Psychological Coping Factors Associated With Breast Cancer-Related Fatigue: A Systematic Review of Recent Evidence for Stages 0 to III

Michael Schaab,[a] Kim Alida Elise Wijlens,[b] Christina Bode[a]

Abstract

Cancer-related fatigue (CRF) is a common, distressing, and difficult to treat symptom for both breast cancer patients and survivors. This review investigates psychological coping factors associated with breast CRF (BCRF) for women who are stage 0 to III breast cancer patients or survivors. A focus was made on active factors that can be practically targeted in a fatigue focused intervention aimed at providing immediate results. A comprehensive literature search was conducted in PsycInfo, Scopus, and PubMed using variations of the keywords Psychology, Breast cancer, Fatigue, and Coping. Guidelines for systematic reviews were followed, and inter-rater reliability between 2 raters was conducted. Seven studies were finally selected out of 1610 publications. A preliminary heuristic psychological coping model was constructed based on the following results: Sense of coherence and reassurance of worth were negatively associated with total BCRF. Subjective/perceived stress, meaning focused coping, and breast-related stereotype threat were positively associated with total BCRF. Reassurance of worth, nurturance, and optimism were negatively associated with mental fatigue. Optimism was also negatively associated with reduced motivation. This research can inform interventions, therapy, and care development by gaining insight into evidence-based factors that can facilitate or hinder BCRF and by utilizing the constructed heuristic model. The factors identified in this research are consistent with previous research and should be tested for their efficacy in practical applications. A larger timeframe and a full picture of all perspectives can lead to a comprehensive psychological coping model and core article on the topic.

Clinical Breast Cancer, Vol. 23, No. 7, e401–e411 © 2023 The Author(s). Published by Elsevier Inc.

Keywords: CRF, Quality of Life, Health Psychology, BRCF

Background

In 2020, there were 2.3 million breast cancer diagnoses worldwide and 685 thousand breast cancer related recorded deaths.[1] By the end of 2020, there were 7.8 million women alive who were diagnosed with breast cancer in the previous 5 years, making breast cancer the most prevalent cancer worldwide. Breast cancer can also occur in men, accounting for 0.5% to 1% of cases, however the dominant breast cancer risk factor remains female gender. Survival rates started increasing in the 1980s with early detection and various treatments, surpassing 90% survival in high-income countries. Nevertheless, there are more disability-adjusted life years lost by women due to breast cancer than to any other cancer globally.[1] Cancer-related fatigue (CRF) has been recognized as one of the most prevalent and distressing consequences of cancer and cancer treatment during the whole patient journey.[2] 65% of patients with cancer report CRF, two-thirds of this group also notes their CRF as severe for 6 or more months, and one-third of this group also reports persistent fatigue for several years after treatment.[2] The recent review by Ruiz-Casado et al.,[3] again supported the recognition of CRF as the most prevalent and distressing symptom that breast cancer survivors experience after treatment. Compared to fatigue scores prior to the breast cancer diagnosis, women reported a large fatigue increase, especially in the first 6 months, and a slow decrease over time after the initial increase.[4]

Breast Cancer-Related Fatigue (BCRF)

CRF is a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment.[2] Moreover, CRF is not proportional to recent activities, interferes with usual functioning, and is different from other kinds of fatigue due to its severity and persistence as well as

[a]Department of Psychology, Health, and Technology, University of Twente, Enschede, Netherlands
[b]Department of Biomedical Signals and Systems, University of Twente, Enschede, Netherlands

Submitted: Nov 29, 2022; Accepted: Jun 16, 2023; Epub: 25 June 2023

Address for correspondence: Kim Alida Elise Wijlens, MSc, Department of Biomedical Signals and Systems, University of Twente, Drienerlolaan 5, Enschede 7522 NB, Netherlands
E-mail contact: k.a.e.wijlens@utwente.nl

https://doi.org/10.1016/j.clbc.2023.06.005

the inability to reduce it through sleep or rest.[4,5] BCRF is considered a multidimensional concept, affecting physical, cognitive, and affective domains.[3] This overwhelming fatigue that younger patients described as "being imprisoned in the body of an 80-year-old" can lead to feelings of helplessness, loss of control and decrease in quality of life when dealing with BCRF.[5] Therefore, knowledge about beneficial coping with BCRF is urgently needed.

Coping

In general, coping is anything an individual does to minimize the effect of an actual, or perceived, stressor aiming at the reduction of negative emotions by focussing on the stress trigger, emotions, or on ignoring or minimizing the threat of the stressor.[6] Psychological coping factors are defined in this review as any psychological factors that are involved in and influence the coping process. An individual's goals, beliefs, personality, and resources serve as antecedents next to the actual stimulus event.[7] These include psychological coping factors such as knowledge, problem-solving skills, social skills, and support but also nonpsychological coping factors that can influence the process such as health status and material resources. Further psychological coping factors in this process are the appraisal and interpretations of the stimulus event, which are affected directly by the antecedents in interaction with the individual's coping strategy. The coping strategies are also affected by the available internal and external resources of the person.[7] In addition to strategies, there are also different coping styles which can be seen as trait-like forms of coping that people tend to use.[6] The outcomes resulting from this process are the individuals emotional, social, and physical functioning, health, and illness, as well as short-term physiological changes.[7]

Psychological Coping With BCRF

Breast cancer patients experiencing fatigue, depression, or anxiety prior to the breast cancer diagnosis were more likely to experience fatigue after treatment.[3] It has even been suggested that in some cases, fatigue is a stable characteristic.[8] Moreover, cancer patients often experience multiple symptoms besides fatigue, including pain, depression, anxiety, and insomnia.[9] In this review, a focus is made on factors that could be seen as active psychological coping factors associated with BCRF, rather than comorbidities and stable factors such as depression, anxiety, and quality of life. The focus is made on psychological coping factors that are not comorbidities and can be targeted in an intervention primarily aimed at fatigue.

