Universitat Autònoma de Barcelona

Positive Psychology in Breast Cancer

Anna Casellas-Grau

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Doctoral Thesis

Positive Psychology in Breast Cancer

Anna Casellas-Grau

Directed by Dr. Antoni Font and Dr. Jaume Vives

Doctorat en Psicologia de la Salut i de l'Esport

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Aquesta Tesi Doctoral està especialment

dedicada al meu avi Manel;

sense ell, no sabria el que sé;

no seria on sóc; ni seria qui sóc.

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1. PRESENTATION

The topic of this thesis emerged from a personal inquisitiveness in exploring why those families who had undergone important traumas, such as one of their members undergoing a cancer, seemed to have more deep relationships, more happiness, and tend to value the important things in life in a more effective way. This was an observation made in the author's own family. Therefore, after finishing the Master's focused on health psychology, as well as the specific subject of psycho-oncology, the opportunity to begin a doctoral thesis on this topic emerged.

The interest on the topic increased when learning more about positive psychology and how it could be related to cancer. The focus on the breast site of this disease was motivated for its high levels of prevalence and, thus, the practical conclusion that this thesis could be beneficial to a large amount of patients. As no review had been previously written on this topic, we systematically reviewed which positive psychology constructs had been reported by women diagnosed with breast cancer, as well as which psychotherapies related to positive psychology had been applied on this population. The aim of these reviews were to find scientific evidence about the relationship between positive psychology and the breast cancer experience, as well as if positive psychotherapies were effective in promoting positive psychological functioning among this population. Results of both systematic reviews revealed the existence of positive psychological functioning among breast cancer patients and survivors, but the application of positive psychological therapies had scarcely been applied on this kind of population. Therefore, together with Dr. Ochoa, the effectiveness of a positive psychotherapy for cancer survivors was appraised.

Results from this psychotherapy showed that patients reported higher posttraumatic growth and less stress symptoms after the intervention.

A research stay in the University of Bologna gave me the opportunity to collaborate with Dr. Ruini's research group, as well as to write a critical review about one of the main constructs which relates positive psychology and cancer: the posttraumatic growth. This review is currently under revision in an indexed journal.

Also the opportunity of contributing to a guide focused on the management of the posttraumatic stress disorder resulted in the publication of two book chapters. The first of these (Ochoa & Casellas-Grau, 2015a) includes the details of the mentioned before positive psychotherapy for cancer survivors. The second one (Ochoa & Casellas-Grau, 2015b) discusses a new topic in the study of the posttraumatic growth: how it is transmitted to cancer patients' significant others. Although some contents of this chapter are commented in this thesis, the original documents could not be included in this dissertation for Copyright reasons.

In addition, it also appeared the chance of contributing to a special issue about positive psychology in the Spanish journal *Papeles del Psicólogo*. Thus, an article about positive psychology in cancer was written, and will be published during the second semester of 2016, after the deposit of this thesis.

Finally, during the PhD studies, contributions were made in national and international congresses, always in poster format. These can be consulted in the annex section.

Combining an external job with the performance of a thesis is not an easy, but rewarding task.

2. LIST OF ABBREVIATIONS

BF – Benefit finding

MBSR – Mindfulness-based stress reduction

PPC – Positive psychotherapy for cancer survivors

PPF – Positive psychological functioning

PTG – Posttraumatic growth

PTGI – The posttraumatic growth inventory

QoL – Quality of life

SS – Social support

WB – Well-being

3. INTRODUCTION

3.1. POSITIVE PSYCHOLOGY

3.1.1. Precedents to positive psychology

Positive psychology conceptualization has been historically linked to the concept of eudaimonia. This concept is distinguished from hedonia, in the sense that this latter states WB as pleasure, enjoyment, and an absence of discomfort (Huta & Waterman, 2014). For hedonic authors (e.g. Aristippus) WB encompasses low levels of negative effect, high levels of positive affect, and a good life satisfaction. On the other hand, eudaimonia, principally stated by Aristotle, highlights the emergence of good life and flourishing connected to the exercise of virtuous activities. It focuses on the creation of meaning and purpose in life (Hefferon & Boniwell, 2011), and has been traditionally translated as *happiness*, although many current authors prefer to use the term *flourishing* because it reflects human virtues, excellence and potentials (e.g. Seligman, 2011; Tiberius & Hall, 2010). According to this definition, WB does not derive from corporal pleasure, but from personal virtues and strengths (Seligman, 2002). In the current days, many authors keep Aristotle's distinction between hedonia and eudaimonia (Gallagher, 2009). Thus, today's conceptualization of WB stands on the shoulders of philosophical thinking.

On the other hand, positive psychology is connected with humanistic psychology. This perspective of psychology emerged in 1950's as an alternative to the predominant theories of its present moment, like psychoanalysis or behaviorism (Hefferon & Boniwell, 2011). It emphasizes the study of the whole person, including human thought, behavior and experience. In contrast with its contemporary theories, humanistic psychology focused on mental health, rather than on mental illness, including happiness or kindness. Thus, the influence of humanistic psychology over the

current positive psychology results obvious. In fact, it was Abraham Maslow the first who used the term positive psychology:

> The science of psychology has been far more successful on the negative than on the positive side; it has revealed to us much about man's shortcomings, his illnesses, his sins, but little about his potentialities, his virtues, his achievable aspirations, or his full psychological height. (Maslow, 1954, p. 134).

Positive psychology has distinguished itself from the humanistic psychology when it comes to methodological issues. Some authors, like Vázquez & Hervás (2009) or Seligman & Csikszentmihalyi (2000) state that although the humanistic movement focused their attention on the positive elements of human beings, the principles of their personality theories were not empirically addressed.

3.1.2. The positive psychology approach

Positive psychology was introduced in 1998 by Martin Seligman while being the president of the American Psychological Association. Seligman noted that psychology had traditionally been focused on repairing damage and solving problems, without taking much interest in those aspects of human existence that make life worth living. In 2000, Seligman and Csikszentmihalyi, published a special issue in *The American Psychologist* where they introduced and established the framework of positive psychology. In their article, they defined positive psychology as "a science of positive subjective experience, positive individual traits, and positive institutions" (p.5). Therefore, this branch of psychology is focused on positive life constructs, like happiness, WB, optimism, or flow, among others. Consequently, many theories have been developed in order to better understand the human optimal functioning, the most relevant of which are described below.

3.1.2.1. The Authentic Happiness and The Well-Being theories

In 2002, Martin Seligman published his theory called The Authentic Happiness theory, in which happiness was its main topic, and proposed three ways for its achievement:

- **Positive emotions**. Positive emotions refer to what people feel (pleasure, comfort, like) and it can be focused on the past (satisfaction, pleasure, self-fulfillment, self-satisfaction, and serenity), the present (flow, joy, calm, pleasure, enthusiasm) or the future (optimism, hope,

faith, and confidence). Life based on these positive emotions was called by Seligman the pleasant life. This pleasant life is sought through the use of the senses (e.g. good food or fine wine), having as many pleasures as possible. It has little to no long-term effects on happiness.

- **Engagement**. This pathway refers to flow (Csikszentmihalyi, 1990), that is a state in which the individual feels that time has stopped when doing an engrossing and absorbing activity. Engagement is different from positive emotions in the sense that the person does not feel specific emotions during flow but, on reflection, people report these situations as enjoyable, despite the void of emotion. These states may lead to long-term WB by the promotion of positive resources, such as nurturing talents or enhancing one's skills (Schueller & Seligman, 2010), resulting in what Seligman calls the good life.
- **Meaning**. Looking for pleasure and engagement are individual efforts, but human beings also look for a meaning and purpose in life that transcends oneself. The meaningful life consists of knowing one's own strengths and using them to either contribute to positive social relationships or connecting with something bigger than oneself, like a higher power or purpose. This sense of purpose provides people with goals that guide action and promote WB (Baumeister & Vohs, 2002). Therefore, as well as the good life, the meaningful life has long-term effects on happiness.

The pleasant life is weighted toward the hedonistic conception of happiness but, for Seligman, the authentic happiness is the meaningful life, which is closer to Aristotle's eudaimonia. Seligman states that the disadvantage of the pursuit of physical pleasure (pleasant life) is that we tend to quickly become habituated. The three lives are not completely contradictory, and a balanced life can contain elements of all three. However, the lasting happiness lies in progressing through each until we achieve the ability to have most of our happiness come from living the meaningful life. In this meaningful life, happiness is obtained through an activity where one's virtues and strengths are used. These are explained in the next section of this thesis.

Some years later, Seligman (2011) considered that his previous authentic happiness theory (Seligman, 2002) had some deficiencies. First, the author realized that the concept of happiness was inextricably related with being in a cheerful mood. Second, the life satisfaction had an overly relevant role when measuring happiness in the sense that life satisfaction could be influenced by the feelings at the moment of assessment, resulting in a probable bias of one's life satisfaction. Finally, positive emotions, engagement, and meaning were not sufficient to involve the elements that people choose for their own sake. In order to solve these issues, Seligman (2011) widened his model and called it the WB theory. In this theory, Seligman states that the main topic of positive

psychology is WB, instead of happiness; that its aim is flourishing, instead of life satisfaction; and this aim is assessed through the five components of WB:

- **Positive emotions (P):** Positive emotions are the main element of the theory, as it was in the authentic happiness theory. However, in this case, happiness and life satisfaction are part of positive emotions, not the objective of the whole theory.
- **Engagement (E):** Engagement, like positive emotions, is a subjective evaluation of one's state including flow. Given that during flow one is not conscious of their emotions, engagement refers to the subjective evaluation of pleasure *a posteriori*.
- **Relationships (R):** There are few individual positive aspects in life. Most of them are shared with others. Therefore, maintaining positive and strong relationships not only represents a support in difficult times, but also triggers the emergence of positive emotions.
- **Meaning (M):** Seligman kept meaning as a WB element, which refers to belonging to and being part of the service of something greater than the self.
- **Accomplishment (A):** It is based on the premise that humans look for success, achievement and virtuosity for their intrinsic value.

Seligman explains that these constructs have the three necessary conditions for becoming components of WB. These conditions are: 1) independently contributing to WB; 2) having its own intrinsic value; 3) being defined and measured independently from the other elements.

When analyzing the two theories of Seligman, it is evident that Seligman goes from a unidimensional to a five-pillar based theory, which is based on personal strengths (Seligman, 2011). In addition, WB is plural in relation to the methods and nature, the positive emotions being a subjective variable, and the other pillars having both subjective and objective variables. Therefore, WB results from feeling good and really having a sense of meaning, good relationships and achievements. Another difference between Seligman's first and second theory is that the authentic happiness theory pursues the increase of happiness, while the WB theory seeks increasing one's personal growth. According to Seligman (2011), in order to achieve WB, people must have all the following core characteristics and three out of six additional characteristics:

Core characteristics	Additional characteristics
Positive emotions	Self-esteem
Engagement	Optimism
Interest	Resilience
Meaning	Vitality
Purpose	Self-determination
	Positive relationships

As mentioned before, one's strengths and virtues have a key role in achieving one's optimal levels of WB, because when WB comes from our strengths and virtues, life is experienced with authenticity. For this reason, positive psychology needs to encourage individuals to identify and use their strengths, as these are their weapons. Dahlsgaard, Peterson, & Seligman (2005) concluded that there are six core virtues, as well as 24 strengths. In their article, the authors described them all:

VIRTUES	DESCRIPTION	STRENGTHS
Wisdom and knowledge	Cognitive strengths that entail the acquisition and use of knowledge	Creativity, curiosity, judgment, love of learning, and perspective.
Courage	Emotional strengths that involve the exercise of will to accomplish goals in the face of opposition, external or internal	Bravery, perseverance, and authenticity (honesty), and zest.
Humanity	Interpersonal strengths that involve tending and befriending others.	Love, social intelligence, and kindness.
Justice	Civic strengths that underlie community health	Fairness, leadership, and citizenship or teamwork.
Temperance	Strengths that protect against excess	Forgiveness, humility, prudence, and self-control.
Transcendence	Strengths that forge connections to the larger universe and thereby provide meaning	Gratitude, hope, and spirituality.

However, some authors state that possessing strengths may not necessarily mean that people use them. The use of strengths could be different depending on the context and the moment that require them. Therefore, an entire evaluation including individual strengths and contexts should be performed (Stone, Shiffman, Atienza, & Nebling, 2007).

3.1.2.2. The psychological WB

Other authors apart from Seligman have also focused their attention on WB. On the one hand, Carol Ryff developed a model of psychological WB which aimed to include the components of optimal human functioning: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance. These dimensions of WB comprise the subscales of The Ryff Scales of Psychological WB (Ryff & Keyes, 1995; Ryff & Singer, 1996; Ryff, 1989). In addition, Vázquez & Hervás (2009) highlight the work of Corey Keyes, who broadened Carol Ryff's theory. For Keyes & Waterman (2003), human's WB does not only include psychological WB (and the six dimensions proposed by Carol Ryff), but also emotional and social WB. Social WB has five components: social acceptance, social actualization, social coherence, social contribution and social

integration. Therefore, Keyes & Waterman (2003) broaden the definition of WB going beyond the individual sphere.

3.1.2.3. The life satisfaction

For Diener, Lucas, & Oishi, (2002) WB is made up of three components: positive affect, negative affect and life satisfaction, this latter being the main construct of their theory. The authors define life satisfaction as the subjective evaluation of one's quality of life (QoL) in accordance with the self-conception of an appropriate standard of life (Diener, Emmons, Larsen, & Griffin, 1985). These criteria can change depending on what is salient at the moment, as well as the cultural context. People from cultures in which happiness is not important are more likely to give more weight to their most negative aspects; if people believe that life satisfaction is desirable, they will search for positive information when reporting global life satisfaction. So, there are two varieties of happiness and satisfaction: on the one hand, the evaluations of specific aspects in life and the feelings associated with them and, on the other hand, the global judgments about one's happiness and satisfaction.

3.1.2.4. Flow

Csikszentmihalyi (1990) defines flow or optimal experience as a positive state of consciousness arising in a situation which is characterized by the individual's perception of high challenges in the task, but also of having the adequate personal skills to properly carry out the task. Its core psychological features are: concentration, involvement, control of the situation, clear-out feedback on the activity, and clear goals. Also Seligman (2002) specifies that flow is that subjective state where we enter when we feel totally involved in what we are doing at the present moment. This subjective state has the following components: the task represents a challenge and needs specific skills; we concentrate; there are clear aims; we obtain an immediate response; we profoundly get involved in the task, but without effort; there is a feeling of control; the feeling of self dissipates; the time stops. Therefore, flow takes place in a specific condition: the task must be achievable but challenging enough to require one's skills, promoting concentration and engagement. Too easy and too complex activities would rarely endorse flow, as they would not comprise high concentration and control of the situation.

3.1.2.5. The Broaden-and-Built-Theory

This theory was primarily suggested by Fredrickson (1998) when claiming that positive emotions have a broadening effect on individual's attention and thought-action repertories, as a difference from negative emotions, which tend to narrow these aspects to obtain an immediate benefit. Specifically, positive emotions tend to broaden the individual's attention (positive emotions stimulate expansive attention, openness and receptivity to new experiences), cognition (increased cognitive flexibility and creativity) and social cognition (changes in social cognition and self-expansive views in relationships). These changes influence one's patterns of decision-making and action, which, at the same time, build long-term psychological, physical and social resources (Fredrickson, 1998, 2001). These built resources derived from the cumulative exposure to positive emotions during childhood, therefore, may have positive effects in adulthood, especially on personal growth, WB and resilience (Conway, Tugade, Catalino, & Fredrickson, 2013).

3.1.2.6. The search for meaning

Meaning in life has been an object of study for many authors. Taylor (1983) explained that meaning-making after a stressful situation is a way of changing individuals' view of life in order to integrate what has happened and to give the event an existential value in the persons' life framework. Previously, Frankl (1965) developed the logotherapy, based on the idea that the primary motivational force of a person is to find a meaning in their life. He reasoned that meaning resulted from three values in one's life: creative –by creating a work–, experiential –by experiencing something or encountering someone–, and attitudinal –by the attitude we take toward unavoidable suffering–. More recently, Park and Folkman (1997) distinguished between two levels of meaning: *global meaning* which refers to one's life goals and beliefs, while *situational meaning* focuses on the appraisals of specific events (Sherman, Simonton, Latif, & Bracy, 2010). Complementally, other distinctions within the meaning construct have been made. For example, Segerstrom, Stanton, Alden, & Shortridge (2003) distinguished between the process of meaning construction –seeking meaning–, and its outcome –found meaning–. The authors suggest that, for some people, the process of search may lead to poor results, especially in those with low global meaning. Thus, sometimes, seeking event-related meaning, such as illness-related meaning, can be counterproductive. In contrast, those who have high levels of global meaning can benefit from the search process of event-related meaning.

