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Walden University

College of Health Sciences

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Meagan Walker

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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The Office of the Provost

Walden University
2019

Abstract

Assessment of Cancer-Related Fatigue in Breast Cancer Survivors

by

Meagan Walker

MS, University of Arkansas for Medical Sciences, 2015

BS, Henderson State University, 2009

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2019

Abstract

Cancer-related fatigue (CRF) is a persistent and debilitating problem for many breast cancer survivors. Although many CRF measurement tools are available, no consensus exists on the most appropriate tool to use for breast cancer survivors. The purpose of this project was to identify the best method of assessing CRF in breast cancer survivors. The practice-focused question inquired about the most appropriate way to assess fatigue in breast cancer survivors. The central concepts of the project were CRF and cancer survivorship. This project was informed by the theory of health as expanding consciousness and Mishel's theory of uncertainty in illness. The sources of evidence included multi-database searches and literature from professional organizations. Results were tracked using preferred reporting items for systematic reviews and metasystems and a literature review matrix. The search identified 14 sources, which were assessed for quality using the grading of recommendations, assessment, development, and evaluation process. The results of this systematic review did not support the use of any particular assessment tool; however, 2 clinical practice guidelines recommended screening using a numerical severity scale followed by detailed assessment of clinically significant fatigue using available assessment tools. Screening can be implemented into the survivorship clinic, allowing nurses to identify potentially clinically significant fatigue so that further workup is done and interventions are implemented. Identifying, assessing, and intervening for clinically significant fatigue can improve the quality of life for breast cancer survivors, contributing to positive social change.

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Section 1: Nature of the Project

Introduction

With advances in treatment, the survival rate for breast cancer is increasing, creating a large population with unique needs based on what they have been through in their cancer treatment (Appling, Scarvalone, MacDonald, McBeth, & Helzlsouer, 2012). Fatigue is one of the most commonly reported symptoms after breast cancer treatment, negatively affecting the recovery of an estimated 40% of survivors for as long as 10 years (Appling et al., 2012).

Fatigue itself is a complex concept. It is highly subjective and relies on patient report of symptoms. Many factors contribute to its severity (e.g., pain, sleep disturbances, depression, anxiety, decreased physical activity, cognitive problems, weight gain, and menopausal symptoms). Fatigue can negatively affect quality of life (QOL) and can be frustrating for patients and providers (Appling et al., 2012). Although many models and scales are available to measure cancer-related fatigue (CRF) for patients undergoing active treatment, a lack of consensus exists on an appropriate method to assess this in breast cancer survivors (Noonan, 2016).

To provide care effectively to breast cancer survivors, nurses need to be able to perform an evidence-based assessment of fatigue. This project was a systematic review of the literature in which I provide guidance on the most appropriate method to assess this complex and persistent symptom. Being able to assess the fatigue adequately is the first step in developing interventions for the problem. Addressing this prominent problem should improve the QOL of breast cancer survivors and contribute to positive social change.

Problem Statement

Breast cancer is common among American women; 1 in 8 will develop invasive breast cancer. As of January 2018, an estimated 3.1 million women were living with a history of breast cancer, and researchers anticipate 266,120 new cases of invasive breast cancer diagnosed in 2019 (Breastcancer.org, n.d.). Due to increased awareness and early screening, women are being diagnosed earlier in the disease. Therefore, the mortality due to breast cancer has been decreasing through the years (Breastcancer.org, n.d.). Similar to the general trend for the United States, in Arkansas, breast cancer mortality has decreased steadily in recent years. Regardless of stage at diagnosis, the overall survival rate at 5 years is 77% and at 10 years is 62% (Arkansas Department of Health, 2017).

In a review of CRF by Weis (2011), fatigue was one of the most frequent symptoms occurring during treatment with prevalence rates ranging from 59 to 100%. The level of fatigue was higher among long-term survivors than in the general population and persisted more often with long-term and late effects. CRF negatively affected QOL by interfering with work life, family life, and sexuality (Weis, 2011). CRF correlates with sleep disorders (Ryan et al., 2007), and a relationship exists between depression, anxiety, psychological distress, and CRF (Fabi et al., 2017). CRF has negative consequences for the patient, the spouse and family, and the health economy as a whole. Cancer patients suffering from CRF, compared with patients without CRF, sought more health services, had higher rates of sick leave, and had more loss of work capacity, with some sufferers not returning to work (Weis, 2011).

My focus in this project was on the prevalence of CRF interfering with QOL in breast cancer survivors at Arkansas's cancer center. There is an ever-increasing number of breast cancer survivors, and many contend with CRF (Fabi et al., 2017). Therefore, it is important to have an evidence-based fatigue assessment. The diagnosis of breast cancer is life changing; the treatment is tedious and damaging, and it can leave a person altered and physically and emotionally drained. Nurses and health care providers need to address how best to help patients overcome the challenges of CRF so that they can experience improved QOL in long-term survivorship (Appling et al., 2012).

The local relevance of the need to address CRF is supported by the Arkansas Cancer Coalition's (ACC) report, issued in 2015, outlining the state plan to address cancer. Among the topics of concern in that report is survivorship care. One objective of the state plan is to "educate health care providers on their role in survivorship by addressing cancer survivor's needs and care-related issues to improve survivorship care" (ACC, 2015, p. 47). Another objective is to "address the needs of cancer survivors and their families to improve survivorship care" (ACC, 2015, p. 48). The findings of this project may be used by health care providers to address the needs of cancer survivors and educate health care providers on the specific psychosocial needs of this patient population.

Purpose Statement

The gap in practice that I addressed in this project is a lack of consensus on a consistent method of assessing CRF in breast cancer survivors (see Noonan, 2016). My purpose in this project was to identify the best method of assessing CRF in breast cancer survivors and develop a plan for dissemination of the findings and implementation in the survivor clinic. The practice-focused question was the following: What is the most appropriate way to assess fatigue in breast cancer survivors?

This project has the potential to address the gap in practice. Through my findings, I have identified an appropriate method for assessing CRF in breast cancer survivors. This assessment method can then be used by health care providers in clinical practice to improve care of breast cancer survivors by addressing the prevalent and life-altering struggle that is CRF. Beyond the scope of this project, the results of this project could aid in further study of interventions in the treatment of CRF.

Nature of the Doctoral Project

The nature of the project is a systematic review of the evidence. Researchers use this type of project to create an unbiased, comprehensive summary of the research on a particular topic (Walden University, 2017b). Specifically, this project was a systematic review of the literature on the assessment of CRF in breast cancer survivors.

Sources of Evidence

Sources of evidence included textbooks on cancer survivorship and oncology symptom management. These sources established an understanding of what is known about CRF assessment. I then conducted a multidatabase search through Thoreau and the

Walden Library website. Key search terms included *CRF* and *breast cancer survivors*. Inclusion criteria included current (published in 2012 or later), peer-reviewed, scholarly journals, and professional organizations that specialize in cancer and survivorship. This included the practice standards and guidelines from organizations such as Oncology Nursing Society (ONS), American Society of Clinical Oncology (ASCO), National Comprehensive Cancer Network (NCCN), and Advanced Practice Society for Hematology and Oncology (APSHO).

Approach

The approach was the structured literature review organized around the central concept of assessment of CRF. I critically appraised each article or source for its significance, applicability, clarity in presentation of findings, and quality of research conducted (see Terry, 2015) and used the GRADE process to classify the quality of the evidence. This system is widely used by organizations such as the World Health Organization and the Cochrane Review. The process is explicit and rigorous yet user friendly, allowing for simplicity and transparency. Each piece of evidence is classified into one of four levels: high, moderate, low, and very low (Guyatt et al., 2008).

Significance

Stakeholders

Key stakeholders in this practice problem include the patients and health care providers for breast cancer survivors. The patients will benefit from interventions directed at managing CRF. The clinical providers will benefit from having clarity on which evidence-based tool may be appropriate and useful.

Contribution to Nursing Practice

Evidence suggests that CRF is important to nursing practice. For example, the Holden Comprehensive Cancer Center at the University of Iowa attempted education and interventions to address CRF in 1995. Unfortunately, CRF is thought of as an untreatable and inevitable consequence and is inconsistently addressed and inadequately managed. Newer efforts (Huether, Abbott, Cullen, Cullen, & Gaarde, 2016) have been implemented at Holden Comprehensive Cancer Center to have a nurse-led exercise intervention for cancer survivors. Huether et al. (2016) noted that the oncology nurse is in an excellent position to assess CRF, educate patients, and follow up with patients to increase adherence.

Another example, in the National Action Plan for Cancer Survivorship, published by the Centers for Disease Control and Prevention (CDC) in conjunction with the Lance Armstrong Foundation, one of the action steps is to establish a base of applied research and knowledge focusing on the issues of cancer survivors. Another action step is to implement effective programs to address survivors more completely (CDC, 2004). These initiatives direct the focus of nursing research. My project is a literature review focused on CRF in breast cancer patients. The results of this literature review will contribute to the research and knowledge that is called for in the National Action Plan for Cancer Survivorship. Similarly, the results of this literature review could help health care providers in implementing an effective program to address cancer survivor’s needs by prioritizing the assessment of CRF (Weis, 2011).

Transferability

The findings of this study have transferability to similar practice areas. CRF is not an isolated symptom but can have adverse effects on functional status, mood, well-being, distress level, and sleep (Mitchell, 2015). CRF is highly subjective with some patients reporting excessive need to rest, whereas others characterize it as loss of efficiency or a mental fogginess (Mitchell, 2015). The experience of CRF is not isolated to breast cancer survivors but can occur at any point in the cancer trajectory and can affect cancer survivors of all types (Kantor & Suzan, 2016). CRF is often underreported and undertreated. Studies have concluded that one of the reasons for this underreporting and undertreating stems from difficulties in defining and accurately measuring CRF (James et al., 2015). The results of this project could be transferred to other disciplines that work within the multidisciplinary cancer survivor clinic. This includes the social worker, nutritionist, pastoral care, counselors, and physical therapists. CRF is a multidimensional problem with physical elements, emotional elements, and cognitive components (James et al., 2015). Being able to fully assess CRF will allow the different professionals working with this population to understand the severity of symptoms the patient may be experiencing. A multidisciplinary approach to treating the CRF can then be created to address the patient's individual needs.

