.01$ ;  $p > 0.01$ ), while a post-hoc analysis (Tukey test) indicated that divorced/widowed BC patients had higher scores ( $p > 0.01$ ) (single women had lower scores). A high BDI score indicates a negative index (the cut-off for depression is  $< 14$ ). Single women with BC did not seem to have depression signs at the same rate

**Table 1**  
Sample demographics.

Age, years	Range 38–50 (mean age 44.3 years, sd ± 6.2)
Relationship status	
Married/living with partner	75,6%
Single	17,4%
Divorced/widows	7,0%
Education	
Not graduate	14,0%
High school	58,1%
Graduation	25,6%
Occupation	
Housewife	27,9%
Employed	53,5%
Self-employed	17,4%
Cancer stage	
0	4,7%
I	47,7%
II	23,3%
III	18,6%
Treatments*	
Mastectomy	40,7%
Lamptectomy	59,3%
Chemiotherapy	16,3%
Radiation therapy	2,3%
Hormonal therapy	73,3%

\* Treatments aren't mutually exclusive.

as married women and those living with partners. Participants were then placed into two groups to identify the influence of the premenopausal effect. Here, we used the age of 41 as a cut-off following Gold (2011) and identified 51 as the average age for menopause. This was chosen to define premenopausal (< 41) and non-premenopausal (> 41) groups at the diagnosis stage. A one-way ANOVA statistical analysis showed no significant differences, meaning there was no influence of gynaecological timing related to fertility.

**4.3. Analysis of emotional changes according to medical variables over time**

First, our statistical analyses were focused on the emotional experiences of patients over time after being diagnosed with BC. A one-way ANOVA was conducted to compare emotional status among patients. Participants were divided into six subgroups according to the timepoint after diagnosis, as follows: T0 (baseline), T1 (six months), T2 (12 months), T3 (18 months), T4 (24 months), and T5 (36 months). These timepoints reflected their scheduled medical check-ups. Emotional condition was detected according to four tests, as follows: The STAI-Y, PDI, BDI-II, and STAXI-2 (consisting of four components: S-Ang, AX/O, AC-O, and AX Index). Statistical analyses showed a significant difference in S-Ang measurements between timepoints (F(5, 120) = 2.51; p > 0.03), while post-hoc analyses (Duncan test) indicated lower scores at T2 (p > 0.02) and T4 (p > 0.004).

**Table 2**  
Raw score of the psychological testing.

Patient Groups	N°	Psychological Tests								
		STAXI						STAI	BDI	PDI
		S-Ang	T-Anger	AX-IN	AX-OUT	AC-O	AX Index			
T0	16	16.1 (± 7.2)	19.0 (± 4.4)	14.0 (± 3.3)	19.1 (± 3.9)	20.1 (± 3.9)	28.2 (± 7.4)	90.1 (± 7.2)	11.0 (± 9.7)	28.1 (± 8.8)
T1	28	14.4 (± 5.8)	17.5 (± 4.1)	15.4 (± 3.5)	19.2 (± 3.5)	23.2 (± 3.7)	27.3 (± 7.0)	86.6 (± 9.3)	10.1 (± 8.7)	31.1 (± 11.2)
T2	29	12.2 (± 3.2)	17.8 (± 3.7)	14.6 (± 3.8)	18.5 (± 2.9)	21.2 (± 4.2)	28.3 (± 6.5)	87.6 (± 6.9)	8.2 (± 6.8)	28.1 (± 8.3)
T3	17	13.8 (± 4.6)	18.2 (± 4.5)	13.8 (± 2.9)	18.5 (± 4.2)	21.5 (± 5.3)	26.9 (± 8.4)	88.9 (± 7.0)	9.7 (± 5.8)	29.4 (± 7.7)
T4	19	11.3 (± 1.9)	17.8 (± 5.0)	13.5 (± 4.8)	18.8 (± 3.9)	21.8 (± 4.2)	27.1 (± 8.4)	88.0 (± 7.1)	8.9 (± 5.4)	26.5 (± 6.2)
T5	17	13.1 (± 4.5)	20.5 (± 4.0)	12.4 (± 2.8)	20.1 (± 4.5)	19.5 (± 4.7)	29.0 (± 8.0)	89.8 (± 5.3)	9.7 (± 7.4)	30.1 (± 8.4)
Sample	126	13.4 (± 4.9)	18.3 (± 4.3)	14.1 (± 3.7)	19.0 (± 3.7)	21.4 (± 4.4)	27.8 (± 7.4)	88.2 (± 7.3)	11.0 (± 9.7)	28.1 (± 8.8)