3.2. POSITIVE PSYCHOLOGY INTERVENTIONS

A distinction of four waves of psychological therapies can be established including the disease model, behaviorism, humanistic psychology and positive psychology (Srinivasan, 2015). During the second half of the 19th century and the second part of the 20th, psychologists were concerned about how to cure mental diseases. Therefore, a large amount of therapies and theories emerged regarding mental disorders like depression or schizophrenia, among others. Renowned psychologists such as Sigmund Freud or Carl Jung pioneered a period of illness-focused psychology which, although being useful in palliating mental disorders, pushed psychology into a damage-repairing approach (Srinivasan, 2015). In turn, behaviorism was based on the premise that human behavior resulted from a punishment/reward system. Relevant authors such as Watson, Pavlov and Skinner followed these statements, which are currently very useful in modifying animal behavior, but not always effective in human beings. On the other hand, humanistic psychology states, as opposed to the commented disease model, that the inherent human drive towards the state of self-actualization, which is the process of being aware and expressing their capabilities and creativity. Finally, positive psychology interventions are considered the fourth wave of psychological interventions. Although the World Health Organitzation's (1986) definition of health recognizes that it is a complete state of physical, mental and social WB rather than the only absence of disease and disability, psychology and medicine have focused their resources on palliating pain and disability (Keyes & Waterman, 2003; Vázquez & Hervás, 2009). These therapies are based on the premise that when reducing pain, distress and any negative state in people, they automatically raise their levels of WB. However, it seems that positive and negative effect, or illness and health, are independent of one another. Therefore, clinical symptoms can be effectively reduced, but it does not automatically result in a significant improvement of their lives. Nevertheless, the efforts in generating interventions to promote WB and happiness have still been limited. The probable increase of WB It is still questioned. Some studies report the existence of a genetically determined WB set-point which can establish between 80% (Lykken & Tellegen, 1996) and 50% (Diener, Suh, Eunkook, Lucas, & Smith, 1999) of personal WB. Therefore, there is still a margin by which happiness or WB levels can be improved. However, Vázquez and Hervás (2009) explain that some longitudinal studies show that this set point is not totally stable. According to Lyubomirsky, Sheldon, and Schkade (2005), it seems that at least 40% of WB variance can result from modifiable elements, such as attitudes or habits that can contribute to improve emotional state. Some therapies have been developed in order to improve these positive attitudes and habits, and are described below:

3.2.1. Positive psychotherapy

Seligman, Rashid, and Parks (2006) developed a positive psychotherapy aimed at the promotion of personal strengths and positive emotions. As a result, the person experiences an increase of meaning in life and happiness, as well as an alleviation of psychopathology (Magyar-Moe, 2009). The psychotherapy is composed of 13 sessions, each of them with a specific aim and exercise:

SESSION #	AIM	EXERCISE
1	To note that the lack of positive strengths can provoke or maintain depression.	The patient writes down a personal story where he or she used his or her best personal strengths.
2	To identify patient's personal strengths.	The patient fills in the VIA strength questionnaire to identify their personal strengths. He also talks about the personal strengths used in the written story in session 1.
3	To focus on specific situations where the personal strengths facilitate pleasure, engagement and meaning.	The patient should write own (from now up to the end of the therapy) three good things that have happened during the day.
4	To note that good and bad memories have an influence on the maintenance of depression	The patient writes about his or her feelings of anger and sadness and how these feed up his or her depression.
5	To introduce forgiveness as a tool to neutralize feelings of anger and sadness or turn them into positive feelings.	The patient writes down a letter of forgiveness in which he or she describes the feelings and promises to forgive the one who had committed the fact.
6	To introduce gratitude as a tool of well-being (WB)	The patient writes down a letter of gratitude to someone who deserves it.
7	To revise the importance of positive emotions through the "three good things" diary and the practice of personal strengths.	The patient comments on his diary and how he has practised his personal strengths.
8	To promote contentment rather than perfection.	The patient revises ways of improving satisfaction and conceives a personal plan of satisfactions.
9	To discuss optimism and hope. Optimism is a way of taking the bad assumption as temporary, modifiable and localized.	The patient thinks of three closed doors in their life and how these could be opened.
10	To identify patient's partner's personal strengths.	The patient learns to react in a positive and constructive way in front of those positive events that the others tell him. The patient also arranges a date with their partner where both can practice their personal strengths.
11	To learn how to identify their relatives' strengths and to identify	The patient asks their relatives to answer the VIA strengths

	where patient's personal strengths come from.	questionnaire and makes a tree including the strengths of all their family members.
12	Enjoying the present moment is introduced as a way of intensifying and extending the positive emotion.	The patient plans and executes pleasure activities. A list of enjoying techniques is given to the patient.
13	Time is one of the most valuable gifts.	The patient has to gift time doing something that needs much of it, and practises their personal strengths.
14	To discuss about the full life, that includes pleasure, meaning and engagement.	Patient discusses with therapist about full life and its components.

This therapy is based on the assumption that, although people are prone to mental illness, they also have an inherent capacity for happiness. In addition, it assumes that strengths and positive emotions are as real as weaknesses and negative emotions. Therefore, therapists who apply this psychotherapy should work for validating negative emotions but also work for building the person's positive emotions, character strengths and meaning in life.

3.2.2. The well-being therapy

The WB therapy (Fava & Ruini, 2003; Fava, 1999) is a therapeutic strategy based on Ryff's model of psychological WB. The main aim of this therapy is that the patient goes from a dysfunctional level of WB towards the optimal-balanced level through the six dimensions of this model (Fava & Ruini, 2014; Vázquez & Hervás, 2009): autonomy (independence, self-determination and resistance to thinking or acting in certain ways), environmental mastery (participating in familial and work activities, taking advantage of environmental opportunities, managing everyday activities), personal growth (considering the self as growing and expanding over time, being open to new experiences and capable of facing challenges), purpose in life, self-acceptance and positive interpersonal relationships. Patients are asked to complete a WB diary where they write down and rate (0-100) their past and current WB experiences. The next step is to identify thoughts, beliefs and feelings associated to WB, as well as those which are of psychological WB, being free of automatic thoughts (Fava & Ruini, 2003).

3.2.3. The quality of life therapy

The QoL therapy (Frisch, 2006) is based on Frisch's CASIO model which incorporates five concepts: life circumstances, attitudes, standards, the importance of values and overall satisfaction. For Frisch (2006), WB results from both patient's satisfaction of life, and the positive affective balance

between positive and negative emotions in patient's day-to-day life. This satisfaction of life is linked to 16 areas of everyday life functioning: health, self-esteem, goals-and-values/spiritual life, money (standard of living), work, play (or recreation), learning, creativity, helping (social service and civic action), love (or love relationship), friends (or friendships), children, relatives, home, neighborhood, community (Magyar-Moe, 2009; Vázquez & Hervás, 2009). Throughout the intervention process, these areas are analyzed using the components of the CASIO model, especially the ones in which patients perceive lower satisfaction. In addition, extra exercises are provided to therapists to help their patients to engage in self-care, to relax, to process stressors and worries and to provide a sense of meaning and purpose in their lives (Magyar-Moe, 2009).

3.2.4. The hope therapy

The hope therapy is based on Snyder's (1995) definition of hope, which consists of the perception of one's ability to create goals, to develop ways of reaching them (pathways thinking) and to maintain the motivation up to their completion (agency thinking). Lopez, et al. (2000) designed this therapy in order to reach hope in the therapy process, helping clients to clarify their goals, to produce pathways to achieve them and to generate motivation and energy to better engage in goal-directed and agentic thinking. There are four major components of the hope therapy:

- **Hope finding**: This component of the intervention is aimed at discovering the type of patient's hope, which can be trait-like (e.g. being hopeful in general), domain-specific (being hopeful in a specific life area) or goal-specific (being hopeful about one specific goal). This task is performed using patient's narratives in which hope can be identified and made explicit.

- **Hope bonding:** The objective is to generate hopeful alliances between the therapist and the patient.

- **Hope enhancing:** The aim is to increase patient's hopeful thinking in a specific domain or in those cases in which there's a lack of hope in general. Lopez et al. (2000) suggest two techniques: first, making an internal movie in which patients are encouraged to watch themselves as if they were in a movie. This exercise allows the patient to note if the chosen pathways lead to success or not. Second, generating as many routes as possible to the goal.

- **Hope reminding**: It is aimed at teaching the patient how to sustain his or her hope levels without therapist's guidance. Lopez et al. (2000) propose four exercises: reviewing personal hope stories; finding a colleague to ask for help or reinforcement when reaching a goal is difficult; reflecting successful goal achievements and reminding how they were reached; and to identify and confront automatic thoughts.

3.2.5. Strengths-based counselling

Magyar-Moe (2009) explains Smith's (2006) protocol of counselling psychology. The model was created to be used in adolescents, but the author states that it is also useful in adult populations. In addition to the counselling psychology, this protocol is based on prevention, positive psychology, positive youth development, social work, solution-focused therapy and narrative therapy. It consists of 10 stages:

Stage #	Aim
I,II, and III	Creating a strong alliance between the therapist and the patient. Identifying patients' major strengths used when solving their own problems.
IV	Providing feedback to patients regarding their efforts and progress, rather than only focusing on the outcomes, in order to encourage patient and promote their sense of hope.
V	Helping patients to find solutions to their problems through problem-solving conversations. These conversations are focused on identifying how the patient tends to solve their problems, rather than focusing on the problems themselves.
VI	Encouraging the patient to realize that he or she has the power to change their life. Building the following strengths: courage, insight, optimism, perseverance, and finding a sense of meaning and purpose in life.
VII, VIII, and IX	Promoting the agency and facilitating the goal pursuits in order to promote patient's resilience. Major components: a) developing an awareness of how patient's problems do not necessarily reside within them; b) seeing that change is a process; c) using strengths to facilitate change; d) viewing mistakes as an opportunity for learning. Patients are also encouraged to realize about their ability to choose how they will view their adversities in life.
X	Identifying the most valuable strengths to the change process and honoring the progress that has been made.

This protocol can be useful for those therapists who, rather than looking for specific strengths-enhancing techniques, look for a guiding framework for practicing from a strengths-based perspective.

3.2.6. Strengths-centered therapy

This therapy is a model of counseling based on social constructionism (knowledge as a product of social consensus), in the sense that therapist's role is to work with their client in developing meanings to personal experiences, as well as to broaden client's strengths' use (Wong, 2006). The use of these virtues and strengths (Dahlsgaard et al., 2005) are the basis of the change process. The therapy employs weekly sessions in which client cycle in four phases:

- **Explicitizing**: Patients name their existing character strengths.
- **Envisioning**: Patients identify those strengths that they wish to improve and envision how these strengths could be useful in accomplishing their goals.
- **Empowering**: Patients feel how their motivation improves as they realize that their strengths can positively affect their lives. This improvement of motivation may result from the practice of their strengths.
- **Evolving**: The strengths-development becomes a never-ending process. Patients and therapists work together for the identification of the areas for further growth and talk about how to use patients' strengths in future challenges.

The completion of the four phases leads to a better knowledge and management of one's strengths and, therefore, to a better WB.

3.2.7. Mindfulness-based interventions

Langer and Moldoveanu (2000) specify that mindfulness refers to the full attention to the present moment and the self. It normally takes places in a slow rather than a quick mental state, or while one is thinking about the future (Seligman, 2002). When we are mindful, our behavior can be guided, but not judged by routines or rules, and we become sensitive to context and perspective, as we are situated in the present. Theories on mindfulness refuse the present-moment evaluations because they are based on the idea that positive and negative evaluations are states of mind. It does not mean that events or consequences are not real, but the number of consequences that one could enumerate for any action depends on the person's interest in noting them and the value given to them. Mindful individuals recognize that outcomes can be simultaneously positive and negative, but they tend to choose to be positive and to experience both the advantages of positivity and of the controlled-WB perception (Langer & Moldoveanu, 2000). For Baer (2015), positive psychology provides a complementary perspective to mindfulness in terms of character virtues and strengths.

The mindfulness-based stress reduction therapy (MBSR; Kabat-Zinn, Lipworth, & Burney, 1985) is commonly used when aiming to promote mindfulness in people. This intervention focuses on paying attention to the present moment with no judgements about one's thoughts and feelings. It represents a model for the integration of mindfulness meditation practices within clinical mainstream medicine and psychology. This therapy has reached similar results to cognitive behavioral stress reduction in terms of reducing stress and depression, in addition to enhancing patient's mindfulness and energy (Hefferon & Boniwell, 2011). Other mindfulness-based programs have been developed since the emergence of MBSR. For example, the mindfulness-based cognitive therapy, which combines MBSR with cognitive therapy and it has been found to be effective for relapse prevention in chronic depression (e.g. Segal, Williams, & Teasdale, 2002). This therapy aims at interrupting automatic thoughts and teaches individuals at accepting and observing incoming stimuli without judgement. Further, some authors, like Baer (2015) state that the mindfulness and the acceptance processes in the acceptance and commitment therapy are similar, both of them including a flexible attention to the present moment and the recognition that thoughts and feelings are transitory events.

3.3. PSYCHOLOGY AND BREAST CANCER

3.3.1. Psychosocial challenges of breast cancer

Cancer has been related to physical and psychological difficulties among patients. In regards to the physical limitations, patients suffer from pain, fatigue, and general discomfort as a result from the illness itself and its treatments (Haberkorn, Burbaum, Fritzsche, et al., 2013; Keyes & Waterman, 2003; Sheppard, Llanos, Hurtado-de-Mendoza, Taylor, & Adams-Campbell, 2013; Taylor, 2007). The emergence of these symptoms have been also linked to poorer QoL, less adherence to cancer treatments, and worse overall survival, as well as poorer self-care and lifestyle (DiMatteo, Lepper, & Croghan, 2000; Giese-Davis et al., 2011; Honda, Goodwin, & Neugut, 2005; Reich, Lesur, & Perdrizet-Chevallier, 2008). In the particular case of breast cancer, it has also been found its association with this negative functioning, such as distress, fatigue, stress, or depression (e.g. Bortolon et al., 2014; Ho, Rohan, Parent, Tager, & McKinley, 2015). Treatment for breast cancer is especially problematic in the sense that radical surgery does not only affect in the physical area (e.g. lymph nodes extraction), but also the psychological (e.g. negatively affecting the self-image of the body). Accordingly, the side effects of chemotherapy (like vomits and nauseas) have not only physical effects (e.g. physical debilitation), but also psychological, like anticipatory reactions to treatment which negatively affect patient's QoL long after the treatment conclusion (Cameron et

al., 2001). As a result from both the improvement of early detection techniques and the efficacy of treatments, many breast cancer patients live with the challenge of long-term adaptation to the chronic character of this disease (Williamson, 2000). Although these negative consequences linked to the illness, some studies still have found that the emergence of positive psychological functioning (PPF) is also a reality among women who have experienced a breast cancer. Authors from positive psychology have been interested in exploring this fact, which is explained below.

3.3.2. Positive psychology and breast cancer

Positive psychology has been applied in different areas of intervention, one of them being life-threatening diseases, like cancer. Recent studies (e.g. Ryff, 2014) show consistent relationships among variables related to the PPF, such as positive emotions, personal growth or benefit finding (BF), and health-related results, like mortality, physical health indicators or the grade of recovering in physical illnesses (Vázquez, 2013). Also global results from meta-analysis highlight that those patients with chronic illnesses who show greater levels of PTG tend to report a better adaptation to the disease, a better mental health, and a perception of a better physical state (Helgeson, Reynolds, & Tomich, 2006; Sawyer, Ayers, & Field, 2010). The specific case of breast cancer not only has the handicap that it is highly diagnosed among women, but also its surveillance has increased along the last years. Hence, breast cancer is a problem which affects millions of women, being a large target population for positive psychology research. The main areas of study of positive psychology regarding cancer are summarized below:

3.3.2.1. Optimism

The main difference between those people with higher levels of optimism and those with low levels is that the first ones perceive that their problems can be solved because they are specific and a result of the circumstances. On the other hand, pessimists tend to weigh their problems and frustration in a pernicious way, considering them as a result of permanent and personal causes (Seligman, 2002). In spite of the existence of these patterns, Forgeard & Seligman (2012) state that optimism is learnable, so that pessimists can assimilate the mechanisms of optimists and increase their QoL. These mechanisms can be operationalized in two ways, depending of the conceptualization (or not) of optimism as a personal trait (Hefferon & Boniwell, 2011). One the one hand, the optimistic explanatory style theories consider that optimists are those individuals who think that bad things are unstable and specific of certain situations, so that they consider them in a

constructive way (Peterson & Steen, 2009; Seligman, 1990). On the other hand, dispositional optimism is operationalized by Scheier & Carver (1992) and is based on an expectancy-based model. This model explains that people seek not only the most important but also the most achievable goals for them.

3.3.2.2. Hope

Snyder, Rand, & Sigmon (2002) define this construct as the purpose of attaining goals looking for the needed pathways for their achievement. Thus, a thoughtful mind reflects the belief that one can find the pathways to the own goals and feels motivated to initiate them. In turn, goals need to be valued enough to occupy one's thoughts, and sufficiently achievable, despite their certain degree of uncertainty. For Snyder et al., (2002), hopeful individuals use both the pathways thinking, (the perception that one can generate different roads to get their goals) and the agency thinking (the goal-directed energy to begin the pathways). Perception of successful goal pursuit generates positive emotions, while negative emotions result from unsuccessful goal pursuits.

3.3.2.3. Resilience

According to Masten & Reed (2002), resilience emerges from the human systems of adaptation, and it is characterized by patterns of positive adaptations in adverse or risky contexts. There are two major judgments in resilience: on the one hand, individuals are behaving better than expected and, on the other hand, extenuating circumstances have threatened the emergence of good results. Therefore, the research in resilience has had two major approaches: on the one hand, the approach focused on those personal characteristics of resilient people that differ from those who do not adapt positively to threat circumstances, and, on the other hand, the approach focused on those individual and environmental variables which account for the emergence of resilience. In general, resilience does not arise from special qualities, but from the personal resources of children and their relationships with their families and the community (school, religions, and cultural traditions). For instance, the most relevant personal characteristics of resilient children is that they tend to have personality traits that suggest effective ways of problem solving and stress management In addition, these children commonly maintain close relationships with their parents, have received authoritative parenting and have been living within a positive family climate. Finally, those protective factors related to community include the effective schools, safety neighborhoods and good public social and health services.