Social Change

This project supports the mission of Walden University by promoting positive social change. The concept of social change refers to the promotion of the "worth, dignity, and development of individuals" (Walden University, 2017a). Persistent CRF can negatively affect the cancer survivor's well-being and QOL (Mitchell, 2015). Therefore, CRF influences the individual's perception of self-worth and dignity. By accurately assessing and measuring CRF in breast cancer survivors, health care providers can then use these measures to determine efficacy of interventions.

Summary

Breast cancer survivors are a growing population with unique needs. CRF is a prevalent symptom in this population and can negatively affect QOL (Appling et al., 2012). Researchers have studied CRF and assessment strategies have been proposed, but consensus does not exist on the ideal assessment strategy for the survivor population (Noonan, 2016). Through this project, which is a systematic review of the literature, I will aid in identifying an appropriate assessment method. Once identified, this assessment method can be implemented into clinical practice. Giving nurses the tool to assess CRF is the first step in the nursing process. In the next section, I will discuss, in further detail, the background, supporting theories, relevance, context, and roles.

Section 2: Background and Context

Introduction

There is an ever-growing population of breast cancer survivors with a unique set of clinical needs. A prevalent symptom in this group of patients is persistent CRF (Wang & Woodruff, 2015). However, currently no consensus exists on the best method of assessing CRF in breast cancer survivors (Noonan, 2016). Therefore, my purpose in this project was to identify the best method of assessing CRF in breast cancers survivors and to develop a plan for dissemination of findings and implementation in the survivor clinic. The practice-focused question was: What is the most appropriate way to assess fatigue in breast cancer survivors?

In the first section of Section 1, I discuss relevant theories and models that I used to understand my research problem; I also provide definitions of important concepts. Second, I present of the relevance of this project to nursing practice in general. Third, I provide a description of the local context. Last, I discuss my role as a doctor of nursing practice (DNP) student, including my motivations and potential biases.

Concepts

Two key concepts were central to this project: CRF and cancer survivorship. The backbone of any scholarly project is the core concepts of interest because concepts are the building blocks of models and theories. The operational definition of a *concept* must be clear so that the connections between the concepts can be made (Doyle, 2008). The following is a summary of concept analyses for CRF and cancer survivorship. These are the 2 key concepts in the practice-focused question, central to the project.

Cancer-Related Fatigue

Historically, the concept of CRF has been difficult to clarify. This lack of clarification has resulted in inconsistencies in the definition and the instruments proposed to measure CRF. Fatigue is a common symptom of illness in general, not only of cancer, and has been used interchangeably and erroneously with tiredness or weakness (Ream & Richardson, 1996). Further study has characterized CRF as feelings of tiredness, weakness, and lack of energy. In addition, CRF interferes with usual functioning and QOL and does not correlate with the level of exertion (Hofman, Ryan, Figueroa-Moseley, Jean-Pierre, & Morrow, 2007). CRF is complex, subjective, and multidimensional, and it is best measured by self-report from patients (Ream & Richardson, 1996).

For this project, I used a recent definition proposed by ASCO. *CRF* is "a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer and/or cancer treatment that is not proportional to recent activity and interferes with usual functioning" (Bower et al., 2014, p. 1844). This definition combines an understanding of the many attributes of CRF as well as the potential ramifications in all areas of life. This definition also highlights the subjective nature of CRF and that it affects patients' functioning in daily life and must be addressed by clinicians (Bower et al., 2014).

Cancer Survivorship

The second concept that requires precise definition for my project is *cancer survivorship*. Attention to cancer survivorship is credited to physician and cancer survivor Mullan. In the book, *Seasons of Survival,* the author described three periods in survivorship: acute, extended, and permanent (1985). Survivorship begins with diagnosis and continues for the remainder of life (Doyle, 2008). Further definitions of this concept extended the criteria to inclusion of caregivers, friends, and family because of the effects of cancer diagnosis and treatment on them by proxy of their loved ones. Often, an undercurrent of battle themes occurs in discussions of survivorship, described as ‘winning the fight’ against cancer (Hebdon, Foli, & McComb, 2015).

For the purposes of this project, I used the following definition that has been proposed by the National Coalition for Cancer Survivorship (NCCS). NCCS defines someone as a *cancer survivor* from the “time of diagnosis and for the balance of life [and] to include family, friends, and caregivers” (Twombly, 2004, para. 6). This definition is concise, accepted widely by the cancer community, and endorsed by ASCO (ASCO, n.d.).

With improvements in screening, early detection, and treatment, there is an ever-increasing cancer survivor population. This has created a shift in perspective regarding cancer survivorship. For example, breast cancer is no longer a completely fatal disease. Cancer survivorship is considered, by clinicians, to be a long-term chronic disease (Cheung & Delfabbro, 2016). As with any chronic disease, patients can experience a wide range of issues and challenges. Cancer survivors may experience persistent fatigue, physical changes, fear of recurrence, late- and long-term effects of cancer treatment, and an expectation to get back to ‘normal.’ During survivorship, the patient is no longer in active treatment and therefore no longer being seen by the treatment team on a regular basis; this reduction in care can be experienced as a removal of a perceived ‘safety net’ (Kantor & Suzan, 2016).

There is a growing focus on understanding and addressing survivorship. This focus stems from the many health problems that survivors can face as a consequence of their illness, their treatment, pre-existing conditions, and normal aging-related changes. To support the complex care of cancer survivors, ASCO published *The Survivorship Curriculum* (2016). The curriculum outlines the essential elements of survivorship care including surveillance for recurrence and second cancers, treatment of long-term and late effects of cancer treatments, health promotion and disease prevention, psychosocial well-being, and communication and care coordination (Shapiro et al., 2016).

CRF is a common and disruptive symptom experienced by cancer survivors. The source of the fatigue is not clear. It could be a consequence of the cancer itself, or the treatments, but generally resolves after end of treatment and cure of cancer (Corbett, Groarke, Walsh, & McGuire, 2016). However, it is estimated that at least 30% of cancer survivors struggle with CRF for years after completing treatment for their cancer. Patients report not being prepared for the experience of persistent fatigue often leading to confusion, isolation, and frustration (Corbett et al, 2016).

Theory

Health as Expanding Consciousness

The Health as Expanding Consciousness theory was developed by Newman and stems from Rogers’s theory of unitary human beings (Petiprin, 2016). The theory proposes that defining *health* as the absence of disease is problematic because some individuals must deal with chronic diseases, so absence of a disease is not a possibility. Yet, health, or thinking of oneself as healthy, should be a possibility for all individuals. Theorists of HEC posit that every person, regardless of disease status, is part of the universal process of expanding consciousness (Petiprin, 2016). This expanding consciousness, according to the theory, leads to a better understanding of oneself, finding greater meaning in life, and connecting with the others and the world. Within the HEC and the unitary-transformative paradigm, nursing is an opportunity to partner with patients and their families and participate in transformative encounters (Doyle, 2008).

In a concept analysis of cancer survivorship, Doyle (2008) applied HEC to the cancer survivorship period. Describing survivorship as a process that starts at diagnosis and extends past treatment. The survivorship period and process can allow for a new synthesized view of self, incorporating chronic illness and disease as a meaningful aspect of health (Doyle, 2008).

Cancer survivors are living with a chronic disease. Yet, according to HEC, survivors can view themselves as healthy (Petiprin, 2016). Cancer survivors can participate in the universal process of expanding consciousness and thus be able to find greater meaning in their life and reconnect with the world around them, regardless of disease state (Kantor & Suzan, 2016). Nurses can engage with patients about their experience within the context of expanding consciousness helping the patient cope and recover.

In 1990, Newman developed a research method based on HEC called the praxis method. The focus within the praxis method is the integration of theory, research, and practice into a unitary perspective. It requires the researcher-practitioner to be authentically present with the client-participant in searching for life patterning (Smith, 2011). Research using HEC and the praxis method is growing and is being used internationally, indicating a global appeal and that the concepts in the theory transcend cultural differences (Endo, Miyahara, Suzuki, & Ohmasa, 2005; Smith, 2011).

HEC has been used to study many chronic illness and distressing situations. These include the study of coronary heart disease, HIV/AIDs, COPD, rheumatoid arthritis, multiple sclerosis, schizophrenia, weight loss, dementia, bipolar disease, menopause, smoking cessation, and health care disparities. This range of focuses indicates that HEC is widely applicable in nursing (Smith, 2011).

Moch (1990) used HEC to explore the experience of health for patients with breast cancer. Patterns of expanding consciousness emerged as a result of the tension created by illness. This expanding consciousness then facilitated change and connectedness between the person and environment (as cited in Smith, 2011, p. 264). Newman (1995) used HEC to explore the meaning of the life pattern of persons diagnosed with cancer. The diagnosis of cancer in these patients led to a turning point in life that, for some, resulted in authentic living and more meaningful connections with others (as cited in Smith, 2011, p. 264). Karlan, Jankowski, and Beal (1998) used HEC to explore the experiences of childhood cancer survivors. The experience of cancer as a child promoted expanded consciousness and life patterns of hope, optimism, empathy, and family bonds (as cited in Smith, 2011, p. 265). Kiser-Larson (2002) used HEC to understand life patterning in Native American women with breast cancer. The diagnosis, for these women, led to chaos and a turning point that led them to deeper meaning in life and spirituality (as cited in Smith, 2011, p. 267).