Recent research has pointed to the importance of psychological coping factors driving BCRF.[3,10-12] A review on BCRF in breast cancer survivors showed the role of psychosocial coping factors such as coping strategies, catastrophizing, and attitudes in the development of fatigue.[3] Moreover, studies have found correlations between personality and BCRF.[12] Research has also found correlations between a patient's coping style and BCRF, with coping styles such as emotional catharsis, avoidance, and fatalism being associated with more BCRF, and more active styles such as optimistic, support-seeking, self-reliance, facing bravely, or conservation being correlated with less BCRF.[10] Moreover, social support, including the subjective experience of support, was correlated with less BRCF.[11] Evidence is growing that the perception and experience of BCRF is associated with several psychological coping factors.[3,10-12]

This leads to the conclusion, that psychological coping with BCRF could be an essential component of reducing BCRF. However, so far, a comprehensive overview of which psychological coping factors are associated with BCRF in both patients and survivors of breast cancer has not been established. An overview of relevant psychological coping factors could enable beneficial coping with BCRF. Ruiz-Casado et al.'s,[3] review on BCRF is a starting point, and this review aims to build upon it by including both active patients and survivors and aims to look at a wider range of psychological concepts related to BCRF, as well as investigating a broader range of databases. Therefore, this study aimed to answer the research question: Which active psychological coping factors are associated with breast cancer-related fatigue and what is the supporting level and quality of evidence?

Method

Search Strategy

A comprehensive literature search was conducted utilizing the databases "PsycInfo", "PubMed", and "Scopus" (Table 1). PRISMA 2020[13] was applied in this review, were applicable. Moreover, a second guideline on how to systematically review observational studies was additionally consulted.[14]

Study Selection Criteria

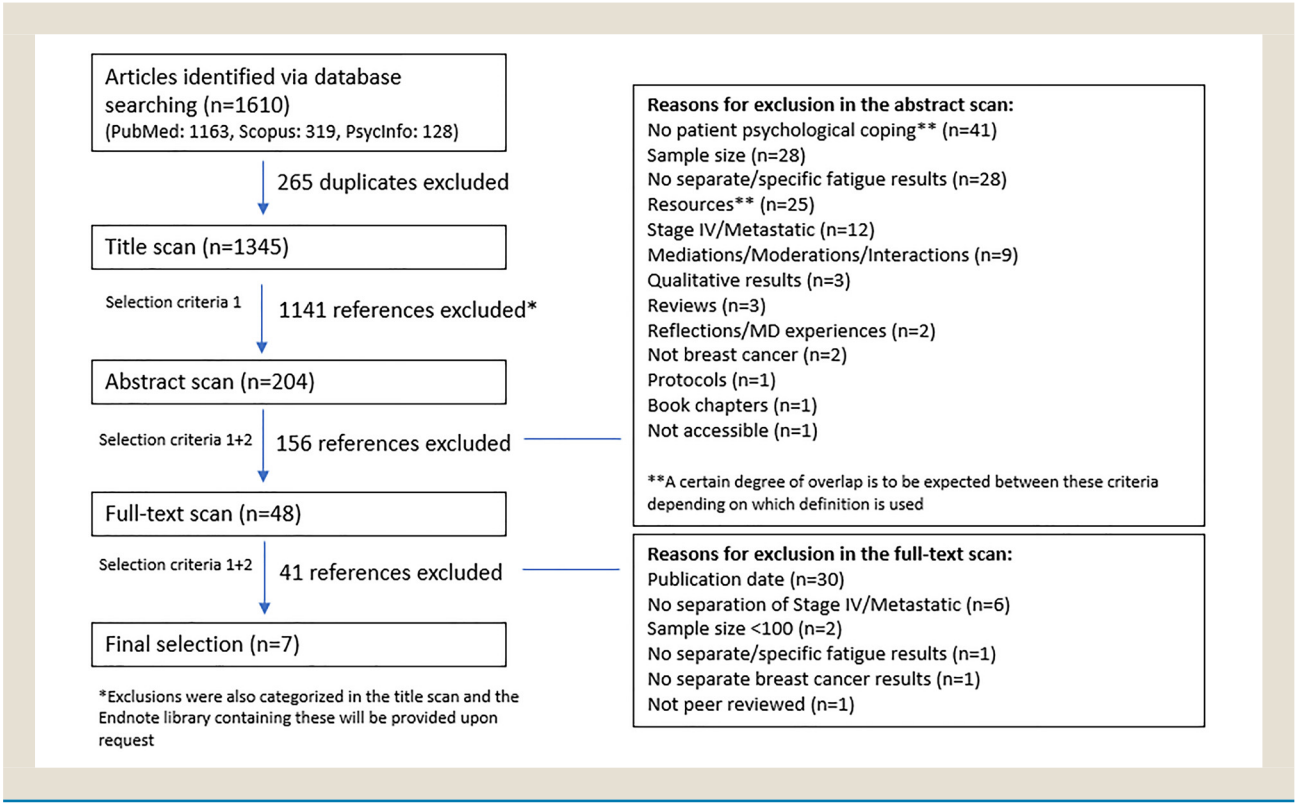
Initially, a broad range of literature was included through the first study selection criteria to gain an overview of the literature. A narrower selection was made in the abstract scan with a second set of criteria (Figure 1).