3.3.2.4. Posttraumatic Growth

"What doesn't kill you makes you stronger". This statement by the German philosopher Friedrich Nietzsche illustrates the meaning of the construct posttraumatic growth (PTG). Many conceptualizations refer to growth in the aftermath of trauma, but Tedeschi & Calhoun's (1996) model has been the dominant among studies (Jayawickreme & Blackie, 2014). The term PTG was originally proposed by Tedeschi & Calhoun (1996) who suggested that PTG appears when struggling in the aftermath of a traumatic event. This struggle seems to generate a cognitive recognition of improvements in individuals' personal strengths and spirituality, in their relationships with others, and in the appreciation of their own life. It also facilitates the feeling of considering the stressful experience an opportunity to engage in new possibilities. Other authors have referred to these positive changes with similar labels. For instance, adversial growth, stress-related growth and positive posttrauma life changes (Joseph et al., 2012; Kaler, Erbes, Tedeschi, Arbisi, & Polusny, 2011; Linley & Joseph, 2004) have been used in reference to changes in interpersonal relationships, in the view of oneself, and in the philosophy of one's life (Joseph et al., 2012). The label positive psychological changes (Yalom & Lieberman, 1991) was used to describe those individuals who, after a trauma, feel that they communicate more openly with family and close friends, that they experience fewer fears and that are less preoccupied with life's difficulties, so they live their present life and rearrange their life priorities. Taken together, all these terms refer to the positive life changes that some people report after experiencing a potentially traumatic event, such as a life-challenging illness diagnosis, like cancer.

3.3.2.5. Benefit finding

BF has been conceptualized as the capacity of an individual to find something positive in their negative experiences, and has been linked to long-term health benefits, as well as to emotional and physical adaptation to trauma (Tennen & Affleck, 2002). Some authors consider BF as an adaptive strategy (e.g. Janoff-Bulman, 1992; Taylor, 1983) or as a human strength (e.g. Snyder & McCullough, 2000), while others use the term as a synonym of PTG (Tedeschi & Calhoun, 1995). However, the difference between PTG and BF seems to be the time of appearance. BF tends to emerge just in the close aftermath of an adversity, while PTG tends to appear after a certain amount of time since trauma (Harding, Sanipour, & Moss, 2014; Mols, Vingerhoets, Coebergh, & van de Poll-Franse, 2009; Tedeschi & Calhoun, 1998). This seems to be due to the fact that PTG is a re-assembly of the assumptive world in a new way following trauma, and it develops as a result of the rumination and

restructuring the relationship between the self and the world, that tend to occur in the weeks, months, and even years following trauma (Tedeschi & Calhoun, 1998). Therefore, PTG requires a modification of deeper cognitive representations, involving changed rules for living and core schema, while BF may be more superficial and transient in nature. In fact, Sears, Stanton, & Danoff-Burg (2003) added the concept of positive reappraisal and differentiated it from BF and PTG: BF concerns the benefits perceived from the adversity itself, which, if used as a coping strategy, represent a positive reappraisal of the adverse experience. The sum of these two phenomena – BF and positive reappraisal- may result in a later PTG.

3.3.3. Breast cancer: epidemiological and medical aspects of the disease

Breast cancer is the most common diagnosed cancer in women worldwide, as well as the first cause of dead in this population (DeSantis et al., 2015). It is characterized by uncontrolled division and growth of cells, and its prognosis and treatment depends on the specific place where the tumor is developed and its stage at diagnosis. Commonly, smaller and more localized tumors tend to be show higher rates of survivorship. In general, there are three types of treatment for breast cancer: surgery –which can remove a part (lumpectomy) or the total of breast tissue (mastectomy)–, radiotherapy, and pharmacological treatment (including chemotherapy). These therapies can be applied either alone or combined, depending on the place, the size, and the stage of tumor, as well as patient's health state (Institut Català d'Oncologia, 2011; Macip, 2012).

3.3.3.1. Risk factors

There are different risk factors related to the development of breast cancer, some of them related to the life style, such as smoking, alcohol consumption, overweightness or long-term use of contraceptives. Other risk factors are related to personal characteristics like the age, given that it is a type of cancer which commonly affects women older than 65 years of age. Also familial history of breast cancer seems to be a risk factor, which can be related to genetic characteristics. In fact, some genetic alterations related to the predisposition to develop a breast cancer have been reported. These genes are the BRCA 1 and the BRCA 2. When they have a normal functioning can protect us from tumors, but when they are altered could increase the risk of developing cancer up to 50-60% (Institut Català d'Oncologia, 2011). However, it seems that only the 5% to 10% of breast cancer are heritable. Therefore, prevention and early detection of breast cancer have an important

role in its prognosis. The Catalan Institute of Oncology reports the following suggestions to promote cancer prevention (Institut Català d'Oncologia, 2011):

- Following a healthy diet: including the ingestion of five portion of fruit and vegetables

- Doing physical exercise every day.

- Following the early detection programs, especially mammograms every two years between 50 to 69 years of age.

- Avoiding harmful substances: including tobacco, alcohol and chemical substances.

Although breast cancer mortality rates are decreasing in the most high-income countries, the incidence and mortality in those countries undergoing rapid changes in human development are increasing. Experts in the field recommend the promotion of the early detection and the access to treatment in transitioning countries, in order to decrease the breast cancer mortality among women in these countries (DeSantis et al., 2015).

3.3.3.2. The most common types of breast cancer

Most breast cancers are carcinomas which have their origin in the epithelial cells that line organs in tissues, like the glandular tissue of the breast. There are also other types of cancers, such as sarcomas, which use to start in the cells of muscle, fat, or connective tissue (American Cancer Society, 2015). However, in this section, the most diagnosed breast carcinomas are commented:

a) Ductal carcinoma in situ

It is considered a non-invasive breast cancer. In this case, cells that line the ducts have changed to look like cancer cells, but they have not spread through the walls of the ducts into the breast tissue. This type of cancer normally does not metastasize outside the breast, but sometimes it can go on to become invasive cancers. Currently, there is not the capability of distinguishing when these cells will become invasive cancer and when they won't. It represents about 1 out of 5 new breast cancer cases and can be cured in most cases.

b) Invasive ductal carcinoma

This is the most common type of breast cancer. It has its origin in milk ducts of the breast, breaks through the wall of the duct, and grows into the fatty tissue. This tumor is capable of metastasizing through the lymphatic system and bloodstream. It represents about eight out of 10 invasive breast cancers.

c) Invasive lobular carcinoma

This type of cancer starts in mild-producing glands (lobules) and also has the capability of metastasizing to other parts of the body. It represents about one out of 10 invasive breast cancer, and it has the handicap that may be harder to detect by a mammogram than the invasive ductal carcinoma.

3.3.3.3. Treatments

When a cancer is detected, the treatment differs from one tumor to another, depending on its size and stage of development. The most common treatments are:

1) Surgery
   a) Conservative surgery:
      i) Lumpectomy: It consists of removing the tumor and a small margin of tissue around it.
      ii) Partial or segmental mastectomy: Removal of a quarter or breast segment comprising the tumor.
   b) Radical surgery:
      i) Radical mastectomy simple: It consists of the removal of the entire breast, including the nipple, but not the lymph nodes.
      ii) Modified radical mastectomy: It consists of the removal of the entire breast, including the nipple and the lymph nodes.

In some women, a breast reconstruction is performed when had undergone radical surgery. This intervention is aimed at restoring the shape of the breast and can be made concurrently with the removal of the breast (immediate reconstruction) or in another surgery (delayed reconstruction). The reconstruction can be performed using tissue from another part of the body (graft) or synthetic implants (internal prostheses). It is also possible to do the reconstruction and use external prostheses. Choosing one option or another also requires an individual assessment of each person (Institut Català d'Oncologia, 2011; Macip, 2012).

2) Radiotherapy

This treatment is aimed at eliminating or reducing tumor cells from a delimited area using high-energy X-ray. It can be used before surgery (reducing tumor cells) or after (destroying the left cells).

There are three main types of radiotherapy (Institut Català d'Oncologia, 2011; Radiology Society of North America, 2016):

a) External beam radiation therapy: it involves high-energy X-ray beams generated by a machine (which is called linear accelerator) that are directed at the tumor from outside the body. It is commonly applied daily, five days per week, during some weeks.
b) Brachytherapy: it is also called internal radiotherapy and consists of placing radioactive material directly inside or next to the tumor.
c) Intensity-modulated radiation therapy: is an advanced high-precision radiotherapy that uses computer-controlled linear accelerators to deliver precise radiation doses to a malignant tumor or specific areas within the tumor. With this method, higher and more effective radiation doses can safely be delivered to tumors with fewer side effects, such as fatigue, skin alteration and hair loss on the irradiated area, in comparison with conventional radiotherapy techniques.

3) Chemotherapy

Chemotherapy refers to a combination of drugs aimed at destroying cancer cells. These drugs can be used to cure cancer or to improve the QoL of patients whose illness cannot be cured. It can be administered intravenously or orally, and works on cells that are rapidly dividing, like cancer cells. The combination of drugs depends on the following criteria:

- Each drug has been proved in their power against cancer.
- Each drug uses a different method of action against cancer.
- Each drug generates different side effects (in order to avoid the hurt on sane tissues as a result of the superposition of the same side effects).
- Normally, it is applied in cycles of four to six months, approximately. Each cycle is composed by two periods: the first when receiving the treatment, and the second, which is the restoring period before initiating the next cycle. Unfortunately, chemotherapy cannot distinct between cancer cells and other normal cells which also divide rapidly (such as blood cells, the cells in the mouth or the stomach, and cells from the hair follicles). The most common side effects are fatigue, hair loss, blood cells decrease, vomit, constipation, diarrhea, and menstrual cycle alterations. (American Cancer Society, 2015; Institut Català d'Oncologia, 2011; Macip, 2012).

4) Hormone Therapy

Hormone therapy is normally used as an adjuvant therapy to help to reduce the risk of cancer recidivism after surgery, but can also be used as neoadjuvant treatment. In addition, it can be used to treat cancer that has come back after treatment or has spread. Estrogen promotes the growth of cancers that are hormone receptor-positive, and about two out of three of breast cancers are hormone receptor-positive — they contain receptors for the hormones estrogen (ER-positive cancers) and/or progesterone (PR-positive cancers). Most types of hormone therapy for breast cancer reduce or even stop the action of estrogens on breast cancer cells. This kind of treatment is helpful for hormone receptor-positive breast cancers, but it does not help patients whose tumors are hormone receptor negative (American Cancer Society, 2015; Macip, 2012).

4. OBJECTIVES

The main objective of this doctoral thesis is to explore and clarify the real connection between this new branch of psychology known as positive psychology and the experience of undergoing a breast cancer, both from a theoretical and a practical point of view.

Specific objectives and structure of this thesis are the following:

a) To systematically review the indicators of PPF in breast cancer.
   i) To study the associations between the main constructs from positive psychology and breast cancer.
   ii) To explore which sociodemographical, medical and psychosocial variables facilitate the emergence of these associations.
b) To systematically review the applicability of the interventions proposed by authors from positive psychology on women who have been diagnosed with breast cancer.
   i) To explore which positive psychological interventions have been applied in women diagnosed with breast cancer.
   ii) To report the benefits of these psychotherapies.
c) To study the effectiveness of a positive psychological intervention applied on distressed cancer survivors in promoting their PTG.
   i) To report data regarding the capability of this positive intervention in reducing stress symptoms through the increase of their PTG.
   ii) To explore the corroboration of cancer survivors' PTG by using their significant others' reports.

5. ARTICLES CONFORMING THIS COMPENDIUM

5.1. POSITIVE PSYCHOLOGICAL FUNCTIONING IN BREAST CANCER: AN INTEGRATIVE REVIEW

This systematic review aimed to integrate the most relevant information reported by those articles which had been focused on looking for the PPF in women who had been previously diagnosed with breast cancer. Specifically, we performed a systematic review looking for the associations between breast cancer and positive psychology constructs like PTG, BF, optimism, happiness, resilience, meaning, WB, and personal virtues or strengths. The methodology was performed following the PRISMA guidelines, which include several steps beginning with the selection of relevant descriptors to be included in the databases. The databases used for the search were the main in psychology area: Medline, PsycINFO, Web of Science, Scopus, Cochrane, CINAHL, and Wiley Online Library. In addition, a Google search was performed in order to identify unindexed literature, and also a search on Proquest Dissertations and Theses, DIALNET and TDX was made seeking thesis in the field. Then, the papers obtained were screened by title (after removing duplicates), abstract, and full text. A second search was performed from the references lists of the articles selected by full text, in order to be as much inclusive as possible. After this process, the content of 143 studies was analyzed. The present systematic review was named as an integrative review, as was suggested by one of the journal's reviewers: as the systematic review included non-experimental studies and it was published in a journal normally read by nurses and medical professionals who normally use this nomenclature when referring to this kind of methodology. The results were classified in terms of sociodemographical, medical, and psychosocial variables; and its relationships with the emergence of PPF in women with breast cancer were explored. Three main categories emerged: positive

dispositional characteristics (including optimism, hope, and resilience), positive subjective states (including WB and happiness) and positive personal changes (including PTG, BF, and meaning). It was concluded that PTG, WB, BF and meaning were the most studied constructs of PPF. In fact, these responses more frequently emerged in those women who were younger and who had undergone more aggressive cancer treatments, probably because they developed more stress and, as a consequence, more PTG. Thus, they were more likely to find benefits from their illness. In addition, it was also discussed the stress-absorbing effect of psychosocial variables, like social support (SS) and religiosity, leading to higher levels of WB and meaning among women with a breast cancer diagnosis. The conclusions obtained in this integrative review provides of important information to the oncological services in the sense that they can be aware of those women who present less probability of showing PPF and, therefore, promote their protective variables, such as ensuring SS and preserving their religious beliefs.

In turn, the PTG construct was also analyzed in another manuscript which is currently under revision in an indexed journal. In this work, a critical review is performed regarding the suitability of using the PTG Inventory when assessing PTG in the aftermath of cancer. The review found that nearly half of the articles reviewed which assessed PTG in cancer were based on Tedeschi & Calhoun's (1995) definition of this construct, but not all of them used their assessment tool (the PTG Inventory). In addition, the paper states that this assessment tool is widely used among cancer patients, while it was developed using data from students. Claiming and demonstrating the need to reach a consensus on properly defining and assessing PTG in cancer is the main achievement of this critical review.

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Review

Positive psychological functioning in breast cancer: An integrative review

Anna Casellas-Grau [a], Jaume Vives [a], Antoni Font [a], Cristian Ochoa [b, c, *]

[a] Universitat Autònoma de Barcelona, Spain
[b] Institut Català d'Oncologia, Spain
[c] Universitat de Barcelona, Spain

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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

* Corresponding author. Psycho-oncology Unit, Duran i Reynals Hospital, Av. Gran Via de l'Hospitalet 199-203, L'Hospitalet de Llobregat, 08908 Barcelona, Spain.
E-mail address: cochoa@iconcologia.net (C. Ochoa).

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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]. *Posttraumatic 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, humo*r, 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

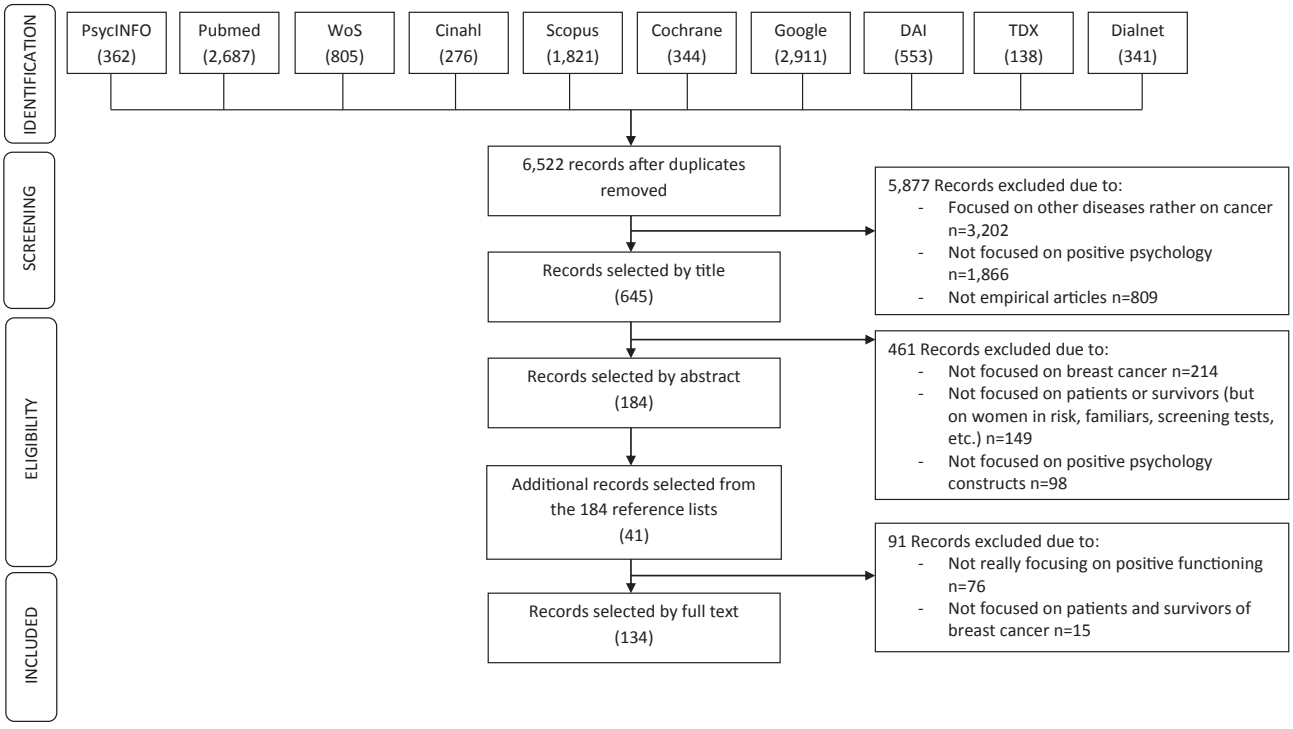

Fig. 1. Articles search process.

