



## Review

## Positive psychological functioning in breast cancer: An integrative review

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## ARTICLE INFO

## Article history:

Received 24 August 2015

Received in revised form

29 March 2016

Accepted 2 April 2016

## Keywords:

Positive psychology

Breast cancer

Psycho-oncology

Posttraumatic growth

Well-being

Integrative review

## ABSTRACT

This integrative review aimed to analyze the research into positive psychological functioning after breast cancer, and to integrate the most relevant findings relating to sociodemographic, medical and psychosocial factors.

Relevant outcomes were identified from electronic databases (Medline, PsycINFO, Web of Science, Scopus, Cochrane, CINAHL, and Wiley Online Library) up to July 2015. A Google search was performed to identify unindexed literature. Dissertations and theses were searched on Proquest Dissertations and Theses, DIALNET and TDX. Selection criteria included empirical studies assessing relationships between breast cancer and positive functioning, without restrictions on type of participants.

In total, 134 studies met the inclusion criteria. The sociodemographic, medical, and psychosocial characteristics associated with well-being, posttraumatic growth, finding benefit and meaning were being young, undergoing chemotherapy, and having social support. The last two of these characteristics were time-oriented. The culture of the different samples and positive dispositional characteristics like optimism had an influence on the women's coping styles. Socioeconomic status and level of education were also associated with positive psychological functioning.

The perceived impact of breast cancer on patient, as well as the perceived support from significant others can result in better functioning in women with breast cancer. The results highlight that oncology health professionals should take into account not only the individual and medical characteristics, but also the stage of the oncological process and the psychosocial environment of patients in order to promote their positive functioning.

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Serious illnesses like cancer are adverse experiences with a high psychological impact on patients. Breast cancer is the most frequently diagnosed cancer among women [1] and is the most frequently studied in psycho-oncology research [2]. Many studies have analyzed the negative psychological responses among those who have suffered from cancer and have found associations with fatigue, distress, and depression [3–5]. However, more recently, there has been growing interest in patients' positive psychological functioning (PPF) during their experience of cancer (e.g. Dunn, Occhipinti, Campbell, Ferguson and Chambers, 2011 [6]) as well as in other conditions like coronary heart disease [7] or AIDS [8]. This widening focus towards positivity has resulted from an emerging

branch of psychology, known as *positive psychology*. Specifically in oncology, positive psychology has prompted research and psychological interventions focused on assessing positive resources, such as positive emotions, strengths, and personal meanings, in addition to the traditional focus on psychopathological symptoms and emotional distress [9,10]. According to Gable and Haidt's [11] definition, PPF in cancer is the study of the conditions and processes that contribute to the flourishing or optimal functioning of cancer patients. *Flourish* means to live within an optimal range of human functioning, and it is related to positive dispositional characteristics like optimism, hope and resilience, as well as to the capacity of experiencing positive life changes (posttraumatic

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growth [PTG] and benefit finding [BF]) or finding meaning in the adversity [12]. PPF is usually understood as the result of these conditions and processes and it is assessed by asking patients about their positive subjective states like well-being (WB) or happiness. There have been significant efforts to operationalize what is meant as PPF. The most notable efforts are following explained, but since there is not a conceptualized PPF in breast cancer available, we have applied this concept to this disease.

A relevant theory that explains positive subjective states is Seligman's Well-Being Theory [13]. It holds that the main topic of positive psychology is WB, and that this construct can be assessed using its five components: positive emotions, engagement, relationships, meaning, and accomplishment, which are termed PERMA. Each of these components is clearly described by Seligman ([13]). *Positive emotions* are subjective variables of WB, and include happiness, satisfaction with life, and pleasure. *Engagement* refers to the commitment to activities that facilitates *flow*, a mental state in which the person is fully involved in an activity [14]. Subsequently, given that humans are social beings, it is not surprising that building *positive relationships* is an important issue when facing difficulties in life. Finally, when talking about *meaning*, Seligman refers to relating experiences to the community, religion, or family, while *accomplishment* refers to the achievement of one's goals. Seligman argues that people apply their personal virtues and strengths in order to achieve these five components and, thus, to achieve WB [13]. Peterson and Seligman [15] classified the most universal strengths and grouped them into six virtues [16]: courage, justice, humanity, temperance, wisdom, and transcendence, which have been a focus for psychotherapeutic interventions [9,10] in the field of breast cancer as well. For example, attempts have been made to enhance optimism, resilience, or personal growth (including PTG and BF) in patients and survivors of breast cancer: *optimism* is a general disposition or tendency to hope that good will happen more often than bad [17], while *resilience* is defined by Stewart and Yuen [18] as the cognitive capacity to regain or maintain mental health when facing significant adversity, including physical illness. Finally, the discovery of positive life changes after the cancer experience provides an excellent example of the value of positive psychology in the context of adverse life events [10]. *Post-traumatic growth* and *benefit finding* are the most studied constructs when referring to positive life changes after an oncological experience. Although some authors use them synonymously (e.g. Zoellner and Maercker, 2006 [19]) PTG specifically refers to a person's transformation, after some time elapsed from trauma, to gain a better appreciation of life, an improvement in their relationships with others, an increase in their personal strengths, a spiritual change and development, and to gain new life opportunities following negative experiences [20,21]. Conversely, BF focuses on finding the benefits from an adversity (e.g. a disease), which can itself result in better relationships, enhanced

emotional strengths, or the desire to live one's life fully [22]. In the case of cancer, many authors have focused on the development of these positive life changes [23–25].

This integrative review aims to provide an exhaustive analysis of the results published to date regarding the conditions and processes that contribute to the optimal functioning of breast cancer patients. More specifically, our research aims to explore which conditions (sociodemographic, medical and psychosocial) and positive issues (dispositional characteristics, subjective states and life changes) are related to PPF in breast cancer. Given that many studies have found that people are capable of developing personal growth, finding benefits, or achieving higher levels of meaning in life in the aftermath of cancer in a variety of sites, we hypothesize that, in the specific case of breast cancer diagnosis, some women will also be capable of developing positive functioning, especially those who perceive their cancer as more disruptive.

## Methods

### Literature search strategy

Electronic literature searches were performed using the following databases: Medline, PsycINFO, the Web of Science, Scopus, Cochrane, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Wiley Online Library. In addition, a search was performed on Google for unindexed literature, as well as on Proquest Dissertations and Theses, DIALNET and Doctoral Theses Online (Tesis Doctorals en Xarxa; TDX) for theses and dissertations. A list of positive psychology-related keywords was used to identify relevant studies through an iterative process of search and refine. There was no restriction to the year of publication, and the searches were performed by subject headings, keywords, titles, and abstracts, using the terms and Boolean operators shown in Table 1 (up to July 2015). The reporting follows the PRISMA guidelines.

### Study selection criteria

The following selection criteria were applied to the identified articles.

**Type of studies.** Empirical primary studies that had been published were eligible for inclusion, and reviews, editorials, letters, and case reports were excluded. Given that the review aimed to focus on the study of PPF without interventions, those articles assessing an intervention were excluded. No other limitations were placed on study design or outcome measures. Only studies published in English and Spanish were included.

**Type of participants.** All studies that clearly specified the inclusion of patients or survivors of breast cancer in the title, keywords, or abstract, were included in the review. There were no restrictions to the age or the number of participants or to the phase of disease or its treatment.

**Table 1**  
Descriptors used for the articles research.

Descriptors	
OR	"positive psychology", "flow", happiness, "well-being", flourish*, "positive emotions", engagement, "positive relationships", meaning*, accomplishment, pleasure, pleasant, savoring, blessing, "life satisfaction", wisdom, knowledge, curiosity, "love of learning", "open-mindedness", creativity, courage, bravery, persistence, authenticity, zest, vitality, humanity, love, kindness, generosity, "social intelligence", justice, citizenship, fairness, equity, leadership, temperance, self-regulation, prudence, humility, modesty, forgiveness, transcendence, "appreciation of beauty", "excellence", gratitude, hope, spirituality, playfulness, humor, kindness, religiousness, optimism, resilience, "posttraumatic growth", "personal growth", "benefit finding"
AND	Breast cancer
NOT	mice, mouse, CK19, CK-19, cytokeratin-19, mrna, nucleic acid, tumor metabolism, androgen receptor, estrogen receptor, progesterone receptor, positive tumors, HER2*, cytoplasm*, node, nodal, circulating tumor cells, protein, BRCA*, molecular, phenotype, biopsy, hormone receptor, CYP2D6, skin, tissue, tumor size, HER-2*, cyclophosphamide, ondansetron, cell*

**Positive psychology constructs related to PPF.** The selection of constructs was based on Seligman's WB theory [13] and Peterson and Seligman's list of virtues and strengths [15]. Those articles that focused on constructs implying positive self-transformation (i.e. PTG or BF) were also included.

### Review methods

The abstracts of the identified records were screened for relevance. Articles were rejected if it was determined from the abstract that the study failed to meet the inclusion criteria. When an abstract could not be rejected with certainty, the full article was appraised. A review template was developed, specifying the key information of each study. Two reviewers extracted this information independently. Results were compared, and discrepancies resolved by consensus. Finally, according to the suggestions by Jarde, Losilla and Vives [26] the methodological quality of all quantitative studies was appraised using the applicable items from Downs and Black [27] checklist. Mixed-methods studies were appraised using Plue et al.'s assessment tool [28], while the quality of qualitative studies was assessed following Kmet, Lee, and Cook [29]. No studies were rejected from the final analysis for low methodological quality.

### Results

After removing duplicates, the electronic database searches yielded 6522 bibliographic records, of which 133 published articles and a single thesis met the inclusion criteria (see Fig. 1).

### Study characteristics

From the 134 studies included (see Tables 2 and 3), 113 (84%) were quantitative, 13 studies and the thesis (11%) used qualitative methods, and seven studies (5%) used mixed methods.

Furthermore, 45 (33%) were longitudinal cohort (86%) or case–control (14%) studies, while the remaining used cross-sectional data (66%).

Mean sample sizes were 238.35 (SD = 348.03; range = 25–1933) in the quantitative studies, 33.44 (SD = 34.18; range = 3–155) in the qualitative studies, and 106.7 (SD = 28.08; range = 54–180) in the mixed-methods studies. Most articles reported the mean age of patients (41.7–64.5 years), but 19 did not (See Table 3), and most participants were married or partnered and labeled as Caucasian.

Study quality was assessed in all papers (see Table 2). Quantitative studies were appraised using Downs and Black's [27] checklist. Longitudinal studies obtained higher quality scores than cross-sectional studies, but the greatest differences between the articles were related to the measurement tools. Nearly all quantitative studies utilized tests with known indexes of validity and reliability to measure the outcome variables. In total, 63 different instruments were used to assess PPF (Table 3). The most frequent indicators of PPF were WB (N = 46), PTG (N = 38), meaning (N = 18), and BF (N = 15). Outcomes were mostly assessed by the Posttraumatic Growth Inventory (PTGI [30]; N = 36), the Life Orientation Test (LOT [25], N = 19), which assesses optimism, and the European Organization for Research and Treatment of Cancer and the Quality of Life Questionnaire (EORTC [32]; N = 12).

The study quality of qualitative articles was assessed using Kmet, Lee, and Cook's assessment tool [29]. In general, studies provided adequate descriptions of their aim, design and context. Sampling was either from larger quantitative studies, support groups, or routine breast cancer follow-ups. Data analyses were clearly described, and the most frequently used methods were content analysis and grounded theory. Finally, the study quality of the articles using mixed-methods approaches was assessed using Plue et al.'s assessment tool [28]. In general, the use of mixed-methods helped to address the outcomes, but the studies were not homogeneous (e.g. some of them showing great losses at

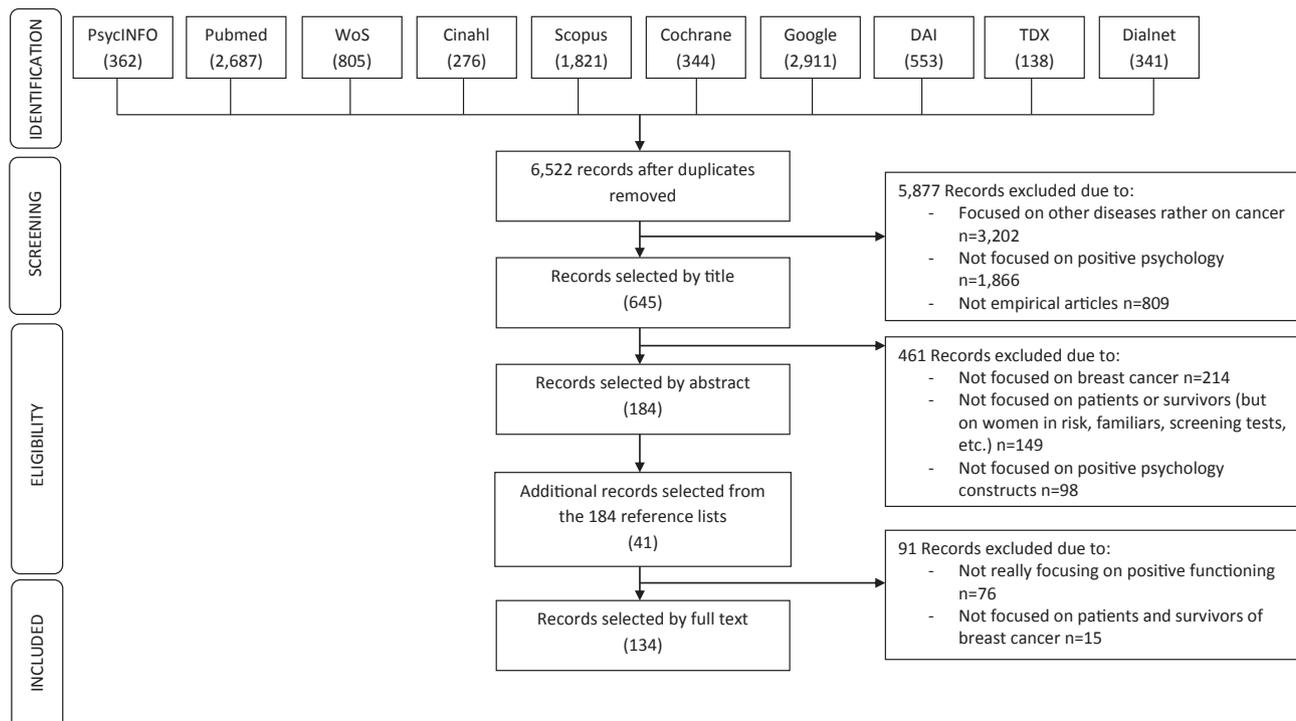


Fig. 1. Articles search process.

**Table 2**  
Main results, limitations, and quality scores of the articles reviewed.

Reference	Main results	Limitations	Quality
Abu-Helalah et al., 2014 (Jordanian)	MPR: WB DC: Monthly income predicted WB (Emotional WB R = 10.6; cognitive WB R = 9.6; social WB R = 10.6). Age was not a predictor of WB.	Only Jordanian women assessed with Western assessment tools. WB assessed as an absence of depression. Did not report cancer treatment.	D&B: 12
Ahmad, Muhammad, & Abdullah, 2011 (Malaysia)	MPR: Hope, positive acceptance of illness, and life appreciation. These were the positive responses identified by women through the interviews.	Small sample size. Only Muslim women.	KLC: 5
Ahn et al., 2007 (South Korea)	MPR: HRQoL/WB. DC: Age was directly related to emotional and social WB and greater levels of HRQoL.	Did not report time since diagnosis, BC stage at diagnosis and age range. Sample recruited from selected academic centers. Tools were developed in Western cultures, but used in this Asian sample.	D&B: 13
Algoe & Stanton, 2011 (USA)	MC: Chemo and radio did not limit patients' WB. MPR: Gratitude. PC: Emotional expression predicted gratitude.	Did not report age range, BC surgery and BC treatment. Most data was recruited from <i>ad hoc</i> measures.	MMAT: 7
Anagnosto-poulos, Slater, & Fitzsimmons, 2010 (Greece)	MPR: Positive Adjustment and Meaning. PC: Personal meaning inversely affected maladjustment to illness. Emotional expression had no effects on psychological maladjustment.	Did not report time since diagnosis. Not all measurement tools had been validated in Greek population.	D&B: 15
Andrykowski et al., 1996 (USA)	MPR: Changes in Outlook of Life and Positive Affect. PC: BC group reported improvements than BBP group in outlook on life spouse/partner relationships, and satisfaction with religion, and more importance to spiritual concerns.	Did not include a second comparison of age-matched healthy women in the design.	D&B: 10
Ashing-giwa, Ganz, & Petersen, 1999 (USA)	MPR: WB DC: socioeconomic level related to greater WB, having a partner were predictors of WB, but ethnicity was not.	Did not report BC stage at diagnosis.	D&B: 13
Avis, Crawford, & Manuel, 2005 (USA)	MPR: WB DC: Not having a partner was inversely related to WB was a predictor of higher WB. More than 90 days of sick leaves was inversely related to WB. PC: Coping – positive cognitive thinking predicted greater WB.	Did not report BC specific percentage of stage at diagnosis.	D&B: 12
Bauer-Wu & Farran, 2005 (USA)	MPR: Meaning in Life. DC: Having children was directly related to meaning in life and spirituality in BC survivors. Having children did not affect in healthy women. PC: Meaning in life was directly related to spirituality and inversely related to stress and distress.	Did not report specific proportions of medical characteristics. Did not report effect size indexes in most results. Matching was not employed (groups were disproportionate on age, children, education, and religion).	D&B: 10
Bellizzi & Blank, 2006 (USA)	MPR: PTG, Optimism and Hope. DC: Being employed and younger age related to PTGI Relationships with others, New Possibilities and Appreciation of Life subscales. PC: Emotional impact and adaptive coping related to PTGI Relationships with others, New Possibilities and Appreciation of Life subscales. Optimism and hope not related to PTG.	Did not report data regarding BC treatment. Did not report total PTGI scores.	D&B: 12
Bellizzi et al., 2010 (USA)	MPR: PTG, Optimism. DC: Age inversely related to PTG. African American women reported higher levels of PTG than White and Hispanic. Being religious was related to higher PTG. MC: BC stage was positively related to PTG. PC: Inverse association between PTG and mental HRQoL. No association between PTG and physical HRQoL.	Did not report time since diagnosis nor type of surgery.	D&B: 12
Berlanga, Aliaga, & Martín, 1995 (Spain)	MPR: WB MC: Type of surgery was related to WB only at T1. PC: Fighting spirit directly correlated with WB.	Did not report the time since diagnosis nor specific values of medical correlations with WB.	D&B: 13
Bloom & Spiegel, 1984 (USA)	MPR: WB DC: Social activity related to better outlook and social WB. Family SS related to better outlook of life.	Did not report type of surgery nor treatment.	D&B: 11
Bloom, Stewart, Johnston, Banks, & Fobair, 2001 (USA)	MPR: WB DC: Being married related to greater WB. MC: Undergoing mast and radio was related to greater WB. PC: Emotional SS directly related to greater mental WB and instrumental SS inversely related to physical WB.	Did not report BC stage at diagnosis.	D&B: 13
Boot, Holcombe, & Salmon, 2010 (UK)	MPR: positive adjustment to illness MC: Women from group 2–5 years postdiagnosis reported higher levels of positive adjustment than	Did not include common measures of positive adjustment such as the Benefit Finding Scale and PTGI.	D&B: 11