**Table 3**  
One way ANOVA (Levene test) results on TNM and Diagnosis Time comparison.

Emotions	Degree of freedom	F	p
S-Ang	18, 98	3.59	0.000
AC-O		5.79	0.02
BDI		2.24	0.00
STAI		1.86	0.02

No significant effect on emotional status was detected according to age group (four subgroups: > 40 years of age, 41–45, 46–49, and ≥ 50) or TNM staging label (four levels), which were evaluated separately.

Next, a MANOVA (4 × 6 × 4) was conducted to compare TNM stages (four levels), timepoints after diagnosis (six levels), and the emotional variables (four measures). This analysis showed significant effects for some of the examined emotions (Table 3).

Results specifically indicated the impacts of S-Ang, AC-O, and STAI-Y. The post-hoc analysis (LSD test) highlighted the following results. Lower S-Ang scores denoted positive outcomes. Participants in TNM Stage 1 showed lower levels of state anger at T2 (p < 0.01) and T4 (p < 0.01). Moreover, S-Ang was significantly higher at T2 (p < 0.03) and T4 (p < 0.01) for patients in TNM Stage 2. Lower AC-O scores signified negative outcomes. The anger of patients in TNM Stage 1 at T5 (p < 0.03) seemed less controlled. This was also evident for participants in TNM Stage 2 at T0 (p < 0.04) and T5 (p < 0.03). Higher STAI scores denoted negative outcomes. Participants in TNM Stage 1 at T5 (p < 0.02) showed higher levels of anxiety, as did patients in TNM Stages 2 and 3 at T1 (p < 0.04 for both groups).

No significant effects were detected regarding psychological distress (PDI) and depression (BDI-II). The trends for both these emotional variables remained unchanged for the three years following diagnosis. Moreover, an analysis of the raw scores revealed emotional weakness, but no pathological emotional impact. In clinical practice, this outcome is a strong psychological feature because it is a basic resilience pattern component.

**5. Discussion and conclusions**

This study investigated the impacts of emotional traits among young BC patients according to an observational perspective. The aim was to detect late stage complications involving psychological distress after primary treatments. Sociodemographic and medical factors were also evaluated (e.g., predictive in-treatment and post-treatment paths).

Overall, our data highlighted the resilience of young women with BC in dealing with diagnosis and medical treatment. Data also revealed positive mental flexibility among these women toward surgical and pharmacological treatments. This resilience was due to a focus on the medical treatments and their following recovery. However, fragility was detected at long periods following diagnosis. This was mostly prevalent around the 12-month timepoint following diagnosis and shortly after post-treatment paths (i.e., 24–36 months after diagnosis).

The fear of recurrence (low level of emotional regulation evidencing anger, anxiety, and depression such as psychological distress) played an important role, while the emotional need to fight the onset of psychopathological symptoms (depression and/or anxiety) was a factor that participants sought to maintain (i.e., an inner trust to overcome those difficult times in their lives). This study highlighted emotional fragility at specific times during post-treatments. This was correlated with living features.