Endo has used HEC in the study of cancer and the nurse-client relationship (1998), family-nurse relationship (2000), praxis methods (2005), and smoking cessation (2009) (Smith, 2011). Endo (2017) specifically applied HEC to cancer and the nursing process. The nurse, or provider, and the patient enter into a mutual process of pattern recognition leading to a higher level of consciousness. This is called the ‘caring partnership,’ which then facilitates the development of interventions that focus on the patient as a whole and the patient’s meaning in the experience. The caring partnership is recommended to nurses and doctors who care for cancer patients. The partnership will lead to better understanding by both parties and personal growth through difficult situations (Endo, 2017).

Mishel’s Theory of Uncertainty in Illness

Cancer survivors experience uncertainty about their disease and its potential trajectory, what extended survival will look like and the ever present fear of recurrence. There is ambiguity surrounding this chronic illness state, complicated by treatments, information gaps, and unpredictable disease course. This uncertainty may lead to positive or negative coping strategies (Hebdon et al., 2015).

This uncertainty is explained by Mishel’s uncertainty in illness theory. Developed by Mishel in the 1980s, the theory attempts to address the issue of uncertainty in chronic illness and coping with that uncertainty. The theory posits that uncertainty in illness can be viewed as a threat or an opportunity, leading to positive and/or negative coping strategies to reduce the threat and/or enhance the opportunity. Mishel further stated that accepting uncertainty as a fluid state and view it as leading to more possibilities and new patterns of thinking in living is essential to coping with chronic illness (Mishel, 1990).

The theory of uncertainty in illness has been studied extensively in many illness states to include heart transplant, myocardial infarction, cardiac surgery, bowel resection, COPD, cystic fibrosis, scoliosis, end-stage renal disease, and multiple sclerosis. It has been studied in children, adolescents, and adults with cancer and among cancer survivors. (Neville, 2003). The perception of uncertainty is identified as one of the major problems of cancer survivors. This uncertainty can influence stress appraisal, coping, and hope (Wonghongkul, Moore, Musil, Schneider, & Deimling, 2000). Uncertainty may become integrated into daily existence and has been associated with poorer QOL in breast cancer survivors (Tramm, McCarthy, & Yates, 2012).

Wonghongkul, Dechaprom, Phumivichuvate, and Losawatkul (2006) investigated the relationship between uncertainty, coping, and QOL among early (3 years after diagnosis) breast cancer survivors. A moderate level of uncertainty was found among the participant and the longer the survival time the less uncertainty they reported. Uncertainty can be mitigated by education, familiarity, and social support (Wonghongkul, Dechaprom, Phumivichuvate, & Losawatkul, 2006). Miller (2014) applied the theory of uncertainty in illness to information seeking in cancer survivorship. The chronic presence of uncertainty in cancer survivorship can lead to or contribute to distress for the patient and the patient’s family and caregivers. Communication with the health care team can reduce uncertainty but too much information can complicate the uncertainty (Miller, 2014). Therefore it is imperative for nurses and providers to establish a relationship with patients, to understand their unique information needs. This facilitates viewing uncertainty as more possibilities rather than a threat (Mishel, 1990).

Both the HEC and the theory of uncertainty in illness focus on building relationships with patients to help them better understand their chronic illness and then better cope with the consequences of the disease (Endo, 2017; Miller, 2014). Both theories are applicable to the study of CRF. Using the HEC nurses can form caring partnerships with cancer survivors to explore the meaning of the fatigue according to the patient. Then using, the theory of uncertainty in illness, nurses can help the patients understand the fatigue and its source then work together to build a care plan to aid in coping and recovery.

Relevance to Nursing Practice

Cancer survivorship is a relevant issue to nursing practice because of the increasing number of cancer survivors. The American Cancer Society estimates that more than 1.3 million people were diagnosed with cancer in 2005 (Hofman et al., 2007). This number is still increasing. In 2012, approximately 13.7 million people were living with a history of cancer. This is projected to increase to 18 million by 2022 (Hebdon et al., 2015). The growing prevalence of patients with a history of cancer presents new challenges for nursing practice to “identify and manage treatment-related sequelae, enhance QOL, and improve the overall functioning” (Jones et al., 2016, p. 52).

In a survey of 763 breast cancer survivors 35% reported experiencing fatigue at 1-5 years post-treatment, 34% at 5-10 years post-treatment, and 21% report experiencing fatigue at both measurement points (Hofman et al., 2007). Fatigue is a persistent, debilitating, distressing symptom in a significant portion of cancer survivors (Hofman et al., 2007). Similarly, in a study of fatigue and disability Jones et al. (2016) found that CRF was still present 6 years post-treatment and was most common among breast and colorectal cancer survivors. CRF is reported by survivors as the most distressing symptom, having greater negative effect on cancer survivors' QOL than pain, depression, and nausea. In addition, other complications of fatigue include: impairment in ability to perform activities of daily living, increased levels of anxiety, mood disturbance, loss of work days for patients, family members, and care givers (Hofman et al., 2007). Research suggests that cancer survivors utilize primary care more frequently than age-matched controls and use it for the primary complaint of fatigue. Still, CRF is underreported, underestimated, and undertreated and represents a poorly managed problem for cancer survivors (Jones et al., 2016).

The Institute of Medicine (IOM) issued a mandate to nurses to "promote evidence-based, comprehensive, compassionate, and coordinated survivorship care" (Hewitt, Greenfield, & Stovall, 2005). Surviving cancer is now a reality for millions of people and fatigue is a significant and distressing for these millions (Shapiro, et al., 2016). In order to fulfill the IOM's mandate for 'comprehensive' survivorship care, nursing care must address CRF. Unfortunately, there is no single standardized CRF measure for breast cancer survivors that has been widely adopted (Wang & Woodruff, 2015).

CRF is not a new practice issue for nurses. Previously, there have been attempts to address this problem. One of the first fatigue assessment scales is the Symptom Distress Scale, developed in 1978. This scale consists of a 13-item self-report Likert scale for characterizations of multiple cancer related symptoms to include fatigue but also pain, insomnia, activity, concentration, mood, and appearance. More focused assessments were also developed such as the Fatigue Scale and Fatigue Observation Checklist (in 1982), the Piper Fatigue Scale (in 1989), the Multidimensional Assessment of Fatigue (in 1991), and the Visual Analog Scale for Fatigue (in 1999). These tools vary in construction, number of items, and the type of scale used. There are barriers to consistent selection among these scales such as: measurement model for statistical analysis, evidence of validity, practicality, psychometric soundness, ease of understanding, ease of use, and standardized rules for administration and scoring (Wang & Woodruff, 2015). Other fatigue scales include the Fatigue Symptom Inventory (FSI), the Medical Outcome Study Short Form-36 Health Survey, and the Profile of Mood States (POMS). However, it is unclear which of these scales is the best instrument for detection of CRF in active cancer patients as well as cancer survivors (Goedendorp, Jacobsen, & Andrykowski, 2016).

Patients are unaware of the potential long-term effects of cancer treatment on their lives and there is need for high quality care after the active treatment phase (James et al., 2015). The physiology and psychosocial burden of fatigue for cancer survivors is high, leading to increased disability that has a negative effect on QOL and ability to perform normal daily activities and be active participants in life. Disability is as important as mortality and cancer research efforts have reduced mortality, but not the morbidity associated with the disability of CRF. Further efforts are needed to detect and treat the persistent and late effects of cancer (Jones et al., 2016).

Local Background and Context

Hebdon (2015) identified 3 *P*'s of cancer survivorship care: palliation of symptoms, prevention of recurrence and late effects, and promotion of wellness. Addressing CRF serves to fulfill all of the 3 *P*'s of survivorship. In 2015, a pilot study was conducted to identify factors contributing to diminished sexual functioning in breast cancer survivors (Makhoul et al., 2016). The researchers surveyed survivors and their partners to discover what potential late and long-term effects may be effecting QOL. They discovered that one of the most reported symptoms affecting sexual function was fatigue (Makhoul et al., 2016). Fatigue as a contributing factor to sexual dysfunction was not the expected outcome. There was not specific interest in CRF but rather interest into QOL and sexual functioning.

Nurses play a key role in the management of fatigue through promoting open communication between patients and clinical providers. This helps to identify the problem, reduce anxiety, explore the disease process, set realistic expectations, and helps to promote meaningful interactions with dignity (Kantor & Suzan, 2016). The cause of CRF is multifactorial and complex with components of pathology, psychology, situation, metabolism, and mood disturbance (Jones et al., 2016). This project will help nurses fulfill their role in the management of CRF by helping nurses to identify the problem and explore the disease process through the assessment of CRF. Also, this project will provide a consistent way to monitor the effectiveness of interventions aimed at addressing CRF.

The state’s medical oncology division at the cancer center participates in ASCO Quality Oncology Practice Initiative (QOPI). This program helps to promote a culture of improvement within the outpatient oncology practice. Participants can report on certain quality measures and become QOPI certified. These quality measures can be used as a measure of performance and can aid in the development and implementation of quality improvement projects leading to better outcomes and better patient care (ASCO.org, 2018). One of the quality domains reported to QOPI and used for certification designation is reporting on efforts for symptom management for breast cancer survivors. CRF is a symptom in breast cancer survivors and the results of this project will aid nurses in the assessment of CRF, thus improving the quality of care for the breast cancer survivors at this site and meeting the criteria for QOPI.