Inclusion Criteria. Articles discussing psychological coping factors associated with BCRF were included. The article also needed to be available in English, Dutch, German, French, or Russian and either be open-access or available through the University of Twente

Table 1 Search Strategy

Concept	Syntax	
Psychology	psycholog*	AND
Breast cancer	(breast and cancer)	AND
Fatigue	(fatigu* OR exhaust* OR tire OR tiring OR tired)	AND
Coping[7]	(coping OR cope OR coped OR personality OR personalities OR goal* OR belief* OR believ* OR resource* OR apprais* OR interpret*)	

Figure 1 Study selection flowchart.



library. All selected articles were only included if they have a sample size of 100 or more participating breast cancer patients or survivors.

Exclusion Criteria. Articles not referring to breast cancer, articles with different predictors, articles focused solely on the patient's social environment, nursing/care/service-related articles, evaluations of interventions/programs, research methods, ethical reviews, and literature reviews/meta-analyses were excluded. Articles regarding breast cancer patients with stage IV and/or metastatic breast cancer as defined by the American Joint Committee on Cancer (National Cancer Institute, n.d.) are excluded due to differences in experience and coping of between women with primary and metastatic breast cancer.[15] The patients' internal resources, including general global health and quality of life, functioning, as well as psychopathologies, trauma, anxiety, depression, and mood, and related disorders were excluded, so that a focus could be made on factors that are more easily changed and are highly relevant for an individual to psychological cope with BCRF. Due to a small sample of qualitative results, the decision was made to focus on quantitative results. Finally, all articles published prior to January 2015 and after the conclusions of data collection (April 2021) were excluded in the full-text scan.

Data-Collection Process

Inter-rater reliability (IRR) was conducted by 2 authors (MS, KW) to ensure reliable and reproducible results. Sufficient agreement (>80%) was reached in the title (86%), abstract (81%) and full-text (100%) scan. Initial disagreements were discussed and if necessary, the criteria were readjusted and clarified. Following the readjustment several categories of articles were rescanned by the primary researcher (MS). Following all readjustments, 100% inter-rater agreement was reached. Full details of this process will be provided upon request. Following the completion of the final sample, data was collected by the primary researcher (MS). The study's title, authors, year of publication, study design and population, sample size and characteristics (stage and treatment), BCRF measurement, and outcome measures in-line with the study selection criteria were extracted from the included studies.

Data Analysis

Included studies were of quantitative observational nature and used a variety of different methods, therefore a descriptive review was chosen.[14] After carefully reading and comprehending all included studies, all results with CRF as an outcome, and active psychological coping factors as predictor were extracted. The data was clustered into 2 groups: (1): psychological coping strategies, goals, personality, and beliefs and (2): stress appraisals and interpretations. The level and quality of evidence in each study was evaluated using the John Hopkins Evidence Based Practice

Table 2 Study Characteristics of Included Studies for Psychological Coping Strategies, Goals, Personality, and Beliefs

NR[a]	Title	Study Design; Population	Sample	BCRF Measurement	Outcomes
1	Social support in early-stage breast cancer patients with fatigue[18]	Cross-sectional descriptive study; Norwegian population	Stage I-II breast cancer patients undergoing active curative treatment (n = 160)	Fatigue questionnaire (FQ), measuring physical (PF) and mental fatigue (MF)	Social support (SPS), measuring "attachment", "social integration", "reassurance of worth", and "nurturance"
2	Factors of the evolution of fatigue dimensions in patients with breast cancer during the 2 years after surgery[17]	Prospective multicenter cohort with longitudinal follow-up; French population	Stage I-IIIA newly diagnosed breast cancer patients having undergone breast surgery (n = 459)	Multidimensional Fatigue Inventory (MFI-20), measuring 4 dimensions: general and physical fatigue, mental fatigue, reduced activities, and reduced motivation	Optimism using the life orientation test (LOT)
3	Sense of coherence and its relationship to participation, cancer-related fatigue, symptom burden, and quality of life in women with breast cancer participating in the OptiTrain exercise trial[19]	Cross-sectional descriptive evaluation of a randomized controlled trial; Swedish population	Stage I-IIIA breast cancer patients scheduled for adjuvant chemotherapy (n = 240)	Piper fatigue scale (PFS), measuring 4 dimensions: behavior/daily life, emotional/affective, sensory/physical, and cognitive	Sense of coherence (SOC) using Antonovsky's short 13-item questionnaire (SOC-13)
4	Symptom cluster of emotional distress, fatigue and cognitive difficulties among young and older breast cancer survivors: The mediating role of subjective stress[20]	Cross-sectional descriptive study; Israeli population	Stage I-III breast cancer survivors one-twelve months post-chemotherapy (n = 170)	Fatigue symptom inventory (FSI), measuring severity and perceived interference	The Emotional Control Subscale for controlling depressed mood (CECS); Meaning-focused coping using the Meaning in Life Questionnaire (MLQ)
5	Breast-related stereotype threat contributes to a symptom cluster in women with breast cancer[21]	Cross-sectional descriptive study; Chinese population	Stage I-III breast cancer patients minimum 1-week post (modified) radical mastectomy (n = 131)	13-Item Functional Assessment of Chronic Illness Therapy Fatigue Scale (FACIT-F), measuring functioning and fatigue	Breast-related stereotype threat (BRST) measured with a yes/no question: "Do you think that disfigurement of your breast will decrease your womanliness"

[a] Presentation order of studies is based on publication date.

(EBP) tools © The Johns Hopkins Hospital/The Johns Hopkins University.[16]

Results

The final selection from the systematic review resulted in 7 articles (Figure 1). The articles are presented based on their publication date below (Table 2 and 3).