Several studies have detected negative psychological impacts among older women (expressed as depression, anxiety, and personality disorders) after cancer diagnosis (Bennet et al., 2012; Conley et al., 2016; Lester et al., 2015). However, this study focused on younger patients, who showed better emotional orientations based on psychological resilience and mental health. The following factors may influence emotional regulation: a) Active work, b) expectations for one's own future (i.e. 'things to realise/do for herself'), c) daily involvement in family life (with young children experiencing the burden of family-like protective factors), and d) having a lifelong perspective. These findings support Li, Wang, Yin, Li, and Li, (2018) regarding the relationship between individual resilience levels among both BC survivors and their families. Family function can have strong effects on resilience levels among women with BC. It can encourage them to improve through the support provided by a positive environment, thus reducing the stresses and burdens of caregivers. This study's analysis of socio-demographic variables seemed to confirm the protective factor of family. That is, marital status is not associated with symptoms of depression in the cancer experiences of young women. To the contrary, emotional fragility and depression following cancer is associated with divorce/widowhood.

The clinical degree of disease (TNM labelling) did not affect mental health. Patients seemed well-informed about their clinical features. As reported by Gibbons et al. (2016), this may be related to both early screening practices and stages of detection. Here, women may draw positive expectations about survivorship. Emotional resilience impacts the effects of medical treatments, thus enhancing women in their personal fights against the illness. On the other hand, certain timepoints of the disease can be used to predict emotional weakness and/or crisis. Specifically, patients show higher levels of anger six months (normally at the very end of pharmacological treatments), 12 months, and 18 months after diagnosis. Patients were less able to control their anger levels 36 months following diagnosis. Anxiety was higher immediately after diagnosis, but was well-managed later on. Fear of recurrence was the most common form of emotional distress affecting quality of life among survivors. Our findings highlight the urgent need for tailored psychological support according to targeted timepoints. This will facilitate better and boosted emotional regulation and can help address fears among patients.

Our previous research (2016, Di Giacomo et al., 2015) has indicated that symptoms of depression and psychological distress are not frequent over the three-year perspective among young women with BC, but are spotted at fixed times during survivorship (i.e., 12, 18, and 36 months following diagnosis). Parikh et al. (2015) reported that the psychological status of BC survivors fluctuated and that resilience was a useful trait among young patients. That is, it may enable them to regain a normal life. In fact, an increased likelihood of survival is strongly linked to the restoration of normal life through modified and improved living. In addition, Min et al. (2013) indicated that psychological resilience contributes to lowered emotional distress during cancer experiences. We agree that this cognitive-behavioural variable should be considered the most efficient key point. The authors suggest that psychological resilience represents a strong emotional predictive factor for patients. Its enhancement may be a clinical factor for fighting and reducing psychological distress among BC patients. Moreover, Min et al. (2013) proposed that emotional distress was frequently associated with poor quality of life. Thus, promoting resilience and reducing emotional distress are potential targets for practical and supportive interventions

designed for cancer patients. Markovitz et al. (2015) showed that traumatic events did not impact resilience levels. Rather, resilience seemed to be a crucial contributor for emotional reactions following negative experiences. A combination of surgical/pharmacological treatments in conjunction with non-pharmacological treatments may increase and enhance healthy outcomes among young BC patients, who comprise a vulnerable population with emotional needs.

This study had some limitations. First, its analyses were observational only; sociodemographic variables were not well-balanced. We can thus not eliminate the possibility that women who were distressed or depressed were more likely to perceive their BC as more intrusive. The BDI and PDI scores were based on self-reported measures of depression and distress symptoms, respectively. That is, they were not measures of clinical indicators. Finally, the relatively small sample size (and subsequent distribution into six subgroups according to timepoint after diagnosis) limits the generalisability of our findings.

We could not fully consider the potential psychosocial factors other than social support in our statistical models. This study's findings should thus be interpreted with caution. Future studies should include comprehensive psychosocial factors, which will be necessary for examinations of larger samples to confirm the independent influence of resilience on emotional distress among cancer patients.

### Conflict of interest

The authors declare that they have no conflict of interest.

### Informed consent

"Informed consent was obtained from all individual participants included in the study."