ASCO, NCCN, and the Canadian Association of Psychosocial Oncology (CAPO) have developed guidelines on the treatment of CRF during active treatment. It should be routinely assessed and measured on a scale of 0-10 with a cutoff of 4 signaling more action needed. Treatment starts with a comprehensive assessment of all contributing factors, specifically functional status, nutrition, exercise, and sleep. Approaches to mitigate CRF include patient education, cognitive behavioral therapy, sleep hygiene, and physical activity. There is no consensus on the best measurement of CRF and its multifactorial origins, nor is there consensus on the gold standard of treatment (Jones et al., 2016).

Treatment of CRF can be costly and time consuming. It is important to be mindful of resources in health care. Therefore it is important to be able to identify clinically significant cases of CRF. This will enable nurses to target those patients in need of treatment for CRF. A method for efficiently and accurately screening large patient populations such as cancer survivors is needed (Goedendorp et al., 2016).

Also, the state's cancer center is striving for National Cancer Institute (NCI) accreditation. This is a rigorous accreditation process that recognizes the cancer center as prestigious and contributes to its support, funding, and increased access to clinical trials. To become accredited a cancer center must prove that it is contributing to the fight against cancer and be a center for ground-breaking treatments and quality care for the community ("NCI-Designated Cancer Centers", n.d.). This project contributes to the NCI accreditation effort in that the results will help to improve the quality of care for the community by improving the assessment of CRF in breast cancer survivors.

Role of the DNP Student

My professional context is that I am the advanced practice registered nurse (APRN) in the UAMS-WPRCI survivor clinic. I am charged with addressing the 3 *P*'s of cancer survivorship for my patients who come from all over the state of Arkansas. My relationship or role in the doctoral project is that I will be conducting the systematic review of the literature. This topic is important to me because it is integral in addressing QOL for my patients. I am a member of the ACC and am passionate about improving the lives of cancer survivors in Arkansas. My professional mentor was the primary investigator in the previously mentioned pilot project conducted at UAMS and is the one who brought this issue to my attention.

Any researcher or project is subject to potential bias. Bias is “any tendency to which prevents unprejudiced consideration of a question” (Pannucci & Wilkins, 2010, p. 1). This can occur in any phase from planning, to data collection, to interpretation. It is important not only to ask if bias is present or not but to consider how it can be prevented by proper design and diligent implementation (Pannucci & Wilkins, 2010). The design of this project is a systematic review of the literature. There is potential for inherent bias with this type of project in the selective inclusion or exclusion of studies to support the authors’ views. To reduce the potential for bias it is important to follow a structured, transparent, and recorded process. In this way, any other reviewer could follow the same steps, with the same resources, and reach the same conclusions (Walden University, 2017b).

Summary

In this section of the paper, I defined the concepts that are central to the project. As well as the underlying theories. Then, I expanded on the relevance to nursing practice as well as the local background and context. Finally, I clarified my role as the DNP student, including motivations and potential biases. In the next section, I will address the practice-focused question, the sources of evidence that I used including published resources and outcomes, and the systems that I used for data analysis and synthesis.

Section 3: Collection and Analysis of Evidence

Introduction

The problem that I addressed in this project is that no consensus exists on the best method of assessing CRF in breast cancer survivors. Many models and scales are available to measure CRF for patients on active treatment but not for survivors (Noonan, 2016). CRF is one of the most commonly reported symptoms for breast cancer survivors and can negatively affect QOL and coping for patients and families (Appling et al., 2012). My purpose in this project was to conduct a systematic review of the literature to identify the best method of assessing CRF in breast cancer survivors and to develop a plan for dissemination of the findings for implementation in the survivor clinic.

Due in part to better screening, early detection, and improved treatments, there is an ever-increasing number of cancer survivors. The American Cancer Society estimates that 18 million people will be living with a history of cancer by the year 2022 (Hebdon et al., 2015). Fatigue is a persistent, debilitating, distressing symptoms in a significant portion of cancer survivors (Hofman et al., 2007). The IOM issued a mandate to nurses to “promote evidence-based, comprehensive, compassionate, and coordinated survivorship care” (Hewitt et al., 2005, p.19). To fulfill this mandate and provide quality patient care to the unique population of cancer survivors, nurses need a tool to properly assess CRF.

In Section 3, I reiterate the practice-focused question and the gap in practice that I addressed in this project. I clarify the purpose, alignment, operational definitions, and key aspects of the project. Further, I elaborate on the sources of evidence, data collection, and analysis methods. Finally, I describe the system for organizing and tracking the evidence.

Practice-Focused Question

The practice-focused question that I addressed in this study was the following: What is the best method to assess CRF in breast cancer survivors? A pilot study of breast cancer survivors and their partners found that fatigue is one of the most reported symptoms negatively affecting sexual functioning and QOL (Makhoul et al., 2016). These results illuminated a gap-in-practice in the management of CRF. Nurses play a key role in the management of fatigue by promoting open communication between patients and clinical providers to identify the problem, reduce anxiety, explore the disease process, set realistic expectations, and promote meaningful interactions and dignity (Kantor & Suzan, 2016). The results of this project will help nurses fulfill their role in the management of CRF.

My purpose in this project was to identify the best method of assessing CRF in breast cancer survivors and to develop a plan for dissemination of the findings and implementation in the survivor clinic. Identifying the best method of assessment for this population will enable nurses to identify the problem, better explore the disease process, and provide a consistent way to monitor the effectiveness of interventions aimed at addressing CRF. The approach that I used for this project was a systematic review of the literature organized around the central concepts of CRF and breast cancer survivors.

For the purposes of this project, *CRF* was defined as "a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer and/or cancer treatment that is not proportional to recent activity and interferes with usual functioning (Bower et al., 2014, p. 1844)." The term *cancer survivor* as defined by NCCS is someone from the “time of diagnosis and for the balance of life,” and “to include family, friends, and caregivers” (Twombly, 2004, para. 6).

Sources of Evidence

Many potential sources of evidence exist to address this question. First, textbooks have been written on survivorship care and oncology symptom management. These were a foundational source to establish what is already known on the topic of CRF. The bibliography sections of these texts also provided further background literature to allow me to fully understand the scope of the problem and what has been done so far to address the problem. The next step was to conduct a multidatabase search through Thoreau and the Walden Library. This provided the bulk of the literature for the systematic review. It clarified what is being done now to address the problem and what assessment methods are being used. Finally, I consulted the websites of various professional organizations for practice standards and guidelines, for example, ONS, ASCO, NCCN, and APSHO. I included these guidelines in the systematic review and highlighted what experts in the field view as the appropriate standard of care for the problem.

Published Outcomes and Research

For this systematic review, I followed the steps detailed in the Walden University manual for systematic reviews. The first step was to identify the scope of the review; this included the list of databases and search engines, key search terms, scope of review, and clarity on how the search would be exhaustive and comprehensive (Walden, 2017b). I accessed the databases through the Walden Library’s Thoreau multidatabase search tool. Available databases included CINAHL, MEDLINE, Ovid, ProQuest, PubMed, Annual

Reviews, BioMedCentral, Cochrane, ScienceDirect, Database of Systematic Reviews, Joanna Briggs Institute EBP Database, Merck Manual, and the Directory of Open Access Journals.

The Google search engine proved helpful to explore the NCCN, ASCO, ONS, and the APSHO guidelines. I also used Google Scholar to search for guidelines and articles. Key search terms included *cancer-related fatigue OR cancer related fatigue* AND *breast cancer survivor* AND *assessment*. Literature included in the review was published within the last 5 years, in English, and with full text available. Sources included peer-reviewed scholarly journals and professional organizations published guidelines. The search was exhaustive and comprehensive in that I continued until I found no new results, indicating saturation in the searches.

The second step was to formulate the review question (Walden, 2017b): What is the best assessment method of CRF in breast cancer survivors? The third step was to define explicit inclusion and exclusion criteria. The exclusion criteria consisted of no free full text available, being written in a foreign language, being older than 5 years, and not using a fatigue measurement instrument.

The fourth step was to perform a comprehensive search to find all relevant studies. In this step, the systems used for recording, tracking, and organizing the evidence and the procedure must be explicit to assure the integrity of the evidence (Walden, 2017b). The system for recording and tracking the evidence is the PRISMA flow diagram (see Appendix A). PRISMA stands for Preferred Reporting Items of Systematic reviews and Meta-Analyses. Developed by an international work group of researchers to address the quality of reporting of results of systematic reviews and meta-analyses, this reporting system consists of a checklist and four-phase flow diagram to display the flow of literature through the systematic review process. It is not a quality assessment tool (Moher et al., 2015).

A systematic review of the literature is not a summary of research articles but a synthesis of ideas and themes from the literature. The system for organizing the evidence was a literature review matrix, which aids in creating a comprehensive, fair, and balanced literature review. This technique can help identify gaps in research and identify diverse or conflicting findings (Clark & Buckley, 2017). I created the matrix in Microsoft Excel and included columns for details such as title, author, year, publication, database, DOI, keywords, summary, strengths, weaknesses, and the reference as well as common themes and main ideas. In addition, I stored each source and reference in Mendeley citation management software (see Appendix B).

Analysis and Synthesis

The fifth step for a systematic review was to select the studies, and then the sixth step was to appraise the studies for quality (Walden University, 2017b). Failure to recognize and differentiate between high- and low-quality evidence can contribute to errors in the care and management of patients. Judgment is needed in the interpretation of evidence, and the GRADE method can help in this interpretation (Guyatt et al., 2008). Therefore, I analyzed the literature that I discovered in this review using the GRADE method.

GRADE is a process for addressing the quality of the evidence and strength of the evidence. Some advantages of GRADE include that it addresses quality and strength, provides explicit criteria for each level of evidence, delineates a transparent process, allows for clear interpretation of strong versus weak evidence and is useful for multiple types of evidence and studies such as the systematic review (Guyatt et al., 2008). Using the GRADE method, the researcher classifies each piece of evidence into one of four levels of evidence: high, moderate, low, and very low (Guyatt et al., 2008). High-quality evidence means that further research is not likely to change the confidence in the evidence (Guyatt et al., 2008). Moderate-quality evidence means further research is likely to affect the confidence in the evidence (Guyatt et al., 2008). Low-quality, sometimes combined with very low-quality, evidence means that further research is very likely to change the confidence level in the evidence (Guyatt et al., 2008).