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**Table 2** (continued)

Reference	Main results	Limitations	Quality
Bower et al., 2005 (USA)	the other groups in: Fulfillment, Re-evaluation, New ways of living and Appreciation of life. MPR: Meaning, positive affect. DC: Age was inversely related to meaning. Monthly income was directly related to meaning. PC: Perceptions of meaning and vulnerability co-occur. Vulnerability directly associated with meaning.	Not exploring meaning in the immediate aftermath of diagnosis. Did not report percentages of BC stage.	D&B: 14
Bozo, Gundogdu, & Buyukasik-Colak, 2009 (Turkey)	MPR: Optimism, PTG. PC: SS and dispositional optimism predicted PTG.	Did not report type of surgery and cancer treatment. Only examined sources of perceived SS.	D&B: 11
Burke, Sabiston, & Vallerand, 2012 (Canada)	MPR: Passion, positive affect, PTG. PC: Positive affect and obsessive passion were related to all subscales of PTGI	–	D&B: 13
Bussell & Naus, 2010 (USA)	MPR: PTG DC: Collectively using religion during chemo facilitated PTG. PC: positive reframing, and acceptance accounted the variance in fatigue and distressed mood during chemo facilitated PTG. This positive type of coping did not relate to PTG at follow-up.	Less diverse and small sample.	D&B: 13
Büssing, Ostermann, & Matthies, 2007 (Germany)	MPR: QoL and WB. DC: BC patients were more engaged in Spirituality/Religiosity practice than the other cancer patients. No correlations between disease duration – Spirituality/Religiosity. PC: Women with BC had the highest scores in search for meaningful support and positive interpretation of the disease.	The sample included several illnesses.	D&B: 12
Büssing & Fischer, 2009 (Germany)	MPR: Meaning DC: Christian denomination associated with the “challenge” perception of illness. PC: Positive disease interpretations correlated with positive attitudes and reappraisal.	Limited medical information	D&B: 12
Carpenter, Brockopp, & Andry-kowski, 1999 (USA)	MPR: WB DC: BC women reporting positive self-transformation were younger, had higher monthly income, and were more likely to be married, than the other two groups (minimal self-transformation group and feeling stuck group). PC: Positive transformation related to higher self-esteem and WB.	No baseline assessment from the BCS to validate self-reported change. Did not report mean time since diagnosis.	MMAT: 8
Carver et al., 1994 (USA)	MPR: Optimism and WB. PC: Personality dimension of optimism–pessimism is associated to differences in psychosocial adjustment to BC (WB, satisfaction with sex life and though intrusion).	Women relatively high in socioeconomic status. Did not report mean time since diagnosis.	MMAT: 8
Carver et al., 2000 (USA)	Study I: MPR: Optimism PC: Perceiving personal control was related to optimism. Study II: MPR: Optimism and WB. PC: Cancer expectancy tended to the optimistic. Expectancy of remaining free of danger related to greater subjective WB, independently of the locus of control.	–	D&B: 13
Carver & Antoni, 2004 (USA)	MPR: BF, WB and QoL PC: Initial BF predicted more positive affect, WB, self-judged QoL, and less negative emotion, distress and depression at follow-up.	Did not report time since diagnosis	D&B: 13
Carver et al., 2005 (USA)	MPR: Optimism and WB. PC: Subjective QoL in the first year post-surgery predicted itself at follow-up. Initial optimism predicted WB years later.	Did not report time since diagnosis.	D&B: 9
Casso, Buist, & Taplin, 2004 (USA)	MC: Medical variables played no role in outcomes. MPR: WB and QoL. MC: Mast negatively impacted QoL. Symptoms and chemo after diagnosis are the strongest correlates of QoL. BC stage, age, recurrence, and time since diagnosis not highly correlated with WB.	Did not report mean age nor time since diagnosis.	D&B: 12
Champion et al., 2014 (USA)	MPR: PTG. DC: Younger BCS reported more PTG than controls in all subscales, and reported more PTG than older	AC stressors may not be comparable to BC. Do not report specific medical data from each group.	D&B: 13

Table 2 (continued)

Reference	Main results	Limitations	Quality
Chan, Ho, Tedeschi, & Leung, 2011 (China)	BCS in appreciations for life and new possibilities subscales. MPR: PTG, positive cancer rumination. PC: Positive and negative cancer rumination are positively related with PTG. Negative attentional bias positively related with PTG.	–	D&B: 10
Ching, Martinson, & Wong, 2012 (China)	MPR: Meaning. PC: Four modes of fighting: Fighters, Followers, Strugglers and Bearers. Positive transformation only found in fighters. Reframing was the core category.	Did not report percentages of BC surgery and treatment.	KLC: 9
Clough-Gorr, Ganz, & Silliman, 2007 (USA)	MPR: WB DC: Emotional SS is associated with positive changes in all aspects of WB. Lower educational level related to negative changes in both general emotional health and BC specific emotional health.	Largely White, well-educated group of older women.	D&B: 14
Cohen, 2002 (Israel)	MPR: Positive coping. MC: The primary group used more problem-solving coping and positive attitude than recurrence. PC: Positive-focus coping is a powerful way to ensure better adjustment to BC.	Do not specify type of BC surgery and treatment.	D&B: 14
Colby & Shifren, 2013 (USA)	MPR: Optimism, WB and QoL. DC: Older women had more positive mental health than younger, and reported better social and mental functioning. PC: Lack of pessimism was associated to higher levels of positive mental health. Higher scores of optimism was related to better social and mental functioning.	Type of surgery and BC treatment is not reported.	D&B: 14
Cordova et al., 2007 (USA)	MPR: PTG DC: Greater PTG associated with younger age and higher education PC: Perceptions of positive change in participants who experienced BC as a traumatic stressor. PTG unrelated to PTSD.	Measures not include a SS measure. 25% participants were receiving chemo or radio at the time of the study.	D&B: 9
Coroiu, Korner, Burke, Meterissian, & Sabiston, in press (Canada)	MPR: PTG PC: General stress showed a curvilinear association with PTG, but not the cancer-related stress.	–	D&B: 12
Costa-Requena, Rodríguez, & Fernández-Ortega, 2013 (Spain)	MPR: QoL and WB DC: Age did not affect QoL and WB. MC: Treatment did not affect QoL and WB.	Did not report time since diagnosis.	D&B: 13
Cotton, Levine, Fitzpatrick, Dold, & Targ, 1999 (USA)	MPR: WB, spirituality. PC: Spiritual WB positively associated with QoL, fighting spirit and fatalism. Spirituality was correlated to all adjustment styles except for cognitive avoidance. Spirituality correlated highly with WB but weakly with QoL.	Did not report medical treatment.	D&B: 13
Coward & Kahn, 2005 (USA)	MPR: Meaning PC: Women found meaning through the emotional support from others. Also faith was used in some women. Altruistic enrollment was a common reaction among women.	Homogeneous sample in relation to demographical characteristics.	KLC: 8
Croft et al., 2014 (USA)	MPR: Optimism DC: Marital status is significantly associated to optimism among short-term (within the first 5-years) but not long-term BCS, married women having higher optimism than unmarried.	The quality or duration of marriage was not assessed. Do not report type of surgery.	D&B: 12
Danhauer et al., 2013 (USA)	MPR: PTG DC: Education and SS were directly related with PTG. MC: PTG increased over time, being the first year after diagnosis when increased the most. PC: Spirituality-meaning and spirituality-faith were associated to greater PTG.	Limited diversity (race, disease stage, education).	D&B: 13
Davis et al., 2014 (USA)	MPR: Meaning PC: Meaning had five main themes: identity as a survivor, spirituality, thriving, resilience, and altruism.	Most participants were members of a SS group. Did not report type of cancer treatment.	KLC: 8
Denewer, Farouk, Mostafa, & Elshamy, 2011 (Egypt)	MPR: Hope. DC: Direct relationship between SS and hope. SS can predict hope for patients with BC. MC: The type of surgery had no effect on the sense of hope.	–	D&B: 11
Dirksen, 2000 (USA)	MPR: WB DC: SS was a positive predictor of resourcefulness and significantly influenced self-esteem and WB.	Did not specify type of surgery.	D&B: 10

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**Table 2** (continued)

Reference	Main results	Limitations	Quality
DiSipio, Hayes, Newman, & Janda, 2008 (Australia)	PC: Significant relationship between resourcefulness and self-esteem. MPR: WB and HRQoL DC: Younger BCS had reduced emotional WB at 6, 12 and 18 months post-diagnosis, while older BCS reported better social and functional WB at 18 months than general population. MC: HRQoL of BCS was comparable with general population.	Few measures of QoL and WB. Do not report BC treatment characteristics.	D&B: 16
DiSipio, Hayes, Battistutta, Newman, & Janda, 2011 (Australia)	MPR: WB and HRQoL PC: WB and HRQoL improved over time, but some women reported declines in physical, functional and overall QoL between 6 and 18 months after diagnosis.	Little number of measures. Uncompleted information of BC treatment.	D&B: 15
Engel, Kerr, Schlesin-gerraab, Sauer, & Hölzel, 2004 (Germany)	MPR: WB DC: Young women had worse social functioning and more depression. MC: BCT had higher role, emotional, and social functioning scores than mast.	High differences regarding BC treatment between groups.	D&B: 13
Farren, 2010 (USA)	MPR: Power, self-transcendence, QoL. PC: Power was present for BCS. Positive association power – QoL. Power mediated the relation uncertainty – transcendence. Self-transcendence mediated the relations of power and uncertainty with QoL.	Purposive sampling design limits the generalizability of the findings. Few medical information.	D&B: 12
Fehlauer, Tribius, Mehnert, & Rades, 2005 (Germany)	MPR: WB and QoL. DC: Role functioning related with younger age. PC: Global QoL and WB increased at follow-up. After 1 year, the psychological profile of women with BC not different from non-malignant BC surgical treatment.	There was not non-cancer comparison group. Few constructs assessed. No percentages of BC stage.	D&B: 15
Friedman et al., 2006 (USA)	MPR: Optimism and QoL. DC: Similar role of positive expectations and satisfaction with SS in QoL and psychological functioning among all ethnic groups. Satisfaction with SS related to social/family WB.	Few information about BC treatment received.	D&B: 10
Friedman et al., 2010 (USA)	MPR: Self-forgiveness, spirituality, QoL. PC: The more self-forgiving, the less mood disturbance and better QoL. Greater level of spirituality related to reduced mood disturbance and better QoL.	Do not report medical information. Limited psychometric properties of self-blame measure.	D&B: 13
Frost et al., 2000 (USA)	MPR: WB MC: SD had better WB than others, and reported similar SF-36 scores than general population. RD had the most difficulties in physical concerns, but reported similar levels of health satisfaction than ND and AT.	Convenience sample. Timing of the survey. Few medical information.	D&B: 14
Gall & Cornblat, 2002 (Canada)	MPR: Meaning, hope, positive attitude. PC: Relationship with God: encouraging inner strength or faith in self; providing guidance in life decisions; reducing emotional distress; increasing calm; personal growth; creating meaning around cancer; and leading one to a positive attitude of acceptance and hope.	Women not interviewed in depth. Few focused on non-religious resources. No medical information.	KLC: 8
Gall, Charbonneau, & Florack, 2009 (Canada)	MPR: Optimism, Hope, WB. PC: A positive image of God, related to greater distress; a negative image of God, related to greater distress through social well-being and positive attitude. Positive attitude and social WB are mechanisms through which spirituality influences adjustment.	POMS limited findings to negative mood states. Less religious women. Few medical information.	D&B: 12
Gall, Charbonneau, & Florack, 2011 (Canada)	MPR: PTG PC: Benevolent reappraisal at 12 months post-surgery related to greater levels of PTG. PTG at 12 months related to reliance on religious coping at 24 months. Reporting higher levels of religious salience or involvement at pre-diagnosis related to less growth at 24 months.	Not all measures collected at each time. Sample limited to less religiously women.	D&B: 12
Ganz et al., 2002 (USA)	MPR: WB/HRQoL DC: The psychosocial impact of a BC diagnosis greater in younger women, especially regarding diet, exercise, religious beliefs, and spirituality. MC: Disease-free BCS had an excellent QoL many years after BC diagnosis.	Limited response rate.	D&B: 12

Table 2 (continued)

Reference	Main results	Limitations	Quality
Gibson & Parker, 2003 (USA)	MPR: SOC, hope, WB PC: SOC, the most, and hope significantly contributed to Psychological WB, but no significant relationship between spiritual perspective and Psychological WB. Positive relationship SOC – hope, hope – spiritual perspective, and SOC – spiritual perspective.	Homogeneous sample regarding residence and socioeconomic level. Few medical information.	D&B: 10
Giedzinska, Meyerowitz, Ganz, & Rowland, 2004 (USA)	MPR: Meaning and QoL. PC: QoL was similar among groups. However, Whites and AsA reported less meaning than AA. Latinas reported less mental health and emotional WB than others. QoL of AA is better than others regarding SS, sexual function and finding meaning.	Women who did not have access to medical care were not included. Lack of some medical information. Surgery differences between groups.	D&B: 14
Ginzburg, Wrensch, Rice, Farren, & Spiegel, 2008 (Israel)	MPR: WB DC: Control subjects with more childhood stressful life events reported lower levels of SS and WB. BC patients with the highest level of childhood stressful events reported greater WB and SS than the other two subgroups.	Few medical information	D&B: 13
Ghodusi & Heidari, 2015 (Iran)	MPR: Hope PC: Positive relationship between body esteem and hope, and between hope and mental health.	No information of BC stage and treatment received.	D&B: 13
Groarke, Curtis, & Kerin, 2013 (USA)	MPR: optimism, BF DC: SS was crucial on adjustment to cancer. PC: Fighting spirit predicted BF. Optimism was crucial on adjustment to the disease.	Few medical information.	D&B: 14
Ha & Cho, 2014 (Korea)	MPR: WB and Optimism. PC: Self-esteem mediated the effect between WB and depressive symptoms, while Optimism had a partial mediation effect between these variables.	No information of BC treatment.	D&B: 11
Hasson-Ohayon, Braun, Galinsky, & Baider, 2009 (Israel)	MPR: Hope DC: Religious identity associated with less anxiety/preoccupation. Higher system of belief, associated with higher fighting spirit, but with more avoidance, anxiety and fatalistic acceptance. PC: Hope positively related with fighting spirit, and to a religious woman's ability to cope with BC.	Sample including only advanced BC. No control group. Only Jewish religion. No information of surgery.	D&B: 12
Hefferon, Grealy, & Mutrie, 2010 (UK)	MPR: PTG MC: The negative effects of chemo had a potential impact on the process of PTG. PC: General improvement of QoL and life appreciation.	Only White and married women. One-year postcompletion of an exercise intervention.	KLC: 10
Heidrich, 1996 (USA)	MPR: PTG, WB. DC: Older women reported lower levels of purpose in life, and positive relations with others than younger women, but similar PTG, depression and self-esteem. The effects of poor physical health on psychological WB were mitigated by positive social comparisons and social network. MC: Women with BC rated their disease as less severe, less chronic, and more controllable than women with arthritis.	Use of a single support measure. The majority of BC women did not receive adjuvant therapy. Few medical information.	D&B: 14
Heim, Valach, & Schaffner, 1997 (Switzerland)	MPR: WB MC: Changes in coping and in psychosocial adjustment had lower scores at chemo, metastasis, and terminal stage. PC: Denial had a favorable effect on WB yet not on social adaptation. Positive relationships between psychosocial adaptation and good coping.	Homogeneous sample. No information of time since diagnosis.	D&B: 14
Helgeson, 2010 (USA)	MPR: PTG, BF, WB. PC: BCS identified positive lasting effects of the experience. Significant others reported less positive change and more negative changed compared to BCS. Three domains of change in both significant others and BCS: help others with cancer, negative self-image, and negative physical health changes.	The closeness of the significant other relationship operationalized by using spouse Vs non-spouse responses. No BC treatment information.	MMAT: 9
Ho, Chan, Yau, & Yeung, 2011 (China)	MPR: PTG DC: Decrease in pessimistic explanatory style for bad events with age. PC: Self-perceived PTG related to explanatory style for good events, but not for bad events.	Small Variance in PTG explained by explanatory style over and above the effect of demographics.	D&B: 10
Holzner et al., 2001 (Austria)	MPR: WB MC: Intermediate remission periods (2–5 years since initial treatment) enjoyed the highest WB and	–	D&B: 14

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**Table 2** (continued)