### Funding

No funding assigned to this study.

### Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### Authors' contributions

Di Giacomo led the project, conducted the statistical analyses, and together Perilli wrote the paper. Ranieri collected data and elaborated the database. Donatucci collected data, Cannita enrolled the patients, and Ficorella and Passafiume supervised the research work.

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### References

- Avis, N. E., Levine, B., Naughton, M. J., Case, L. D., Naftalis, E., & Van Zee, K. J. (2013). Age-related longitudinal changes in depressive symptoms following breast cancer diagnosis and treatment. *Breast Cancer Research and Treatment*, 139(1), 199–206. <https://doi.org/10.1007/s10549-013-2513-2> PMID: 23588951.
- Beck, A. T., Steer, R., & Brown, G. (1996). *BDI-II, Beck depression inventory: Manual*. Boston: Psychological Corp Italian version.
- Bennet, B., Lloyd, A., Webber, K., Friedlander, M., et al. (2012). Predictors of resilience in women treated for breast cancer: A prospective study. *Journal of Clinical Oncology*, 30.
- Conley, C., Bishop, B., & Andersen, B. (2016). Emotions and emotion regulation in breast cancer survivorship. *Healthcare*, 4, 56. <https://doi.org/10.3390/healthcare4030046>.
- Costanzo, E. S., Lutgendorf, S. K., Mattes, M. L., Trehan, S., Robinson, C. B., Tewfik, F., et al. (2007). Adjusting to life after treatment: Distress and quality of life following