Study Selection Summary

This review aimed at finding active psychological coping factors associated with BCRF for stage 0 to III breast cancer patients and survivors in accordance with the Lazarus[7] coping model and described the level of evidence. Following the Lazarus model (and excluding the internal resources), the results were structured in 2 groups. Group A: goals, beliefs, personality, and coping strategies (Table 2) and Group B: appraisal and its interpretation (reported in Table 3). Four out of 5 studies in Table 2 had a cross-sectional descriptive design. Only the study of Person et al.[17] had a prospective multicentre cohort with longitudinal follow up of 10 measurements over the course of 2 years. The studies were from different countries situated in North America, Europe, and Asia. All studies used different CRF measurements and measured different outcomes. Two samples included women who are stage I to III breast cancer patients or survivors, 2 included stages I to IIIA, and 1 study's sample included only stages I to II (Table 2).

All selected studies about stress appraisal and interpretations (Table 3) used a cross-sectional descriptive design and were from different countries. Two samples included women who are stage I to III breast cancer patients or survivors, and the other sample included stages 0 to III. All studies used different CRF measurements and different perceived/subjective stress measurement instruments.

Level and Quality of Evidence

The level and quality of evidence was evaluated using the John Hopkins EBP tools© The Johns Hopkins Hospital/The Johns

Table 3 Study Characteristics of Included Studies for Stress Appraisals and Interpretations

NR[a]	Title	Study Design; Population	Sample	CRF Measurement	Outcomes
4	Symptom cluster of emotional distress, fatigue and cognitive difficulties among young and older breast cancer survivors: the mediating role of subjective stress[20]	Cross-sectional descriptive study; Israeli population	Stage I-III breast cancer survivors 1 to 12 months post-chemotherapy (n = 170)	Fatigue symptom inventory (FSI), measuring severity and perceived interference	Subjective Stress Scale
6	Depressive symptoms and inflammation are independent risk factors of fatigue in breast cancer survivors[22]	Cross-sectional descriptive study; American population	Stage 0-III breast cancer survivors post breast cancer surgery who received whole breast radiotherapy (n = 110)	MFI-20, measuring 4 dimensions: general and physical fatigue, mental fatigue, reduced activities, and reduced motivation and a single item questionnaire capturing severity according to National Comprehensive Cancer Network (NCCN) guideline Version 2.2015	Perceived Stress Scale (PSS)
7	Association of fatigue with perceived stress in Chinese women with early stage breast cancer awaiting adjuvant radiotherapy[23]	Cross-sectional descriptive study; Chinese population	Stage I-III breast cancer patients awaiting adjuvant radiotherapy (n = 133)	Brief fatigue inventory, measuring severity and interference on daily functioning	Perceived Stress Scale-10 (PSS-10)

[a] Presentation order of studies is based on publication date.

Table 4 Level and Quality of Evidence

NR	Title	Level	Quality
1	Social support in early-stage breast cancer patients with fatigue[18]	3	High quality
2	Factors of the evolution of fatigue dimensions in patients with breast cancer during the 2 years after surgery[17]	3	High quality
3	Sense of coherence and its relationship to participation, cancer-related fatigue, symptom burden, and quality of life in women with breast cancer participating in the OptiTrain exercise trial[19]	3	Good quality
4	Symptom cluster of emotional distress, fatigue and cognitive difficulties among young and older breast cancer survivors: the mediating role of subjective stress[20]	3	High quality
5	Breast-related stereotype threat contributes to a symptom cluster in women with breast cancer[21]	3	High quality
6	Depressive symptoms and inflammation are independent risk factors of fatigue in breast cancer survivors[22]	3	High quality
7	Association of fatigue with perceived stress in Chinese women with early stage breast cancer awaiting adjuvant radiotherapy[23]	3	High quality

Hopkins University.[16] The assessment criteria provided in the tool was applied with the aim and rationale of the review in mind. All included studies provide level 3 evidence due to their nonexperimental nature (Table 4). All but 1 studies are considered high quality evidence with the remaining study being considered good quality (Table 4).

Tables 2 and 3 revealed that fatigue is conceptualized and measured in different ways. Therefore, in the following, the tables are combined. The results are presented according to the fatigue dimensions. First the results for total fatigue are presented (Table 5), followed by the results for the fatigue dimensions (Table 6). Significance was considered at $P < .05$.

Total Fatigue

All studies reported results for total fatigue. The fatigue compositions that were measured differed, with the most frequent composition being fatigue severity and perceived fatigue interference. All other compositions were reported only once (Table 5). The most frequently measured related outcome variable was perceived/subjective stress. All other concepts were measured once respectively (Table 5). Significant results were found for reassurance of worth, SOC, perceived/subjective stress, meaning-focused coping, and breast-related stereotype threat (BRST). Statistical methods used were reported for each construct (Table 5).

Table 5 Total Fatigue

Study	Fatigue Composition	Measured Outcome Variables and Level of Evidence	
1[18]	Physical + Mental	**Concept**	**Association**
		Social Provisions Scale (SPS) total	Nonsignificant
		Attachment	Nonsignificant
		Reassurance of worth	Negative
		Nurturance	Nonsignificant
		Social integration	Nonsignificant
		n = 160, Univariate linear regression analysis	
2[17]	General + Physical	**Concept**	**Association**
		Optimism	Nonsignificant
		n = 346, Multivariate multinomial logistic regression analysis	
3[19]	Behavior/daily life + Emotional/affective + Sensory/physical + Cognitive	**Concept**	**Association**
		Sense of Coherence (SOC)	Negative
		n = 206, Stratified groups	
4[20]	Severity + Perceived interference	**Concept**	**Association**
		Subjective stress	Positive
		Emotional control	Nonsignificant
		Meaning-focused coping	Positive
		n = 170, Associations	
5[21]	Functioning + Fatigue	**Concept**	**Association**
		Breast-related stereotype threat (BRST)	Negative
		n = 131, Group comparison and multivariate logistic regression	
6[22]	Severity + Perceived interference	**Concept**	**Association**
		Subjective stress	Mixed results*
		n = 111, Bivariate associations, multivariate model, and mediation model	
		*Bivariate associations showed a significant positive association. The association between subjective stress and fatigue was nonsignificant in the multivariate model. In a mediation model subjective stress had a significant direct positive effect on fatigue when depressive symptoms were not in the model	
7[23]	Severity + Perceived interference	**Concept**	**Association**
		Perceived stress	Positive
		n = 133, Correlations and multiple regression	