GRADE has been adopted by more than 100 organizations globally, including the World Health Organization, National Institute for Health and Care Excellence, and the European Union (EU). For example, the EU used GRADE to develop the Evidence to Decision (EtD) framework to support the process of going from evidence to decisions. The EtD framework based on the GRADE method is a transparent, systematic, and explicit process for judging the evidence (Alonso-Coello et al., 2016).

I completed the remaining steps in the literature review process at the same time that I filled out the literature review matrix and applied the GRADE criteria. These steps include (a) identify what is known on the topic, (b) analyze relevant studies, (c) summarize and GRADE studies in the review matrix, (d) synthesize the results, (e) interpret the results, and finally (f) present the results (Walden University, 2017b).

Summary

To improve the care provided to breast cancer survivors, it is imperative for nurses to address their patients' needs. One of the most persistent distressing issues facing these patients is CRF. A method to adequately assess this issue is needed. This project was a systematic review of the literature to identify the best method of assessing CRF. Using multidatabase searches, search engines, and library resources I gathered and organized the evidence then analyzed the evidence using GRADE criteria.

Section 4: Findings and Recommendations

Introduction

CRF is often described as an “overwhelming or all-embracing feeling of tiredness, weariness, exhaustion, and malaise which usually cannot be relieved by sleep or rest” (James et al., p. 2089, 2015). CRF is a debilitating and persistent symptom into the survivorship period negatively effecting QOL (Mitchell, 2015). To provide effective care to breast cancer survivors, nurses need to be able to identify significant cases of fatigue and perform an evidence-based assessment of fatigue. Although many models and scales are available to measure CRF for patients undergoing active treatment, a lack of consensus exists on an appropriate method to assess CRF in breast cancer survivors (Noonan, 2016). This represents a gap in practice. This project is a systematic review of the literature whose purpose is to address this gap in practice and to answer the practice-focused question: What is the best method to assess CRF in breast cancer survivors?

The sources of evidence for this systematic review of the literature include multiple scientific databases accessed through Walden Library’s Thoreau search tool and published guidelines from professional organizations. After obtaining the evidence online following a logical PRISMA flow diagram, I organized the evidence in a literature review matrix and analyzed it using GRADE criteria. I managed the citations using Mendeley software.

Findings and Implications

The Thoreau search criteria included the terms *cancer-related fatigue* OR *cancer related fatigue* AND *breast cancer survivor* AND *assessment*. The search mode was

Boolean with limits set at full text available, published in 2012 or after, peer-reviewed, academic journals, and available in English. In this search, I found 17 articles. I found an additional seven records through the websites of the ONS, ASCO, NCCN, and Cochrane review. After removing duplicate records, 23 remained. I then screened these 23 and removed nine records. Two records removed for being focused on health-related QOL and not on fatigue. Two others removed for being examples of fatigue scales and not examples of their use. One record excluded for focusing on the etiology of CRF, 1 for focus on cancer-related cognitive impairment, 1 for focus on measuring acupuncture dose, and 1 for measuring inflammatory markers. Finally, 1 excluded because free full text was not available (see Appendix A). I then entered the remaining 14 into the literature review matrix (see Appendix B). In the following sections, I provide a description of each fatigue assessment tool and the article found in the literature review that used said tool.

Profile of Mood States

The POMS scale, originally developed in 1971 and consisting of 65 self-report items, each rate 0 (*not at all*) to 4 (*extremely*) (Spielberger, 1972). The items are divided into six subscales: tension-anxiety, depression-dejection, anger-hostility, fatigue-inertia, vigor-activity, and confusion-bewilderment. Administration time for healthy adults is 3 to 7 minutes and for ill adults 15 to 20 minutes (Sacham, 1983). Internal consistency is Cronbach alpha 0.63 to 0.96. Correlation between subscales and total score was 0.84 (Spielberger, 1972). Sacham (1983) abbreviated the scale into a short form of 37 items.

This decreased the administration time by half while maintaining internal consistency (Sacham, 1983).

Goedendorp et al. (2016) used a cross-sectional analysis to determine the optimal cutoff scores for fatigue screening on the Medical Outcomes Study Short Form- 36 (SF-36), FSI, and the POMS-fatigue. On the POMS-fatigue, higher scores mean greater fatigue. Goedendorp et al. concluded that brief, accurate screening can be done using POMS but that the FSI was found to be most accurate. Limitations include a homogenous sample and that the results were cross-validated using the same data from different time points (Goedendorp et al., 2016).

36-Item Short Form

The 36-item short-form (SF-36), developed for the Medical Outcomes Study by RAND health care in 1992, includes eight multiitem subscales (Ware & Sherbourne, 1992). These subscales measure aspects of fatigue that include physical functioning, role limitations because of physical health problems, bodily pain, social functioning, mental health, role limitations because of emotional problems, vitality, and general health perceptions (Ware & Sherbourne, 1992). The scale can be self-administered or administered by a clinician. Each item is rated on a Likert scale using summated ratings. For healthy adults, the form can be completed in 5 to 10 minutes (Ware & Sherbourne, 1992). Other measures of QOL include the 12- and 20-item short forms. All are derived from the core survey instrument of 116 measures of QOL and functioning (RAND Corporation, n.d.).

Again, Goedendorp et al. (2016) used a cross-sectional analysis to determine the optimal cutoff scores for fatigue screening on the SF-36, FSI, and the POMS-fatigue. The SF-36 measures vitality, and a lower score means less vitality, which is then interpreted as fatigue. Goedendorp et al. determined that brief, accurate screening can be done using SF-36 but, again, that the FSI was most accurate. The researchers also found that a limitation of the SF-36 is that is has reverse-worded items (Goedendorp et al., 2016).

Functional Assessment of Cancer Therapy

The Functional Assessment of Cancer Therapy (FACT), developed in 1994, measurement system is a component system consisting of a general scale (FACT-G) that measures health-related QOL and then disease-specific and symptom-specific subscales such as the fatigue subscale (FACT-F) (Yellen et al., 1997). FACT-G consists of 28 items, self-report format, measured on a 5-point Likert scale. The questions assess physical well-being, social/family well-being, relationship with physician, emotional well-being, and functional well-being (Yellen et al., 1997). FACT-F consists of the original 34 items plus 13 items specific to fatigue. The combined scale has test-retest reliability of 0.87 and internal consistency with alphas = 0.95 (Yellen et al., 1997). The scale has been found especially useful in identifying the physical and functional component of fatigue (Yellen et al., 1997).

Kaur, Gupta, Sharma, and Jain (2018) conducted a cross-sectional study to illuminate survivorship issues among Indian breast cancer survivors and effects on QOL. The fatigue measurement tool was the Functional Assessment of Cancer Therapy-Breast (FACT-B). This questionnaire consists of the FACT tool plus a fifth subscale specifically for breast cancer and consisting of nine items. Kaur et al. found the most commonly reported survivorship issues include fatigue, shoulder restriction, body pain, joint pain, loss of sex drive, and chemotherapy-induced amenorrhea. This study, although the first to study this population, was more focused on overall QOL rather than CRF. Other limitations include the hospital setting limiting generalization to the ambulatory setting and being cross sectional, therefore lending no longitudinal data (Kaur et al., 2018).

Revised Piper Fatigue Scale

The revised Piper Fatigue Scale (PFS), developed by Piper in the 1997 as a shortened version of the original multidimensional PFS, contains 22 items in four subscales (Piper et al., 1998). These subscales look into the multidimensionality of fatigue by measuring behavior/severity, affective meaning, sensory, and cognitive/mood (Piper et al., 1998). Respondents rate each item on a scale of 0 to 10 and the overall scale was found to be reasonable in time for completion (Piper et al., 1998). The Cronbach's alpha was retained at 0.92 after item reduction and the overall alpha coefficient was reliable at 0.97 (Piper et al., 1998). Piper et al. recommended screening for fatigue with a simple 0 to 10 severity rating and then further assessing those patients who report moderate to severe fatigue using the revised PFS (Piper et al., 1998).

The PFS has been translated into multiple languages and the literacy demand for most items is an eighth-grade education (Reeve et al., 2012). A main concern with the PFS is respondent burden, so research has been done to reduce the number of items even further (Reeve et al., 2012). This resulted in a 12-item fatigue scale (PFS-12) that was tested in a cohort of breast cancer survivors and found to be reliable and able to capture multiple aspects of fatigue while being more brief (Reeve et al., 2012).

Galiano-Castillo et al. (2014) used a cross-sectional study to investigate the association between depressed mood and physical activity, CRF, QOL, and fitness level. CRF was measured using the PFS. The researchers found statistically positive correlations between depressed mood and level of CRF. Having CRF, low physical activity level, systematic side effects, and low body image were all predictors of depressed mood. Limitations to this study include the limited inclusion criteria, no causal relationship can be drawn, and the study did not consider other variables such as sleep (Galiano-Castillo, Ariza-Garcia, Cantarero-Villanueva, Fernandez-Lao, Diaz-Rodriguez, Arroyo-Morales, 2014).

Hall, Mishel, and Germino (2014) conducted a cross-sectional analysis to investigate the relationship between survivorship-related functioning, fatigue, and uncertainty in younger breast cancer survivors. The revised PFS was used. The researchers concluded that fatigue is a persistent concern for survivors and is significantly related to uncertainty. Limitations to this study include the inability to draw causal relationship conclusions, and the use of self-report measures but no objective measures (Hall, Mishel, & Germino, 2014).