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

Reference	Main results	Limitations	Quality
Abu-Helalah et al., 2014 (Jordania)	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. MC: Chemo and radio did not limit patients' WB.	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)	MPR: Gratitude. PC: Emotional expression predicted gratitude.	Did not report age range, BC surgery and BC treatment. Most data was recruited from *ad hoc* measures.	MMAT: 7
Anagnosto-poulos, Slater, & Fitz-simmons, 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
	the other groups in: Fulfillment, Re-evaluation, New ways of living and Appreciation of life.		
Bower et al., 2005 (USA)	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 s 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. MC: Medical variables played no role in outcomes.	Did not report time since diagnosis.	D&B: 9
Casso, Buist, & Taplin, 2004 (USA)	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
	BCS in appreciations for life and new possibilities subscales.		
Chan, Ho, Tedeschi, & Leung, 2011 (China)	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
	PC: Significant relationship between resourcefulness and self-esteem.		
DiSipio, Hayes, Newman, & Janda, 2008 (Australia)	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
	QoL. The areas affected were: emotional, cognitive and role functions, social WB, and sexuality.		
Horgan, Holcombe, & Salmon, 2011 (UK)	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 (≤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. MC: Chemo associated to HRQoL.	Few constructs measured.	D&B: 13
Ivanauskienė et al., 2014 (Lithuania)	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
	MC: Female patients experienced les PTG 6 months after diagnosis if treatment was curative.		
Lechner et al., 2006 (USA)	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
	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.		
Morrill et al., 2008 (USA)	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
Pettrie, 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. *Found* 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
	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.		
Swinton, Bain, Ingram, & Heys, 2011 (UK)	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 & Bonnand-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 (Jordania)	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 – *ad hoc* 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: Ductual 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 expectances 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
		(35%). Surgery: Lump (53%), mast (47%), recons (25%). Treatment: Radio (50%), chemo (31%), hormone (56%).		Self-related Quality of Life – Open-ended questions.
Casso, Buist, & Taplin, 2004 (USA)	O.CS.	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	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
		−43). Treatment: Chemo (45.3%), radio (62.9%), hormone (41%).		functioning − The National Health Interview Survey.
Danhauer et al., 2013 (USA)	O. Cohort 18-month follow-up	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	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
		N = 39. Mean age 55.2 years (39–70). Mean time since diagnosis 4.75 years (4 mths–23 years).		
Gall, Charbonneau, & Florack, 2009 (Canada)	O. Cohort 1 year follow-up.	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%), ductual carcinoma in situ (22.2%) or infiltrating ductual 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
		(SD = 0.45). BC stage: I (33%), II (63%), III (3%). Surgery: Lump (68%), mast (33%). Significant Other (SO): Spouse (57%).		
Ho, Chan, Yau, & Yeung, 2011 (China)	O.CS.	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 least12 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
		treatment: Most received a combination of surgery, chemo and radio.		
Lechner et al., 2006 (USA)	O. Cohort Study I: 12-month follow-up. Study II: 5-year follow-up.	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 – SSQ; 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.
Pettrie, 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 o 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, & Albieri, 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
		surgery + hormone + chemo + radio (24%).		
Scheffold et al., 2014 (Germany)	O. Cohort. 6-month follow-up.	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 & Bonnand-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
		recons (50%). Treatment: Adjuvant (76%). //Husbands (N = 48). Mean age 55.4 years (35–74).		
Weiss, 2004 (USA)	O.CS.	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.

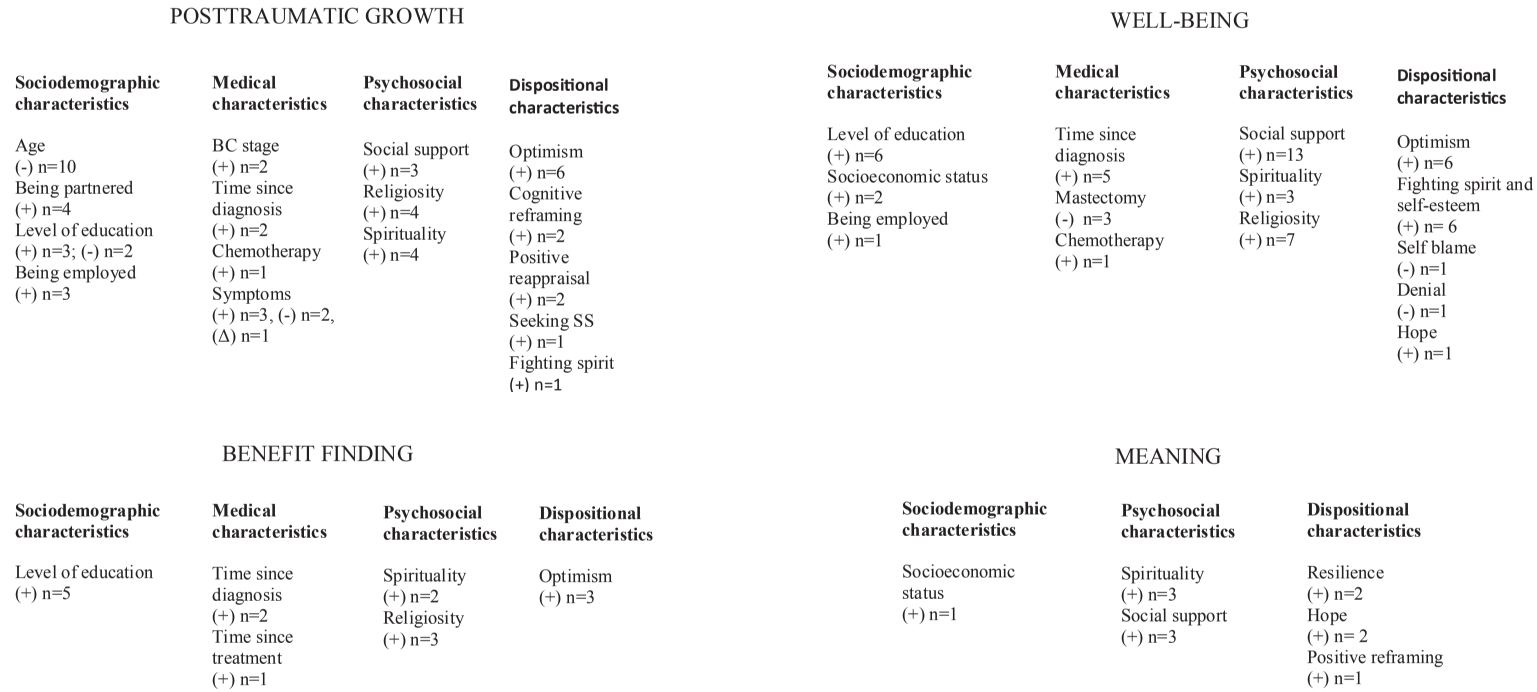
Note I. Abbreviation used in order of appearance: O.CS. = Observational cross-sectional design; CS = Cross-sectional design; SD = Standard deviation; BC = Breast cancer; Mast = Mastectomy; Lump = Lumpectomy; WB = Well-being; MPR = Main positive responses analyzed; DC = Demographical characteristics related 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



(+): 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. $r = 0.42$, $p < 000.1$) [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 increased 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.

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5.2. POSITIVE PSYCHOLOGY INTERVENTIONS IN BREAST CANCER: A SYSTEMATIC REVIEW

Having seen that women who had a breast cancer diagnosis were capable of showing PPF, it was considered the need of exploring if positive psychology psychotherapies had been used to promote this PPF in women with breast cancer. Therefore, the present systematic review was aimed at identifying those psychological interventions related to positive psychology which had been applied on women with a breast cancer diagnosis. The methodology was also performed following the mentioned process in section 5.1. A selection of relevant descriptors was performed, and these were included in the most relevant databases in psychology, including Medline, PsycINFO, Web of Science, Scopus, Cochrane, CINAHL, and Wiley Online Library. Also DIALNET and TDX were screened seeking thesis and dissertations. The papers obtained were screened by title (after removing duplicates), abstract, and full text. A second search was performed from the references lists of the articles selected by full text, in order to be as much inclusive as possible. After this sequence, the content of 16 studies was analyzed, leading to the results and discussion of this systematic review. Results showed that the application of positive psychotherapies in breast cancer patients or survivors was scarce and heterogeneous. Five main groups of positive psychology psychotherapies were found, including: mindfulness-based therapies, meaning-making interventions, written expression of positive emotions, psycho-spiritual interventions, and a hope therapy. The most common were mindfulness-based therapies, which enhanced women's WB, followed by meaning making-interventions and written expression of positive emotions, which increased women's sense of meaning and hope, respectively. This latter improvement was also achieved by psycho-spiritual interventions, together with PTG and WB. Finally, the hope intervention enhanced women's hope, at least at short-term.

Although the studies reported the good effectiveness of the interventions it was found necessary to analyze the effectiveness of a positive psychotherapy for cancer (PPC) survivors which was being used in the Catalan Institute of Oncology in that moment. The article which reports these analyses is currently being revised by the reviewers of an indexed journal. The study was aimed at verifying the effectiveness of the PPC in reducing cancer survivors' stress symptoms through the facilitation of PTG. It was a 12 session group-based psychotherapy, and structurally-based on the assimilation and accommodation processes suggested by Joseph and Linley (2006). The first five sessions were aimed at favoring the assimilation process, including the promotion of attitudes to facilitate growth from disease, favoring emotional expression and processing, and working on emotional regulation

and coping. The following seven sessions were aimed at favoring the accommodation process, including the facilitation of PTG (through giving meaning to the experience and promotion the relational growth), and the existential and spiritual aspects (such as working on mortality, transcendence or regret in a constructive way). For further details of the PPC, please see the annex section or the published book chapter (Ochoa & Casellas-Grau, 2015a). Seventy-four individuals (83.6% were survivors of breast cancer) received the PPC, while 53 (96.2% were survivors of breast cancer) were included in a waiting list receiving the treatment as usual, a symptomatic emotional support and psychoeducation. Follow-up measures were taken three and 12 months after the intervention. Results showed that PPC was effective in increasing PTG in patients, as well as in reducing their stress symptoms. Significant differences in this direction were found between baseline and post-intervention evaluation, in comparison to results from the waiting-list group. Follow-up measures indicated the stabilization of these results, showing the long-term effects of the psychotherapy. In addition, the corroboration of patients' PTG was also analyzed in this study, through the perception of this PTG by patients' significant others. These corroborated the real PTG reported by participants.

In regards the effects of this PTG on patients' loved ones, a book chapter (Ochoa & Casellas-Grau, 2015b) was published exploring if cancer patients' significant others also experience PTG, and if this PTG is either secondary or vicarious. Secondary PTG means that those accompanying develop PTG through "infection" of the traumatic event's effect (witnessing their relative's illness), while vicarious PTG refers to the cases in which significant others experience PTG from observation and learning about their relative's personal growth. Through a revision of the literature, the article concludes that, at least in cancer, PTG processes in significant others are better explained by vicarious mechanisms. Factors like dyad, marital engagement and perceived closeness have an influence on PTG in couple, while the quality of family relationships predicts PTG in parents of children and teenagers with cancer. However, there are some characteristics of the event that may be difficult to explain vicariously. For example, existential worries and questions are too personal to be vicarious. Thus, PTG in these cases may be explained from a secondary perspective, and have other explicative factors. Specifically, women tend to have more worries than men when they are the partner of a patient with cancer. In the same line, parents of children with cancer may also develop their own PTG from a secondary mechanism, rather than a vicarious one.

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Review

Positive psychology interventions in breast cancer. A systematic review

Anna Casellas-Grau*, Antoni Font and Jaume Vives
Universitat Autònoma de Barcelona, Cerdanyola del Vallès (Barcelona) 08193, Spain

**Correspondence to: Universitat Autònoma de Barcelona, Cerdanyola del Vallès (Barcelona) 08193, Spain. E-mail: anna.casellasg@e-campus.uab.cat*

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Abstract

***Objective*: Positive psychology is an emerging area of empirical study, not only in clinical, but also in health psychology. The present systematic review aims to synthesize the evidence about the positive psychology interventions utilized in breast cancer.**

***Methods*: Relevant studies were identified via Pubmed, PsycINFO, Web of Science, Scopus, Cochrane, CINAHL, Wiley Online Library, TDX, and DIALNET databases (up to April 2013). Only those papers focused on interventions related to positive psychology and carried out on breast cancer patients were included.**

***Results*: Of the 7266 articles found through databases, 16 studies were finally included in this review. Five groups of therapies were found: mindfulness-based approaches, expression of positive emotions, spiritual interventions, hope therapy, and meaning-making interventions. These specific interventions promoted positive changes in breast cancer participants, such as enhanced quality of life, well-being, hope, benefit finding, or optimism. However, the disparity of the interventions and some methodological issues limit the outcomes.**

***Conclusions*: Some studies provided relevant evidence about the clear development of positive aspects from the breast cancer experience. Positive interventions applied to patients and survivors of breast cancer were found to be able to promote positive aspects. A global consensus of a positive therapies classification is needed to take one more step in structuring positive psychology.**
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Breast cancer is the most frequently diagnosed cancer among women, which is expected to account for 29% of all new cancer among women in 2013 in the USA [1]. The incidence rates increased between the 1980s and 1990s and have stabilized since 1999 in women of 50 years of age or older, but not in younger women, who show an increase of this diagnosis [2]. Cancer, in general, and breast cancer, in particular, generate psychological challenges that, traditionally, have been treated through problem-focused strategies. Many interventions have been developed to help women to cope with both the physical and psychological negative effects of the diagnosis and the treatment ([3–6]). On the other hand, there is evidence that extremely significant events, such as cancer, can impact on people's self-concept, their relationships, and their values, which can mean a reorganization of life's priorities as the person attempts to achieve a better and healthier life [7,8]. Dealing with cancer may lead to positive changes, which may emerge spontaneously or be elicited through the suitable psychological intervention.

During the last decade, positive psychology has broadened psychology's focus toward a more positive side of the person. It is considered by some to have aspects in common with humanistic psychology and, in part, with Buddhism [9,10], as well as contributions from other disciplines, such as psychiatry [11,12]. Seligman defines positive psychology as the study of human's positive side through the development of personal strengths and virtues, as well as optimal functioning and well-being [13]. It does not mean that a positive psychology approach obviates or neglects the negative side of the disease. As Wong [14] suggests, positive psychology should attain two goals: overcoming and transforming the negatives and enhancing the positives by promoting meaning/virtue in order to reduce mental illness and to increase well-being. Thus, positive psychology therapies shift their focus toward a balanced approach between emphasizing the positive potentials of negativity, that is, it takes distress and disorder as a starting point to improve fulfillment and health [15]. These therapies are not aimed at compelling people to develop positive responses from bad experiences, as has been criticized by some authors [16,17], neither do they attempt to modify cancer's progression [18], but rather, they aim to facilitate positive responses in those who have the potential to develop them. Thus, positive interventions are those that aim to cultivate positive feelings, thoughts, behaviors, and cognitions in addition to well-being and personal strengths [14,19].

We have focused on the positive therapies proposed by Seligman *et al*. [20]: *well-being therapy* [21], *quality*

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of life (QoL) *therapy* [22], and *positive psychotherapy* [20]. Other authors support these therapies ([23–25]) and additionally include *hope therapy* [26], *strengths-based counseling* [27], *strength-centered therapy* [28], *mindfulness-based approaches* [29], and *therapies to promote posttraumatic growth* (PTG) [8]. All of these therapies share the aims of positive psychology: developing personal strengths, enhancing positive emotions, well-being, flow, life satisfaction, and personal growth and change, and they have been applied with satisfying results in different contexts, from affective disorders (e.g., [21,30,31]) to at-risk youths (e.g., [32]) or chronic diseases, such as different types of cancer (e.g., [33]). Seligman [30] specifies that positive psychology procedures should cover those illnesses which affect longevity, are prevalent, are disabling, have a variable prognosis, and can suffer a relapse. Breast cancer has these characteristics, and Seligman makes it explicit when proposing this disease as being treatable by positive psychology interventions. Beyond the concrete therapies labeled and proposed by the aforementioned well-known authors, there are other therapies (e.g., meaning-making interventions) that also share the aims of positive psychology, such as fostering positive feelings, thoughts, behaviors, and cognitions [19]. Thus, these therapies were also included in this review.

According to the positive and beneficial outcomes that have been suggested in the studies mentioned, we aim to synthesize the up-to-date evidence about the use and the effects of positive psychology interventions in breast cancer patients and survivors.

Methods

Literature search strategy

Electronic literature searches were performed using Medline, PsycINFO, Web of Science, Scopus, Cochrane, CINAHL, Wiley Online Library, TDX, and DIALNET databases including publications up to April 2013. A list of positive psychology related keywords was used to identify studies, including relevant interventions, through an iterative process of search and refine, and there was no restriction on the year of publication (Table 1).

Study selection criteria

The following selection criteria were applied to the articles found in databases:

Type of studies

Published primary studies were eligible for inclusion and reviews, editorials, and letters, and case reports were excluded. No limitations regarding study design or outcome measures were used. Articles included were in English or Spanish.

Type of participants

Eligible studies were those whose title or abstract specifically indicated the inclusion of breast cancer patients. The studies were included even if the sample was not exclusively composed of breast cancer patients. There were no restrictions regarding participants' age, number of participants, or disease stage.

Positive interventions

Eligible articles were empirical studies applying at least one of the following positive psychology therapies for breast cancer patients: positive psychotherapy, hope therapy, well-being therapy, QoL therapy, mindfulness, PTG therapies, and strength-centered therapies. In addition, interventions focused on developing personal strengths, meaning-making, enhancing positive emotions, engagement, positive relationships, accomplishment, life satisfaction, and personal growth and change were also included.