Fatigue Dimensions

After reporting associations with total fatigue, in the following the findings were reported separately for physical fatigue, mental fatigue, reduced activities, and reduced motivation. Significant results were found for several aspects of social provision and optimism with dimensions of fatigue (Table 6). Statistical methods used were reported for each construct (Table 6).

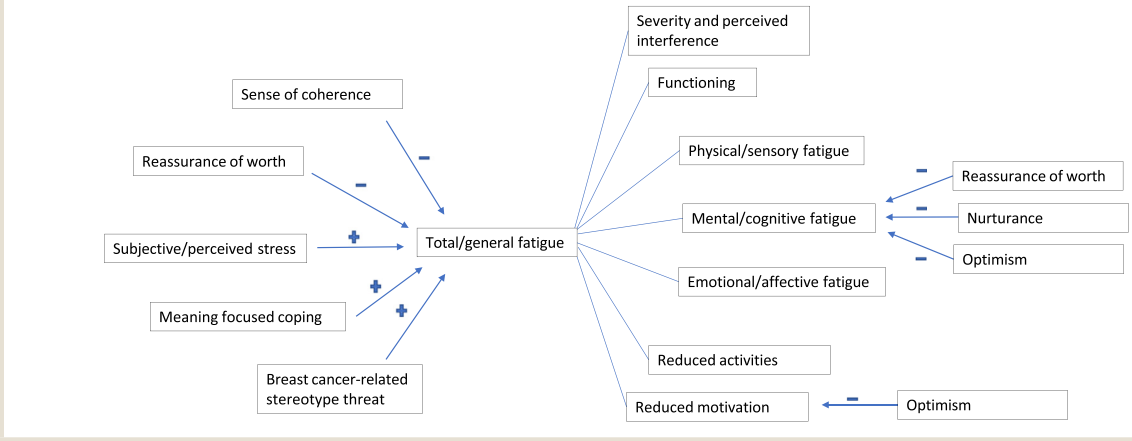
Preliminary Model of Psychological Coping in Breast Cancer Related Fatigue

Significant results from the included studies have been used to construct a preliminary heuristic BCRF psychological coping model (Figure 2). Firstly, all significant results that were found are visualized. Next, the different conceptualizations used for fatigue, identified by the questionnaires used in each of the studies are added to the model, as well as all significant results that were found for each BCRF dimension. A positive association (+) relates to increased fatigue and decreased functioning. A negative association (−) indicates decreased fatigue and increased functioning in association with the concept. It is to be noted that the preliminary heuristic model does not visualize the level of evidence, which can be found in the respective tables (Tables 4-6).

Table 6 Fatigue Dimensions

Study	Subscale	Evidence	
1[18]	Physical fatigue	No significant results were found for the Social Provisions Scale (SPS total), as well as all the subscales.	
		n = 160, Univariate linear regression analysis	
1[18]	Mental fatigue	**Concept**	**Association**
		Social Provisions Scale total	Nonsignificant
		Attachment	Mixed results*
		Reassurance of worth	Negative
		Nurturance	Negative
		Social integration	Nonsignificant
		n = 160, Multivariate linear regression analysis	
		*A negative association was found in a univariate linear regression, however in the multivariate regression the association was no longer significant	
2[17]	Mental fatigue	**Low, transient increasing fatigue vs. no-fatigue**	
		Concept	**Association**
		Optimism	Negative
		Moderate, transient increasing fatigue vs. no-fatigue	
		Concept	**Association**
		Optimism	Negative
		Severe, transient increasing fatigue vs. no-fatigue	
		Concept	**Association**
		Optimism	Negative
		n = 344, Multivariate multinomial logistic regression analysis	
2[17]	Reduced activities	No significant results were found for optimism.	
		n = 332, Multivariate multinomial logistic regression analysis	
2[17]	Reduced motivation	**Moderate, transient decreasing motivation vs. no reduction**	
		Concept	**Association**
		Optimism	Nonsignificant
		Severe, transient decreasing motivation vs. no reduction	
		Concept	**Association**
		Optimism	Negative
		Decreasing motivation vs. no reduction	
		Concept	**Association**
		Optimism	Nonsignificant
		Increasing motivation vs. no reduction	
		Concept	**Association**
		Optimism	Nonsignificant
		n = 328, Multivariate multinomial logistic regression analysis	

Figure 2 Preliminary heuristic breast cancer-related fatigue coping model. Note: All relationships are significant at $P < .05$.



Discussion

This review emphasizes the association between psychological coping factors and BRCF for stage 0 to III breast cancer patients and survivors and provides a preliminary heuristic model of psychological coping with BCRF (Figure 2). Several evidence-based factors are provided that can be used to inspire interventions, therapy, care development, further research, and strengthen the existing relationship between psychological coping factors and BCRF. A full comprehensive overview is yet to be established.