Brief Fatigue Inventory

The Brief Fatigue Inventory (BFI) was developed in 1998 and was based on the Brief Pain Inventory (BPI) with its simple wording and numerical scale from 0-10 (Mendoza et al., 1998). The BFI consists of 9 items and assesses how the fatigue interferes with general activity, mood, walking ability, normal work, relationships, and enjoyment of life (Mendoza et al., 1998). This scale was tested against the POMS and FACT-F scales and was found to be significantly correlated to each other (r = -0.88, p < .001 for FACT and r = 0.84, p < .001 for POMS) (Mendoza et al., 1998). The BFI also has internal consistency coefficient of 0.96. The scale is easily and quickly administered in clinic or clinical trials (Mendoza et al., 1998). However, it does not capture the multidimensional nature of fatigue and therefore may be most useful as a screening tool with a cut-off of 7 denoting severe fatigue that warrants further, lengthier investigation (Mendoza et al., 1998).

Mao et al. (2018) conducted a cross-sectional analysis of breast cancer survivors on aromatase inhibitor (AI) therapy and the prevalence of fatigue. CRF was measured using the BFI. The researchers concluded that 4 in 5 patients on AI experience fatigue with 1 in 2 reporting moderate to severe fatigue. Limitations include potential for recall bias, decreased generalizability since only assessed those on AI, the BFI is not multidimensional, and with this design a causal relationship cannot be established (Mao et al., 2018).

Smith et al. (2013) conducted a mixed method randomized controlled trial to investigate acupuncture on CRF. The fatigue measurement tool was the BFI. The researchers concluded that acupuncture is a feasible intervention and that the BFI is sensitive to changes in CRF over time. This study was of higher quality being a controlled trial and had good compliance with the intervention. However, recruitment was slow, the study sample was small, the study had a short duration, and there was potential for a dose response bias (Smith, Carmady, Thornton, Perz, & Ussher, 2013).

Fatigue Symptom Inventory

The Fatigue Symptom Inventory (FSI) was developed in 1998 as a way to measure fatigue intensity and duration (Hann et al., 1998). The respondents rate their fatigue for the past week at its worst, least, and average on a 0-10 scale. It also consists of a 7 item subscale that assesses the amount of interference the fatigue had on general activity, activities of daily living, work, concentration, relationships, enjoyment, and mood, again on a 0-10 scale (Hann et al., 1998). The alpha coefficients for the interference subscale were high for each tested group (0.93-0.95). The test-retest reliability correlations were not as strong ranging from 0.1-0.75 (Hann et al., 1998). The FSI was correlated with the POMS, and SF-36. It was found to be acceptable to patients with low respondent burden (Hann et al., 1998).

Again, Goedendorp et al. (2016) used a cross-sectional analysis to determine the optimal cutoff scores for fatigue screening on the SF-36, FSI, and POMS-fatigue. On the FSI higher ratings equates to greater severity or interference. The researchers concluded that while all three scales are brief and accurate the FSI was found to be most accurate. Limitations include a homogenous sample and that the results were cross-validated using the same data from different time points (Goedendorp et al., 2016).

Multidimensional Fatigue Symptom Inventory-Short Form

The Multidimensional Fatigue Symptom Inventory-Short form (MFSI-SF) was developed in 1998 to fill the need for a multidimensional scale (Stein, et al., 2004). It consists of 30 items in 5 subscales measuring general fatigue, physical fatigue, emotional fatigue, mental fatigue, and vigor. Each item is a self-report measure using a 5-point Likert scale to indicate the extent to which the patient had the symptom the previous week (Stein, et al., 2004). Reliability coefficients for the subscales were 0.96 for general, 0.85 for physical, 0.93 for emotional, 0.90 for mental, and 0.88 for vigor. The internal consistency alpha coefficients for each subscale were 0.96 for general, 0.92 for emotional, 0.87 for physical, 0.91 for mental, and 0.90 for vigor (Stein, et al., 2004). The MFSI-SF had high to moderate correlation with the FSI and SF-36. Advantages of this scale include the fact that it is multidimensional, not disease specific, it is brief, and has ease of response (Stein, et al., 2004).

Stan et al. (2016). Conducted a pilot feasibility study to determine if a DVD guided home based yoga intervention versus a strength training intervention improved CRF and QOL. CRF was screened using the NCCN guidelines and then assessed in more detail using the MFSI-SF. The researchers concluded that both the yoga DVD and strength intervention were effective and feasible in improving CRF and QOL. Limitations of this study include lack of a non-intervention (control) group. There was also a small sample size, short follow-up period, lack of contact with the instructors, low adherence to the treatment, and difference in length of the 2 interventions. These limitations contribute considerably to bias and weaken the results (Stan et al., 2016).

Cancer Fatigue Scale

The Cancer Fatigue Scale (CFS) was developed in Japan in 1999 as a self-report, brief, multidimensional measure of fatigue for cancer patients (Okuyama, et al. 2000).

The scale consists of 15 items in 3 subscales of physical, affective, and cognitive dimensions. The maximum score is 28 with higher scores meaning more severe fatigue and average completion time is 132.9 seconds (Okuyama, et al. 2000). The Cronbach's alpha coefficient were 0.90 for the physical subscale, 0.78 for the affective subscale, 0.79 for the cognitive subscale, and 0.88 for the total scale. The CFS scores correlated with the visual analog scale (VAS) for fatigue scores (average $r = .49$, $p < .001$). The internal consistency coefficient was 0.89 for physical, 0.79 for affective, 0.79 for cognitive, and 0.77 for total scale. The test-retest correlation coefficient for each factor compared the total score were all greater than 0.50 with a $p < 0.001$ (Okuyama, et al. 2000).

Kroz et al. (2014) conducted a prospective observational study to investigate the effect of autonomic and self-regulation on CRF and distress. CRF was measured using the CSF-D with reliability reported at Cronbach's alpha of $r = .84\text{-}.94$ and test-rest reliability of $r = .73\text{-}.86$. Distress was measured by the Hospital Anxiety and Depression Scale (HADS). The researchers concluded that reduced risk of CRF co-occurs with high autonomic regulation and high self-regulation is associated with reduced distress. Limitations include small cohort sample, no causation can be established, presence of selection bias with Caucasian only sample, and patient reported outcomes without objective measures (Kröz et al., 2014).

In a different study, Kroz et al. (2017) conducted a cohort study to compare multimodal therapy (mindfulness and behavioral training) in combination with aerobic training to standard aerobic training alone to see which intervention had an effect on CRF and sleep. The researchers measured fatigue using the CFS-D in German. The researchers found that multimodal was superior to aerobic therapy alone in reduction of CRF and improvement in sleep. Limitations to this study include small sample size, high drop-out rate, and use of the last-value-carried-forward technique. These limitations could lead to bias and decrease in generalizability (Kröz et al., 2017).

Functional Assessment of Chronic Illness Therapy

The Functional Assessment of Chronic Illness Therapy (FACIT) is a measurement system with a collection of questionnaires measuring different elements of QOL (Cella, et al., 2003). The original version was the FACT, previously described, developed in 1987. Now in its 4th version the FACIT-general questionnaire is used to assess physical well-being, social/family well-being, emotional well-being, and functional well-being (Cella, et al., 2003). The items on each subscale are rated on a 5-point Likert scale with a high score being good. FACIT has been translated into 45 different languages. Most questionnaires within FACIT can be completed in 5 to 10 minutes. Contained within the FACIT scales collection are disease specific scales such as anemia, breast cancer, and colorectal cancer (Cella, et al., 2003).

Lev-ari et al. (2013) conducted a descriptive study of a pilot program to investigate the use of meditation in improving well-being. CRF was assessed using FACIT. The researchers found an improvement in physical and mental health after intervention. However, limitations include no control group, a modest sample size and self-selected participants, no data over time, and reliance on self-report outcomes (Lev-ari, Zilcha-Mano, Rivo, Geva, & Ron, 2013).

Jones et al. (2016) conducted a cross-sectional analysis to investigate the prevalence of CRF across time in breast, prostate, and colorectal cancer survivors. The researchers used the FACIT scale. The researchers concluded that fatigue scores were higher for breast and colorectal survivors but did not differ over time and that CRF can persist 6 years posttreatment. CRF was also found to be highly associated with disability. Limitations include the cross-sectional design which limits the ability to establish causation (Jones et al., 2016).

Swen, Mann, Paxton, and Dean (2017) conducted a cross-sectional analysis to determine the association between physical activity level and fatigue level in African-American breast cancer survivors. The FACIT was used to measure fatigue. The researchers found that less CRF was associated with more physical activity. This finding applied mostly to younger survivors (less than 50 years old). Limitations include the inability to establish a causal relationship, no differentiation between physical fatigue and emotional fatigue, self-reported data makes it more prone to recall bias, and that the FACIT scale was developed for those in active treatment, not cancer survivors (Swen, Mann, Paxton, & Dean, 2017).

Numerical Severity Screening

In 2014, ASCO published clinical practice guidelines on the screening, assessment, and management of fatigue in cancer survivors. The guideline was informed by existing guidelines from the pan-Canadian guideline which was formed from recommendations from the ONS and the NCCN (Bower, et al., 2014). ASCO recommends screening all patients at least annually for CRF, more frequently if indicated. Screening is done using a numerical severity scale, 0 being no fatigue and 10 being worst fatigue in the last week (Bower, et al., 2014). Patients who score 4-10 on the screening should then be further evaluated using a multisymptom tool. Included in the guideline is a table listing the potential instruments for evaluating fatigue (Bower, et al., 2014). The available unidimensional scales include FACT-F and POMS and the multidimensional scales include BFI, FSI, MFSI-20 and 30, and the Revised PFS (Bower, et al., 2014). Other scales mentioned in the guideline but not covered in this review include the Schwartz Cancer Fatigue Scale, the Chalder Fatigue Scale, and the European Organization for Research and Treatment of Cancer, Quality of Life Questionnaire (EORTC-QLQ). The guideline goes on to detail the comprehensive physical assessment along with potential interventions (Bower, et al., 2014).