Reference	Main results	Limitations	Quality
Horgan, Holcombe, & Salmon, 2011 (UK)	QoL. The areas affected were: emotional, cognitive and role functions, social WB, and sexuality. MPR: positive life changes. PC: Women described 3 types of positive change from BC experience: increased self-confidence, beliefs about what is important in life changed, exploration of previous values and beliefs about empathy and desire to help others.	–	KLC: 10
Høyer et al., 2011 (Sweden)	MPR: WB and HRQoL DC: Young women ( $\leq 50$ years) experienced poorer HRQoL compared to age-adjusted normative data. SS associated to greater WB. Being on sick leave and having poor financial situation diminish the effect of young age on HRQoL.	Few constructs measured.	D&B: 13
Ivanauskienė et al., 2014 (Lithuania)	MC: Chemo associated to HRQoL. MPR: WB and HRQoL DC: Lack of SS, unemployment, poor financial situation were related to low WB. MC: Clinical variables not significantly related to HRQoL.	High rates of absence of response.	D&B: 13
Jafari et al., 2013 (Iran)	MPR: WB and QoL MC: Social functioning, pain and arm symptoms important predictors of general QoL. PC: Spiritual WB was also important predictor of general WB and QoL, specially meaning and peace scales.	Only Muslim women. Lack of medical information.	D&B: 12
Jim, Richardson, Golden-Kreutz, & Andersen, 2006 (USA)	MPR: Meaning PC: Active Coping and SS restored a sense of personal control over cancer and life. Greater Acceptance/Positive Reinterpretation in coping with diagnosis derived in higher life perspective, purpose and goals.	Low sampling of racial groups other than Whites.	D&B: 12
Jim & Andersen, 2007 (USA)	MPR: Meaning PC: Significant relationships between poor functioning, meaning losses and distress may not diminish over time if functioning remains impaired. MC: Time since diagnosis is not influential in outcomes. Meaning in life is a partial mediator for the effect of physical functioning on distress.	Low sampling from culturally diverse groups. Lack of medical information.	D&B: 12
Karademas, Karvelis, & Argyropoulou, 2007 (Greece)	MPR: Optimism, Self-efficacy. PC: Coping focusing on the positive is positively related to optimism, but avoidance is negatively related. Optimism is predicted by psychological factors (illness-related stress, self-efficacy, coping). Self-efficacy exerts influence on optimism both directly and through focusing on the positive.	Time since diagnosis or mast broadly ranging. Women were active members of BC association. Few medical information.	D&B: 13
Kim, Han, Shaw, McTavish, & Gustafson, 2010 (USA)	MPR: WB DC: SS directly increases emotional WB, and through the effect on the choice of coping strategies. The indirect effect of SS on emotional WB through self-blame was stronger than the indirect effect through positive reframing.	Did not consider specific types of SS. Few medical information.	D&B: 12
Klein et al., 2011 (France)	MPR: WB and QoL DC: Age, education level and income related to QoL for both cases and controls. PC: BCS at 5 years had poorer subjective WB and QoL than controls, but differences decreased with time resulting in 15 year-BCS reporting no differences with controls.	Do not report medical information.	D&B: 11
Kucukkaya, 2010 (Turkey)	MPR: PTG DC: No relationship between sociodemographic data and treatment with positive changes, except for higher educational level. MC: Positive relation between PTG and BC stage PC: 50% of patients experienced positive changes following illness. PC: Positive changes within patients' life together with their life appreciation and with interpersonal relationships.	Short time after diagnosis. The prevalence and areas of PTG were assessed by asking a single open-ended question. No surgery information.	KLC: 7
Künzler, Nussbeck, Moser, Bodenmann, & Kayser, 2014 (Switzerland)	MPR: PTG DC: Women (patients or partners) reported more PTG than men. Male patients experienced less PTG if their partners experienced PTG and the treatment was curative.	Due to the nature of the sample, medical information was limited.	D&B: 13

Table 2 (continued)

Reference	Main results	Limitations	Quality
Lechner et al., 2006 (USA)	MC: Female patients experienced less PTG 6 months after diagnosis if treatment was curative. MPR: BF, optimism, positive coping. Women with low or high BF had better adjustment than those with intermediate BF. Curvilinear patterns were larger at long-term for positive outcomes (positive affect and QoL) than negative. BF more related to positive outcomes than to the absence of negative. Women with higher BF had higher WB, optimism, and used positive coping strategies.	Use of convenience samples. BF treated as a unidimensional construct.	D&B: 13
Lee, 2001 (South Korea)	MPR: Hope PC: Hope was a significant factor affecting adjustment. The interaction between hope and fatigue did not predict variances in adjustment.	Lack of detailed medical data.	D&B: 11
Lelorain, Bonnaud-Antignac, & Florin, 2010 (France)	MPR: PTG, happiness. MC: Long-term PTG, independent of time since diagnosis. Only chemo was a significant predictor of PTG. PC: Small association between PTG and mental QoL; mid association PTG – happiness. Spiritual changes not related to QoL or happiness.	French translation of PTGI, although Cronbach's alphas were acceptable.	D&B: 10
Levine, Aviv, Yoo, Ewing, & Au, 2009 (USA)	MPR: QoL, WB, and BF. PC: Women who prayed had greater spiritual WB, faith, assurance and found more positive contributions from BC experience (BF). No significant differences between groups in meaning, peace, mood, QoL or SS.	Data skewed towards good QoL, WB and mood.	MMAT: 9
Li & Lambert, 2007 (China)	MPR: WB DC: Employment status was the best positive predictor of general WB PC: The three most frequently used coping strategies were: planning, positive reframing and self-distraction. Self-blame was the best negative predictor of WB.	No information of time since diagnosis.	D&B: 11
Liu et al., 2014 (China)	MPR: PTG PC: Women reported PTG at 3 months postdiagnosis except for spirituality scale of PTGI. PTG increased and distress decreased between 3 and 6 months. Between 6 and 9 months postdiagnosis, PTG increased, but distress did not decrease.	Only early-stage sample. No information of time since diagnosis and BC treatment.	D&B: 12
Manne et al., 2004 (USA)	MPR: PTG DC: Younger age was a predictor of PTG. MC: Shortly after diagnosis, patient and partners reported positive psychological changes, and PTG increased for both over the 1½-year period. PC: Cognitive and emotional processes contributed to increases in patient PTG, but fewer variables predicted partner PTG.	Relatively high rate of study refusal. Not evaluated the influence of time since treatment. Lack of medical information.	D&B: 11
Manning-Walsh, 2005 (USA)	MPR: WB MC: No difference of distress between women receiving adjuvant therapy and those who had completed. PC: Inverse relationship symptom distress – psychospiritual WB.	Predominantly Caucasian and well-educated sample. No information of cancer treatment.	D&B: 13
Matthews & Cook, 2009 (USA)	MPR: WB, optimism, self-transcendence. PC: The effect of optimism through SS was non-significant. Early confrontation of problems has a positive influence on EWB. Positive relationship optimism – self-transcendence and optimism – BF. Self-transcendence influences Emotional WB.	Sample social homogeneity. Only participants at a particular point in the disease course.	D&B: 12
McDonough, Sabiston, & Wrosch, 2014 (USA)	MPR: PTG, WB. DC: BC-specific SS predicts increases in PTG during the early post-treatment period. PC: Changes in subjective WB were inversely associated with general stress.	Some limitations of the internal consistency of the BC-specific SS and WB measures at follow-up assessment. No information of time since treatment.	D&B: 13
Mera & Ortiz, 2012 (Chile)	MPR: QoL and optimism. PC: Active seeking for SS and cognitive restructuring was associated with WB. Self-criticism and/or social recruitment isolating from family and friends, was associated with poor WB.	Small sample size. No information BC stage.	D&B: 10
Mols, Vingerhoets, Coebergh, & van de Poll-Franse, 2009 (Holland)	MPR: WB, PTG, BF. MC: Long-term BCS reported similar health status and psychological WB as control group. BCS not	Non respondents received radio less often, so the results cannot be generalized to this patient population.	D&B: 13

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**Table 2** (continued)

Reference	Main results	Limitations	Quality
Morrill et al., 2008 (USA)	treated with radio experienced the most PTG and BF 10 years after diagnosis. Patients with lower disease stage at diagnosis were likely to report BF 10 years later. MPR: PTG, QoL. DC: Higher financial status and education related with greater WB. PC: PTG weakened relationships between stress symptoms and both QoL and depressive symptoms. Positive association PTG –PTSS.	Inclusion criteria limited participation to post-treatment women.	D&B: 11
Morris & Shakespeare-Finch, 2011 (Australia)	MPR: PTG MC: BCS reported higher levels of PTG than others. Participants that perceived diagnosis as more traumatic and had higher levels of distress reported higher levels of PTG.	Type of treatment was not taken into account. Few medical information.	MMAT: 8
Mystakidou et al., 2008 (Greece)	MPR: PTG DC: Younger women reported the highest levels of PTG in all domains. Having a partner is related to PTG. MC: Growth was not significantly correlated with time since cancer diagnosis.	No information of cancer surgery.	D&B: 12
Northouse et al., 1999 (USA)	MPR: Optimism, QoL. DC: More satisfaction with family's support related to higher QoL. PC: Optimism was not significantly related to appraisal neither QoL.	Some concepts' measurement overlap.	D&B: 12
Ocampo et al., 2011 (Mexico)	MPR: WB, QoL, and resilience. DC: Age and cancer related variables were not significant in predicting WB. PC: Logic-analytical, problem-solving, and acceptance coping styles related to higher QoL. Positive relationship between resilience and QoL. SS, hardiness, meaning and resilience increased QoL. No relationship between spirituality/religiosity and QoL.	Heterogeneous distribution of BC stages throughout sample. Lack of medical information.	D&B: 12
Perkins et al., 2007 (USA)	MPR: Optimism. PC: Increased optimism and spirituality related to less depression and increased life satisfaction and health perception.	Few medical information.	D&B: 10
Petrie, Buick, Weinman, & Booth, 1999 (New Zealand)	MPR: BF DC: No association between positive effects and age, self-rated health and level of education. PC: Positive experience from illness: healthy lifestyle, improved relation-ships, appreciation of life and health, changed priorities, improved empathy.	Samples were assessed relatively early in the course of patient's illness. Few medical information.	D&B: 11
Porter et al., 2006 (USA)	MPR: PTG DC: Cognitive reframing was a significant predictor of PTG in both groups, but especially in African American. PC: In both groups, cognitive reframing was affected by religious participation and SS satisfaction.	–	D&B: 15
Ransom, Sheldon, & Jacobsen, 2008 (USA)	MPR: PTG. MC: PTG showed a positive relationship with time since treatment. PC: Intrinsic goal orientations predicted PTG. PTG was related with perceived but not actual change in positive attributes.	Lack of non-cancer sample group.	D&B: 14
Romero et al., 2006 (USA)	MPR: Forgiveness, spirituality, WB. PC: Self-forgiving and spirituality were not related. Self-forgiving attitude and spirituality predicted psychological adjustment.	Sample predominantly African American.	D&B: 13
Ruini, Vescovelli, & Albieri, 2012 (Italy)	MPR: PTG, WB. PC: Some PTG levels were higher in BCS and were inversely related to somatization and distress. BCS reported impaired levels of psychological WB, purpose in life and self-acceptance compared to controls.	–	D&B: 15
Ruini & Vescovelli, 2013 (Italy)	MPR: Gratitude, PTG, WB. PC: Gratitude strongly associated to PTG, BF, positive affect and lower symptoms, but only to one scale of Psychological WB (positive relationships with others). PTG related to hedonic WB and negatively to anxiety, depression and hostility.	Self-selected sample. Heterogeneity of patients' clinical conditions.	D&B: 15

Table 2 (continued)

Reference	Main results	Limitations	Quality
Scheffold et al., 2014 (Germany)	MPR: Meaning PC: Personal relationships, meeting basic, personal needs, the preservation of culture and tradition, feeling financially secure and participating in hedonistic activities were the most important sources of meaning for cancer patients.	No cancer treatments information.	D&B: 11
Schou, Ekeberg, Sandvik, Hjermstad, & Ruland, 2005 (Norway)	MPR: HRQoL, optimism. DC: Younger women had poorer WB just after BC treatment. MC: BCS had poorer social and cognitive functioning after BC treatment. PC: Social functioning had the slowest recovery. At 12-month post-diagnosis BCS had similar QoL than the general population.	Less sample representativeness.	D&B: 16
Schou, Ekeberg, & Ruland, 2005 (Norway)	MPR: QoL, optimism. PC: Two coping strategies mediated QoL: fighting spirit (developed from optimistic women and related to better QoL) and Hopeless/helpless (developed from pessimistic women and related to poorer QoL).	Less sample representativeness. Too similar to the other study.	D&B: 15
Schreiber & Edward, 2014 (USA)	MPR: life changes. PC: Women high-engaged with religion reported altruistic and/or relational lifestyle changes. Women low-engaged with religion reported egocentric lifestyle changes.	The article did not report medical and sociodemographic variables of the sample.	KLC: 8
Sears, Stanton, & Danoff-Burg, 2003 (USA)	MPR: Optimism, PTG, BF, Positive coping. DC: Personal characteristics predicted BF and positive reappraisal coping, not PTG. MC: Perceived cancer stress and longer diagnosis at study entry related to PTG 1 year later. PC: 83% of women perceived benefits from BC experience. Positive reappraisal coping predicted 12-month PTG.	Limited sample representativeness. Type of timing. Only positive reappraisal as coping strategy was included.	D&B: 11
Shelby et al., 2008 (USA)	MPR: Optimism, QoL. PC: SS buffered the relationship low optimism–distress, reduced WB, and poorer psychosocial functioning. High levels of SS related to better adjustment when low optimism. Optimism related to WB and SS.	All women had high levels of optimism.	D&B: 12
Sherman, Simonton, Latif, & Bracy, 2010 (USA)	MPR: Meaning, HRQoL. PC: Higher global meaning related with lower distress, improved HRQoL and fewer BC problems. <i>Found</i> meaning was not related to health outcomes. Seeking benefits predicted poorer adaptation.	Patients were recruited from support groups, tumor registries, psychosocial intervention.	MMAT: 6
Shin et al., 2009 (South Korea)	MPR: WB, HRQoL. DC: Lower monthly income, educational status, and unemployment were predictors of poor existential WB among BCS. PC: BCS had more existential and spiritual concerns than general population. No association religion–existential WB.	McGill QoL Questionnaire in evaluation of BCS and general population is questionable.	D&B: 15
Da Silva, Moreira, & Canavarro, 2011 (Portugal)	MPR: PTG, QoL PC: PTG has potential for adaptive consequences, especially for BC women not perceiving BC as traumatic experience.	Portuguese version of PTGI different factor structure from the original.	D&B: 11
Silva, Moreira, & Canavarro, 2012 (Portugal)	MPR: PTG, QoL. PC: PTG buffered the effect of the perceived impact of BC on Psychological and Social QoL and depression. Similar to SS, PTG protects women against the effects of a high perceived impact of cancer on adjustment.	Portuguese version of PTGI different factor structure from the original.	D&B: 13
Sohl et al., 2012 (USA)	MPR: WB, optimism. MC: Optimism was not related to emotional WB and distress in BC patients prior to radio. Emotional response expectancies to radio was related to both emotional WB and distress. Mast and higher stage related to worse emotional outcomes.	No information regarding time elapsed since diagnosis.	D&B: 13
Stanton, Danoff-Burg, & Huggins, 2002 (USA)	MPR: Hope MC: Coping strategies and hope prior to BC surgery predicted adjustment at first year postdiagnosis. PC: Turning to religion useful for low-hope women. Positive coping and seeking SS were more effective for highly hopeful women.	Few medical information.	D&B: 13
Svetina & Nastran, 2012 (Slovenia)	MPR: PTG. DC: Age, educational level, and religiosity not	Compromised properties of the Slovenian version of PTG.	D&B: 11

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Table 2 (continued)

Reference	Main results	Limitations	Quality
Swinton, Bain, Ingram, & Heys, 2011 (UK)	related to PTG. Communication or satisfaction with family relationships contributed to PTG, but not family members or marital status MC: Time since diagnosis, length of treatment and illness status not related to PTG. MPR: Meaning. PC: Movements of the BC experience: inwards – women need time to discover the meaning of BC; outwards –relationships are a good source for hopeful meaning making; upwards – religion offered ways of realigning the experience of BC and for more effective coping.	Few medical information.	KLC: 8
Tartaro et al., 2005 (UK)	MPR: Meaning, WB, QoL. PC: 50% participants found benefits or positive meaning in their experience. Women who did not find positive meaning did not evidence a decline in distress. Higher BF was related to higher spiritual WB.	Collection data of BF occurred at the final interview only. Few medical information.	D&B: 13
Tessier, Lelorain & Bonnard-Antignac, 2012 (France)	MPR: Happiness, positive affect, WB, satisfaction with life. MC: Mast related to poor Subjective WB. Chemo or hormone therapy improved affective WB. Time since diagnosis positively related with physical health, but not with Subjective WB.	Sample selection bias.	D&B: 10
Thompson, 2007 (USA)	MPR: Meaning. MC: Women continue to experience moderate fatigue 16 months after treatment. PC: Positive correlations between symptom distress and meaning in life.	Bias sample recruitment. Small sample size. No information of type of surgery.	D&B: 12
Tighe, Molassiotis, Morris, & Richardson, 2011 (UK)	MPR: Meaning MC: After treatment, women reported feeling positive and the need to change her work priorities. PC: Three core themes: symptom experience, coping and meaning, and relationships.	Small sample size. Few medical information.	KLC: 8
Tomich & Helgeson, 2002 (USA)	MPR: Meaning, spirituality, WB. PC: BCS viewed the world as less controllable than controls. No differences between groups regarding religion (faith), meaning, positive, psychological functioning and the impact on daily activities. BCS reported greater BF and acceptance.	BCS participated voluntarily. Healthy controls were only healthy with respect to cancer.	D&B: 13
Tomich, Helgeson, & Vache, 2005 (USA)	MPR: PTG, BF. PC: BCS reported growth in comparison with controls. Some domains were unique to BC (perceived growth, BF, and positive changes).	Heterogeneity of the stressful events recalled by controls. Few medical information.	KLC: 9
Urcuyo, Boyers, Carver, & Antoni, 2005 (USA)	MPR: BF, optimism. DC: Great reports of BF related to low education levels. MC: Relation between BF and higher disease stage. PC: BF related to the tendency to engage in positive reframing of the stressful experience and the tendency to use religious coping.	Volunteer sample (more educated and better off psychologically).	D&B: 11
Van der Steeg, De Vries, & Roukema, 2008 (Holland)	MPR: WB and QoL. MC: Similar WB between groups, but BCT scored better in psychological domain. Similar health status between groups, but MTC scored worse on physical functioning and role limitations.	No information of time since diagnosis.	D&B: 12
Wang et al., 2014 (China)	MPR: PTG PC: Four trajectories of PTG: stable high (showed better adjustment at long-term), low increasing (showed worse adjustment level), low decreasing, and high decreasing.	Young sample.	D&B: 15
Wang et al., 2014 (China)	MPR: PTG. DC: Higher household income and education level were related to greater PTG. Retirees had higher PTG than working and sick leave survivors. PC: BCS realized the most positive change in personal strength. Spirituality subscale did not increase.	No information of time since diagnosis.	D&B: 13
Wang et al., 2015 (China)	MPR: BF DC: Age, educational level, perceived SS from family at baseline had a positive relationship with BF at six weeks postdiagnosis. PC: Acceptance and positive reappraisal at baseline predicted BF at six weeks postdiagnosis.	Young sample. Few medical information.	D&B: 13