Table 1. Descriptors used for the articles research

	Descriptors	
	Positive constructs	**Positive interventions**
OR	*positive psychology, posttraumatic growth, positive psychological growth, personal growth, benefit finding, flow, optimism, dispositional optimism, personal strengths, satisfaction, happiness, positive coping, positive reappraisal coping, resilience, hardiness, positivity, positive emotions, humor, gratitude, savoring, blessing, kindness, meaning*, meaning-making, accomplishment, positive relationships, engagement*	*quality of life therapy, well-being therapy, hope therapy, strength-centered therapy, strength-based counseling, positive psychotherapy, mindfulness, meaningful life therapy*
AND	*Breast Cancer*	
NOT	*mice, mouse, CK19, CK-19, ciytokeratin-19, mma, nucleic acid, tumor metabolism, androgen receptor, estrogen receptor, progesteron 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, tamoxifen, cell**	

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Table 2. Studies characteristics

Reference	Study design	Inclusion criteria	Sample	Group comparison	Intervention	Measures	Results	Limitations
Carlson *et al*. 2007 Canada [35]	QE. Single group. Time series. Twelve-month follow-up.	Diagnosed with stage 0-II breast cancer or early stage prostate cancer and ≥3 months since surgery. Not chemo or radio currently/within the past 3 months. Not mood, anxiety or psychotic disorder. Not have participated in an MBSR group.	N = 41. BC (80.5%) and prostate cancer (19.5%). Stage I BC (39%) and stage II (61%). Mean time since diagnosis 1.92 years (SD = 2.95). Mean age 55.99 years (SD = 10). Married (73%).	—	MBSR program. Eight weekly, 90-minute group sessions and a three-hour silent between weeks six mindfulness theoretical material, relaxation, meditation, yoga, body-mind connection.	Health behavior—Health behaviors form; meditation behavior —Meditation log; QoL—EORTC QLQ-C30; Mood—POMS; Stress symptoms—Symptoms of stress inventory.	MBSR program decreased stress and enhanced QoL in breast and prostate cancer patients for over one-year follow-up. No significant changes on mood disturbance scores.	Lack of control group.
Creswell *et al*. 2007 USA [36]	RCT. Three-month follow-up.	Early-stage BCS within 20 weeks after completing treatment. Not recurrence/metastatic disease.	N = 63. Mean age 49.5 years (21–76). Stages I and II BC. Caucasian (93%).	Emotional expression group versus BF group versus fact-writing control.	Self-affirmation writing (SAW): for each session, participants were instructed to write continuously for 20 min. Four essays of 20 min during a three-week period. Coders were blind to the study hypothesis and the participants' writing conditions.	General life satisfaction—Satisfaction With Life Scale; Mood throughout the past week—POMS; Physical symptoms.	SAW mediated relationships emotional expression—BF at three-month follow-up. Affirmation of valued relationships, the most common form of self-affirmation. SAW does not predict increases in life satisfaction at follow-up.	No manipulation of conditions, assessed through the naturalistic occurrence of these statements in the context of an expressive writing trial
Fallah *et al*. 2011 Iran [37]	QE. Control group pre-post.	Aged 30–65 years. BC stage I–III. No metastasis at least 8 months after diagnosis. Not in treatment. No history of psycho-spiritual education neither other chronic diseases.	N = 50. Case group: n = 25. Mean age 50.16 years (29–68). Mean time since diagnosis 46.68 months (8–120). BC stage II (52%) and married (76%). High school level education (48%)/ control group: N = 25. Matched with case group.	Spiritual intervention group versus control group	Spiritual intervention: contemplation and meditation, prayer, trust in God, patience, repentance and atonement, forgiveness, gratitude and altruistic services. Eight sessions of 1.5 h once a week.	Spirituality—Spiritual Experience questionnaire; Hope—Snyder's Hope Scale; Life Satisfaction—Satisfaction with Life Scale; Happiness—Oxford Happiness Questionnaire; Mental disorders—General Health Questionnaire-28.	Spiritual intervention increases happiness, hope, and life satisfaction; gives BC patients the opportunity to feel they are in control of the mental trauma of the cancer and increases life satisfaction.	Nonrandomized sampling method.
Garlick *et al*. 2011 USA [7]	QE. Single group. Time series. One-month follow-up.	Diagnosed with BC in stages 0–III the past 10 years. No metastasis.	N = 24. Mean age 53 (40–66). Married/partnered (75%), Caucasian (79%), medium and high economic income (87%), Christian and Jewish Religion (85%). Treatment: 58% radio and 54% chemo. Time since diagnosis 2 weeks–10 years (mean 20.7 months).	—	Psycho-Spiritual Integrative Therapy (PSIT): 8-week addressing spiritual, existential, and psychological issues. Also skill building and mindful acceptance. Three-hour sessions over 8 weeks for a total of 24 h of intervention.	Physical and Psychological well-being—FACT-B; Psychological well-being—POMS; PTG—PTGI; Spiritual well-being—FACIT-Sp-Ex.	PSIT improved psychological, physical and spiritual well-being, and PTG. No significant change in FACT-B social/family subscale. Increases in energy. Improvements in new possibilities scale of PTGI but not in relation with others, appreciation for life and spiritual change subscales.	Lack of a control group. Small sample size. Only BC patients. Use of multiple assessments and variables.

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Table 2. Continued

Reference	Study design	Inclusion criteria	Sample	Group comparison	Intervention	Measures	Results	Limitations
Lee *et al.* 2006 Canada[47]	RCT.	Adult colorectal or BC patients first diagnosed within the last 6 months. No previous cancer diagnosis. Receiving treatment. Not brain metastases or psychiatrics history.	N = 74. Experimental group: (N = 35) 80% female. Mean age 56.4 years (SD = 9.8). Married (63%) and high school education or university (76%). Employed (51%), Catholic (62%). 66% had BC: most stages I (31%) or II (20%). Control group: (N = 39). Matched with the experimental group.	Meaning-making intervention versus control group.	A 'lifeline' exercise to guide participants through a review of the cancer experience using a narrative approach to chronologically embed the cancer experience in the historical context of other important life events. Four individualized sessions, 120'.	Self-esteem—The Rosenberg Self-Esteem Scale; Optimism—Life Orientation Test-Revised; Self-efficacy—The Generalized Self-Efficacy Scale.	Improvements in self-esteem, optimism, and self-efficacy for the experimental group. Self-esteem increased despite the ongoing chemo. A sense of optimism improved as a result of examining the fearful aspects of cancer following a review of each individual's strengths.	Sample mainly of BC participants. Non-participants tended to be less educated, older, and had lower family incomes. Limitations in time and sources.
Matchim *et al.* 2011 USA [38]	QE. Control group time series. One month follow-up.	Women diagnosed with stages 0–II BC. Minimum 3 months after completing active treatment. No active psychological disorder. Not had practiced meditation within 1 year before the study.	N = 36. Mostly white people in both groups (86.67% intervention vs 100% control), Christian (86.67% vs 76.5%), married (80% vs 64.7%). Intervention group (N = 15). Mean age 61.47 years. Time since diagnosis 10.02 years. Control group (N = 17). Mean age 56.87 years. Time since diagnosis 6.73 years.	MBSR intervention group vs. No MBSR intervention (control group).	Eight-week MBSR. Relaxed breathing, guided awareness of bodily sensation, yoga stretches, meditation, body scan, walking mindfulness meditation. Mindfulness to the awareness of thought processes, focusing awareness on an image.	Mood—POMS; Stress level—Calgary Symptoms of Stress Inventory; Mindfulness—Five Facet Mindfulness Questionnaire; Physiological measures.	No significant effects on reducing mood disturbance and stress but on increasing mindfulness state.	Small sample size.
Matousek *et al.* 2010 Canada [39]	QE. Single group. Pre-post.	Had completed medical treatment for BC. No concurrent psychiatric disorders.	N = 59. Mean age 56.4 years old (28–79). All high school education or above. Most early-stage BC (66%). In 20.3%, cancer stage was unknown. Time since completion of BC treatment 28.9 ± 58 months (2–340months).	—	Coping through meditation practice and dialog. Home practice 45–60 min/day. Two and a half-hour classes/week, for 8 weeks Participation in a 6-hour silent retreat day after week six.	Perceived stress—Perceived Stress Scale-10; Depression—CES-D; Coping—Coping with Health Injures and Problems; Sense of coherence—Sense Of Coherence Scale; Mindfulness—MAAS.	Mindfulness increased significantly from pre to post. Sense of coherence increased significantly over time. Correlation between increases in mindfulness and decreases in emotional coping.	No RCT. Lack of control group and long-term follow-up.
Rustøen *et al.* 2010 Norway [49]	QE. Single group. Time series. 12 months follow-up.	BC participants who contacted offices of the Norwegian Cancer Society looking for support or assistance.	N = 194. Most women (81%), married (59%), college or university education (39%), unemployed (71%), and had BC (38%). Mean time since diagnosis 2.9 years. 56% receiving cancer treatment at T1. At T2, 26.5%; T3 25.5%; T4 24.5%.	—	HOPE-IN: Belief in oneself and one's own ability; emotional reactions; relationships with important others; active involvement in one's life; spiritual values, acknowledgement that there is a future. Eight 2-hour sessions over 8 weeks.	Hope—Norwegian version of Herth Hope Index; Distress—Impact of Event Scale.	Intervention increased participants' level of hope and decreased distress. Levels of hope not maintained at three and 12 months but did not return to baseline level. Lower distress maintained at three and 12 months.	Pre-post rather RCT design. Small sample size and it was drawn from the community.

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Stanton *et al*. 2002 USA [40]	RCT. Three-months follow-up.	Women with diagnosis of stage I or II BC and within 20 weeks after completion of medical treatments. Not recurrent or metastatic disease.	N = 60. Mean age 49.53 years (21–76). White people (93%). 68% employed and 78% married. Average diagnosis duration was 28.37 weeks. Treatment: Mast (30%), breast conservation (62%). Chemo (75%), radio (67%) and 17% recons. 52% selective estrogen receptor.	Expressive (EMO) versus BF (POS) versus control group.	Conditions involved a writing about thoughts and feelings regarding BC (EMO group); positive thoughts and feelings (POS group); facts regarding cancer and its treatment (control group). Sessions of 20-minute writing within a 3-week period.	Psychological adjustment—POMS. Health-related QoL—FACT. Physical health-related outcomes–The Psychology of Physical Symptoms.	Writing about positive consequence resulted in less medical appointments at 3 months. BF conferred a greater advantage for avoidant women. Inducing participants to focus on the benefits of their BC experience did not seem to produce extreme emotional suppression.	Primary reliance on participant self-report. Participants evidenced more positive psychological adjustment than other samples.
Tacón. 2011 USA [45]	QE. Single group. Pre-post.	Women diagnosed with early stage BC within the past 12 months.	N = 76. Mean age 45.4 years (32–63). Mostly white people (94%), middle class (92%), and married (60.8%), of Protestant faith (96%), with education beyond high school (68%). 52% were working part-time. BC stage: I (68%) and II (32%). 73.6% receiving chemo or radio.	—	Four mindfulness practices: the body scan, sitting meditation, *hatha* yoga, and walking meditation.	Existential WB—Spiritual Well-Being Scale; Loss categories—Section B of the Grief Diagnostic Instrument (GDI); Grief—Section C of the GDI; Mental adjustment to cancer—The Mental Adjustment to Cancer Scale.	Existential WB improved, whereas grief scores decreased. Positive changes in mental adjustment: anxious preoccupation, and hopeless-helpless subscales improved. Fighting spirit coping response increased significantly.	Participants primarily white people. Participants not randomly assigned to multiple treatment conditions.
Van der Lee, *et al*. 2012 Holland [48]	RCT. 6-month follow-up.	Women had completed BC treatment at least 1 year previously, were curatively treated, ≥35 on the fatigue subscale of Checklist Individual Scale (CIS), no other somatic disease.	N = 83. Intervention group: mean age 53.1 years (SD = 9.1). Both groups: mostly married (63% intervention vs 81% control), medium education level, had BC (63% vs 54%), had undergone surgery (95% vs 86%), chemo (50% vs 57%), radio (66% vs 76%), and hormone therapy (29% vs 48%). Time since treatment (3 years vs 3.1 years).	Mindfulness-based cognitive therapy (MBCT) versus waiting list control group	Therapy attempted to teach the participant to use a detached perspective as a skill to prevent the automatic negative thinking patterns. 9-week group therapy, including eight weekly sessions of 2.5 h and one 6-hour session.	Fatigue—Checklist Individual Strength; Functional impairment—Sickness Impact Profile; WB—Dutch Health and Disease Inventory; Sleep quality—Sleep Quality Scale; Depression—Hospital Anxiety and Depression Scale.	One third of patients reported no longer suffering from fatigue, even 6 months later. MBCT enhanced WB. Improvement in functioning not immediately but 6 months later.	Heterogeneous and small sample. Short follow-up. The same two therapists led all groups.
Vilhauer 2009 USA [41]	Mixed methods. QE and qualitative. Only post.	Women with metastasis BC diagnosis. Not concurrent chronic illness or medical condition likely to affect QoL. Not psychiatric illness. Continuous access to a computer.	N = 20. Mean age 54.2 years (SD = 5.9). All Caucasian. Married (85%). 65% had attended college. 45% employed. Mean months since diagnosis of metastasis 22.9 (SD = 17.5). Half currently attend a face-to-face support group and 20% currently in individual psychotherapy.	—	Online support group: women were free to write about negative and positive experiences and feelings. There was no moderator of the groups.	Experience of being in the online support groups—open-ended interviews; Group cohesiveness, altruism, universality, catharsis, and hope—Likert scale items.	Women benefited from group cohesiveness, universality, information, exchange, and hope. Half of them reported altruism and being able to write freely about their concerns and feelings. Women had similar benefits as do in traditional self-help groups.	Sample may be not representative of all metastasis BC patients. All participants were voluntaries. The ethnic composition of the sample was restricted.

(Continues)

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Table 2. Continued

Reference	Study design	Inclusion criteria	Sample	Group comparison	Intervention	Measures	Results	Limitations
Witek-Janusek *et al.* 2008 USA [46]	QE. Control group. Time series. One month follow-up	Early stage BC. Not treated with chemo. Not having immune-based disease, psychosis, anxiety disorders, or cognitive impairments. Not substance abusers. Not taking corticosteroids, anxiolytics, or antidepressant drugs. Not had been trained in MBSR.	N = 96. MBSR group (N = 38): mean age 55 years (SD = 10). BC Stage 0 (37%), I (50%), and II (13%). Conservative surgery (87%). Mostly married (66%), employed (61%), and Caucasian (84%). Non-MBSR group (N = 28): mean age 54 years (SD = 8). BC Stage 0 (25%), I (71%), and II (4%). Conservative surgery (96%). Mostly married (75%), employed (68%), and Caucasian (79%). Cancer free group (N = 30) similar demographic characteristics as other groups.	MBSR group versus non-MBSR control group versus healthy women.	Eight-weekly (2.5 h/week) group sessions plus one full day session held after the fifth week. Mindfulness taught through breath awareness, sitting and walking meditation, and mindful yoga.	Life Satisfaction—Quality of Life Index Cancer Version III; Coping—Jalowiec Coping Scale; Present awareness—MAAS; Immune and cortisol measures.	MBSR group reported more improvement in QOL also at 1-month follow-up and in coping effectiveness. Only two of the four domains of QOL were assessed: the psychological—spiritual and the family domains. No changes in MAAS scores in MBSR group.	Non-randomized assignation.
Collie *et al.* 2006 USA and Canada [42]	Qualitative design	Women diagnosed with BC were eligible to participate regardless of the stage of the disease, time since diagnosis, or type of treatment.	N = 17. Mean age 56.5 years (37–82). Nine (53%) were survivors, four had recurrent BC (23.5%), and one (6%) in terminal phase. Ten (59%) had children. Eight (47%) living on their own. Four (23.5%) had serious financial difficulties.	Art therapy versus art making	Art therapy: expression of their emotions through art, with an art therapist. Art-making: expression of their emotions through art, without an art therapist	Interviews based on an invitation to tell their story of art therapy/art-making in their own words within their own framework of meaning.	Four main storylines (art and art therapy as a haven; getting a clearer view; clearing the way emotionally; enhancing and enlivening the self) which act as mechanisms for maintaining a sense of valuable, unique, and permanent self, for mobilizing personal resources and for experiencing meaningfulness.	No women from some major ethnic groups in the USA or Canada (Black people, Hispanic, or Asian)
Coward *et al.* 2005 USA [43]	Qualitative design	Women diagnosed with BC within the past 6 months.	N = 14. Support group (n = 7): mean age 53.7 years (43–63), mostly college educated, and Caucasian. Four (28%) married. Mean time since diagnosis 2.7 months. Most stage II of BC, received lumpectomy and radio. Control group (n = 7): mean age 44.3 years (31–56), mostly college educated, and Caucasian. Three (21%) married. Mean	Support group versus control group	Eight-week self-transcendence theory-based support group sessions. 90-minute sessions to promote the expansion of perceived self-conceptual boundaries characteristic of self-transcendence.	Three interviews about their cancer experience while being in the support group	All identified benefit from interacting with other women diagnosed with BC. Participants expanded their previous self-conceptual boundaries to construct meaning from the experience. Similar themes for both groups.	No quantitative measures (although being part of a RCT study)

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		time since diagnosis 1.9 months. Most stage II of BC, received lumpectomy and chemo plus radio.				
Hoffman *et al.* 2012 UK [44]	Qualitative design	Diagnosed with stages 0–III of BC. Two months to 2 years after surgery or completing treatment. No suicidal thoughts, current psychosis, or intellectual impairment. N = 92. High predominant socio-economic status. Most presented stage II of BC (51%). 59% breast conserving surgery, 46% mast, 59% chemo, 80% radio, and 20% recons.	—	MBSR. The eight-week program. Classes 2–6 lasted 2.25 h. Other classes lasted 2 hours. Consisted of stretching exercises, meditation sitting positions, information on ways of seeing, pleasant and unpleasant events, stress, some stories/poems, and short exercises.	Participants' experience of MBSR—one closed and four opened questions.	Increased awareness, described as openness to change and the spirit of connectedness. Increased acceptance, calm, confidence, and ability to cope. MBSR improves self-management and self-efficacy.	No quantitative measures (although being part of a RCT study)

QE, quasi-experimental; Chemo, chemotherapy; Radio, radiotherapy; BC, breast cancer; MBSR, mindfulness-based stress reduction; QoL, quality of life; EORTC QLQ-C30, European organization for research and treatment of cancer quality of life questionnaire; POMS, profile mood states; BF, benefit finding, RCT, randomized controlled trial; BCS, breast cancer survivors; FACT-(B), Functional Assessment of Cancer Therapy-(Breast Cancer); PTG, posttraumatic growth; PTGI, posttraumatic growth inventory; FACIT-Sp-Ex, Functional Assessment of Chronic Illness Therapy-Spiritual WB-Expanded Version; CES-D, Center for Epidemiologic Studies-Depression; MAAS, Mindful Attention Awareness Scale; Mast, mastectomy; Recons, breast reconstruction; and WB, well-being.