In 2018, the NCCN issued updated survivorship guidelines with a section on CRF. This guideline is similar to the ASCO guideline and recommends screening for fatigue in every cancer survivor at least annually and as clinically indicated (NCCN, 2018). Screening is done using a numerical severity scale with 0 being no fatigue and 10 being worst fatigue over the previous week. Those that score 4-10 indicating moderate to severe fatigue are then further evaluated with a comprehensive history and physical. NCCN does not make a recommendation regarding the best assessment tool nor do they list available assessment instruments (NCCN, 2018).

Analysis

The articles in the literature review are all examples of fatigue assessment tools being used in the survivorship population. Most studies were cross-sectional analyses (7), with 1 mixed method-randomized controlled trial, and 1 each of cohort study, feasibility study, descriptive study, and prospective observational study. The most commonly used assessment tools include the FACIT used 3 times, CFS-D used twice, PFS used twice, and the BFI also used twice. The MFSI-SF and the FACT-B were each used once. Finally, 1 study used 3 assessment tools: SF-36, FSI, and POMS-Fatigue. (See Appendix B)

The data analysis was conducted using the GRADE approach which consists of 5 basic steps. (See Table 1) First is to set a priori ranking based on the type of study according to the hierarchy of evidence. (See figure 1) For example, a randomized controlled trial is ranked high and an observational study would be ranked low. Second step is to either upgrade or downgrade this priori ranking according to certain criteria. For example, risk of bias would indicate a downgrade while a large consistent effect of outcome could justify an upgrade. Third is to assign the final GRADE, either high, moderate, low, or very low. Fourth is to take into consideration other factors such as cost-effectiveness and patient preference. Finally, is to make a recommendation either strong for using, weak for using, strong against using, or weak against using (Siemieniuk & Guyatt, 2018).

Table 1

GRADE Process

Step 1: A prior ranking	Step 2: Upgrade/downgrade	Step 3: GRADE assignment	Step 4: Consider factors affecting recommendation	Step 5: Make recommendation
Randomized controlled trial: HIGH Observational study: LOW	Downgrade for: Risk of bias Inconsistency Indirectness Imprecision Publication bias Upgrade for: Large consistent effect Dose response Confounders only Reducing size of effect	HIGH MODERATE LOW VERY LOW	Balance of desirable and undesirable effects Cost-effectiveness Preference of patients	Strong for Using Weak for using Strong against using Weak against using

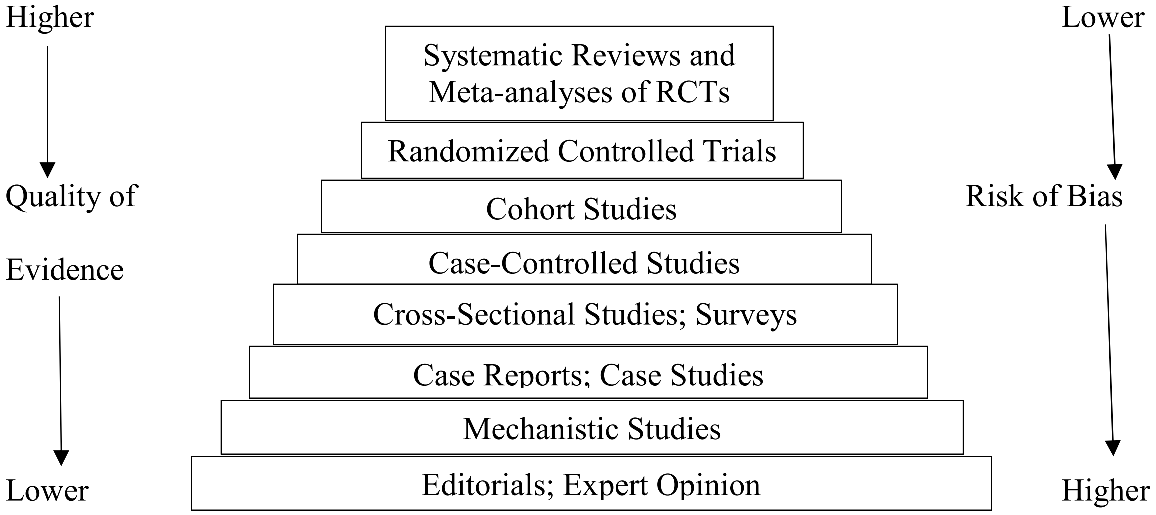


Figure 1. Hierarchy of evidence pyramid.

GRADE was applied to the 14 sources in the literature review matrix. Of these, I assigned 4 an initially high ranking, 9 a moderate ranking, and 1 a low ranking. After taking into consideration bias and limitations of each source the final GRADE consisted of 2 high, 3 moderate, 8 low, and 1 very low. I considered other factors such as cost-effectiveness, time efficiency, and ease of use for patients, reliability and validity of scale, and multidimensional or single dimensions. Of the 14 sources, 2 are recommended as strong for using, 6 are recommended as weak for using, and 6 are recommended as weak against using. None are considered strong against using (see Table 2).

Table 2

GRADE Summary of Findings

Author(s), year	Ranking[a]	Up/downgrade	GRADE	Other factors	Recommendation	Fatigue tool
NCCN, 2018	High	None	High	Cost and time effective. Ease of screening for patients.	Strong for using	Numerical screening
Bower et al., 2014	High	None	High	Cost and time effective. Ease of screening for patients.	Strong for using	Numerical screening
Kroz et al., 2017	High	Down-bias and limitations[b]	Mod	Reliable scale and valid measures of multiple dimensions.	Weak for using	CFS-D
Stan et al., 2016	Mod	Down-study limitations[b]	Low	Reliable and valid fatigue scale.	Weak for using	MFSI-SF
Galiano-Castillo et al., 2014	Mod	Down-study limitations[b]	Low	Fatigue scale with high reliability.	Weak for using	Revised PFS
Goedendorp et al., 2016	Mod	Down-study limitations[b]	Low	Efficient screening. SF-36 has reverse worded items.	Weak against using	SF-36; FSI; POMS-fatigue
Swen et al., 2017	Mod	Down-bias and limitations[b]	Low	None.	Weak against using	FACIT
Hall et al., 2014	Mod	Down-study limitations[b]	Low	Validated fatigue scale for multiple domains of fatigue.	Weak for using	Revised PFS
Jones et al., 2016	Mod	None	Low	Scale supported by	Weak for using	FACIT

				psychometric data.		
Mao et al., 2018	Mod	Down-bias and limitations[b]	Low	Internal consistency of fatigue scale.	Weak against using	BFI
Lev-ari et al., 2013	Mod	Down-study limitations[b]	Low	None.	Weak against using	FACIT
Kroz et al., 2014	Low	Down-bias and limitations[b]	Very low	Fatigue scale with good reliability, validity, and test-retest reliability.	Weak against using	CFS-D
Smith et al., 2013	High	Down-study limitations[b]	Mod	Fatigue scale with good sensitivity to change over time.	Weak for using	BFI
Kaur et al., 2018	Mod	Down-study limitations[b]	Low	None.	Weak against using	FACT-B

Note. [a] Initial ranking is either high, moderate, low, or very low. [b] See literature review table for study limitations.

The 2 sources considered strong for using with a high final GRADE include the NCCN and ASCO guidelines. Both of these guidelines recommend initial screening of all breast cancer survivors using a numerical severity scale with 4 being the cutoff to indicated potentially clinically significant fatigue. Then further assessment using any fatigue measurement instrument (Bower et al., 2014; NCCN, 2018). The fatigue assessment tools used in the sources that received a weak for using recommendation include the CFS-D, MFSI-SF, PFS, FACIT, and the BFI. PFS was recommended twice as weak for using. The fatigue assessment tools using in the sources that received a weak against using include the SF-36, FSI, POMS-fatigue, FACIT, BFI, FACIT, CFS-D, and

FACT-b. The only assessment tool that received a ‘for using’ recommendation and did not receive an ‘against using’ recommendation was the PFS.

An unanticipated outcome was the lack of current articles addressing this topic. Other than the 2 clinical practice guidelines, all of the other sources were research using fatigue assessment scales in breast cancer survivors, but none of the sources evaluated which scale was the most appropriate to use. This limits their applicability to the question at hand and limits the conclusions that can be drawn from the sources. Another unanticipated outcome is that the 2 clinical practice guidelines made no recommendation as to which fatigue assessment scale to use when more thorough and detailed assessment is warranted. Leaving the decision up to the individual practitioner.

There are a few implications to address. On the individual level, the assessment of fatigue can lead to a more accurate clinical picture of the situation and thus more targeted interventions. For the community of breast cancer survivors, addressing fatigue in a targeted purposeful way could help reduce the number of patient suffering from CRF and improve the QOL for this population. For the institution, and health system as a whole, improved QOL and less distressing symptoms for breast cancer survivors could mean a decrease over-utilization of the health care system. Relieving the burden of CRF from individual patients, the local breast cancer survivor population, and the university health system. All of these potential implications can contribute to positive social change.

Recommendations

The results of this literature review support the use of the NCCN or ASCO guidelines in the screening of fatigue. However, the review does not provide enough evidence to clearly support any specific follow up tool in the assessment of potentially clinically significant cases of fatigue. Screening of all survivors at initial survivorship visit and periodically thereafter using a numerical severity scale from 0-10 with 0 being none and 10 being severe fatigue. This can be done during rooming for office visits, similar to how the pain scale is used. If the score is 4 or greater then further evaluation is warranted. Further evaluation can then be done with one the various tools described in this review. See Appendix C for a summary of the tools.