**Table 2** (continued)

Reference	Main results	Limitations	Quality
Weiss, 2002 (USA)	MPR: PTG PC: Positive changes reported by both women and husbands. Spouses tended to corroborate each other's reports of PTG. Wives had greater levels of PTG. Those who reported PTG did not deny the difficulties (fear, helplessness ...). Appreciation for life was the major indicator of PTG.	High socioeconomic status of couples. Voluntary samples.	D&B: 11
Weiss, 2004 (USA)	MPR: PTG DC: Educational level inversely related to PTG. PC: Two aspects associated with PTG in BCS: a) contact with someone who suffered a similar trauma and perceived benefits from it b) marital emotional support. MC: Time since diagnosis inversely related to PTG.	Lack of racial and socioeconomic diversity and by the use of a self-selected sample.	D&B: 12
Wildes, Miller, de Majors, & Ramirez, 2009 (USA)	MPR: WB DC: Latina BCS had high levels of R/S. Higher levels of R/S related to higher levels of social and functional WB but not to personal, emotional or overall WB.	Few medical information.	D&B: 12
Yanez et al., 2009 (USA)	MPR: PTG, WB PC: Meaning/peace facilitated adjustment. Sense of meaning and peace in life predicted decrease in depression and increase in vitality during early survivorship phases. Baseline faith predicted PTG at six and 12 months.	No information of BC stage.	D&B: 13
Zhang et al., 2010 (China)	MPR: Hope DC: Inverse relationship hope – monthly income. PC: Optimistic and confrontive were the most used coping styles. Positive relationship hope – optimistic, confrontive, self-reliant and emotional coping styles. Positive relationship hope – SS.	Information was only obtained during the chemo period for BC patients. No information of time since diagnosis.	D&B: 10
Leung, 2007 (China)	MPR: Meaning PC: Five-phase meaning reconstruction: experiencing loss and deconstruction, reappraising and reconstructing the assumptive world, reconstructing selfhood, redefining purpose and priorities in life, rebuilding or deepening relationships.	No specific medical information as a group.	KLC: 10

*Abbreviations of the assessment tools.* D&B – Downs&Black (2008) assessment tool for quantitative studies; MMAT: Pluye et al. (2011) assessment tool for mixed-methods studies; KLC: Kmet, Leek and Cook (2004) for qualitative studies.

*Abbreviations used in order of appearance:* O.CS. = Observational cross-sectional design; CS = Cross-sectional design; D&B = Downs & Black quality tool punctuation; SD = Standard deviation; BC = Breast cancer; Mast = Mastectomy; Lump = Lumpectomy; WB = Well-being; MPR = Main positive responses analyzed; DC = Demographical characteristics related or unrelated to the positive response; Radio = Radiotherapy; Chemo = Chemotherapy; Hormone = Hormonal therapy; MC = Medical characteristics in relation to PPF; Mixed meth = Mixed methods design; Long = Longitudinal study; PC = Psychosocial/Psychological characteristics in relation to PPF; Recons = Breast reconstruction; PTG = Posttraumatic-Growth; HRQoL = Health-related quality of life; SS = Social support; BF = Benefit finding; QoL = Quality of life; PTSD = Posttraumatic Stress Disorder.

follow-up [33], or others describing samples previously recruited for an interventional study [34]). Given that all the articles included in this integrative review have passed quality filters, their quality is not assessed in the results section.

### Study contents

The contents of all the studies are organized into two sections: a) PPF variables in patients and survivors from breast cancer; and b) sociodemographic, medical, and psychosocial factors related to this PPF. Fig. 2 summarizes the relationships between the main outcomes in these two sections.

#### PPF related to the breast cancer experience

Results are classified in three sets: positive dispositional characteristics (optimism, hope, and resilience), positive subjective states (WB and happiness), and positive life changes (PTG, BF, and meaning). The relationships between these PPF variables and sociodemographic, medical or psychosocial characteristics are commented in their specific sections.

*Positive dispositional characteristics.* Three main positive dispositional characteristics to PPF were found: optimism, hope, and resilience. In the case of optimism (N = 26), quantitative outcomes

showed that optimistic women favored the positive and active coping styles (e.g. seeking social support, positive reappraisal of their illness, or maintaining a fighting spirit [35–41]) as well as were more likely to adjust to illness, have a higher life satisfaction and WB, and to find more benefits from their illness experience compared with pessimistic women [17,36,37,42–50].

Hope (N = 15) was studied using quantitative methodology from three different perspectives: as a dispositional characteristic positively related to optimism (0.23;  $p < 0.005$ ) [51], as a function of high levels of spirituality and religiosity [33,46–49], and as a coping strategy promoted by social support (i.e.  $r = 0.27$ ,  $p = 0.005$ ) [46,50]. Hopeful women tended to adjust better to illness from the first days after diagnosis up to five years [38,52,56–58] and reported better mental health ( $r = 0.565$ ,  $p < 0.001$ ) [59]. However, in contrast to optimism, hope did not have power to generate positive life changes, such as BF or PTG [37,40].

Resilience was studied by two articles using qualitative and quantitative approaches. Although the populations were recruited from different cultures (Chinese and Mexican), both studies concluded that those women with higher levels of resilience were more likely to take meaning from the breast cancer experience and showed higher levels of quality of life ( $r = 0.291$ ,  $p = 0.004$ ) [60,61].

**Table 3**  
Study design, sample characteristics, groups and measures of the articles reviewed.

Reference	Design	Sample	Groups	Measures assessing positive functioning
Abu-Helalah et al., 2014 (Jordanian)	O.CS.	N = 236. Mean age 50.7 years (18–65). Mean time since diagnosis 1.9 years (SD = 1.3). BC stage: I (12.8%), II (45.5%), III (34.6%), IV (7.1%). Surgery: Mast (75%), lump (24%).	1: BC	WB – HADS.
Ahmad, Muhammad, & Abdullah, 2011 (Malaysia)	Qualitative CS.	N = 3. Ages: 47, 39 and 39 years. All of them had recurrent BC.	1: BC	In-depth individual interviews to uncover meanings these women had constructed in their lives after being diagnosed with BC.
Ahn et al., 2007 (South Korea)	O.CS. D&B: 13	N = 1933. BC (N = 634): Mean age 46.6 years (9.4). Treatment: radio (82.4%), chemo (57.3%), hormone (48%). //Mast group (N = 1299): Mean age 47.8 years (9.2). Treatment: radio (18.4%), chemo (64.9%), hormone (48.1%).	BC Vs Mast	HRQoL/WB – EORTC QLQ-BR23.
Algoe & Stanton, 2011 (USA)	Mixed meth. O. Cohort 3-month follow-up.	N = 54. Mean age 56.96 years (SD = 10.36). BC stage: All were diagnosed with metastatic BC.	1: BC	Grateful situations – appraise of a personal grateful situation; Ego transcendence – 2 Likert items; Benefactors' thoughts – two Likert items; Gratitude – Likert Scale.
Anagnosto-poulos, Slater, & Fitz-simmons, 2010 (Greece)	O.CS.	N = 153. Mean age 58.43 years (33–80). BC stage: 0 (9.3%), I (41.5%), II (46.7%), III (2.5%). Surgery: lump (73%), mast (27.4%). Treatment: radio (60%), chemo (37%), hormone (33%).	1: BC	Positive psychological adjustment – SF-36; Personal meaning – LAP-R; Emotional expression – EES.
Andrykowski et al., 1996 (USA)	O.CS.	BC group: N = 80. Mean age 53.9 years (35–76). Mean time since diagnosis 24.6 months (6–57 months). BC stage: I (56%), II (36%), IIIA (7%). Surgery: lump (28%), mast (72%), recons (20%). Treatment: chemo (33%), radio (29%), both (10%), hormone (40%). //Benign breast problems group: N = 80. Mean age 53.3 years (37–76).	BC Vs Benign breast problems	Outlook of life – CPBS; Positive affect – PANAS
Ashing-giwa, Ganz, & Petersen, 1999 (USA)	O.CS.	N = 117. Mean age 63.6 years (32–90). Mean time since diagnosis 7 years (6–8). Surgery: Lump (29%), mast (52%), recons (19%). Treatment: Radio (38%), chemo (41%), hormone (66%).	1: BC	WB – Ladder of Life Scale
Avis, Crawford, & Manuel, 2005 (USA)	O.CS.	N = 202. Mean age 43.5 years (6.23). Mean time since diagnosis 23.23 (<12–36) months. BC stage I–III. Surgery: Lump (57%), mast (43%). Treatment: Chemo (75%), radio 70%.	1: BC	WB – FACT-B and Ladder of Life Scale
Bauer-Wu & Farran, 2005 (USA)	O.CS.	N = 78. BC survivors group (N = 39): Mean age: 49.41 (35–55)//Healthy group (N = 39): Mean age: 42.58.	BC survivors Vs. Healthy women.	Personal meaning in life – PMI, Existential Vacuum and LLS at present; Spirituality – Index of Core Spiritual Experiences;
Bellizzi & Blank, 2006 (USA)	O.CS.	N = 215. Mean age 60 years (32–86). BC stage (tumor stage): localized (57%); regional (7%); invasive (30%). Treatment: Lump (70%), mast (26%).	1: BC	Optimism – LOT-R; Hope – Snyder's HOPE scale; PTG – PTGI.
Bellizzi et al., 2010 (USA)	O.CS.	N = 802. Mean age 57.2 years (31–65). BC stage: in situ (22.2%), local (56.5%), regional (21.3%). Surgery and treatment: Only surgery (32.4%), surgery + radio (36.8%), surgery + chemo (9.1%) surgery + radio + chemo (21.7%).	1: BC	PTG – PTGI; HRQoL – SF-36; Optimism – LOT-R
Berlanga, Aliaga, & Martín, 1995 (Spain)	O. Cohort. 6-month follow-up.	N = 68. Mean age 52.57 years (27–74). BC stage at diagnosis I (17.6%), II (61.8%), III (20.6%). Surgery: Mast (67%), lump (29%). Treatment: Chemo (75%), radio (38%) and hormone (34%).	1: BC	WB – Quality of Life of EORTC – Spanish version
Bloom & Spiegel, 1984 (USA)	O.CS.	N = 86. Mean age 54 years (35–79). Range time since diagnosis 4 months–2 years and 1 year of average since cancer metastasis.	1: BC	Family SS – Family Environment Scale; Outlook – 5 items of sense of achievement in life and hope; Social WB – Heimler's Scale of Social Functioning.
Bloom, Stewart, Johnston, Banks, & Fobair, 2001 (USA)	O.CS.	N = 336. Mean age 44 years (22–51). Range time since diagnosis 1–7 months. Surgery: Mast (47%), lump (46%). Treatment: Chemo (41%), radio (9.8%), hormone (12.5%).	1: BC	Functioning – SF-36; Instrumental support – three items of situations requiring assistance from others; Emotional support – 14 items asking woman's SS perception.

Table 3 (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Boot, Holcombe, & Salmon, 2010 (UK)	O.CS.	N = 156. Mean age 56 years (30–88). Range time since diagnosis: Group 1 (2–4 weeks post-diagnosis), group 2 (6–24 months), group 3 (2–5 years). BC stage: I (12%), II (26%), III (30%). Surgery: Lump (55%), mast (42%). Treatment: Chemo (19%), radio (10%), both (33%), hormone (67%).	Group 1 Vs Group 2 Vs. Group 3	Positive Adjustment – The Positive Adjustment Questionnaire.
Bower et al., 2005 (USA)	O. Cohort. 5-year follow-up	N = 763. Mean age: 55.6 years (30–87). Mean time since diagnosis 3.4 years (1–5). BC stage I and II. Surgery: Lump (53%), mast (28%). Treatment: Chemo (42%), hormone (60%).	1: BC	Meaning – <i>ad hoc</i> questionnaire; HRQoL – RAND, SF-36; Positive and negative affect – CES-D.
Bozo, Gundogdu, & Buyukasik-Colak, 2009 (Turkey)	O.CS.	N = 104. Mean age: 46.28 years (25–69). Mean time since diagnosis 46.28 months (SD = 49.88). Stage of BC: I (16.3%); II (11.5%), III (9.6%), IV (3.8%).	1: BC	Dispositional optimism – LOT-R; PTG – PTGI.
Burke, Sabiston, & Vallerand, 2012 (Canada)	O.CS.	N = 177. Mean age 54.86 years (SD = 10.83). Mean time since diagnosis 10.39 months (SD = 3.89). BC stage: I (34.1%), II (43.2%), III (21.3%). Surgery: Lump (74.6%), mast (64.2%). Treatment: Chemo (75.9%) or radio (85.6%).	1: BC	Passion – The Passion Scale; Positive affect – PANAS; PTG – PTGI.
Bussell & Naus, 2010 (USA)	O. Case-control 2-year follow-up.	Time 1 responders (N = 59): Mean age 50 years (28–76). BC Stage: Ductal carcinoma in situ (3.3%), Stage I (3.3%), II (55.9%), III (18.6%), IV (11.9%). //Time 2 responders (N = 24): Mean age 49 years (30–76). BC Stage: II (70.8%), III (20.8%), IV (4.2%).	Time 1 responders Vs Time 2 responders.	Coping – Brief COPE; PTG – PTGI.
Büssing, Ostermann, & Matthies, 2007 (Germany)	O.CS	Pool 1: N = 6312. 8% had cancer (N = 505). //Pool 2: N = 719 patients. 25% had cancer (N = 180)	1: BC	Spirituality/Religiosity – SpREUK questionnaire from SpREUK; Adaptive coping – AKU questionnaire.
Büssing & Fischer, 2009 (Germany)	O.CS.	N = 387. Mean age 59.7 years (SD = 7.3). Mean time since diagnosis 10.9 (SD = 6.4) months. Various cancer sites, of which 81% were BC.	1: various cancer sites.	Meaning of illness – 8-item questionnaire; Physical and mental HRQoL – SF-12.
Carpenter, Brockopp, & Andrykowski, 1999 (USA)	O. Mixed-meth. CS.	N = 120. BC (N = 60): Mean age 53.7 years (35–77). Mean time since diagnosis 30.8 (SD = 15.3) months. BC stage 0 – IIIB (78% stage II). Surgery: Lump (28%), mast (65%). Treatment: Radio (13%), chemo (32%), radio + chemo (22%), hormone (45%)// Healthy group (N = 60). Mean age 53.6 years (35–78).	BC Vs. healthy group	BC group: Semi-structured interview regarding the BC experience. Both groups: Self-esteem – Rosenberg self-esteem scale, Ryff's self-acceptance scale, and the self-anchoring self-esteem scale; WB – Ryff's Subscales of WB.
Carver et al., 1994 (USA)	O. Mixed-meth. 3, 6, 12-month follow-up.	N = 70. Mean age 58.17 years (32–75). BC Stage: I (72%), II (28%). Surgery: Mast (79%), lump (21%). Treatment: Radio (19%), chemo (22%), hormone (33%).	1: BC	Optimism – LOT-R; WB – interview.
Carver et al., 2000 (USA)	Study I and II: O. Cohort long. 12-month follow-up	Study I: two samples recruited in different times. Sample I (N = 66). Mean age 58.23 (33–72) years. BC stage: I (71%), II (29%). Surgery: Mast (69.7%), bilateral mast (10.6%), lump (19.7%). Treatment: Chemo (6.9%), radio (6.9%), hormone (31.8%). Sample II (N = 78). Mean age 53.42 (28–76). BC stage I (71.7%), II (26.9%). Surgery: Mast (53.8%), bilateral mast (7.7%), lump (37.2%). Treatment: Chemo (23%), radio (30.7%), hormone (51.3%). Study II: N = 202 BC patients of stages 0 (4.9%), I (58.4%) and II (36.6%). Surgery: Mast (33.1%), bilateral mast (3.9%), lump (62.8%). Treatment: Chemo (36.6%), radio (63.4%), hormone (37.6%).	Samples from Study I Vs Sample from Study II	Study I: Optimism – 1 item about expectancies to remain free of cancer; Personal Control – 1 item about inside/outside personal control//Study II: Optimism and personal control over recurrence – same items as in Study I.
Carver & Antoni, 2004 (USA)	Qualitative long 4, 7-year follow-up.	N = 96. Mean age 59.14 (33–79). BC Stage 0 (3%), I (62%), II (35%). Surgery: lump (38.5%) or mast (61.4%), recons (25%). Treatment radio (61.4%), chemo (38.5%), hormone (38.5%).	1: BC	BF – Open-ended questions; Perceived QoL – Open ended questions.
Carver et al., 2005 (USA)	O. Cohort 1, 5, 13 years follow-up.	N = 163. BC women from the initial CS study. Mean age at diagnosis 54.18 (SD = 10.61). BC stage I (62%) and II	Initial sample vs. 5–13 year sample	Optimism – LOT-R; Cancer-related confidence – Affects Balance Scales;