BCRF is a distressing and prevalent symptom that both breast cancer patients and survivors experience.[2-5] Psychological coping factors were defined in this review as any psychological factors that are involved in and influence the coping process. These factors are an established part of the coping process, in this case aimed at minimizing BCRF, and reducing the threat and negative emotions associated with BCRF.[6,7] Besides emotional and social functioning, the outcomes of the coping process affect physical functioning, health, and illness, as well as short-term physiological changes, making it evident that constructive coping is essential when dealing with BCRF, due to the multidimensional nature of BCRF.[3,7] Some psychological coping factors, however, have been seen as comorbid symptoms besides fatigue, and despite being associated with increased fatigue, have even led to fatigue being considered a stable characteristic in some cases.[8,9] Therefore, this review excluded such factors and focused on active psychological coping factors that are easier to target in an intervention aimed BCRF and providing immediate results.

All included studies used samples of women who are patients or survivors of nonmetastatic breast cancer ranging from stage 0 to III. Women with stage IV and/or metastatic breast cancer were excluded because the experiences of these patients have been found to be different than those of women with primary breast cancer,[15] and therefore it was deemed appropriate to investigate coping separately.

There are several psychological factors that are associated with BCRF that could thereby be considered relevant elements in the coping process. The results indicate that the extent to which an individual perceives stress has an influence on BCRF. Thereby, efforts should be made to cognitively restructure stressors, and thereby create a perspective in which stressors are seen as less severe. In addition to the unbeneficial effect of high stress levels for increased BCRF, negative breast-related stereotype threat also has detrimental effects on BCRF. Women who had received radical mastectomy and perceived a breast-related stereotype threat, reported higher levels of BCRF than those who did not perceive the stereotype threat.

Beside mechanisms that lead to more BCRF, this review also identified protective factors. Having a stronger sense of coherence and perceiving reassurance of worth and nurturance from the social environment could help to alleviate BCRF. Reassurance of worth is associated with lower levels of total BCRF, and reassurance of worth and nurturance are associated with lower levels of mental BCRF, which might also play a role in reducing the perceived stereotype threat due to their social nature. Another protective factor identified, sense of coherence, can be seen as the coping capacity to deal with everyday stressors and includes the 3 elements of comprehensibility, manageability, and meaningfulness.

Meaningfulness might not be very helpful in this context, as higher levels of meaning-focused coping were found to be associated with higher levels of BCRF. This could be explained by the nature of cancer in general, where there is no inherent meaning behind it and rather is a tragic circumstance that might need to be coped with in another way. Furthermore, depending on the religious and spiritual beliefs of the individual, it might come in conflict with preexisting beliefs regarding the meaning and structure of life eg, someone who believes in god might find themselves asking why god has punished them with this disease. This in turn could lead to a loss of meaning and/or an inability to find and utilize meaning to cope. Interviews with cancer patients in Iran had found a theme with

religious patients seeing their disease as a divine test.[24] Moreover, some patients felt closer to god due to the experience and others felt the need for forgiveness by god and others.[24] Whether this mindset is helpful for coping with the BCRF is questionable. The question also remains how nonreligious participants could find meaning in this context as, if they do not believe in god, they could not see this as some sort of test or as a moment to seek forgiveness. Thereby, consistent with our previous findings, it seems that the comprehensibility and manageability which is essentially the perception of stressors, is key. These processes could be supported by the social provision factors identified in this review.

Optimism also seems to play an important role as a psychological coping factor as associations with BCRF have been observed over the span of 2 years. Optimism could facilitate a more positive perception of all mentioned factors, enabling a more optimistic view of the presented stressors, a more optimistic view of others and their perceptions, potentially strengthening perceived nurturance and worth, and thereby also mitigating stereotype threats. It seems that rather than finding meaning in the situation, being optimistic when trying to comprehend the situation, and finding a way to manage life and the stressors that are presented when coping with BCRF is important. Moreover, the question arises whether there remains time, space, and freedom to find meaning for some women, as they might already be overwhelmed with other aspects of the illness. Finally, the degree to which one feels nurtured and reassured of ones worth supports the coping process. This also highlights the importance of the social environment for women when psychologically coping with BCRF.

These findings are supported by previous research on BCRF. Higher tendencies to catastrophize and lower tendencies to accommodate to illness or passive management strategies have been predictive of BCRF.[3] Furthermore, optimistic and support seeking coping styles seem to be protective factors of BCRF, whereas avoidance and fatalistic coping seem to worsen BCRF.[10] Perceived social isolation and lower levels of subjective social support have been linked to higher BCRF.[3,11] And lastly, negative self-efficacy and body image are also linked to higher BCRF.[3]

Strengths, Limitations and Implications for Further Research

Several psychological coping factors identified in previous research were not found in this systematic review. This is in part due to sources being older than the time period investigated in this research while others might have been published in journals not found via the databases included, moreover, reviews were also excluded which had found further relevant results. We could not identify coping styles such as emotional catharsis and conservation, attitudes, as well as several correlations between BCRF and personality factors.[3,10,12] Thereby, the biggest limitation in this research is that the results are based on research findings that were published between 2015 and 2021. Moreover, while there is reason to believe that coping with BCRF will look differently between stage 0-III and stage IV and/or metastatic breast cancer, including them in future reviews could provide further insight into this hypothesis.