- treatment for breast cancer. *British Journal of Cancer*.
- Di Giacomo, D., Cannita, K., Ranieri, J., Aloisio, F., Cocciolone, V., & Ficarella, C. (2015). Predictive features of resilience in early breast cancer young patients: Experience in real life. *Annals of Oncology*, *10*, 1–6.
- Di Giacomo, D., Cannita, K., Ranieri, J., Cocciolone, V., Passafiume, D., & Ficarella, C. (2016). Breast cancer survivors and psychological resilience among young women. *Journal of Psychopathology*, *22*(3) 191–19.
- Di Giacomo, D., Ranieri, J., Donatucci, E., Perilli, E., Cannita, K., Passafiume, D., et al. (2018). Emotional 'patient-centred' support in young patients with I-II stage breast cancer: pilot study. *Frontiers of Psychology*, *9*. <https://doi.org/10.3389/fpsyg.2018.02487> (DEC);N° 2487.
- Gibbons, A., Groarke, A. M., & Sweeney, K. (2016). Predicting general and cancer-related distress in women with newly diagnosed breast cancer. *BioMed Central Cancer*, *16*, 935–943.
- Guan Ng, C., Mohamed, S., See, M. H., Harun, F., Dahlui, M., Sulaiman, A. H., et al. (2015). Anxiety, depression, perceived social support and quality of life in Malaysian breast cancer patients: A 1-year perspective study. *Health and Quality of Life Outcomes*, *13*, 205–213.
- Helgeson, V. S., Snyder, P., & Seltman, H. (2004). Psychological and physical adjustment to breast cancer over 4 years: Identifying distinct trajectories of change. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, *23*(1), 3–15.
- Howard-Anderson, J., Ganz, P. A., Bower, J. E., & Stanton, A. L. (2012). Quality of life, fertility concerns, and behavioral health outcomes in younger breast cancer survivors: A systematic review. *Journal of the National Cancer Institute*, *104*(5), 386–405. <https://doi.org/10.1093/jnci/djr541> PMID: 22271773 6.
- Hubbelling, H. G., Rosenberg, S. M., Gonzaález-Robledo, M. C., Cohn, J. G., Villarreal-Garza, C., Partridge, A. H., et al. (2018). Psychosocial needs of young breast cancer survivors in Mexico city, Mexico. *PLoS One*, *13*(5) e0197931.
- Lester, J., Crosthwaite, K., Stout, R., et al. (2015). Women with breast cancer: Self-reported distress in early survivorship. *Oncol. Nurs. Forum*, *42*(1), E17–E23. <https://doi.org/10.1188/15.ONF.E17-E23>.
- Li, Y., Wang, K., Yin, Y., Li, Y., & Li, S. (2018). Relationship between family resilience, breast cancer survivors' individual resilience, and caregiver burden: A cross-sectional study. *International Journal of Nursing Studies*, *88*, 79–84.
- Linley, P. A. (2006). Counseling psychology's positive psychological agenda: A model for integration and inspiration. *Counseling Psychologist*, *34*, 313–322.
- Liu, Y., Li, Y., Chen, L., Li, Y., Qi, W., & Yu, L. (2018). Relationships between family resilience and posttraumatic growth in breast cancer survivors and caregiver burden. *Psycho-oncology*, *27*(4), 1284–1290.
- Markovitz, S. E., Schrooten, W., Arntz, A., & Peters, M. (2015). Resilience as a predictor for emotional response to the diagnosis and surgery in breast cancer patients. *Psyconology*, *24*(Dec. (12)), 1639–1645. <https://doi.org/10.1002/pon.3834>.
- Martino, M. L., Gargiulo, A., Lemmo, D., & Margherita, G. (2019). Cancer blog narratives: The experience of under-fifty women with breast cancer during different times after diagnosis. *Qualitative Report*, *24*, 158–174.
- Min, J. A., Yonn, S., Lee, C. U., Chae, H. J., Lee, C., Song, K. Y., et al. (2013). Psychological resilience contributes to low emotional distress in cancer patients. *Supportive Care in Cancer: Official Journal of the Multinational Association of Supportive Care in Cancer*, *21*, 2469–2476.
- Morasso, G., Costantini, M., Baracco, G., Borreani, C., & Capelli, M. (1996). Assessing psychological distress in cancer patients: Validation of a self-administered questionnaire. *Oncology*, *53*, 295–302.
- Parikh, D., De ieso, P., Garvey, G., Thachil, T., Ramamoorthi, R., Penniment, M., et al. (2015). Post-traumatic stress disorders and post-traumatic growth in breast cancer patients—A systematic review. *Asian Pacific Journal of Cancer Prevention*, *16*. <https://doi.org/10.73114/APJCP2015.16.2.641>.
- Parks, R. M., Derks, M. G. M., Bastiaannet, E., & Cheung, K. L. (2018). Breast cancer epidemiology. In L. Wyld, C. Markopoulos, M. Leidenius, & E. Senkus-Konefka (Eds.). *Breast cancer management for surgeons*. Cham: Springer.
- Quattropiani, M. C., Lenzo, V., & Filastro, A. (2017). Predictive factor of anxiety and depression symptoms in patients with breast cancer undergoing chemotherapy. An explorative study based on metacognitions. *Journal of Psychopathology*, *2*, 67–73.
- Ruddy, K. J., Greaney, M. L., Sprunck-Harrild, K., Meyer, M. E., Emmons, K. M., & Partridge, A. H. (2013). Young women with breast cancer: A focus group study of unmet needs. *Journal of Adolescent and Young Adult Oncology*, *2*(4), 153–160. <https://doi.org/10.1089/jayao.2013.0014> PMID: 24380034.
- Spielberger, C. D. (2004). *State-Trait Anger Expression Inventory-2 (STAXI-2)*. *Professional Manual*. Tampa, FL: Psychological Assessment Resources Beck, 1996. Italian version: Comunian AL. STAXI-2. Giunti Editore.
- Spielberger, C. D., & Sydeman, S. J. (1994). State-trait anxiety inventory and state-trait anger expression inventory. In M. E. Maurish (Ed.). *The use of psychological tests for treatment planning and outcome assessment* (pp. 292–321). Hillsdale, NJ: Erlbaum Italian version: Pedrabissi L., Santinello M., STAI. Giunti Editore, 1989.