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**Table 3** (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Casso, Buist, & Taplin, 2004 (USA)	O.CS.	(35%). Surgery: Lump (53%), mast (47%), recons (25%). Treatment: Radio (50%), chemo (31%), hormone (56%). N = 216. Aged 45–60 years. BC stage: 0 (13%), I (29.2%), II (29.6%), III and IV (6%). Surgery: Lump (45.8%), mast (54.2%). Treatment: No therapy (15.8%), radio (62.8%), chemo (54.9%), hormone (37.2%).	1: BC	Self-related Quality of Life – Open-ended questions. Rehabilitation and WB – CARES-SF; QoL and health – SF-36.
Champion et al., 2014 (USA)	O.CS.	N = 1531. Younger BCS group: N = 505. Aged 23–45 years at diagnosis. Older BCS group: N = 582: aged between 55 and 70 years. //Age-matched group N = 348. Surgery: Lump (47%), mast (53%).	Younger BCS (YS) Vs Older BCS Vs Age-matched controls	PTG – PTGI.
Chan, Ho, Tedeschi, & Leung, 2011 (China)	O.CS	N = 170. Mean age 48.36 (20–60). Mean time since diagnosis 15.59 months. BC stage: 0 (19%), I (32%), II (38%), III (12%). Surgery: Mast (62%), lump (39%). Treatment: Chemo (64%), radio (72%), hormone (68%).	1: BC	Positive cancer rumination – Chinese cancer-related rumination scale; PTG – Chinese PTGI.
Ching, Martinson, & Wong, 2012 (China)	Qualitative. long 3-month follow-up.	N = 35. Age range 20–79 years. BC stage: all were diagnosed with primary BC without metastasis. Newly diagnosed (34.3%), receiving treatment (34.3%), during rehabilitation (31.4%).	1: BC	Open-ended interview.
Clough-Gorr, Ganz, & Silliman, 2007 (USA)	O. Cohort. 5-year follow-up.	N = 660. Ages 65–69 (26%), 70–79 (56%), 80+ (18%). BC stage I (51%), IIA (30%), IIB (15%), IIIA (4%). Surgery and treatment: Mast (49%), surgery + radio (33%), surgery with no radio (16%), chemo (22%), hormone (75%).	1: BC	Emotional WB – MOS SF-36; BC specific emotional WB – four-item measure of feeling and cancer worries.
Cohen, 2002 (Israel)	O.CS.	N = 80. Primary BC group (N = 39): Mean age 60.4 years (10.2). BC stage I and II. Time since diagnosis: 1 year// Recurrence BC group (N = 41): Mean age 62.3 years (7.7).	Primary BC Vs Recurrent BC	Positive coping styles – WCQ.
Colby & Shifren, 2013 (USA)	O.CS. D&B: 14	N = 51. Mean age 58.7 years (27–82). Time since diagnosis (years): 1–3 (37.3%), 4–6 (33.3%), 7–9 (15.7%), 10+ (11.8%). BC stage I (25.5%), II (22%), III (9.8%), IV (9.8%) or in remission (33%).	1: BC	Optimism – LOT-R; WB and QoL – FLIC.
Cordova et al., 2007 (USA)	O.CS.	N = 65. Mean age 52.3 years (32–72). Mean time since diagnosis 9.4 months (SD = 6.4). BC stage I (45%), II (40%), III (11%). Surgery: Lump 57%, mast 40%. Treatment: chemo (72%), radio (55%), hormone (50%).	1: BC	PTG – PTGI.
Coroiu, Korner, Burke, Meterissian, & Sabiston, In press (Canada)	O.CS.	N = 193. Aged between 28 and 79 years. Mean time since diagnosis 10.6 months (SD = 3.4). BC stage I (40%), II (40%) and III (20%). Surgery: Lump (60%), mast (45%). Treatment: Radio (89%), chemo (65%), hormone (55%).	1: BC	PTG – PTGI
Costa-Requena, Rodríguez, & Fernández- Ortega, 2013 (Spain)	O. Cohort. 3-month follow-up	N = 62. Mean age 52.8 years (10.7). BC stage 0 (14.5%), I (46.7%), II (32.2%), III (6.4%). Surgery: Lump (80.6%), mast (1.6%), mast + recons (17.7%). Treatment: Radio (80.6%), chemo (54.8%), hormone (77.4%).	1: BC	QoL and WB – FACT-B.
Cotton, Levine, Fitzpatrick, Dold, & Targ, 1999 (USA)	O.CS.	N = 142. Mean age 49 years (26–78). Mean time since diagnosis 14 months. BC stage: recurrence or metastatic BC.	1: BC	Psychological adjustment style – MAC scale; Religious and spiritual beliefs – The Principles of Living Survey; WB – FACT-B.
Coward & Kahn, 2005 (USA)	Qualitative. long 8-month follow-up.	N = 14. Support group (n = 7) Mean age 53.7 years (43–63). Mean time since diagnosis 2.7 months (1–5). BC stage 0 (29%), II (57%), III (14%). Surgery: Lump (57%), mast (43%). Treatment: radio (71%), chemo (29%). //Control group (n = 7): well matched with support group.	Support group Vs Control group	Each women was interviewed three times over an 8-month period.
Croft et al., 2014 (USA)	O.CS.	N = 722. Age: <50 years (14.3%), 50–59 (29.4%), 60–69 (34.1%), ≥70 (22.3%). Mean time since diagnosis: 7 years (1	Married Vs Unmarried	Optimism – LOT-R; Spirituality – The Spirituality Self-Rating Scale; Physical

Table 3 (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Danhauer et al., 2013 (USA)	O. Cohort 18-month follow-up	–43). Treatment: Chemo (45.3%), radio (62.9%), hormone (41%). N = 544. Mean age 54 years (25–96). Mean time since diagnosis 4.7 months (0.1–7.3). BC stage I (52%), II (40%), III (8%). Surgery: Lump (64%), mast (16%), mast + recons (20%). Treatment: Radio (72%), chemo (67%), hormone (41%).	1: BC	functioning – The National Health Interview Survey. PTG – PTGI; Spirituality – FACIT-Sp; General HRQoL – SF-36; Optimism – LOT.
Davis et al., 2014 (USA)	Qualitative. CS.	N = 155. Mean age 51.7 (31–77). Mean time since diagnosis: 9.7 years (SD = 6.8). BC stage: 0 (3.2%), I (18.7%), II (38.1%), III (23.2%), IV (11%).	1: BC	Open-ended questions about meaning of survivorship.
Denewer, Farouk, Mostafa, & Elshamy, 2011 (Egypt)	O.CS.	N = 301. Mean age 45.8 years (21–88). Time since diagnosis: women with newly diagnosed BC. Surgery: mast (83%), sparing mast with recons (17%). Sample had not still received treatment for BC.	1: BC	Hope – The Hope Measurement Questionnaire. SS – The Social Support Questionnaire.
Dirksen, 2000 (USA)	O.CS.	N = 84. Mean age 54 years (32–72). Mean time since diagnosis: 2 years (2 months–17 years). Surgery and treatment: surgery alone (29%), surgery + chemo and/or radio (65%), chemo and/or radio alone (6%), hormone (53%).	1: BC	SS – Personal Resource Orientation Questionnaire; Resourcefulness – Self-Control Schedule; Self-esteem – Self-Esteem Index; WB – Index of WB.
DiSipio, Hayes, Newman, & Janda, 2008 (Australia)	O. Case–control 18-month follow-up	N = 963. BC survivors (N = 287). Age: 73.5% were ≤50 years of age. //General population group (n = 675): Aged Most ≤ 50 years of age (57%).	BCS Vs General population group	WB and HRQoL – FACT-G.
DiSipio, Hayes, Battistutta, Newman, & Janda, 2011 (Australia)	O. Cohort 18-month follow-up	N = 287. Mean age 55 years (SD = 10). Mean time since diagnosis 80 months (10–87). BC stage: I (55.7%). Surgery: complete local excision (72.5%), lymph node dissection (87%), mast (86.7%).	1: BC	WB and HRQoL – FACT-B + 4
Engel, Kerr, Schlesin-gerraab, Sauer, & Hölzel, 2004 (Germany)	O. Cohort 5-year follow-up	N = 567. Breast-conserving therapy (BCT; N = 567; 57.4%): Age <50 years (26.1%), 50–69 (59.3%), ≥70 (14.6%). BC stage 0 (5.3%), I (68.1%), II (25.6%), III (0.4%), IV (0.4%). Treatment: no adjuvant therapy (46.2%), chemo/hormone (53.8%), radio (87.1%). //Mast group (N = 421; 42.6%): Age <50 years (18.3%), 50–69 (54.2%), ≥70 (27.6%). BC stage 0 (5.1%), I (40.6%), II (39.1%), III (8.6%), IV (6.6%). Treatment: no adjuvant therapy (27.1%), chemo/hormone (72.9%), radio (21.9%).	BCT group Vs Mast group	WB and QoL – EORTC QLQ-30
Farren, 2010 (USA)	O.CS.	N = 104. BCS. Mean age 53 years (28–81). Most women were diagnosed (60%) and completed treatment (51%) more than 1.5 years prior to the study.	1: BC	QoL – Quality of Life Index-Cancer Version; Power – Power as Knowing Participation in Change Tool, Version II; Uncertainty – MUIS-C; Self-transcendence – Self-Transcendence Scale.
Fehlauer, Tribius, Mehnert, & Rades, 2005 (Germany)	O. Cohort 7–12-years follow-up	N = 370. Mean age 54 years (28–83). Mean time since initial radio 116 months (60–164). BC stage 0, I and II. Surgery: Lumpectomy and axillary lymph node dissection (100%). Treatment: radio (100%).	1: BC	WB and QoL – EORTC QLQ-C30 and QLQ-BR23.
Friedman et al., 2006 (USA)	O.CS	N = 84. Mean age 52 years (27–71). Mean time since diagnosis 26 months. Surgery: Mast (50%), no surgery (21%), lump (10%).	1: BC	HRQoL – FACT-G; Dispositional Optimism – LOT; SS – SSQ.
Friedman et al., 2010 (USA)	O.CS.	N = 108 women with BC. Mean age 52 years. Mean time since diagnosis 21 months (SD = 19.9). BC stage I, II and III.	1: BC	Self-forgiveness – The Forgiveness of Self Scale; Spirituality – FACIT-Sp; QoL – FACT-B.
Frost et al., 2000 (USA)	O.CS.	N = 235. Mean age were 49.5–62 years. Time since diagnosis, BC stage, and treatment: Newly diagnosed (ND; N = 35); Adjuvant therapy (AT; N = 52); Stable disease (SD; N = 84); Recurrent disease (RD; N = 64).	ND group Vs AT group Vs SD group Vs RD group.	Functional level – SF-36; Symptoms – Brief-Symptom Inventory; rehabilitative needs – CARES-SF.
Gall & Cornblat, 2002 (Canada)	Qualitative CS.		1: BC	Qualitative interview

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Table 3 (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Gall, Charbonneau, & Florack, 2009 (Canada)	O. Cohort 1 year follow-up.	N = 39. Mean age 55.2 years (39–70). Mean time since diagnosis 4.75 years (4 mths–23 years). N = 93. Mean age 60.95 years (28–82). BC stage: 0–II (75%), had no lymph node involvement (80%). Surgery: Lump (57%). Treatment: various combinations of treatments post-surgery (51%).	1: BC	Relationship with God – God Image Scale; Optimism – LOT-R; Hope – Functional Hope Scale; WB – FACT-B
Gall, Charbonneau, & Florack, 2011 (Canada)	O. Cohort 2-year follow-up.	N = 93. Mean age 60.95 years (28–82). Time since diagnosis 0–24 months. BC stage: 0–II (75%), had no lymph node involvement (80%). Surgery: Lump (57%). Treatment: 51% had various combinations of treatments post-surgery.	1: BC	Relationship with God – GIS; Religious coping – Religious Coping Questionnaire; PTG – PTGI.
Ganz et al., 2002 (USA)	O. Cohort ≈2.9-year follow-up	N = 817. Mean age 55.6 years. Mean time since diagnosis 3.4 years. Surgery: Lump (52.6%), mast (28.5%), recons (18.9%). Treatment: Chemo (42.2%), hormone (48.4%).	1-year Vs 5-year Vs 10-year follow-up	WB and HRQoL – RAND SF-36 and Ladder of Life Scale; SS – MOS.
Gibson & Parker, 2003 (USA)	O.CS.	N = 162. Mean age 56.5 years (31–85). Mean time since diagnosis was greater than 2–5 years. BC stage: The majority had stage I and II BC (55.5%), ductal carcinoma in situ (22.2%) or infiltrating ductal BC (17.3%).	1: BC	SOC – SOC-13 Scale; Hope – Abbreviated HHI; Spiritual perspective – Spiritual Perspective Scale; WB – Psychological WB Subscale of the QoL/BC.
Giedzinska, Meyerowitz, Ganz, & Rowland, 2004 (USA)	O.CS.	N = 621. Mean age 55.23 years. Mean time since diagnosis 2.93 years (SD = 1.19). BC stage: 0, I or II. Surgery: mast (50%). Treatment: chemo (42.8%), radio (51.7%), hormone (43%). Four ethnic groups: African American (AA), Latin, Asian American (AsA) and White.	AA Vs Latin Vs AsA Vs White	HRQoL – RAND 36-Item Health Survey; Meaning – Meaning Questionnaire.
Ginzburg, Wrensch, Rice, Farren, & Spiegel, 2008 (Israel)	O.CS.	N = 605. BC group (N = 300): Mean age 58.27 years. Mean time since diagnosis 2.28 years//Control group (N = 305) were well-matched with BC group.	BC Group Vs Control Sample	WB – 12-questions regarding happiness and WB.
Ghodusi & Heidari, 2015 (Iran)	O.CS.	N = 100. Aged between 30 and 70 years. Time since surgery: the majority reported 24–73 months. Surgery: mast (100%).	1: BC	Hope – HHI; Body-Esteem – Body Esteem Scale.
Groarke, Curtis, & Kerin, 2013 (USA)	O. Cohort 4-month follow-up	N = 241. Mean age 53.31. BC stage 0 (7%), I (27.4%), II (49.40%), III (12%), IV (1.7%). Surgery: Lump (59%), mast (41%).	1: BC	Optimism – LOT; Cancer adjustment – MAC; Illness-related positivity/BF – Silver Lining Questionnaire.
Ha & Cho, 2014 (Korea)	O.CS.	N = 384. Mean age 48.2 (20–69). BC stage 0 (5.9%), I (41.9%), II 38.7%, III (13%), IV (0.5%). Surgery: Total mast (25.1%) or partial mast (69.2%)	1: BC	WB – EORTC-QLQ; Optimism – LOT-R; Self-esteem – Self-Esteem Scale.
Hasson-Ohayon, Braun, Galinsky, & Baider, 2009 (Israel)	O.CS.	N = 233. Mean age 57.48 years (SD = 11.43). Mean time since diagnosis 11.40 (SD = 3.22). BC stage III (65.2%) and IV (34.3%). Treatment: chemo + radio (50.6%), radio (45.5%), chemo (36.9%), hormone (2%).	1: BC	Cancer adjustment – MAC; Religiosity – The Systems of Belief Inventory; Hope – The Hope Scale.
Hefferon, Grealy, & Mutrie, 2010 (UK)	Qualitative CS.	N = 10. Age range 43–63 years. All were married. Surgery: Lump (80%), mast (20%). Treatment: chemo + radio (80%), chemo (10%), radio (10%).	1: BC	Open-ended interviews concentrating on “What does finding positive benefits from your trauma mean to you?”
Heidrich, 1996 (USA)	O.CS.	BC group (N = 86). Aged between 60 and 74 years (59.3%), over than 75 years (40.7%). //Osteoarthritis (N = 102).	BC group Vs arthritis group.	Self-esteem – Rosenberg's Self-Esteem Scale; PTG, purpose in life, relations with others – Ryff's scales of psychological WB.
Heim, Valach, & Schaffner, 1997 (Switzerland)	O. Cohort 5-year follow-up	N = 74. Mean age 61 years (35–88). BC stage: I (50%), II (2.7%), III (41.8%). Surgery: Mast (100%). Treatment: Radio (10%), chemo (38%).	1: BC	Coping modes – The Bernese Coping Modes; Social adaptation – The Social Adaptation Scale; WB – The Emotional State Scale.
Helgeson, 2010 (USA)	Mixed meth. Case –control 10-year follow-up.	Initial sample (N = 364): mean age 48.25 (27–75). Mean time since diagnosis 4 months. BC stage: I (25%), II (69%), III (6%). Surgery: Lump (69%), mast (31%). //Ten-year sample (N = 180): Mean age 59.43 (38–85). Mean time since diagnosis: 10.58 years	Significant others Vs 10-year BCS	BF – The 16-item BF Scale; PTG – PTGI; Body Image – Cancer Rehabilitation Evaluation System; Physical Functioning – SF-36; Spiritual WB – FACT.