Review methods

A list of relevant descriptors was used to obtain the articles (Table 1). The abstracts of the identified publications were screened for relevance to the selection criteria. An article was rejected if it was determined from the abstract that the study failed to meet these criteria. When an abstract could not be rejected with certainty, the full article was appraised.

A review template was developed specifying key information about each study. This information was extracted independently by three reviewers (AC, JV, and AF), and results were compared. Discrepancies were resolved by consensus. Finally, the methodological quality of all quantitative studies was reviewed using Downs *et al.*'s checklist [34]. All studies that met inclusion criteria were assessed using this quality tool. Those studies that did not meet quality criteria were rejected from the review.

Results

Electronic database searching yielded 7266 bibliographic records (after removing duplicates). After applying the aforementioned filter, 16 studies met inclusion criteria and were included in the review (Table 2).

Study characteristics

Sixteen studies with different designs were included (Table 3). Sample sizes varied from 14 to 194, although they tended to be small: 10 articles reported samples of less than 65 participants [7,35–43], whereas five had samples between 66 and 96 [44–48]. Only one study included nearly 200 participants [49]. In relation to demographic characteristics, all studies reported the mean age of patients, except two [44,49], and this ranged from 49 to 61.5 years. Participants were mainly married or partnered and, in eight studies [7,36,38,40,41,43,45,46] that reported the sample ethnicity, this was mainly Caucasian (Table 4).

In total, 53 different instruments were used (Table 2), and the most frequently assessed outcomes were QoL, stress symptoms, well-being, mood state, and psychological adjustment.

Study quality

Study quality was assessed using Downs *et al.*'s [34] quality assessment tool. Six of the nine quasi-experimental studies lacked a control group [7,35,39,41,45,49], thus weakening their internal validity. The participant dropout rates were reported in all articles. Three papers [50–52] were excluded because of their high dropout rates (54%, 67.3%, and 57.1%, respectively). Four studies [35,40,46,47] of the 14 reported some characteristics of those participants who dropped out of the study. In three [35,40,46] of these four papers, characteristics from those who withdrew from the study did not differ from those who remained. In Lee

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Table 3. Studies designs

Quantitative: randomized controlled trial (N = 4)		Quantitative: quasi-experimental (N = 9)					
		Pre-post design (N = 8)					
		Single group (N = 5)		Non-equivalent control group (N = 3)		Only post (N = 1)	Qualitative (N = 3)
Follow-up (months)	No follow-up	Follow-up (months)	No follow-up	Follow-up (months)	No follow-up	No follow-up	No follow-up
[36] 3 [40] 3 [48] 6	[47]	[7] 1 [45] 3 [35] 12 [49] 1	[39]	[38] 1 [46] 1	[37]	[41]	[44] [43] [42]

Table 4. Samples' medical characteristics

Only breast cancer (BC) N = 11					Breast and prostate cancer N = 1	Breast and colorectal cancer N = 1	Diverse types of cancer N = 2	
Early stage		Diverse stages		Metastatic	Early stages	Diverse stages	No information about cancer stages	
Treatment	No treatment	Treatment	No treatment	Treatment	No treatment	Treatment	Treatment	No treatment
[45]	[36,38,40,46]	[7,42]	[37,39,42,44]	[41]	[35] (80.5% BC)	[47] (66% BC)	[49] (55.1% treatment) (37.8% BC)	[49] (43.9% no treatment) [48] (63% BC)

Treatment/no treatment: receiving/not receiving cancer treatment during the study. Coward, *et al.* [43] did not specify if their participants were receiving treatment at the time of the study. Collie, *et al.* [42] included survivors and recurrent participants.

et al.'s [47] article, those who dropped out had some irrelevant demographical differences from those who remained in the study. Owing to the nature of the interventions, proper blinding of participants was generally unfeasible, except for three studies [36,40,47]. Regarding the measuring instruments used, all quantitative studies utilized questionnaires with acceptable indexes of validity and reliability to measure their main variables. There were three studies [42–44] that used a qualitative design, and therefore could not be assessed using Downs *et al.*'s [34] quality assessment tool. Vilhauer [41] applied a mixed method design in which the component used ad hoc measures based on Yalom's conceptualization, and this could not be assessed by the Downs *et al.*'s [34] quality assessment tool.

Study contents

Mindfulness-based therapies were the most used in breast cancer patients (seven studies - [35,38,39,44–46,48]), followed by those therapies based on creating a meaning of the disease [42,43,47]. Three other studies were based on writing about positive emotions ([36,40,41]), whereas psycho-spiritual interventions were applied to breast cancer patients in two studies [7,37]. Finally, Rustøen *et al.* [49] used a therapy that was explicitly focused on enhancing hope.

Mindfulness-based interventions

These interventions were focused on teaching the necessary skills to reduce stress through enhancing the ability of being aware of the present moment without judging or trying to change thoughts and feelings. Seven articles used mindfulness to achieve positive responses in breast cancer patients [35,38,39,44–46,48]. All studies were based on Kabat-Zinn *et al.*'s [53] mindfulness-based stress reduction program (MBSR). One of these articles applied the mindfulness-based cognitive therapy, which was based on both MBSR and cognitive therapy [48]. These therapies reported an increase in women's QoL [35,46,48] and in general well-being [48]. The QoL domains that have been found to be improved were the psychological, spiritual, and family domains, and the improvement remained even one month after completing MBSR [46]. MBSR interventions also improved the perception of patients of the social support they received as well as the ability to cope with and accept breast cancer [44]. MBSR also provided breast cancer patients with the chance to find a space to care for themselves, as well as to experience more calm and confidence [44]. However, there were no clear data about MBSR effectiveness on the improvement of breast cancer patients' mindfulness state. On the one hand, Matchim *et al.*, and Hoffman *et al.* [38,44] found an increase of present awareness but, on the other hand, Witek-Janusek *et al.* [46] could not find differences between MBSR's and control groups' mindfulness scores, perhaps because the assessment tool did not assess the five dimensions of mindfulness, except one (acting with awareness, automatic pilot, concentration, and nondistraction) [54].

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Meaning-making interventions

Lee *et al.*'s study [47] was focused on following a 'lifeline' exercise to build a meaning for the cancer experience and maintaining a meaningful life in the present. Participants who received the meaning-making intervention reported, despite undergoing chemotherapy, enhanced self-esteem, self-efficacy, and optimism, which increased the sense of meaning. Authors concluded that optimism can be improved through the exercise of reviewing individual strengths and capacities. On the other hand, Coward *et al.* [43], using a qualitative design, found that newly diagnosed breast cancer participants receiving self-transcendence theory-based support, expanded their self-conceptual limits to construct meaning from their experience. Finally, Collie *et al.* [42] found that participants experienced meaningfulness through art-making.

Written expression of positive emotions

Expressing positive emotions has been described in three articles [36,40,41]. These types of therapies enhanced benefit finding even at three-month follow-up [36,40], especially in those women who presented an avoidance-oriented coping [40]. In addition, writing in online social support groups enhanced women's hope and altruism [41]. Finally, although life satisfaction was increased, it could not be predicted at three-month follow-up [36].

Psycho-spiritual interventions

Enhancement of spiritual well-being through psycho-spiritual interventions in breast cancer patients was the focus of two studies [7,37]. Fallah *et al.* [37] explicitly found that their spiritual interventions enhanced positive emotions while decreasing negative ones in their sample. Regarding these positive emotions, psycho-spiritual interventions were able to enhance hope, as well as happiness, life satisfaction [37], and PTG [7]. Well-being was also improved in terms of psychological, physical, spiritual, and emotional aspects, and patients also reported an energy increase and enhancement of their social relationships' quality [7]. In addition, psycho-spiritual intervention could increase the sense of control among patients through giving information and using their spiritual resources [37].

Hope intervention

Only one article was focused on enhancing hope among breast cancer patients [49]. The intervention, called HOPE-IN, increased hope levels immediately after therapy, but it could not maintain the high hope levels reported by participants, at three-month and 12-month follow-ups.

Discussion

To our knowledge, this is the first attempt at reviewing the effects of positive psychology interventions in breast cancer patients. This systematic review reveals that the main positive psychology therapies proposed by Seligman *et al.* [20], Joseph *et al.* [25], Hervás *et al.* [23], and Magyar-Moe [24] have been little studied among breast cancer patients. Only two therapies of these have been applied to this population: mindfulness [35,38,39,44–46,48] and a type of hope therapy [49]. Apart from these therapies, three other groups of interventions were included—expression of positive emotions, psycho-spiritual interventions and meaning-making interventions—as they also aimed to foster positive feelings, thoughts, behaviors, and cognitions [19], thus broadening the aims of classical psychology to the positive side [14]. In the specific case of mindfulness intervention studies, although they were focused on reducing stress, which is a negative construct, they were considered to be relevant as they are related to Csikszentmihalyi's concept of flow [55] and because some negative or stressful experiences can trigger positive emotions [14]. Other authors [56] found that enhanced QoL was the common outcome in all mindfulness studies.

In general, the positive therapies included in this review were capable of enhancing QoL, well-being, PTG, hope, meaning, happiness, optimism, life satisfaction, and benefit finding in women with breast cancer. However, not all patients were able to develop positive coping styles and responses to breast cancer even after the interventions. This may indicate that not everyone is responsive to these therapies, which suggests that positive psychology is not universally effective, but it is capable of triggering positive responses in those women who have the potential to develop them.

Quality of evidence

As reported by Coyne *et al.* [18], we also found some studies that, after being appraised using Downs, *et al.*'s tool [34], had to be rejected because of the lack of methodological quality.

The 16 reviewed studies included approximately 930 women with breast cancer. Methodological quality varied, but every study had its limitations. A common weakness was a small sample size, with nine papers [7,35,37–43] having 60 participants or fewer, resulting in small comparison groups, thus limiting their statistical power to detect intervention effects. Samples were also found to be highly homogeneous, all being almost exclusively white, married or partnered, and not undergoing cancer treatment during the study, thus limiting their external validity. All longitudinal studies, except two [44,49], reported moderate rates of loss to follow-up, which could introduce attrition bias into the results. However, those articles which reported

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high levels of loss to follow-up were excluded from this review [50–52]. It is possible that individuals who dropped out from the studies had shown relevant improvements after some months due to the delayed effects of the interventions. The lack of a control group in seven studies [7,35,39,41,44,45,49] also compromised their internal validity. Additionally, heterogeneity of the research designs makes meta-analytical techniques hardly applicable to provide a summarized measure of the effects of the interventions.

In conclusion, the aims of the present review were to synthesize the up-to-date evidence about positive interventions in breast cancer patients and survivors. All therapies found in this review enhanced positive responses in breast cancer patients, but the low number of studies, as well as disparities among therapies and the methodological characteristics of the studies made it difficult to reach clear general conclusions. Although we did not find any instances of use of the positive psychology interventions proposed by Seligman *et al*. [20], Hervás *et al*. [23], Joseph *et al*. [25], or Magyar-Moe [24], in the strictest sense, except for mindfulness and hope therapy, found that all interventions in this review were related to these main positive psychology therapies. Further work is needed in order to reach a consensus on the classification of positive psychology therapies.

Limitations

Bias at the data extraction stage of the review process was reduced by developing a study review template, which was applied by three independent reviewers to extract key data from studies. Although efforts were made to identify 'grey literature' including dissertations, some of these documents could not be accessed.

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6. DISCUSSION

The results obtained from the performed studies are discussed below. Also clinical applications and future lines of research are proposed, in order to provide this thesis with further utility.

6.1. VARIABLES THAT FACILITATE THE EMERGENCE OF THE FOUR MAIN POSITIVE RESPONSES AMONG WOMEN WITH BREAST CANCER

One of the aims of this dissertation was to explore and clarify the connections between the experience of suffering from breast cancer and positive psychology theories, constructs and interventions. A systematic review was considered to be the optimal methodology for achieving this aim, given that it goes further from a mere revision of the literature: it is aimed at the exhaustive identification of quality articles to obtain unbiased synthesis of their results. Therefore, taking into account the large amount of articles focusing on this issue, it was important to use a methodology which ensures the exhaustiveness of the articles search. In the concrete case of the first of the systematic reviews included in this thesis (section 5.1.), in accordance with the publishing journal reviewer's suggestion, we adapted the nomenclature of systematic review to integrative review, as it is the most commonly used among nursery and medical professionals when a systematic review includes non-experimental studies. The integrative review revealed that the more stressful the breast cancer experienced, the more latter PPF was reported. For this reason, those women who were younger and had undergone more aggressive cancer treatments, tended to develop more PTG after the cancer experience. As discussed in the article, a possible explanation of these results was that being diagnosed with cancer at a younger age tends to be more disruptive

for several reasons: firstly, it breaks with the popular conception of the age of appearance of this disease; secondly, the fact of experiencing a premature diagnosis of cancer compromises one's plans of life. In addition, cancer in early ages tends to have a worse prognosis, resulting in treatments with a higher impact, and more reflections about the value of one's health and life. It may be this latter phenomenon which leads to positive responses like PTG, as the appearance of PTG nourishes of these reflections. A similar explanation can be given with regard to cancer treatments: those women who had suffered more in their treatments, especially those who had undergone chemotherapy, developed higher levels of stress and, hence, higher latter PPF. In addition, the time needed to develop this reflection probably explains why medical variables like the time since diagnosis and treatment also run for better WB, QoL, PTG, and BF.

In turn, psychosocial variables like SS and religiousness were strongly linked to later PPF among women with breast cancer. These variables were found to have a shock-absorbing effect from the time of diagnosis up to the end of cancer treatment, resulting in higher levels of WB and meaning in life. These two variables may be interlinked in the sense that women with religious beliefs reported to have an extra SS either from their belief in God or from the other believers.

These conclusions lead to important clinical implications in the sense that part of the oncological population is older and have little SS. Therefore, in practical terms, these women should be especially attended by oncological professionals, providing them with additional SS, at least from physicians, nurses, or psychologists. Also their religious beliefs should be preserved, as well as their needs with regard to the cancer treatment. On the other hand, psychologists should take into account that not all breast cancer patients develop positive responses from their experience, which has also been highlighted by relevant authors of positive psychology. Aspinwall and Tedeschi (2010) for instance, explain that positive psychology recognizes that not everybody experiences positive emotions in the aftermath of trauma, but as some people do, it is necessary to also study the positive responses to trauma. For this reason, it is important to keep exploring how PPF develops from a traumatic experience and, how to promote this emergence, which is discussed in the next section.

6.2. PSYCHOTHERAPIES TO PROMOTE THE POSITIVE PSYCHOLOGICAL FUNCTIONING IN WOMEN WITH BREAST CANCER

The integrative review highlighted that PPF was possible among women with breast cancer. Therefore, an exploration of which positive psychotherapies had been applied for the promotion of

this PPF among women with breast cancer was performed. As commented in section 5.2., results of the systematic review showed that the application of positive psychotherapies in breast cancer patients or survivors was scarce and heterogeneous. From the only 16 studies which focused on promoting PP among women with breast cancer, five distinct groups of psychotherapies were found: mindfulness-based therapies, meaning-making interventions, written expression of positive emotions, psycho-spiritual interventions, and a hope therapy. The most common were mindfulness-based therapies, which were based on Kabat-Zinn's MBSR (Kabat-Zinn et al., 1985). Results of these therapies showed that, after their completion, women were more capable of perceiving the SS they were receiving, leading to higher levels of WB. Paradoxically, the power of MBSR in enhancing women's capability of developing mindfulness was not clear. Maybe a better adaptation of MBSR in the breast cancer population should be done, given that it has its specific characteristics regarding treatment, body changes, and fear of recurrence. In turn, meaning-making intervention could modulate the negative effects of chemotherapy, promoting a sense of meaning among women. Thus, this kind of therapies may promote the aforementioned relationships between undergoing this aggressive kind of cancer treatment and latter PPF in women with breast cancer. In regard with written expression of positive emotions, it was found that it was especially useful when shared with other breast cancer patients, highlighting the shock-absorbing role of SS. Also SS had a relevant role in psycho-spiritual interventions, in which women tended to report better levels of quality in social relationships, as well as WB. Finally, the hope intervention included was found to be effective in enhancing women's hope in the short-term, but not in the long-term. All in all, it is relevant to stress two big issues: on the one hand, the important role that the social environment has on women's PPF, even when undergoing different types of psychotherapies. On the other hand, however, more research is needed in terms of the applicability of positive psychological interventions in women with breast cancer: only two of these therapies which have been applied on breast cancer patients explicitly coincide with the seven positive psychology interventions explained in the introduction section of this thesis.