Nevertheless, the results of this study can inspire the development of interventions, therapy, and care in general in the coming years by focussing on psychological coping factors from current research, that was appraised for quality and level of evidence. This could include shifting the focus of any meaning-focused interventions and care to being more focusing on acute management of life and the stressors that come with the illness by developing a strong sense of coherence, as well as facilitating an optimistic mindset. Additionally, considering that perceptions of worth and feeling nurtured are useful coping mechanisms, the social environment of those women with BCRF should be involved in interventions and care. Furthermore, these factors can be used for treatment personalization since research showed that on average interventions that support patients in dealing with BCRF have different underlying concepts, are effective in research setting but not for all patients.[25]

Moreover, the results can also inspire revalidation and further development of existing questionnaires both for psychological coping factors as well as the multidimensional measurement of BCRF. Concretely, it might be worth investigating whether Breast Cancer-related Stereotype threat could be measured in a more reliable and valid way, as the Li et al.,[21] study only used 1 question to measure this concept. Furthermore, if all included studies had used the same BCRF measurement, it could have been easier to develop a model that goes beyond heuristics eg, by utilizing some form of Structural Equation Modelling to display the relationships. The question also remains why so many different BCRF measurements were found and why there remains so much ambiguity and disagreement when it comes to which factors should be measured in a BCRF questionnaire. Finally, this review can inspire future research into the topic, and the further development of the BCRF coping model. A deeper dive into this topic, also including Stage IV and other cancer types, spanning more than a 5-year period, could provide further insights into coping with BCRF and Cancer-related fatigue in general.

Furthermore, it may be beneficial to consider not only the stage but also investigate cultural differences in the different continents and countries that the included studies were conducted in. In these studies, culturally adapted resources and information can be found to enable further research in these regions. Cultural differences in coping have been found in research, such as differences in thinking between Asian and Western cultures that could even lead to different clinical outcomes.[26] Thereby, considering the impact that this can have, practitioners should consider the characteristics of their region in regard to psychological coping. Moreover, these tools can be useful for those conducting research in the same region, as they have been translated and validated in the desired language. Finally, it needs to be mentioned that only articles in the native languages of the review authors were included to avoid mistranslations, thereby several potentially relevant articles in different languages might have not been included.

Due to the large amount of vocabulary related to psychology and coping, it was difficult to include all possible variations. This is largely due to the state of psychological coping research, with Morrison & Bennett[6] reporting over thirty definitions of coping. The Lazarus model is considered to have had the most profound impact on the conceptualization of coping.[6] Therefore, the search string was constructed based on the terminology used in the Lazarus[7] model. Several alterations in vocabulary and other terms inspired by other

models and research could have broadened the results. Moreover, no core article could be found that put the variables of interest together, and there was no real consistency in the use of the terminology of psychological coping. As a starting point, the general BCRF review by Ruiz-Casado et al.,[3] was used. This review can thereby add to the research by Ruiz-Casado et al.,[3] by providing more depth to the psychological dimension and making a start in structuring and guiding further BCRF research.

Incorporating the findings into a Lazarus-inspired coping model was challenging,[7] but by structuring the findings according to total fatigue and fatigue dimensions the existing empirical evidence for psychological coping factors in BCRF could be presented comprehensively.

All included studies had a high quality except 1 article that had a good level. Moreover, the studies were considered to be level 3 evidence due to their nonexperimental design. The highest level of evidence would be to implement randomized control trials (RCTs) with a control group, in which the effect of the identified psychological coping factors can be measured and evaluated to see whether they hold real life efficacy in comparison to a control condition. Moreover, another way to increase the evidence for this topic, would be to conduct further reviews, broadening search terms and using further databases. Finally, an overarching meta review could integrate the findings from the conducted reviews into one, and thereby provide a core article that can guide BCRF research.

To summarize, implications of this research are twofold. Firstly, this research can be used to inform interventions, therapy, and care development by gaining insight into evidence-based factors that can facilitate or hinder BCRF and by utilizing the constructed heuristic coping model. Secondly, this review can inspire research to further develop the coping model proposed. A larger timeframe and a full picture of all possible perspectives into this problem can lead to the construction of a comprehensive psychological coping model for BCRF. Moreover, factors identified in this research should be tested for their efficacy in practical applications.

Conclusion

Several psychological coping factors associated with BCRF were identified in this review. A preliminary heuristic coping model for BCRF was constructed. It seems that psychological coping with BCRF involves reducing negative perceptions of stress and breast-related stereotype threat, as well as comprehending and being able to manage stressors, leading to a higher sense of coherence. Finding meaning as part of that sense of coherence seems to be less relevant, as meaning focused coping has been found to be associated with higher levels of BCRF. Being optimistic, and perceiving nurturance and reassurances of worth from the social environment supports the coping process. Further research should be conducted to confirm the practical efficacy of the identified factors.

Disclosure

The authors declare that they have no competing interests.

CRediT authorship contribution statement

Michael Schaab: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Validation, Visualization, Writing – original draft. **Kim Alida Elise Wijlens:** Conceptualization, Methodology, Validation, Writing – review & editing, Supervision. **Christina Bode:** Conceptualization, Methodology, Writing – review & editing, Supervision, Project administration.