Table 3 (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Ho, Chan, Yau, & Yeung, 2011 (China)	O.CS.	(SD = 0.45). BC stage: I (33%), II (63%), III (3%). Surgery: Lump (68%), mast (33%). Significant Other (SO): Spouse (57%). N = 90. Mean age 46.89 years (30–58). Mean time since diagnosis 25.31 months/7 months–9 years). BC stage 0 (7.8%), I (28.9%), II (46.7%), III (15.6%) IV (1.1%). Surgery: lump (100%). Treatment: Radio (72.2%), chemo (65.5%), hormone (67.8%).	1: BC	PTG – Chinese PTGI; Explanatory Style – The Attributional Style Questionnaire.
Holzner et al., 2001 (Austria)	O.CS.	N = 87. Group 1–2 years since start of initial treatment (N = 30): Mean age 52.9 years (SD = 8.3). Surgery: Mast (61%), lump (39%). Treatment: Chemo (23%), radio (31.2%), chemo + radio (15.6%)//Group 2–5 years (N = 28): Well-matched with the other 2 groups// Group >5 years (N = 29): Well-matched with the other groups.	1–2 years Vs 2–5 years Vs > 5 years	WB/QoL – EORTC QLQ-C30 and FACT-B.
Horgan, Holcombe, & Salmon, 2011 (UK)	Qualitative CS.	N = 20. Mean age 53 years (32–75). Mean time since diagnosis: 4 years and 8 months (3 months–28 years). BC stage 0 (10%), I (5%), II (30%), III (40%), IV (15%). Surgery: Mast (65%), lump (35%). Treatment: 70% chemo and 50% radio.	1: BC	Semi-structured interviews regarding positive changes from the experience of BC.
Høyer et al., 2011 (Sweden)	O.CS.	N = 1086. Mean age 61.8 years (25–94). BC stage: in situ (9.3%), invasive (90.6%). BC. Surgery: no surgery (0.9%), partial mast (56.9%) and total mast (42.2%). Treatment: Radio (67.3%), chemo (35.8%), hormone (67.8%), no therapy (9.1%).	1: BC	WB and HRQoL – EORTC QLQ-C30.
Ivanauskienė et al., 2014 (Lithuania)	O.CS.	N = 338. Mean age 58.6 years (28–95). Mean time since diagnosis 7.5 months (0–23). BC stage I (37.8%), II (31.7%); III (18.6%); IV (2.4%). Surgery: Mast (37.1%), lump (62.9%). Treatment: Hormone (57.6%).	1: BC	HRQoL and WB – EORTC QLQ-C30
Jafari et al., 2013 (Iran)	O.CS.	N = 68. Mean age 48 years (24–70). Time since diagnosis: at least 12 months. Treatment: Radio (100%).	1: BC	WB and QoL – EORTC QLQ-C30; Spirituality – FACIT-Sp12.
Jim, Richardson, Golden-Kreutz, & Andersen, 2006 (USA)	O. Cohort 2-year follow-up	N = 167. Mean age 51.30 years (SD = 10.56). Mean time since surgery: 36 days. BC stage II (90%), III (10%). Surgery: Segmental (44%), mast (56%). Treatment: Radio + chemo (54%), chemo (30%), no treatment (16%).	1: BC	Coping – COPE Inventory; Meaning in Life – MiLS
Jim & Andersen, 2007 (USA)	Study I: O.CS. Study II: O. Cohort 30 month follow-up	Study I: N = 420 (33% had diagnosis of BC). Mean age 50.53 years. Mean time since diagnosis 4.86 years (4.97). 20% had recurrence. //Study II: N = 167. All had diagnosis of BC. Mean time since diagnosis 1.89 years (0.42). 0% had recurrence.	1: BC	Physical and social functioning – SF-36; Meaning in life – MiLS.
Karademas, Karvelis, & Argyropoulou, 2007 (Greece)	O.CS.	N = 92. Mean age 54.89 years (35–68). Mean time since diagnosis and mast: 9 years (3–19). BC stage: lymphedema (23.9%), metastasis (0%).	1: BC	Coping strategies – WCQ; Optimism – Questionnaire for the Assessment of Personal Optimism and Social Optimism-Extended; Self-efficacy – 7-item self-efficacy scale.
Kim, Han, Shaw, McTavish, & Gustafson, 2010 (USA)	O.CS.	N = 231. Mean age 51 years. BC stage: 0–II (70.1%), III–IV (29.9%).	1: BC	Emotional WB – FACT-B; SS – 6-item scale; Positive reframing – COPE.
Klein et al., 2011 (France)	O.CS.	N = 1840. BCS (n = 652): Most women were aged between 55 and 74 years. //Controls (n = 1188): were well-matched with BCS.	5 years Vs 10 years Vs 15 years Vs Controls	WB and QoL – EORTC QLQ-C30 and SF-36; Anxiety – State-Trait Anxiety Inventory;
Kucukkaya, 2010 (Turkey)	Qualitative. CS.	N = 84 women with BC. Aged 30–39 years (19%), 40–49 (50%), 50–60 (31%). Time since after diagnosis 0–6 months (21.4%), 7–12 (14.3%), 13–36 (64.3%). Treatment: Chemo (23.8%), radio (2.4%), chemo + radio (11.9%), no treatment (61.9%).	1: BC	PTG – Open-ended questions regarding positive changes from the experience of BC.
Künzler, Nussbeck, Moser, Bodenmann, & Kayser, 2014 (Switzerland)	O. Cohort 12-month follow-up	N = 154 patients and their couples (39% had BC). Mean age of women with cancer 52 (13.5) years. Surgery and	Cancer patient Vs Partner	PTG – PTGI German translation.

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**Table 3** (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Lechner et al., 2006 (USA)	O. Cohort Study I: 12-month follow-up. Study II: 5-year follow-up.	treatment: Most received a combination of surgery, chemo and radio. Study I: N = 96. Mean age 59.14 (10.03). BC stage 0 (3%), I (61%), II (35%). Surgery: Mast (39%), lump (61%). Treatment: Radio (69%), chemo (39%), hormone (39%). Study II: N = 74. Mean age 51.81 (9.59). BC stage 0 (8%), I (47%), II (45%). Surgery: Mast (51%), lump (49%). Treatment: Radio (49%), chemo (42%), hormone (50%).	1: BC	Study I: BF – 17 items for BF; QoL – 10 items for QoL. Study II: 17 items for BF; QoL and WB – 10 items for QoL and WB; optimism – LOT-R; coping – COPE; Emotion processing – scales for examining emotions.
Lee, 2001 (South Korea)	O.CS.	N = 127. Mean age 44.40 years (27–63). BC stage: Most had stage II BC (68%). Surgery: Mast (60.7%), lump (49.3%). Treatment: chemo (83.6%).	1: BC	Psychological adjustment – PAIS; Hope – HHI
Lelorain, Bonnaud-Antignac, & Florin, 2010 (France)	O.CS.	N = 307 women with disease-free BC. Mean age 62.4 years (36–77). Mean time since diagnosis 10 years (SD = 2.8). BC stage: I (56.3%), II (36.5%), III (6.3%). Surgery: Mast (28%), lump (69%), no surgery (3%). Treatment: Radio (87%), chemo (50%) and hormone (36.5%).	1: BC	PTG–PTGI; Mental Health – MOS-36; Coping Strategies – Brief COPE; Positive Affect–PANAS; Happiness – Open-ended questions.
Levine, Aviv, Yoo, Ewing, & Au, 2009 (USA)	O. Mixed-meth. Long. 9-month follow-up	N = 75. Mean age 57.1 (31–83). BC stage: 0 (6%), I (48%), II (47%).	Women who prayed vs. women who did not pray.	QoL and WB – FACIT-B; Spirituality – FACIT-Sp; SS – ISEL; Social Networks – Social Network Index; BF – BFS.
Li & Lambert, 2007 (China)	O.CS.	N = 100. Mean age 48.18 years. BC stage: I (29%), II (50%), III (15%), IC (6%). Surgery: Mast (91%), lump (9%). Treatment: Chemo (63%), chemo + radio (15%), chemo + hormone (12%), chemo + radio + hormone (8%), radio (2%).	1: BC	Coping strategies – Brief COPE; Affective WB and subjective health – Psychological General WB Index.
Liu et al., 2014 (China)	O. Cohort. 6-month follow-up.	N = 120. Mean age 51.27 years (30–72). BC stage I (26.7%) and II (73.3%). Surgery: Mast (74.2%), lump (25.8%).	1: BC	PTG – PTGI-Simplified Chinese Version
Manne et al., 2004 (USA)	O. Cohort 9, 18 –month follow-up	N = 162. Mean age patients 49 years (29–74)/partners 51 years (29–76). BC stage: I (34%), II (37%), III (3%), metastatic BC (42.2%).	Patient Vs Partner.	PTG – PTGI; Search for Meaning and Reason for Cancer – 3 items about meaning and reason for cancer; Positive Reappraisal – COPE subscale.
Manning-Walsh, 2005 (USA)	O.CS	N = 100. Mean age 45.98 years (30–74). Mean time since diagnosis 10.25 (5.36). BC stage: I (48%), II (41%), III (5%), IV (4%). Surgery: Mast (51%), lump (48%).	1: BC	Psychospiritual WB – FACT-B and FACT-Sp-12;
Matthews & Cook, 2009 (USA)	O.CS. D&B: 12	N = 93. Mean age 59.7 years (39–79). BC stage: I (67%), II (22%), III (9%), stage IV (1%). Surgery and treatment: Surgery + radio (64.5%) and surgery + chemotherapy + radiation (33.5%).	1: BC	Emotional WB – PANAS; Optimism – LOT; Perceived SS – SSO; Self-transcendence – Self-Transcendence Scale.
McDonough, Sabiston, & Wrosch, 2014 (USA)	O. Cohort 6-month follow-up	N = 173. Mean age 55.40 years (28–79). BC stage: from I to III (81.8 stages I or II). Surgery: Lump (60.1%), mast (57.8%). Treatment: Chemo (63.6%), radio (85%), hormone (52.6%).	1: BC	PTG – PTGI; Subjective WB – short version of Ryff's psychological WB scale; SS – Social Support Survey.
Mera & Ortiz, 2012 (Chile)	O.CS.	N = 25. Mean age 52.8 years (29–67). Mean time since diagnosis 15.8 months (2–70). Surgery: mast (81.9%). Treatment: chemo (24%), radio (15%), hormone (40%).	1: BC	QoL – World Health Organization QoL-BREF (WHQOL); Optimism – LOT-R Spanish version; Coping strategies – CSI Spanish version.
Mols, Vingerhoets, Coebergh, & van de Poll-Franse, 2009 (Holland)	O.CS.	N = 183. Aged under 50 years (33%), 50–69 years (62%). Time since diagnosis: 16 years. Most had stage I–II of BC (87%). Surgery: Lump (57%), mast (40%). Treatment: chemo (10%), radio (72%), hormone (16%).	Women with BC Vs healthy matched controls	Health status and subjective WB – Centre data Health monitor; PTG – PTGI; BF – Perceived Disease Impact Scale
Morrill et al., 2008 (USA)	O.CS.	N = 161. Mean age 59 years (36–87). BC stage: I (55%), IIA (29%), IIB (14%). Surgery (99%). Treatment: Chemo (53%), radio (62%), hormone (67%).	1: BC	QoL – FACT-B; PTG – PTGI.
Morris & Shakespeare-Finch, 2011 (Australia)	O.CS. Mixed-meth.	N = 235 (BC: 35%). Mean age 62.99 years (19–89). No longer receiving treatment (75.2%).	1: Various cancer sites	PTG – PTGI.

Table 3 (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Mystakidou et al., 2008 (Greece)	O.CS.	N = 100. Mean age 58.2 years (31–81). Mean time since diagnosis: 6.11 years (0–28). BC stage: Metastasis time: <5 years (61%), 5 or >5 years (39%) 50% had more than two metastasis. Treatment: radio (71%), chemo (99%).	1: BC	PTG – PTGI.
Northouse et al., 1999 (USA)	O.CS.	N = 98. Mean age 55 years (29–81). Mean time since diagnosis 4.6 years (1–15). Surgery: Mast (70%), no cancer in lymph nodes (57.4%) and no metastasis (89%), 34.7% were receiving treatment for BC.	1: BC	Optimism – LOT; Social factors – Family APGAR; QoL – FACT-B.
Ocampo et al., 2011 (Mexico)	O.CS.	N = 50. Mean age 46 years (9.8). 82% were receiving treatment for BC.	1: BC	QoL and WB – Inventario de Calidad de Vida y Salud (InCaViSa); Resilience – Escala de Resiliencia; Religiosity/Spirituality – Escala multidimensional de Medida de Religiosidad y Espiritualidad.
Perkins et al., 2007 (USA)	O.CS.	N = 127. Mean age 78.23 (5.01). Mean time since diagnosis 5.11 years (2.74). BC stage: In situ (12.6%), localized (57.5%), regional direct extension (2.4%); regional nodes (22.8%), distant (4.8%). Treatment: hormone (27.6%).	1: BC	Optimism – LOT-R; Mastery – Mastery Scale; Spirituality – FACIT-Sp; SS – a composite scale.
Petrie, Buick, Weinman, & Booth, 1999 (New Zealand)	O. Cohort 3-month follow-up.	BC group: N = 52. Mean age 54 years (SD = 9.9). //Myocardial infarction (MI) group: N = 143.	BC Vs MI	Positive effects of illness – The Sickness Impact Profile; Illness severity – biological measures; Self-perception of health – self-rated health item.
Porter et al., 2006 (USA)	O.CS.	N = 524. White group (N = 369): Mean age 64.4 years (SD = 8.6). Mean time since diagnosis 79.8 months (SD = 2.9). BC stage: 0 (6.3%), I (55.9%), II (30.4%), III (7.4%). Surgery: Mast (79.6%), lump (18.7%). Treatment: Chemo (22%), radio (29.3%), hormone (28.7%). //African American group (N = 155). Mean age 65 years (SD = 9.5). Mean time since diagnosis 83.6 months (SD = 16.2). BC stage: 0 (9%), I (53.1%), II (28.3%), III (9.7%). Surgery: Mast (76.5%), lump (22.8%). Treatment: Chemo (21.3%), radio (21.9%), hormone (27.7%).	White Vs African American	SS satisfaction – SSQ; PTG – Growth Through Uncertainty Scale.
Ransom, Sheldon, & Jacobsen, 2008 (USA)	O. Cohort 6-month follow-up	N = 83 (BC N = 83; PC N = 27). Mean age BC = 56.2 (SD = 10.2). BC stage 0 or I (95.8%). Surgery: Mast (5.5%), lump (94.5%). Treatment: Chemo (45.5%).	T1 (before radio) Vs T2 (after radio)	Positive personal attributes – Personal Attribute Rating Scales; intrinsic and extrinsic goals – Aspirations Index; PTG – PTGI.
Romero et al., 2006 (USA)	O.CS.	N = 81. Mean age 51.85 years (27–71). Mean time since diagnosis 25.59 months (SD 33.5). Surgery: Mast (62%), lump (12%), no surgery (26%). Treatment: Chemo (32%), radio (3.7%), hormone (16%), chemo + radio (13.6%).	1: BC	Forgiveness – Forgiveness of the Self scale; Spirituality – one item Likert-type scale; QoL/WB – FACIT.
Ruini, Vescovelli, & Albiéri, 2012 (Italy)	O.CS.	N = 120. BCS group (N = 60): Mean age 56.31 years (SD = 11.78). Mean time since diagnosis: 6.42 years (SD = 4.06). BC stage: non-invasive BC (40.7%), invasive BC (33.3%). Treatment: Surgery + hormone + radio (30%), surgery + hormone + chemo + radio (28.3%)//Control group (N = 60): Mean age 56.52 years (SD = 4.06). Moderate stressors (11%), major stressor (50%); personal illness (16.7%); relatives' illness (21.6%).	BCS group Vs healthy control	PTG – PTGI; Psychological WB – Psychological WB scales; Hedonic WB – SQ.
Ruini & Vescovelli, 2013 (Italy)	O.CS.	N = 67. Mean age 56.6 (35–84). Time since diagnosis: 1–15 years. BC stage: non-invasive BC (71.4%), invasive BC (28.6%). Treatment: surgery + hormone (39%), additional chemo (18.6%), additional radio (25.7%).	High levels of gratitude Vs Low levels of gratitude	Gratitude – Gratitude Questionnaire-6 (GQ-6); PTG – PTGI; Psychological WB – Psychological WB Scales; Hedonic WB – SQ.

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Table 3 (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Scheffold et al., 2014 (Germany)	O. Cohort. 6-month follow-up.	surgery + hormone + chemo + radio (24%). N = 258 (45% had BC). Mean age 58.71 years (28–83). Mean time since diagnosis 50.03 months (SD = 54.82).	1: Various cancer sites	Sources of meaning – Sources of Meaning Profile-Revised; Global meaning – PMI.
Schou, Ekeberg, Sandvik, Hjermstad, & Ruland, 2005 (Norway)	O. Case–control 12-month follow-up.	N = 161. Mean age 56 years (21–78). Mean time since diagnosis (at baseline): 12 days. BC stage: 0 (2%), I (68%), II (30%). Surgery: Lump (59%), mast (41%). Treatment: Systematic adjuvant treatment (38%), radio (43%), surgery only (19%).	BCS Vs General female population	HRQoL – EORTC QLQ-C30; Optimism/Pessimism – LOT-R.
Schou, Ekeberg, & Ruland, 2005 (Norway)	O. Cohort 12-month follow-up.	N = 165. Mean age 56.5 years (21–78). BC stage: I or II (93%), III or IV (4%). Surgery: lump (57%), mast (43%). Treatment: chemo, hormone or both (39%).	1: BC	QoL – EORTC QLQ-C30; Optimism – Pessimism – LOT-R.
Schreiber & Edward, 2014 (USA)	Qualitative. CS.	N = 28. Aged older than 21 years. No currently receiving treatment for cancer. Part of a larger CS study of 131 survivors of BC.	1: BC	Open-ended questions
Sears, Stanton, & Danoff-Burg, 2003 (USA)	O. Cohort 12-mths follow-up.	N = 92. Mean age 51.27 years (28–76). Mean time since diagnosis: 28.47 weeks (8–53). BC stage: I or II (100%). Surgery: Mast (39%), lump (48%). Treatment: Chemo (60%), radio (58%), hormone (45%).	1: BC	Personality attributes – LOT; QoL – FACT; PTG – PTGI; BF – 1 direct question; positive reframing coping – COPE.
Shelby et al., 2008 (USA)	O.CS.	N = 77. Mean age 53.5 years (SD = 12.8). Mean time since surgery: 3.4 month (SD = 2.4). BC stage: 0 (4%), I (38%), II (53%), IIIA (5%). Surgery: Lump (47%), mast (53%). Treatment: Chemo (27%), radio (21%), both (29%), hormone (38%).	1: BC	Optimism – LOT; SS – ISEL; Distress and WB – Mental health inventory; QoL – CARES-SF.
Sherman, Simonton, Latif, & Bracy, 2010 (USA)	O.CS. Mixed-meth.	N = 73. Mean age 58.4 (SD = 10.8). Mean time since diagnosis: 53.3 months (SD = 64.8%). Surgery: Mast (58.3%), lump (44.4%). Treatment: Radio (38.4%), chemo (47.9%), hormone (58.9%).	1: BC	Global meaning – Sense of Coherence Scale; Illness-related meaning – written narratives; HRQoL – FACT-G and FACT-B.
Shin et al., 2009 (South Korea)	O.CS.	N = 1,933. Mean age 47.1 (SD = 9.1). Mean time since surgery: 66 months (36–144). BC stage: I (35%), II (47.6%), III (8.5%). Surgery: Mast (66.8%), lump (37.2%). Treatment: chemo (62.5%), radio (40.1%), hormone (49%).	BCS Vs General female population	HRQoL – EORTC; Existential WB – Korean version of McGill QoL Questionnaire.
Da Silva, Moreira, & Canavarro, 2011 (Portugal)	O.CS.	BCS group: N = 71. Mean age 51.5 years (30–68). Mean time since diagnosis: 13.5 months. BC stage: invasive carcinoma (81.7%), non-invasive carcinoma (18.3%). Surgery: Lump (50.7%), mast (49.3%), recons (12.7%). Treatment: Chemo (15.5%), radio (28.2%), chemo + radio (36.6%). //Health control women (N = 89). Mean age 51.1 years old (28–89).	BCS Vs. Health control women	PTG – PTGI; QoL – WHOQOL-Bref.
Silva, Moreira, & Canavarro, 2012 (Portugal)	O.CS.	N = 78. Mean age 52.08 years (30–68). Mean months since diagnosis 6.05. BC stage: Invasive cancer (94%). Surgery: Mast (36%), lump (64%). Treatment: Chemo (73%), Radio (27%).	1: BC	PTG – PTGI; QoL – Portuguese WHOQOL-Bref.
Sohl et al., 2012 (USA)	O.CS.	N = 106. Mean age 56.40 (12.40) years. BC stage 0/I (68%), II/III (31.4%). Surgery: Lump (68%), mast (32%). Treatment: Chemo (39%).	1: BC	Emotional WB – FACT; Dispositional optimism – LOT-R.
Stanton, Danoff-Burg, & Huggins, 2002 (USA)	O. Cohort 12 months follow-up.	N = 70. Mean age: 52.63 years (30–80). BC stage: I (70%), II (30%). Surgery: Mast (41%), breast conservation (59%).	1: BC	Hope – The hope scale; Coping processes – Brief COPE; Psychological adjustment – POMS.
Svetina & Nastran, 2012 (Slovenia)	O.CS	N = 190. Mean age 61.7 years (31–83). BC stage: In remission state for ≥5 years (46%), in remission for <5 years (23%), undergoing treatment (24%), recurrence (6%). Surgery: Mast (55%). Treatment: Radio (48%), chemo (45%), hormone (39%).	1: BC	PTG – PTGI; Coping strategies – Coping Response Inventory