Also the effects of a positive psychology intervention were explored in survivors of cancer, in a study which is currently under review in an indexed journal. More than the 80% of the sample comprised survivors of breast cancer. The intervention and its results are explained in section 5.2. The results of this therapy went further than the promotion of PTG in cancer survivors; it also achieved a significant reduction of stress among individuals in the sample. This condition can be explained by the organismic valuing theory of adaptation to threatening events (Joseph & Linley, 2006) in the sense that in the aftermath of trauma, two processes emerge: the assimilation and the accommodation. The first one refers to the management of the stressful event in order to make it

consistent with one's basic beliefs. This management causes a questioning about one's vision of oneself, the world and the others. On the other hand, accommodation process represents the changes of these basic beliefs when seeking to incorporate a difficult experience. This latter would explain our results in the sense that when we facilitate PTG we also achieve a reduction of posttraumatic stress in cancer patients. Therefore, a connection between posttraumatic stress disorder and PTG has been studied and found. This connection could be further investigated in the sense that PTG can be an element which also reduces the emergence of stress and distress, adding a plus on stress-reduction psychotherapies.

Further, two other phenomena have been explored in regards the relationship among PTG, cancer, and patients' loved ones: the corroborative role of significant others of patients' PTG, and how patient's PTG is transmitted to their significant others. The first point was explored in the article which focuses on the PPC application. In fact, the PPC study was not only aimed at assessing the effectiveness of PPC in distressed cancer survivors, but also at analyzing the existence, or not, of PTG among survivors of cancer. Results showed that survivors' significant others corroborated the PTG that they had reported, highlighting its real existence, as had also been found in other studies (e.g. Moore et al., 2011; Shakespeare-Finch & Barrington, 2012). These results could answer one of the criticisms against positive psychology: the subjective perception of PTG. For example, Coyne and Tennen (2010) consider that the widely used tool for PTG assessment, the Posttraumatic Growth Inventory, is not appropriate because it generates a subjective bias. Pioneer researchers in the field, like Crystal Park, explain that the study of positive psychology constructs like PTG are based on the subjective opinion of participants, but it is a common practice in psychology (Cho & Park, 2013). Aspinwall and Tedeschi (2010) also state that subjective and retrospective evaluations are crucial in trauma. In fact, researchers of PTG are actually looking for changes in the aftermath of trauma, the details of memories not being crucial in this process. Therefore, the subjective and retrospective evaluation of trauma seems to be unavoidable. In order to better address this issue, a critical review was performed, which is currently under revision for an indexed journal, and explained in section 5.1. In this article entitled *The Clinical Characteristics of PTG in cancer. A Systematic and Critical Review*, the massive use of the PTGI in assessing the PTG in all kinds of populations is discussed. In fact, it is exposed there that PTGI was developed in sample of North-American College students, but has been used to assess PTG in the aftermath of several kinds of trauma. This could be a limitation of its use in breast cancer, considering the disparities of samples in the awareness of mortality, the medical nature of trauma, the fear of cancer recurrence, and the range of age.

Regarding the point about the way by which PTG is transmitted to their significant others, a book chapter was published (Ochoa & Casellas-Grau, 2015b). The chapter reports that significant others are also capable of developing PTG in the sense that they also suffer the stressful situation of having a loved one undergoing the cancer disease, which is known as secondary PTG. In the case of breast cancer, patient's partner develops this kind of PTG. This fact was specifically supported by the results from the PPC study, in which partners of women with breast cancer experienced their own PTG, which was not influenced by the patients' increased PTG after having undergone PPC. Therefore, future lines of research and clinical practices should include ways of promoting PTG among patient's significant others, especially when patients are women, and partners are men, given the relevant role that gender has on PTG.

7. CONCLUSIONS

The articles and book chapters included in this thesis lead us to important conclusions regarding the connection between positive psychology and the experience of undergoing a breast cancer.

i. Four main indicators of PPF have been the most studied in women with breast cancer which are WB, PTG, BF and meaning. Meaning and WB are two constructs directly related to Seligman's theories of positive psychology. The other two constructs, PTG and BF have been the object of authors (e.g. Joseph and Linley) who have focused their research of positive psychology on the aftermath of trauma. Both lines of research are useful in the sense that they provide psychology with new information about the PPF in individuals. Although during the last two decades the amount of research in this area has been increased, there is still the need for investing more resources in the exploration of flourishing in breast cancer.

ii. The role of sociodemographical, medical and psychosocial variables on the development of positive responses from breast cancer has been investigated enough to conclude that being diagnosed at a younger age, undergoing more aggressive cancer treatment are related to a higher perception of illness severity, which leads to higher levels of stress. Paradoxically, this higher stress is linked to more PTG in the long-term in breast cancer survivors. In turn, psychosocial variables like having a quality SS and religious beliefs are related to showing greater levels of PPF. These conclusions are useful in the practical area, especially among oncological professionals.

iii. Few positive psychology therapies have been applied in breast cancer patients. Only two out of the seven main positive psychotherapies have been used for the promotions of PPF in patients or survivors from this disease: MBSR and a hope therapy. Other interventions, like meaning-making interventions, written expression of positive emotions, psycho-spiritual therapies have been also applied in patients and survivors of breast cancer. In general, the applied therapies contributed to the emergence of positive responses in breast cancer, including the four main ones aforementioned (WB, meaning, PTG and BF). However, further research should apply positive psychotherapies in patients from this disease, to provide patients with more ways to enhance their PPF.

iv. The proposed psychotherapy for distressed cancer survivors achieved promising results. The therapy was capable of both enhancing PTG in cancer patients and, consequently, reducing their levels of posttraumatic stress disorder. Applying this therapy, as well as the other proposed by positive psychology has a relevant importance in order to take care of PPF in those who suffer from cancer.

v. The role of the social environment seems to be key in patients' flourishing in the aftermath of breast cancer. Not only observational articles reach this conclusion, but also those which apply any kind of positive psychological intervention tend to also make a point on SS. Therefore, in the practical area, providing patients with quality SS should be the norm. In addition, given that partner's SS has a high importance, psychotherapies should also include exercises for their PPF.

vi. The corroboration of patients PTG is discussed and proved. Significant others report that their loved ones really grow from the adversity. Therefore, science should keep on studying the mechanisms of this PTG in order to promote its emergence in cancer survivors.

vii. Breast cancer has its own particularities, like being a life-threatening illness and commonly linked to treatments with unpleasant side-effects. Therefore, it would be more appropriate to develop assessment tools which focus on the evaluation of positive responses in patients of this kind of illness.

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This section is written in Catalan to make sure that every cited person can properly understand the message.

Al meu entendre, resulta imprescindible plasmar els agraïments a totes aquelles persones que han fet possible la realització d'aquesta tesi. Agraïments que, sens dubte, van molt més enllà d'aquesta feina en si, assolint nivells de caire molt personal.

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10. ANNEXES

10.1. POSITIVE PSYCHOTHERAPY FOR CANCER SURVIVORS

In the Catalan Institute of Oncology, a psychotherapy based on positive psychology assumptions is currently being used among cancer survivors in order to decrease their stress symptoms through the increase of their PTG. The article that includes the analysis of the PPC effectiveness is currently under revision in an indexed journal. As aforementioned, the therapy was based on Joseph and Linley (2006) explanation of PTG, which specify the accommodation and assimilation phases when facing a trauma. The 12 sessions of the PPC were, therefore, divided in two blocks in accordance to these two processes. The first five sessions were aimed at favoring the assimilation process, including the promotion of attitudes to facilitate growth from disease, favoring emotional expression and processing, and working on emotional regulation and coping. The following seven session were aimed at favoring the accommodation process, including the facilitation of PTG (through giving meaning to the experience and promotion the relational growth), and the existential and spiritual aspects (such as working on mortality, transcendence or regret in a constructive way). The details of PPC sessions are described in a book chapter recently written (Ochoa & Casellas-Grau, 2015a) and are also included the table below. Results showed that PPC was effective in increasing PTG in patients, as well as in reducing their stress symptoms. Significant differences in this direction were found between baseline and post-intervention evaluation, in comparison to results from the waiting-list group. Follow-up measures indicated the stabilization of these results, showing the long-term effects of the psychotherapy. In addition, the corroboration of patients' PTG was also analyzed in this study, through the perception of this PTG by patients' significant others. These corroborated the real PTG reported by participants.

Table 1.

Aims and sessions details of the PPC.

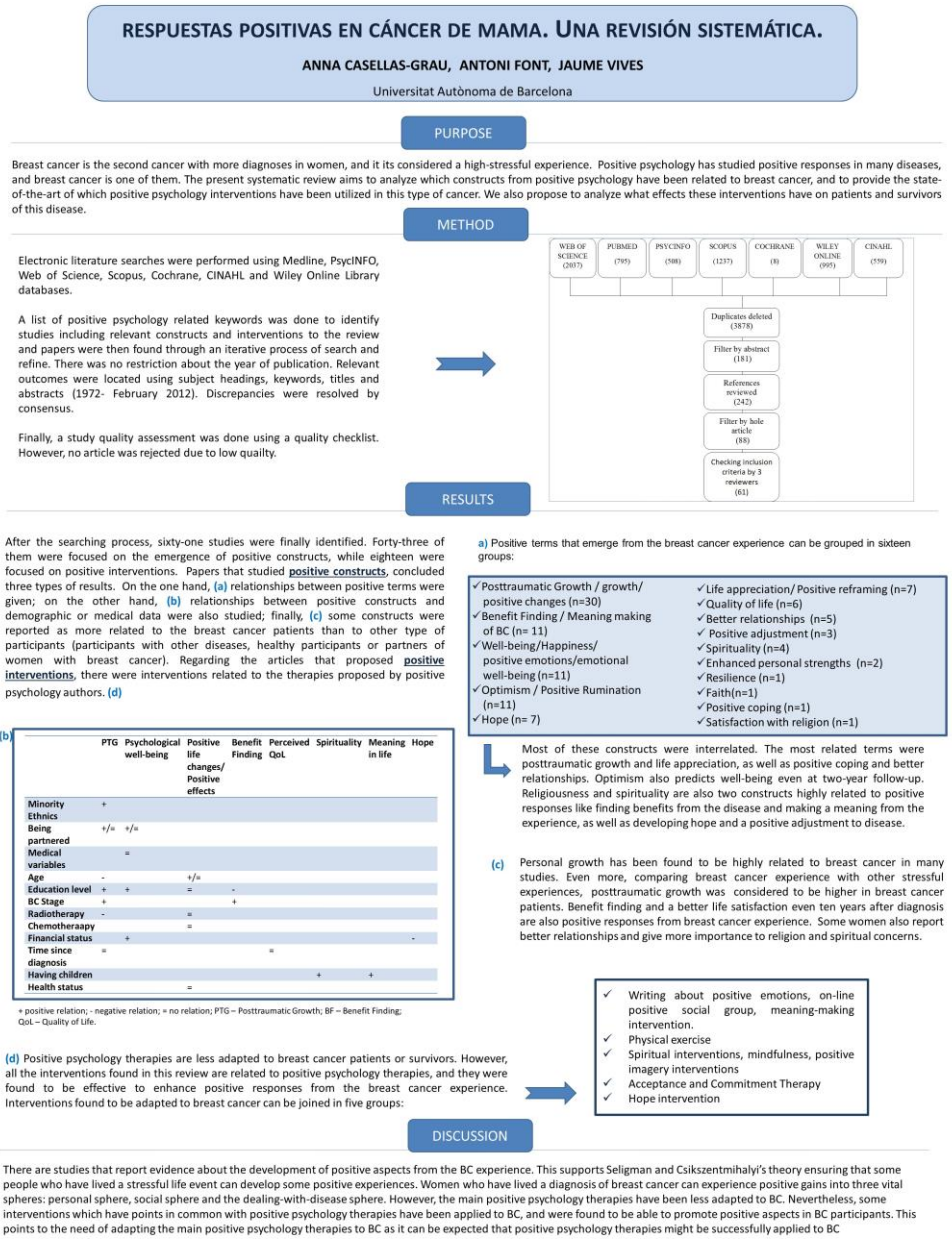
INITIAL PHASES: FAVORING ASSIMILATION PROCESSESS			
Module	Session	Aim	Therapeutic elements in each session
1	1 -2	a. Promoting attitudes to facilitate growth from disease. b. Favoring emotional expression and processing.	1. "What did the diagnosis of cancer mean for me?" Promoting vital curiosity, group universality and change openness. 2. Working with positive and negative emotions: somatic consciousness, symbolization and adaptive emotional reframing.
2	3 -5	Emotional regulation and coping	3. Coping styles and emotional regulations: consciousness and emotional assessment. 4. Horizons of positive change and healthy life style. 5. Personal strengths and memories of success in coping with past adverse events.
INTERMISSION AND FINAL PHASES: FAVORING ACCOMODATION PROCESSES			
3	6 - 9	PTG facilitation	6. Giving meaning to the experience. Work with recent and remote positive memoirs. 7. Giving meaning to the experience. Personal realization guidelines and hope-based interventions 8. Relational growth: Promoting and awaking interest towards significant others and working with positive models against adversity 9. Relational growth: Gratitude and forgiveness-based interventions.
4	10-12	a. Existential and spiritual aspects b. Group conclusion	10. Foreseeing recurrence, increase of mortality and transience consciousness, and dealing with emotional anesthesia 11. Transcendence and regret as a constructive way 12. Farewell letter and review of the group experience

10.2. CONGRESSES

Attending and contributing to national and international congresses has also been one of the aims of the doctorate process. We considered important to contribute to the scientific community, as well as to obtain knowledge through congress attendance. For this reason, six poster contributions have been made which, also being modest, have hopefully contributed to the knowledge of positive psychology in breast cancer.

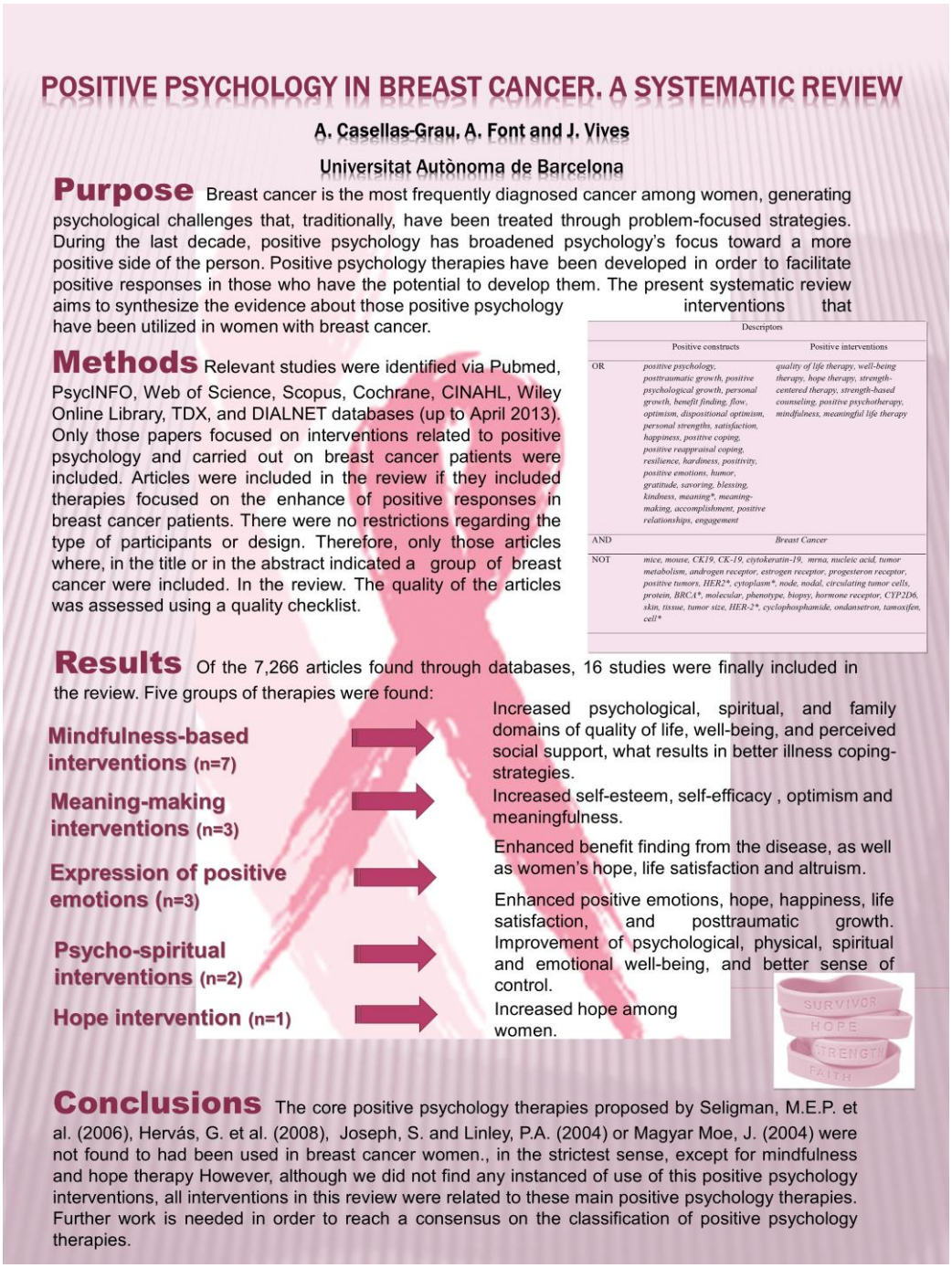
10.2.1. Respuestas positivas en cáncer de mama. Una revisión sistemática

Congress: IX Congreso Internacional de la Sociedad Española para el Estudio de la ansiedad y el estrés (València, September 6th – 8th, 2012). Authors: Casellas-Grau, A., Font, A, and Vives, J.