Acknowledgments

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. WHO. Breast cancer. Accessed December 18, 2020. Available at https://www.who.int/news-room/fact-sheets/detail/breast-cancer.
2. Fabi A, Bhargava R, Fatigoni S, et al. Cancer-related fatigue: ESMO Clinical Practice Guidelines for diagnosis and treatment†. *Ann Oncol*. 2020;31(6):713–723. doi:10.1016/j.annonc.2020.02.016.
3. Ruiz-Casado A, Álvarez-Bustos A, de Pedro CG, Méndez-Otero M, Romero-Elías M. Cancer-related Fatigue in breast cancer survivors: a review. *Clin Breast Cancer*. 2020;21(1):10–25. doi:10.1016/j.clbc.2020.07.011.
4. Biering K, Frydenberg M, Pappot H, Hjollund NH. The long-term course of fatigue following breast cancer diagnosis. *JPRO*. 2020;4(1):37. doi:10.1186/s41687-020-00187-9.
5. Levkovich I, Cohen M, Karkabi K. The experience of fatigue in breast cancer patients 1–12 month post-chemotherapy: a qualitative study. *Behav Med*. 2019;45(1):7–18. doi:10.1080/08964289.2017.1399100.
6. Morrison V, Bennett P. *Introduction to Health Psychology*. 4th ed. Pearson Education Limited; 2016.
7. Lazarus RS. *Stress and Emotion: A New Synthesis*. London (UK): Free Association Books; 1999.
8. Bower JE, Wiley J, Petersen L, Irwin MR, Cole SW, Ganz PA. Fatigue after breast cancer treatment: biobehavioral predictors of fatigue trajectories. *Health Psychol*. 2018;37(11):1025–1034. doi:10.1037/hea0000652.
9. Miaskowski C. Symptom clusters: the new frontier in symptom management research. *J Natl Cancer Inst Monographs*. 2004;2004(32):17–21. doi:10.1093/jncimonographs/lgh023.
10. Jiang P, Wang S, Jiang D, Yu L. Cancer related fatigue in patients with breast cancer after chemotherapy and coping style. *J Cent South Univ*. 2011;36(4):323–328. doi:10.3969/j.issn.1672-7347.2011.04.008.
11. Jiang P, Wang S, Jiang D, Yu L, Tang L, Lai J. Association between cancer related fatigue and social support in patients after breast cancer chemotherapy in Changsha. *J Cent South Univ*. 2011;36(9):844–848. doi:10.3969/j.issn.1672-7347.2011.09.005.
12. Wang SH, He GP, Jiang PL, et al. Relationship between cancer-related fatigue and personality in patients with breast cancer after chemotherapy. *Psycho Oncol*. 2013;22(10):2386–2390. doi:10.1002/pon.3303.
13. PRISMA. HOME. Accessed November 24, 2020. Available at https://www.prisma-statement.org/
14. Mueller M, D'Addario M, Egger M, et al. Methods to systematically review and meta-analyse observational studies: a systematic scoping review of recommendations. *BMC Med Res Methodol*. 2018;18:44. doi:10.1186/s12874-018-0495-9.
15. Vilhauer RP. 'Them' and 'us': the experiences of women with metastatic disease in mixed-stage versus stage-specific breast cancer support groups. *Psychol Health*. 2011;26(6):781–797. doi:10.1080/08870446.2010.496853.
16. Dang D, Dearholt S, Bissett K, Ascenzi J, Whalen M Johns Hopkins Evidence-Based Practice for Nurses and Healthcare Professionals: Model and Guidelines. 4th ed. Sigma Theta Tau International; 2022. Indianapolis, IN 46202, USA
17. Person H, Guillemin F, Conroy T, Velten M, Rotonda C. Factors of the evolution of fatigue dimensions in patients with breast cancer during the 2 years after surgery. *Int J Cancer*. 2020;146(7):1827–1835. doi:10.1002/ijc.32527.
18. Sørensen HL, Schjølberg TK, Småstuen MC, Utne I. Social support in early-stage breast cancer patients with fatigue. *BMC Womens Health*. 2020;20(1):243. doi:10.1186/s12905-020-01106-2.
19. Hiensch AE, Bolam KA, Mijwel S, May AM, Wengström Y. Sense of coherence and its relationship to participation, cancer-related fatigue, symptom burden, and quality of life in women with breast cancer participating in the OptiTrain exercise trial. *Support Care Cancer*. 2020;28(11):5371–5379. doi:10.1007/s00520-020-05378-0.
20. Levkovich I, Cohen M, Alon S, et al. Symptom cluster of emotional distress, fatigue and cognitive difficulties among young and older breast cancer survivors: the mediating role of subjective stress. *J Geriatr Oncol*. 2018;9(5):469–475. doi:10.1016/j.jgo.2018.05.002.

21. Li J, Gao W, Yu LX, Zhu SY, Cao FL. Breast-related stereotype threat contributes to a symptom cluster in women with breast cancer. *J Clin Nurs*. 2017;26(9-10):1395–1404. doi:10.1111/jocn.13698.
22. Xiao C, Miller AH, Felger J, Mister D, Liu T, Torres MA. Depressive symptoms and inflammation are independent risk factors of fatigue in breast cancer survivors. *Psychol Med*. 2017;47(10):1733–1743. doi:10.1017/s0033291717000150.
23. Ho RT, Kwan TT, Cheung IK, et al. Association of fatigue with perceived stress in Chinese women with early stage breast cancer awaiting adjuvant radiotherapy. *Stress Health*. 2015;31(3):214–221. doi:10.1002/smi.2548.
24. Rassouli M, Yaghmaie F, Zendedel K, Majd H, Hatamipour K. Spiritual needs of cancer patients: a qualitative study. *Indian J Palliat Care.*. 2015;21(1):61. doi:10.4103/0973-1075.150190.
25. Buffart LM, Galvão DA, Brug J, Chinapaw MJM, Newton RU. Evidence-based physical activity guidelines for cancer survivors: current guidelines, knowledge gaps and future research directions. *Cancer Treat Rev*. 2014;40(2):327–340. doi:10.1016/j.ctrv.2013.06.007.
26. De Vaus J, Hornsey MJ, Kuppens P, Bastian B. Exploring the East-West divide in prevalence of affective disorder: a case for cultural differences in coping with negative emotion. *Pers Soc Psychol Rev*. 2018;22(3):285–304. doi:10.1177/1088868317736222.