Table 3 (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Swinton, Bain, Ingram, & Heys, 2011 (UK)	Qualitative. CS.	N = 14. Mean age 53.8 years (39–76). BC stage: Invasive tumor (100%). Surgery: Mast (100%). Treatment: patients had completed their chemo or radio treatment.	1: BC	In-depth interviews based on the perspective of hermeneutic phenomenology.
Tartaro et al., 2005 (UK)	O. Cohort 2 ½ year follow-up	N = 39. Ages: 40–49 years (23%), 50–59 (33%), 60–69 (18%), 70–79 (25%).	1: BC	Functional QoL – FLIC; Spiritual WB – Spiritual WB Scale. Semi-structured interview about cancer adjustment meaning attribute.
Tessier, Lelorain & Bonnard-Antignac, 2012 (France)	O.CS.	N = 321. Mean age 62.6 years (36–78). Mean time since diagnosis: 9.9 months (SD = 2.9). BC stage 0–I (52.3%), II–III (39.9%). Surgery: Mast (30%), lump (68%), no surgery (2%). Treatment: Radio (84.1%), chemo and/or hormone (61.7%).	1: BC	Satisfaction with life – 7 ordered-category response scale; Happiness – visual horizontal line graduated 0–10; Positive and negative affect – PANAS; HRQoL/WB – SF-36.
Thompson, 2007 (USA)	O.CS	N = 34. Mean age 50.94 (36–70). Time since treatment; ≤ 6 months (50%), 7–12 months (35%), 13–16 months (15%). BC stage: 0 (6%), I (38%), II (38%), III (12%), IV (6%). Treatment: Only surgery (9%), chemo (3%), radio (6%), surgery + chemo + radio (56%), surgery + chemo (17%), surgery + radio (9%).	1: BC	Meaning – LAP-R
Tighe, Molassiotis, Morris, & Richardson, 2011 (UK)	Qualitative. Cohort 1-year follow-up	N = 10. Mean age 51 years. BC stage I/II (100%). Treatment: Chemo + radio (40%), hormone + radio (30%). 80% had undergone surgery.	1: BC	Use of a narrative approach for in-depth interviews.
Tomich & Helgeson, 2002 (USA)	O. Case–control 5-year follow-up	N = 496. BCS (N = 168): Mean age 54.4 (33–81). Time since diagnosis 5.5 years. BC stage: I (30%), II (65%), III (5%). BC surgery and treatment: surgery + chemo 100%. All were treated with surgery and chemo// Controls (N = 328): well matched with BCS.	BCS Vs. Healthy Controls	Meaning in life – Four questions to assess the meaning of individuals' stressful experiences; Spirituality – FACT-B; QoL/WB – SF-36.
Tomich, Helgeson, & Vache, 2005 (USA)	Mixed-method 5-year follow-up	N = 184. Mean age 54.21. BC stage: I (28.8%), II (66.8%), III (4.3%). //Controls (N = 184): Well-matched with BCS.	BCS Vs. Healthy Controls	Amount of growth and decline – 7-point Likert scale; Positive impact of events on one's life – 14-item measure of BF; Nature of growth and decline – 3 open-ended questions.
Urcuyo, Boyers, Carver, & Antoni, 2005 (USA)	O.CS.	N = 230. Mean age: 53.45 years (27–87). BC stage: 0 (4%), I (58%), II (38%). Surgery: Lump (57%), mast (43%). Treatment: Radio (59%), chemo (38%), hormone (37%).	1: BC	BF – Open-ended questions; Optimism – LOT-R; QoL – 10 QoL items; Coping – BCOPE
Van der Steeg, De Vries, & Roukema, 2008 (Holland)	O.CS.	N = 140. Breast Conserving Therapy (BCT – N = 68) group: Mean age 54.9 years (11.8). BC stage: tumor <1 cm (22%), 1–3 cm (72%), >3 cm (6%), lymph node metastases (21%). Treatment: Chemo (23%), radio (85.2%), hormone (32.3%). //Mastectomy group (MTC – N = 72) well matched with BCT group.	BCT Vs MTC	QoL and WB – WHQOL-100.
Wang et al., 2014 (Taiwan)	O. Cohort 12-month follow-up.	N = 124. Mean age 48.6 years (32–69). Time since surgery: one day at assessment 1. BC stage: 0 (15.3%), I (31.5%), II (32.2%), III (20.1%); IV (0.008%). Surgery: Mast (43.5%), lump (56.5%). Treatment: Radio (66.1%), chemo (63.7%).	1: BC	PTG – PTGI; HRQoL – SF-36.
Wang et al., 2014 (China)	O.CS.	N = 1227. Mean age 53.30 years (26–79). BC stage 0 (1.2%), I (26.4%), II (51.5%), III (13.3%), IV (0.6%). Surgery: mast (82.6%). Treatment: Chemo (31.4%), radio (7.6%), chemo + radio (10.3%).	1: BC	PTG – PTGI-Simplified Chinese Version.
Wang et al., 2015 (China)	O. Cohort 6-week follow-up.	N = 404. Mean age 47.64 years (SD = 7.66). BC stage: 0 (0.5%), I (5.9%), II (62.4%), III (31.2%).	1: BC	BF – BFS – Chinese; Optimism – OPS
Weiss, 2002 (USA)	O.CS.	N = 48. Mean age 52.9 years (37–72). Mean time since diagnosis 38 months (15–65). BC stage: 0 (12%), I (61%), II (20%). Surgery: Mast (68%), lump (32%),	Patients Vs. Husband	PTG – PTGI

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Table 3 (continued)

Reference	Design	Sample	Groups	Measures assessing positive functioning
Weiss, 2004 (USA)	O.CS.	recons (50%). Treatment: Adjuvant (76%). //Husbands (N = 48). Mean age 55.4 years (35–74). N = 72. Mean age 54.2 years (37–78). Time since diagnosis 38.7 months (15–66). BC stage: 0 (19%), I (49%), II (21%). Surgery: Mast (61%), lump (39%), recons (50%). Treatment: + chemo (32%), surgery + chemo + radio (14%)// Couples (N = 72).	Patients Vs. Couples	PTG – PTGI; SS – SSQ; Exposure to a Model of Positive Changes and Stressfulness of the Event – dichotomous questions.
Wildes, Miller, de Majors, & Ramirez, 2009 (USA)	O.CS.	N = 117. Mean age 54.72 years (SD = 10.21) Time since diagnosis: ≤one year (55.8%), 2–5 years (23%), 6–10 years (13.3%), >10 years (8%). Surgery: 99.1% had surgery.	1: BC	Religiosity/Spirituality (R/S) – SBI-15R; HRQoL/WB – FACT-G; Acculturation – Short Acculturation Scale.
Yanez et al., 2009 (USA)	O. Cohort 12-month follow-up	N = 418. Mean age 58.05 years (11.16). Mean time since treatment: 5.6 months. Surgery: Lump (66%), mast (33%). Treatment: Chemo (48%), radio (69%), hormone (58%).	1: BC	Spiritual WB – FACIT-Sp; PTG–PTGI.
Zhang et al., 2010 (China)	O.CS.	N = 159. Age 18–39 years (20%); 40–49 (41%); 50–59 (28%); 60–65 (11%). BC stage: I (32.7%), II (45.48%), III (13.84%), IV (8.18%). Treatment: Chemo (100%).	1: BC	Hope – HHI; Coping styles – Jalowiec Coping Scale.
Leung, 2007 (China)	Qualitative.	N = 26. Age: 21–30 years (3.8%), 31–40 years (7.7%), 41–59 years (34.6%), 51–60 years (46.2%), 61–70 years (7.7%). Mean time since diagnosis 4 years (1–9).	1: BC	Interviews performed through Grounded Theory methodology.

Note I. Abbreviation used in order of appearance: O.CS. = Observational cross-sectional design; CS = Cross-sectional design; SD = Standard deviation; BC = Breast cancer; Mast = Mastectomy; Lump = Lumpectomy; WB = Well-being; MPR = Main positive responses analyzed; DC = Demographical characteristics related or unrelated to the positive response; Radio = Radiotherapy; Chemo = Chemotherapy; Hormone = Hormonal therapy; Mixed meth = Mixed methods design; Long = Longitudinal study; Recons = Breast reconstruction; PTG = Posttraumatic-Growth; HRQoL = Health-related quality of life; SS = Social support; BF = Benefit finding; QoL = Quality of life; PTSD = Posttraumatic Stress Disorder.

Note II. Measurement tools abbreviations in order of appearance: HADS = Hospital Anxiety and Depression Scale; EORTC QLQ-BR23 = European Organization for Research and Treatment of Cancer Breast Cancer-Specific Quality of Life Questionnaire – 23; MOS SF-36 = Medical Outcomes Study Short Form 36; LAP-R = Life Attitude Profile – Revised; EES = The Emotional Expressivity Scale; CPBS = Cancer Patient Behavior Scale; PANAS = Positive and Negative Affect Scale; PMI = Personal meaning index; LLS = The Ladder of Life Scale; LOT – R = The Life Orientation Test-Revised; PTGI = Posttraumatic Growth Inventory; RAND = Research and Development; Brief COPE = The short version of the COPE scale; SPREUK = Spiritual and Religious Attitudes in Dealing with Illness, AKU = Adaptive Coping with Disease; CARES-SF = Cancer Rehabilitation Evaluation System-Short-Form; WCQ = Ways of Coping Questionnaire; FLIC = The Functional Living Index-Cancer; FACT-B = Functional Assessment of Cancer Therapy; MAC = Mental Adjustment to Cancer; FACIT-Sp = The Functional Assessment of Chronic Illnesses Therapy – Spiritual Well-Being; MUIS = Mishel's Uncertainty in Illness Scale; SSQ = Social Support Questionnaire; MO; MiLS – Meaning in Life Scale; HHI: Herth Hope Index; BFS – Benefit Finding Scale; WHQoL – The World Health Organization Quality of Life; InCaViSa = Inventario de Calidad de Vida y Salud; POMS = Profile of Mood States; OPS = Optimism–Pessimism Scale; SQ = Symptom Questionnaire.

**Positive subjective states.** WB (N = 46) was studied in five vital areas, labeled subjective, emotional, social, spiritual, and psychological WB. Quantitative studies reported that some areas of WB were related to specific elements of PPF, as was the case for spiritual WB, being associated with higher levels of hope ( $r = 0.55$ ,  $p < 0.001$ ) and meaning ( $r = 0.576$ ,  $p < 0.001$ ) [62,63], and psychological WB being significantly associated with maintaining a fighting spirit, a gratitude attitude, and self-esteem [52,46,64–68]. Paradoxically, constructs associated to a negative psychological functioning had a time-related relationship with WB ( $r = -0.42$ ,  $p = 0.01$ ) [69]. For instance, although self-blame was inversely related to general WB ( $r = 0.126$ ,  $p < 0.05$ ) [70], WB was found to be improved by a coping strategy of denial in the initial phases of the disease and treatment ( $r = 0.58$ ;  $p < 0.01$ ) [71]. Regarding the relationship between WB and positive life changes, such as PTG, the results were controversial, with the studies reporting either a positive relationship between them ( $F = 6.301$ ,  $p < 0.001$ ) [68,72] or a non-significant one [73].

Only two articles explicitly examined women's happiness, finding that Caucasian women who had survived breast cancer expressed happiness in the long-term (five to 15 years) after diagnosis [74,75] and that this happiness was moderately associated with PTG ( $r = 0.26$ ;  $p < 0.05$ ) [74], life satisfaction ( $r = 0.653$ ,  $p < 0.01$ ), and positive affect ( $r = 0.435$ ,  $p < 0.01$ ) [75].

**Positive life changes.** This section refers to the benefits and positive changes that breast cancer patients and survivors from different cultures identified from their experiences, including PTG, BF, and meaning. The 38 articles in which PTG was studied focused on either those coping styles related to the emergence of PTG or to the five dimensions of PTG proposed by Tedeschi and Calhoun [76] – improved appreciation for life, recognition of personal strengths and spirituality, improvements in personal relationships, and considering new possibilities. Some attitudes toward breast cancer were related to PTG in White and African American samples, such as cognitive reframing ( $\beta = 0.92$ ,  $p < 0.05$ ) [77,78], positive reappraisal ( $r = 0.27$ ,  $p < 0.05$ ) [37], seeking social support ( $\beta = 0.23$ ,  $p < 0.05$ ), having religious beliefs ( $\beta = 0.24$ ,  $p < 0.05$ ) or participation ( $\beta = 0.184$ ,  $p < 0.005$ ) [74,77,79], and maintaining a fighting spirit [80]. This last study was the only one that obtained the data using qualitative methods. Culture factors may mediate the relationships between coping styles and PTG, as found in the studies by Porter et al. [77] and Bellizzi et al. [81] where the effect size between cognitive reframing and PTG was larger in African American women ( $\beta = 0.219$ ,  $t = 4.221$ ,  $p < 0.05$ ) than in White women ( $\beta = 0.093$ ,  $t = 5.898$ ,  $p < 0.05$ ), reporting significant differences between groups ( $\beta = 0.34$ ,  $t = 11.15$ ,  $p < 0.001$ ). Finally, the emotional expression, gratitude, positive affect and maintaining an active and optimistic explanatory style showed significant positive

POSTTRAUMATIC GROWTH				WELL-BEING			
Sociodemographic characteristics	Medical characteristics	Psychosocial characteristics	Dispositional characteristics	Sociodemographic characteristics	Medical characteristics	Psychosocial characteristics	Dispositional characteristics
Age (-) n=10 Being partnered (+) n=4 Level of education (+) n=3; (-) n=2 Being employed (+) n=3	BC stage (+) n=2 Time since diagnosis (+) n=2 Chemotherapy (+) n=1 Symptoms (+) n=3, (-) n=2, (Δ) n=1	Social support (+) n=3 Religiosity (+) n=4 Spirituality (+) n=4	Optimism (+) n=6 Cognitive reframing (+) n=2 Positive reappraisal (+) n=2 Seeking SS (+) n=1 Fighting spirit (+) n=1	Level of education (+) n=6 Socioeconomic status (+) n=2 Being employed (+) n=1	Time since diagnosis (+) n=5 Mastectomy (-) n=3 Chemotherapy (+) n=1	Social support (+) n=13 Spirituality (+) n=3 Religiosity (+) n=7	Optimism (+) n=6 Fighting spirit and self-esteem (+) n= 6 Self blame (-) n=1 Denial (-) n=1 Hope (+) n=1
BENEFIT FINDING				MEANING			
Sociodemographic characteristics	Medical characteristics	Psychosocial characteristics	Dispositional characteristics	Sociodemographic characteristics	Psychosocial characteristics	Dispositional characteristics	
Level of education (+) n=5	Time since diagnosis (+) n=2 Time since treatment (+) n=1	Spirituality (+) n=2 Religiosity (+) n=3	Optimism (+) n=3	Socioeconomic status (+) n=1	Spirituality (+) n=3 Social support (+) n=3	Resilience (+) n=2 Hope (+) n= 2 Positive reframing (+) n=1	

(+): positive lineal relationship between the predictor and the construct of positive psychological functioning; (-): negative lineal relationship between the predictor and the indicator of positive psychological functioning; n: number of the articles reporting significant relationships; (Δ): curvilinear association between the predictor and the construct of positive psychological functioning.

**Fig. 2.** Summary of the main predictors (including sociodemographic, medical, psychosocial and dispositional characteristics) of the most studied constructs of the positive psychological functioning: posttraumatic growth, well-being, benefit finding and meaning.

correlations to higher levels of PTG in women with breast cancer (e.g.  $r = 0.398$ ,  $p < 0.01$ ;  $r = 0.19$ ,  $p < 0.01$ ) [68,74,82–87]. Regarding the PTG dimensions, women who had been treated for breast cancer reported a better appreciation for life and health [34,40,73,88–92], which triggered a positive change in their health behavior [34,90–94]. They also reported cancer to be an opportunity for life changes, and as a means to achieve better recognition and enhancement of their personal strengths [66,88–90,95,96,87] and spirituality [34,74,89,97]. In addition, better interpersonal relationships were widely reported [34,37,73,89–91,94,97–100], especially in regards to their relationship with their partner/spouse, as well as enhanced empathy and altruism toward others [53,91,94,101]. Longitudinal studies looking at PTG found that it tended to increase over time (e.g.  $F = 13.387$ ,  $p = 0.000$ ) both in Western and Eastern populations [96,87,102].