10.2.2. Positive Psychology Interventions in Breast Cancer. A Systematic Review.

Congress: IV Jornadas de Emociones y Bienestar de la Sociedad Española para el estudio de la Ansiedad y el Estrés (Madrid, October 3rd – 4th, 2013). Authors: Casellas-Grau, A., Font, A., and Vives, J.



POSITIVE PSYCHOLOGY IN BREAST CANCER. A SYSTEMATIC REVIEW

A. Casellas-Grau, A. Font and J. Vives

Universitat Autònoma de Barcelona

Purpose Breast cancer is the most frequently diagnosed cancer among women, generating psychological challenges that, traditionally, have been treated through problem-focused strategies. During the last decade, positive psychology has broadened psychology's focus toward a more positive side of the person. Positive psychology therapies have been developed in order to facilitate positive responses in those who have the potential to develop them. The present systematic review aims to synthesize the evidence about those positive psychology interventions that have been utilized in women with breast cancer.

Methods Relevant studies were identified via Pubmed, PsycINFO, Web of Science, Scopus, Cochrane, CINAHL, Wiley Online Library, TDX, and DIALNET databases (up to April 2013). Only those papers focused on interventions related to positive psychology and carried out on breast cancer patients were included. Articles were included in the review if they included therapies focused on the enhance of positive responses in breast cancer patients. There were no restrictions regarding the type of participants or design. Therefore, only those articles where, in the title or in the abstract indicated a group of breast cancer were included. In the review. The quality of the articles was assessed using a quality checklist.

Descriptors		
	Positive constructs	Positive interventions
OR	*positive psychology, posttraumatic growth, positive psychological growth, personal growth, benefit finding, flow, optimism, dispositional optimism, personal strengths, satisfaction, happiness, positive coping, positive reappraisal coping, resilience, hardiness, positivity, positive emotions, humor, gratitude, savoring, blessing, kindness, meaning*, meaning-making, accomplishment, positive relationships, engagement*	*quality of life therapy, well-being therapy, hope therapy, strength-centered therapy, strength-based counseling, positive psychotherapy, mindfulness, meaningful life therapy*
AND	*Breast Cancer*	
NOT	*mice, mouse, CK19, CK-19, ciytokeratin-19, mrna, nucleic acid, tumor metabolism, androgen receptor, estrogen receptor, progesteron 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, tamoxifen, cell**	

Results Of the 7,266 articles found through databases, 16 studies were finally included in the review. Five groups of therapies were found:

- **Mindfulness-based interventions (n=7)** → Increased psychological, spiritual, and family domains of quality of life, well-being, and perceived social support, what results in better illness coping-strategies.
- **Meaning-making interventions (n=3)** → Increased self-esteem, self-efficacy , optimism and meaningfulness.
- **Expression of positive emotions (n=3)** → Enhanced benefit finding from the disease, as well as women's hope, life satisfaction and altruism.
- **Psycho-spiritual interventions (n=2)** → Enhanced positive emotions, hope, happiness, life satisfaction, and posttraumatic growth. Improvement of psychological, physical, spiritual and emotional well-being, and better sense of control.
- **Hope intervention (n=1)** → Increased hope among women.

Conclusions The core positive psychology therapies proposed by Seligman, M.E.P. et al. (2006), Hervás, G. et al. (2008), Joseph, S. and Linley, P.A. (2004) or Magyar Moe, J. (2004) were not found to had been used in breast cancer women., in the strictest sense, except for mindfulness and hope therapy However, although we did not find any instanced of use of this positive psychology interventions, all interventions in this review were related to these main positive psychology therapies. Further work is needed in order to reach a consensus on the classification of positive psychology therapies.

10.2.3. The Detection of Positive Responses after a Breast Cancer Diagnosis. A Systematic Review.

Congress: International Psycho-Oncology Society 15th World Congress (Rotterdam, November 4th- 8th, 2013). Authors: Casellas-Grau, A., Vives, J. and Font, A.

The detection of positive responses after a breast cancer diagnosis

A. Casellas-Grau, A. Font and J. Vives

Universitat Autònoma de Barcelona

Purpose

Breast cancer is the second cancer with more diagnoses among women, and it its considered to be a high-stressful experience. Positive psychology has studied positive responses in many diseases, and breast cancer is one of them. This systematic review aims to find the best available evidence regarding positive responses in women diagnosed with breast cancer from their disease experience.

Methods

Relevant outcomes were located in electronic databases (Medline, PsycINFO, Web of Science, Scopus, Cochrane, CINAHL, Wiley Online Library) using subject headings, keywords, titles and abstracts up to 2012.

A selected list of descriptors was used to identify studies including positive responses from breast cancer. The information was extracted independently by three reviewers and results were compared. Discrepancies were resolved by consensus. There was no restriction regarding the year of publication, study design, sample size or participants' demographical and medical characteristics. Finally, a study quality assessment was done using a quality checklist

WEB OF SCIENCE (2037) · PUBMED (795) · PSYCINFO (508) · SCOPUS (1227) · COCHRANE (0) · WILEY ONLINE (605) · CINAHL (559)

Duplicates deleted (1878)

Filter by abstract (181)

References reviewed (242)

Filter by hole article (88)

Checking inclusion criteria by 3 reviewers (59)

Results

59 studies were included in the review. Posttraumatic growth, optimism and spiritual coping were the most common responses found among papers. Demographical and medical characteristics were found to be related to specific positive responses, being the most relevant the inverse association between developing positive responses and age, as well as the direct association between positive responses and having children or being partnered.

Additionally, 5 groups of positive psychology related therapies were found to be applied on breast cancer patients: **hope therapy, meaning-making therapies, spiritual therapies and written emotional-expression interventions.** These therapies were capable of enhancing QoL, well-being, PTG, hope, meaning, happiness, optimism, life satisfaction and benefit finding in women with breast cancer.

	PTG	Psychological well-being	Positive life changes	Benefit Finding	Perceived QoL	Spirituality	Meaning in life	Hope
Minority Ethnics	=							
Being partnered	+	+						=
Medical variables	=	=						
Age	-		+					=
	-		=					
	-							
Education level	+	+	=	-				
BC Stage I	+			-				
				+				
Radiotherapy	-		=					
Chemotherapy			=					
Financial status		+						-
Time since diagnosis or treatment	=				=			
	=							
Having children							+	
Health status			=					

- ✓Posttraumatic Growth / growth and positive changes in life (n=30)
- ✓Benefit Finding and making meaning from BC (n= 11)
- ✓Well-being, positive emotions and happiness (n=11)
- ✓Optimism (n=11)
- ✓Hope (n= 7)
- ✓Positive coping (n=7)
- ✓Life appreciation (n=4)
- ✓Quality of life (n=6)
- ✓Better relationships (n=5)
- ✓ Positive adjustment (n=3)
- ✓Spirituality (n=4)
- ✓Enhanced personal strengths (n=2)
- ✓Resilience (n=1)
- ✓Faith(n=1)
- ✓Satisfaction with religion (n=1)

Several kinds of positive responses were found, from posttraumatic growth and meaning-making to using positive types of coping, such as positive reframing, fighting spirit, between others. Most of these constructs were interrelated. The most related terms were posttraumatic growth and life appreciation, as well as positive coping and better relationships. Optimism also predicted well-being even at two-year follow-up. Religiousness and spirituality are also two constructs highly related to positive responses like finding benefits from the disease and making a meaning from the experience, as well as developing hope and a positive adjustment to disease.

Conclusions

Positive psychology is beginning to be studied in relation to breast cancer, above all in the study of positive responses from this disease. It has been found that these positive responses are given in three vital spheres: the personal sphere (e.g. well-being, personal growth), social sphere (e.g. enhanced altruism, personal relationships) and disease-related sphere (e.g. hope, meaning-making). However, few interventions have been developed in order to promote these positive responses. Only five groups of therapies have been found to be applied in breast cancer patients. This entails a need to engage more research in order to develop ways of promoting positive responses among women with breast cancer.

Clinical implications

Psychologists may obtain benefit from the information obtained in this review in, at least, two ways. On the one hand, it provides relevant data regarding the demographical and medical characteristics of those women who tend to develop positive response from breast cancer, what can result in useful screening criteria. On the other hand, it also provides psychologists with efficient therapies in promoting positive responses among women diagnosed with breast cancer

10.2.4. El Estudio de la Psicología Positiva en el Cáncer de Mama

Congress: VI Congreso de la Sociedad Española de Psicooncología (Málaga, March 27th – 29th, 2014). Authors: Casellas-Grau, A., Vives, J, Font, A. and Ochoa, C.

10.2.5. Las Aportaciones de la Psicología Positiva en la Psicología Oncológica

Congress: II Congreso Nacional de Psicología Positiva (Orpesa del Mar, May 8th – 10th, 2014).

Authors: Casellas-Grau, A., Vives, J., Font, A. and Ochoa, C.

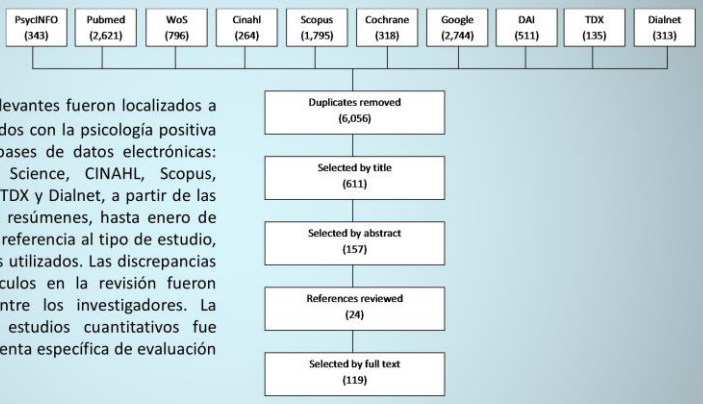
Las aportaciones de la Psicología Positiva en la Psicología Oncológica

Anna Casellas-Grau[a], Jaume Vives[a], Antoni Font[a] y Cristian Ochoa[b]
Universitat Autònoma de Barcelona[a]
Institut Català d'Oncologia[b]
Correspondencia a: anna.casellasg@e-campus.uab.cat

INTRODUCCIÓN: Tradicionalmente, la psicología se ha centrado en el estudio del malestar, la patología y las respuestas negativas a las experiencias negativas humanas. Durante la última década, la psicología aporta una visión más amplia de la experiencia humana focalizándose, también, en el bienestar, la felicidad y las emociones positivas. Así mismo, el cáncer de mama representa el cáncer con más diagnósticos entre las mujeres, después de los cánceres de piel, lo que supone un volumen importante de personas afectadas. De todos modos, algunas pacientes pueden llegar a identificar algunas respuestas positivas derivadas de tal experiencia.

OBJETIVO: El objetivo de la presente revisión sistemática se centra en analizar los constructos de la psicología positiva más asociados a la experiencia del cáncer de mama y sugerir un perfil de características sociodemográficas y de la enfermedad que mejor los predice.

MÉTODO: Los estudios relevantes fueron localizados a partir de descriptores relacionados con la psicología positiva y el cáncer de mama en 10 bases de datos electrónicas: PsycINFO, Pubmed, Web of Science, CINAHL, Scopus, Cochrane, Google Scholar, DAI, TDX y Dialnet, a partir de las palabras clave, los títulos y los resúmenes, hasta enero de 2014. No hubo restricciones en referencia al tipo de estudio, tipo de muestra ni instrumentos utilizados. Las discrepancias sobre la inclusión de los artículos en la revisión fueron solucionadas por consenso entre los investigadores. La calidad metodológica de los estudios cuantitativos fue evaluada mediante una herramienta específica de evaluación de calidad metodológica.



RESULTADOS: Fueron identificados 118 estudios publicados, y una tesis. Los constructos de la psicología positiva más estudiados fueron el crecimiento postraumático, el bienestar, y la espiritualidad. Los estudios, en cuanto a características sociodemográficas, destacaron que las mujeres más jóvenes presentan mayor crecimiento postraumático a pesar de tener peores niveles de calidad de vida y bienestar. Así mismo, también las mujeres que recibieron un mayor apoyo social, reportaron mayor bienestar, crecimiento postraumático, esperanza y sentido. Finalmente, el tener creencias religiosas también incrementaba la probabilidad de experimentar bienestar, crecimiento postraumático y búsqueda de beneficios tras la enfermedad. En referencia a las características médicas, las mujeres que pasaron por tratamientos más agresivos, como la mastectomía o la quimioterapia, desarrollaron más crecimiento postraumático, afrontamiento optimista y bienestar a largo plazo.

CONCLUSIONES: Los resultados obtenidos en la revisión sistemática sugieren que, coincidiendo con la definición de crecimiento postraumático, cuánto más amenazante y disruptiva se percibe la experiencia del cáncer de mama, más probable es el desarrollo de cambios vitales positivos derivados de la enfermedad, a largo plazo. Esta amenaza y disrupción es mayor en las mujeres jóvenes que reciben tratamientos agresivos, ya que han de asimilar cambios que no les tocaría por edad, cuestionándose la visión de sí mismas, los otros y el mundo. Tal cuestionamiento tan marcado representa el impulso a realizar cambios vitales positivos. Por otra parte, las creencias religiosas de las mujeres actúan como elemento facilitador de tales respuestas, especialmente a partir de la mayor adopción de estilos de afrontamiento positivos, así como de la mayor percepción del soporte social recibido. De hecho, la importancia del soporte social recibido y percibido por la mujer con cáncer de mama es considerada como relevante a lo largo de los estudios, como elemento facilitador de las respuestas positivas. Por esta razón, se sugiere que las intervenciones psicológicas positivas que facilitan el soporte social (grupales) podrían estar especialmente indicadas en mujeres con cáncer de mama jóvenes que han recibido tratamientos agresivos y tienen dificultades para asimilar los cambios post-tratamiento.

10.2.6. Il Funzionamento Psicologico Positivo in Pazienti con Tumore al Seno: Una Revisione della Letteratura

Congress: Giornatte Nazionale de Psicologia Positiva- VIII Edizione (Bergamo, 12th – 13th June, 2015). Authors: Casellas-Grau, A., Vives, J. and Font, A.

Il funzionamento psicologico positivo in pazienti con tumore al seno: una revisione della letteratura

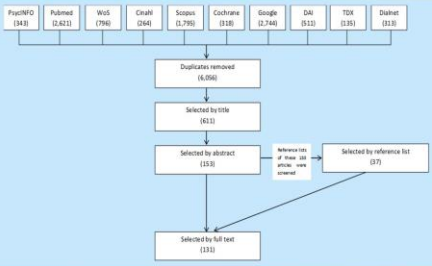
A. Casellas-Grau, A. Font and J. Vives
Universitat Autònoma de Barcelona

Purpose

Breast cancer is the second cancer with more diagnoses in women, and it its considered a high-stressful experience. Positive psychology has studied positive responses in many diseases, and breast cancer is one of them. The present systematic review aims This systematic review aims to analyze the research into positive psychological functioning in patients with breast cancer, and to integrate the most relevant findings relating to sociodemographic, medical and psychosocial factors.

Methods

Relevant outcomes were located in electronic databases (Medline, PsycINFO, Web of Science, Scopus, Cochrane, CINAHL, Wiley Online Library, DIALNET and TDX) using subject headings, keywords, titles and abstracts up to January 2015 A selected list of descriptors was used to identify studies including positive responses from breast cancer. The information was extracted independently by two reviewers and results were compared. Discrepancies were resolved by consensus. There was no restriction regarding the year of publication, study design, sample size or participants' demographical and medical characteristics.



Results

131 studies were included in the review. Posttraumatic growth, optimism and spiritual coping were the most common responses found among papers. Also an inverse association between developing positive responses and age was found, as well as a direct association between positive responses and having children or being partnered. Additionally, 5 groups of positive psychology related therapies were found to be applied on breast cancer patients: hope therapy, meaning-making therapies, spiritual therapies and written emotional-expression interventions. These therapies were capable of enhancing QoL, well-being, PTG, hope, meaning, happiness, optimism, life satisfaction and benefit finding in women with breast cancer.

Most of these constructs were interrelated. The most related terms were posttraumatic growth and life appreciation, as well as positive coping and better relationships. Optimism also predicts well-being even at two-year follow-up. Religiousness and spirituality are also two constructs highly related to positive responses like finding benefits from the disease and making a meaning from the experience, as well as developing hope and a positive adjustment to disease.

- ✓Posttraumatic Growth / growth/ positive changes (n=30)
- ✓Benefit Finding / Meaning making of BC (n= 11)
- ✓Well-being/Happiness/ positive emotions/emotional well-being (n=11)
- ✓Optimism / Positive Rumination (n=11)
- ✓Hope (n= 7)
- ✓Life appreciation/ Positive reframing (n=7)
- ✓Quality of life (n=6)
- ✓Better relationships (n=5)
- ✓ Positive adjustment (n=3)
- ✓Spirituality (n=4)
- ✓Enhanced personal strengths (n=2)
- ✓Resilience (n=1)
- ✓Faith(n=1)
- ✓Positive coping (n=1)
- ✓Satisfaction with religion (n=1)

Conclusions

Positive psychology is beginning to be studied in relation to breast cancer, above all in the study of positive responses from this disease. It has been found that these positive responses are given in three vital spheres: the personal sphere (e.g. well-being, personal growth), social sphere (e.g. enhanced altruism, personal relationships) and disease-related sphere (e.g. hope, meaning-making). However, few interventions have been developed in order to promote these positive responses. Only five groups of therapies have been found to be applied in breast cancer patients. This entails a need to engage more research in order to develop ways of promoting positive responses among women with breast cancer.

Clinical implications

Psychologists may obtain benefit from the information obtained in this review in, at least, two ways. On the one hand, it provides relevant data regarding the demographical and medical characteristics of those women who tend to develop positive response from breast cancer, what can result in useful screening criteria. On the other hand, it also provides psychologists with efficient therapies in promoting positive responses among women diagnosed with breast cancer

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