More than 50% of women reported at last one benefit from their cancer experience [37,73,103] and was positively related to PTG (e.g.  $r = 0.42$ ,  $p < 0.001$ ) [73,104]. BF was appraised by 15 studies; as for PTG, it was related to maintaining a fighting spirit ( $r = 0.34$ ;  $p < 0.01$ ) [105] and to positive reframing ( $r = 0.33$ ,  $p < 0.01$ ) [49], as well as having optimistic and grateful attitudes ( $r = 0.36$ ,  $p < 0.01$ ;  $r = 0.14$ ,  $p < 0.05$ ) [29,41]. In addition, women who reported higher levels of spirituality and religiosity were prone to find benefits from their illness [79,103,106,107], resulting in greater positive emotions and altruism toward others [34,42,108,109]. A quadratic association was found in one study between psychological adjustment to illness and BF, such that women with medium levels of adjustment to breast cancer showed the highest levels of BF ( $\beta = 0.20$ ,  $R^2 = 0.028$ ;  $p < 0.009$ ) [22].

Meaning was explored in 18 articles, both qualitative and quantitative. In qualitative interviews, women related this construct with the presence of resilience, courage, and self-transformation [60,66,110], as well as their perceived social support [98,111]. Quantitative studies were more focused on the relationship between meaning and the adoption of certain coping styles like positive reframing ( $r = 0.41$ ,  $p < 0.01$ ) [112], as well as the inverse relationship with negative thoughts and distress ( $r = -0.36$ ;  $p < 0.05$ ;  $r = -0.41$ ;  $p < 0.01$ ) [113,114]. Both qualitative and quantitative studies reported that those women reporting higher levels of meaning adjusted better to their illness and had better quality of life [60,108,114–117].

#### *Sociodemographic, medical and psychosocial characteristics related to PPF*

**Sociodemographic characteristics.** Four sociodemographic characteristics were considered: age, familial and marital status, educational level, and socioeconomic level.

**Age.** This was the most studied sociodemographic characteristic. Although younger women presented lower levels of initial quality of life than older ones in the immediate aftermath of breast cancer [118,119], they subsequently tended to report higher levels of PTG [40,68,89,92,120–125]. The majority of the studies that explored this characteristic found a significantly inverse relationship.

**Familial status.** The relationship between having children and reports of meaning in life or PTG was not significant [40,126]. Being partnered had also no relationship with meaning [127] or hope [55,128], but it was positively associated with higher levels of PTG, optimism, and quality of life ( $r = 0.19$ ,  $p < 0.01$ ;  $r = 0.33$ ,  $p < 0.001$ ;  $B = 10.069$ ,  $p = 0.009$ ) [40,125,44], especially in the short-term survivors of breast cancer [35]. In addition, some studies found that the better PPF in married women was related to their higher perception of social support when compared with those that had no partner [40,78,97,129,130], even at three ( $r = 0.22$ ,  $p < 0.05$ ) and six months ( $r = 0.17$ ,  $p < 0.05$ ) of follow-up.

**Level of education.** Education was positively associated with greater BF, quality of life, and WB in both Eastern and Western breast cancer populations [90,107,128,131–134]. However, the association between education and PTG was controversial, showing either negative ( $\beta = -0.18$ ,  $p < 0.05$ ;  $r = -0.26$ ,  $p < 0.05$ ;  $r = -0.17$ ,  $p < 0.03$ ) [40,97,135] or positive relationships ( $\beta = 0.33$ ,  $p < 0.01$ ;  $F = 6.653$ ,  $p = 0.001$ ;  $r = 0.28$ ,  $p < 0.05$ ) [84,87,124].

**Socioeconomic status.** Socioeconomic status and household income was studied with samples from diverse cultures (Chinese, African American, Caucasian), and it was positively associated with higher levels of WB ( $R^2 = 10.9$ ,  $p < 0.001$ ;  $R^2 = 10.6$ ,  $p < 0.001$ ) [134,136], meaning ( $\beta = 0.76$ ,  $p < 0.001$ ) [92], quality of life ( $F = 6.74$ ,  $p < 0.01$ ) [137], and optimism ( $t = 2.46$ ;  $p < 0.05$ ) [84]. In line with these results, employed women reported better WB ( $\beta = 0.275$ ,  $p < 0.05$ ) [74] and were better able to attain PTG ( $\beta = 0.22$ ,  $p < 0.05$ ;  $\beta = 0.19$ ,  $p < 0.05$ ). This was mainly a result of taking part in an activity ( $r = 0.24$ ,  $p < 0.05$ ) [138] and being more socially connected ( $\beta = 0.17$ ,  $p < 0.05$ ) [40].

**Medical characteristics.** Many primary articles studied the association of PPF with disease-related variables, including time since diagnosis and treatment, breast cancer stage, and the type of surgery and oncological treatment.

**Diagnosis and time since diagnosis.** Women at diagnosis commonly presented with global perceived stress ( $t = 10.52$ ,  $p < 0.01$ ) [105] and anxiety ( $F = 11.88$ ,  $p < 0.01$ ) [139], and with use of negative coping strategies, like denial ( $r = 0.31$ ,  $p < 0.05$ ) [71]. This was especially true of those women with a higher stage breast cancer ( $r = 0.333$ ;  $p < 0.001$ ) [140]. However, after treatment, levels of WB and PTG retained a positive tendency over time, with the first year after diagnosis accounting for the greatest increase in levels of PTG ( $r = 0.63$ ,  $p = 0.044$ ;  $r = 0.18$ ,  $p < 0.001$ ) [141]. Paradoxically, one year after diagnosis, those women who had been diagnosed with advanced breast cancer reported higher levels of BF ( $r = 0.16$ ,  $p < 0.05$ ) [49], but the period between 2 and 5 years post-diagnosis was when the greatest positive adjustment to the illness was reported, in comparison with women with shorter time of diagnosis [142]. Long-term (more than five years) survivors of breast cancer ultimately reported similar levels of WB and quality of life to that in the general population [132,143,144].

**Surgery.** Shortly after treatment, women who had undergone mastectomy reported less subjective WB ( $t = 3.8$ ,  $p < 0.001$ ), physical functioning ( $d = 0.25$ ,  $p < 0.001$ ), and self-security ( $d = 0.27$ ,  $p < 0.001$ ) when compared with women who underwent breast-conserving therapy [126,142,145] and with general female population ( $p = 0.28$ ) up to one year follow-up [57]. Long-term outcomes suggested that women who had undergone mastectomy reported lower illness-related stress over time ( $r = 0.28$ ,  $p < 0.01$ ) [36].

**Oncological therapy.** Having undergone chemotherapy was a strong predictor of later happiness ( $R^2 = 0.889$ ,  $p < 0.001$ ), affective WB ( $R^2 = 2.498$ ,  $p < 0.05$ ) [75] and PTG ( $\beta = 0.14$ ,  $p < 0.05$ ) [74]. In addition, having undergone radiotherapy was inversely related to PTG ( $r = -0.18$ ,  $p < 0.05$ ) [73], while women who did not receive adjuvant treatment rated higher in general health, physical or social functioning, and global quality of life ( $p = 0.005$ ) up to 6.3 years follow-up [143]. At long-term follow-up patients reported a progressive improvement of their quality of life ( $p = 0.006$ ) [146], suggesting no impairment of the type of oncological treatment received at long-term.

**Recurrence.** Those women who were diagnosed with breast cancer recurrence were the most dissatisfied with their health ( $F = 5.75$ ,  $p < 0.001$ ), and reported the highest impact of cancer on life ( $F = 3.92$ ,  $p = 0.009$ ), in comparison to newly diagnosed, adjuvant therapy and stable groups [147]. They also had the lowest positive attitude and used fewer problem-focused coping

mechanisms compared with women with primary breast cancer ( $F = 4.4, p < 0.005$ ) [128].

#### Psychosocial characteristics

**Spirituality and religiousness.** Higher levels of spirituality in women with breast cancer were related to enhanced psychological adjustment ( $r = 0.37, p < 0.05$ ), quality of life ( $r = 0.38, p < 0.001$ ;  $r = 0.48, p < 0.001$ ), meaning ( $r = 0.43, p < 0.001$ ;  $r = 0.36, p < 0.001$ ;  $r = 0.38, p < 0.01$ ), and BF (qualitatively assessed) [70,112,121,130,146–148]. On its turn, having religious beliefs positively correlated with greater levels of later PTG ( $r = 0.37, p < 0.01$ ;  $r = 0.32, p < 0.001$ ;  $t = 3.52, p < 0.001$ ) [78,79,83], positive attitude ( $r = 0.35, p < 0.01$ ;  $r = 0.30, p < 0.01$ ) [83,89,149], BF ( $R^2 = 0.28, p < 0.001$ ) [49], and WB ( $r = 0.266, p = 0.005$ ;  $r = 0.216, p = 0.22$ ;  $r = 0.219$ ;  $p = 0.05$ ) [62,134,150], especially in those women who prayed ( $r = 0.36, p < 0.05$ ) [111]. Religious women qualitatively reported greater perceived emotional support, either from God or from other believers [53,106], and used their religious beliefs as a coping strategy obtaining PTG and meaning ( $r = 0.28, p < 0.001$ ;  $r = 0.26, p < 0.05$ ;  $r = 0.33, p < 0.01$ ) [79,49,112].

**Social support.** In addition to promoting a hopeful attitude ( $\beta = 0.614, p < 0.001$ ) [55], social support improved WB and quality of life [64,111,122,151–159,47,160,161,50], meaning (qualitatively assessed) [98,111], and positive adjustment ( $r = 0.69, p < 0.001$ ) [105] [162]. In addition, social support was involved in the relationships between several dispositional variables (optimism and hope) and some sociodemographic characteristics (being partnered, being employed, and practicing religion). Therefore, social support had a wide influence on PPF either directly or through a mediating or moderating effect.

#### Discussion

This integrative review is focused on the study of positive psychological functioning in women with breast cancer, and its relation with demographic, medical, and psychosocial characteristics. It summarizes the growing amount of research that has been conducted over the last two decades into the role of PPF in the aftermath of breast cancer, suggesting that some kinds of negative functioning (e.g., the higher impact of cancer on patient's WB) may have a mediating effect on later positive functioning. Pioneering research into this phenomenon [163] emphasized the role of higher levels of stress as a catalyst for the emergence of self-transformation. In this review, the specific relationship between PTG and stress symptoms showed controversial data, but the study of specific sociodemographic and medical variables shows that the ones that may be linked to a higher impact of cancer are the ones related to higher PPF [164], suggesting that the impact of cancer on one's life may foster later PPF. PTG and WB were by far the most commonly studied PPF variables in breast cancer. Sociodemographic and psychosocial variables, such as having a partner and perceiving social support, were positively related to higher levels of PTG; however, so were medical variables such as the time elapsed since diagnosis and higher perceptions of illness severity (which is influenced by, for example, being younger or undergoing chemotherapy).

The inverse relationship between age and later PTG was one of the most frequently reported results in articles from different cultures and using different designs. Younger women (around 30 years of age) tended to perceive their cancer as more aggressive and disruptive than their older peers (around 60 years of age) [40,64]. This is probably not just because it was more commonly associated with a worse prognosis but also because the diagnosis challenged the social assumption that illness was related to older

age [165]. In addition, being diagnosed with a life-threatening illness can interfere with life plans, resulting in the perception of cancer as a highly disruptive illness [166].

Other sociodemographic characteristics such as cultural issues were also found to affect the correlations between PPF and coping style. Studies in Chinese, African American, and Caucasian populations have obtained similar cross-cultural results with regard to higher economic status, but not in regards to the coping style. For example, African American women tended to positively reframe their illness better than Caucasians, and Eastern women found greater meaning in breast cancer than Caucasian women. Thus, taking into account the patient's culture can be crucial in the attempts to reinforce positive coping styles.

Undergoing chemotherapy, although associated with worse physical symptoms and poorer quality of life when compared with radiotherapy or hormone therapy, was associated with a later increase in the woman's appreciation for health and life. Chemotherapy is lengthier and more invasive than radiotherapy and has more unpleasant side effects, both physical and psychosocial, which negatively disturb patients' emotional balance. These long-term physical effects require significant social and family support, which in turn can promote greater cohesion and interpersonal closeness. The inability to sustain the same pace of life also obliges patients to make decisions regarding the aspects of their lives they want to prioritize differentially. These effects may facilitate the redefinition of goals and beliefs, and thus give women more time to develop PPF. Also, it is known that cancer patients tend to consider chemotherapy more curative than radiotherapy or hormonal treatment [167] and could give them more confidence and hope in relation to their prognosis.

The link between the impact of cancer on one's life and PTG is also connected to the increased personal reflection that patients may engage in when presented with a life-threatening illness. This process is concordant with the relationship between the time elapsed since diagnosis and PPF variables like PTG, suggesting that women may enter a period of self-reflection that allows them to develop a more positive appraisal of their illness. Salsman et al. [168] studied this connection and found that those cancer patients who reported higher levels of negative thoughts and symptoms of posttraumatic stress tended to reflect on their experiences, and this reflection derived in later fewer posttraumatic stress symptoms and more PTG.

Social support is considered relevant to PPF in multi-ethnic samples, being positively related to greater WB, meaning, and optimistic or hopeful attitudes, especially early in the disease [169]. In fact, the social WB was found to be the most susceptible to decreases over time in comparison with the other WB domains [143,170]. Support from family, friends, and physicians was more evident at diagnosis and during oncological treatment than when the patient was in remission. However, survivors of breast cancer may still need social support even when they are no longer undergoing treatment, given the need for periodic follow-up. Thus, the moment immediately after the primary oncological treatment may be a suitable time to evaluate further psychosocial support. The perception of support quality from family and partners generated higher levels of WB and PTG, not only in breast cancer patients but also in other patient groups [171]. In fact, a good relationship between the patient and their partner can generate a relational PTG reflected in higher levels of PTG [165]. The concrete social support received from a patient's partner also has a stress-absorbing role for patients, such that social support can generate PPF in two ways: buffering the negative effects of the stress – especially during the initial disease phases – and increasing positive

emotions [166,172,173]. These results suggest the importance of preserving social support and ensuring its optimal quality and intensity.

### *Clinical implications*

Knowing the factors that facilitate PPF in women with breast cancer can help us to better integrate the elements of suffering with positive aspects like WB, PTG, BF, and meaning throughout the disease process. Early detection of PPF and its inclusion in psychological treatment can lead to better results from psychotherapies [174] and can save medical and social resources [10,175].

Knowing that women who are younger, partnered, and have suffered from more invasive cancer treatment are more prone to develop positive life changes, and that these changes can facilitate their adjustment, suggest three relevant clinical aspects. First, it guides the early detection of those women who show lower propensity to develop PPF from the breast cancer experience. Second, promoting PPF may facilitate positive adjustment after severe illness, especially among younger women who must face important challenges that they might not otherwise need to consider. Third, PPF seems to be highly dependent on the availability of significant social support from others. We therefore suggest the need of helping women who have survived breast cancer to foster greater social support by encouraging engagement in social activities, return to work, or enrolling in breast cancer support programs. Group-based therapy and cancer support groups represent an important source of PTG and WB, providing positive role models [10,88].

In addition, this review also provides oncology health professionals with useful information about coping with breast cancer. In the initial phases of the illness, physicians are expected to help patients realize that they are still capable of experiencing positive emotions. This awareness helps to normalize patients' distress, conceptualizing their reactions as normal in the face of an abnormal situation (the cancer process). In later phases, after cancer treatments, facilitation of PPF could be more focused on giving personal and social meaning to the cancer experience. Personal meaning-making may help to establish a subjective continuity between the past, the illness period, the present moment, and the capacity to envisage the future. On the other hand, the promotion of social meaning-making should involve the development of a shared explanation of the illness period that is co-created with significant others. This integrative review, therefore, also recommends a specialized psycho-oncological approach in breast cancer patients and survivors to promote PPF, particularly in cases in which the development of real positive functioning despite the obvious negative consequences of the illness may be less of a concern to other oncology health professionals.

As regards future directions for research, the present integrative review highlights the need to refine the validation of the assessment tools used in order to avoid sociocultural biases. Furthermore, since people who have undergone life-threatening illness like breast cancer may have developed specific responses, it would be inappropriate to use a tool validated with populations that have not had this kind of experience. We stress the need for well-validated tools to assess the indicators of positive psychological functioning in cancer patients. Additionally, some PPF-related variables have scarcely been studied in women with breast cancer, like resilience or flow (see Table 1). On the other hand, although WB has been the most studied positive response in breast cancer, researchers should consider whether Seligman's conception of this construct (PERMA) warrants further study. With regards to meaning, the present review shows how the construct

has been explored almost exclusively via the use of qualitative methods. We propose to combine these approaches with quantitative assessment tools (e.g. Steger, Frazier, Oishi and Kaler, 2006 [176]) to obtain quantitative data about the meaning-making process in breast cancer patients and survivors.

### *Limitations*

Bias at the data extraction stage of the review process was reduced by developing a study review template, which was applied by two independent reviewers for the extraction of key data from the studies. Despite our efforts to achieve full-text dissertations, some of these documents could not be accessed. However, global comments regarding the quality of studies are provided. Most studies reported cross-sectional data, with only a third being longitudinal. Given that PPF is influenced by time, the lack of more longitudinal data (e.g., cohort and case–control studies) may have limited the scope of the evidence gathered in this review. In addition, samples were homogeneous, with patients mostly being Caucasian, married, or partnered, and survivors. Thus, the external validity of the results to other contexts may be limited.

### **Conflict of interest statement**

None declared.

### **Acknowledgments**

This manuscript was supported by grants from Instituto de Salud Carlos III (FIS PI15/01278) and co-funded by FEDER funds/ European Regional Development Fund (ERDF) – a way to build Europe – //FONDOS FEDER “una manera de hacer Europa”.

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