Implementation would begin with education of the clinicians and nurses providing survivorship care. Education would include background on the clinical problem, necessity of screening and assessment, and education on use of the screening tool. Next would be incorporating the screening into the electronic health record and into clinic flow. Then, an important step to implementation is to receive feedback from patients and staff and make adjustments in the process as necessary.

Strengths and Limitations of the Project

Strengths of the doctoral project include logical flow through the data collection, practical organization of data, and use of a specific criteria for analyzing the data. Another strength is the availability of high quality evidence in the form of 2 clinical practice guidelines that address this topic. Conversely, the majority of sources discovered in the literature review were cross-sectional studies which is of low priori ranking in GRADE. Again, one of the limitations was the lack of sources that specifically addressed the question, limiting their applicability to the question. Another limitation is the lack of panel of reviewers applying the GRADE criteria. Panel consensus is stronger and more objective with different viewpoints coming to a decision together than an individual's viewpoint which can be subjective.

It is clear that more research needs to done on this topic. The various fatigue scales and assessment tools need to be evaluated under more rigorous conditions to reduce the bias and limitations found in this review and result in more reliable results.

Section 5: Dissemination Plan

Dissemination

A few avenues exist for potential dissemination of my findings to the institution and to the broader nursing profession. The information and conclusions from the systematic review could be presented via PowerPoint or poster to the breast cancer care team during the weekly breast team meetings. For the wider institution, dissemination could be done through the weekly cancer institute grand rounds forum. For the statewide cancer community, the information could be presented to the ACC through a poster at their annual meeting. For national oncology nursing profession, the systematic review could be submitted for publication through the ONS or APSHO.

Analysis of Self

I began this journey toward the DNP in January of 2016. I then began my career in oncology in September of 2016. At that time, my mentor, being ever supportive of my education and growth as a practitioner, presented a survivorship clinical problem: fatigue interfering with sexual function in breast cancer survivors. My mentor then challenged me to investigate this problem and I was not sure where to even begin. The journey through this program has guided me in the pursuit of this clinical problem and has prepared me to take on future problems as a scholar practitioner. My next goal is to achieve certification in oncology advanced practice. Long-term professional goals would be to grow the survivorship clinic to include other cancer survivors, such as melanoma and colon, and to be able to provide a truly multidisciplinary clinic.

This project was a daunting task. It involves many steps and pages of writing to fully cover the scope of the issue and to thoroughly address the gap in practice. I certainly experienced frustrations and delays throughout the quarters. Personal issues interfered and then my own disorganization and procrastination interfered. Thankfully, my committee chair was ever present to help me focus my premise, revise and fine tune my proposal, and complete my data collection and analysis. Ultimately, I was prepared to synthesis the data results and present my findings along with recommendations for clinical practice and for future research. The process, although daunting at first, evolved in an organic way.

Summary

This doctoral project is a culmination of doctoral study. It is a systematic review of the literature, the purpose of which is to address a gap in nursing practice. The guiding clinical practice question was: What is the best method of assessing CRF in breast cancer survivors? The literature review and analysis revealed that no recommended assessment tool exists in this population but rather suggestions of several different fatigue measurement tools. The most robust evidence was for the use of the NCCN and ASCO guidelines that recommend screening using a numerical severity scale and then further assessing those patients who score 4 or greater. The further assessment can be done using several different instruments and this review does not support the use of any 1 tool.

References

American Society of Clinical Oncology. (2018). Quality oncology practice initiative. Retrieved from https://practice.asco.org/quality-improvement/quality-programs/quality-oncology-practice-initiative

American Society of Clinical Oncology. (n.d.). Survivorship compendium. Retrieved from https://www.asco.org/practice-guidelines/cancer-care-initiatives/prevention-survivorship/survivorship/survivorship-compendium

Alonso-Coello, P., Oxman, A. D., Moberg, J., Brignardello-Petersen, R., Akl, E. A., Davoli, M., . . . Verstijnen, I. (2016). GRADE Evidence to Decision (EtD) frameworks: A systematic and transparent approach to making well informed healthcare choices. 2: Clinical practice guidelines. *British Medical Journal*, *353*, i2089. doi:10.1136/bmj.i2089

Appling, S. E., Scarvalone, S., MacDonald, R., McBeth, M., & Helzlsouer, K. J. (2012). Fatigue in breast cancer survivors: The impact of a mind-body medicine intervention. *Oncology Nursing Forum*, *39*, 278–286. doi:10.1188/12.ONF.278-286

Arkansas Cancer Coalition. (2015). Arkansas cancer plan: Cancer is personal. Retrieved from http://www.arcancercoalition.org/wp-content/uploads/2010/09/508_ACC_CancerPlan_Final_MINI_REV.pdf

Arkansas Department of Health. (2017). *Arkansas Cancer Facts & Figures 2017*. Retrieved from https://www.healthy.arkansas.gov/images/uploads/publications/ARCancerFacts2017.pdf

Bower, J. E., Bak, K., Berger, A., Breitbart, W., Escalante, C. P., Ganz, P. A., . . Jacobsen, P. B. (2014). Screening, assessment, and management of fatigue in adult survivors of cancer: An American Society of Clinical Oncology clinical practice guideline adaptation. *Journal of Clinical Oncology*, *32*, 1840–1850. doi:10.1200/JCO.2013.53.4495

Breastcancer.org. (n.d.). U.S. breast cancer statistics. Retrieved from https://www.breastcancer.org/symptoms/understand_bc/statistics

Cella, D., Webster, K., Cella, D., & Yost, K. (2003). Functional assessment of chronic illness therapy measurement system. *Health and Quality of Life Outcomes, 1*, 1–7. doi:10.1186/1477-7525-1-79

Centers for Disease Control and Prevention. (2004). A national action plan for cancer survivorship: Advancing public health strategies. Centers for Disease Control and Prevention. Retrieved from https://www.cdc.gov/cancer/survivors/pdf/plan.pdf

Cheung, S. Y., & Delfabbro, P. (2016). Are you a cancer survivor? A review on cancer identity. *Journal of Cancer Survivorship*, *10*, 759–771. doi:10.1007/s11764-016-0521-z

Clark, K. R., & Buckley, M. B. (2017). Using a synthesis matrix to plan a literature review. *Radiologic Technology*, *88*, 354–358. Retrieved from http://www.radiologictechnology.org/content/88/3/354.full.pdf+html

Corbett, T., Groarke, A. M., Walsh, J. C., & McGuire, B. E. (2016). Cancer-related fatigue in post-treatment cancer survivors: Application of the common sense model of illness representations. *BMC Cancer*, *16*, 919. doi:10.1186/s12885-016-

2907-8

Doyle, N. (2008). Cancer survivorship: Evolutionary concept analysis. *Journal of Advanced Nursing*, *62*, 499–509. doi:10.1111/j.1365-2648.2008.04617.x

Dyess, S. M. (2011). Faith: A concept analysis. *Journal of Advanced Nursing*, *67*, 723–731. doi:10.1111/j.1365-2648.2011.05734.x

Endo, E. (2017). Margaret Newman's theory of health as expanding consciousness and a nursing intervention from a unitary perspective. *Asia-Pacific Journal of Oncology Nursing*, *4*, 50–52. doi:10.4103/2347/5625.199076

Endo, E., Miyahara, T., Suzuki, S., & Ohmasa, T. (2005). Partnering of researcher and practicing nurses for transformative nursing. *Nursing Science Quarterly, 18*, 138–145. doi:10.1177/0894318405274845.

Fabi, A., Falcicchio, C., Giannarelli, D., Maggi, G., Cognetti, F., & Pugliese, P. (2017). The course of cancer related fatigue up to ten years in early breast cancer patients: What impact in clinical practice? *Breast, 34*, 44–52. doi:10.1016/j.breast.2017.04.012

Galiano-Castillo, N., Ariza-Garcia, A., Cantarero-Villanueva, I., Fernandez-Lao, C., Diaz-Rodriguez, L., & Arroyo-Morales, M. (2014). Depressed mood in breast cancer survivors: Associations with physical activity, cancer-related fatigue, quality of life, and fitness level. *European Journal of Oncology Nursing*, *18*, 206–210. doi:10.1016/j.ejon.2013.10.008

Goedendorp, M. M., Jacobsen, P. B., & Andrykowski, M. A. (2016). Fatigue screening in breast cancer patients: Identifying likely cases of cancer-related fatigue. *Psycho-*

Oncology, *25*, 275–281. doi:10.1002/pon.3907

Guyatt, G. H., Oxman, A. D., Vist, G. E., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P., & Schünemann, H. J. (2008). GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *British Medical Journal*, *9*, 8–11. doi:10.1136/bmj.39489.470347.AD

Hall, D. L., Mishel, M. H., & Germino, B. B. (2014). Living with cancer-related uncertainty: Associations with fatigue, insomnia, and affect in younger breast cancer survivors. *Supportive Care in Cancer*, *22*, 2489–2495. doi:10.1007/s00520-014-2243-y

Hann, D. M., Jacobsen, P. B., Azzarello, L. M., Martin, S. C., Curran, S. L., Fields, K, . . . Lyman, G. (1998). Measurement of fatigue in cancer patients: development and validation of the fatigue symptom inventory. *Quality of Life Research, 7*, 301-310. Retrieved from https://link.springer.com/article/10.1023/A:1024929829627

Hebdon, M., Foli, K., & McComb, S. (2015). Survivor in the cancer context: A concept analysis. *Journal of Advanced Nursing*, *71*, 1774–1786. doi:10.1111/jan.12646

Huether, K., Abbott, L., Cullen, L., Cullen, L., & Gaarde, A. (2016). Energy through motion: An evidence-based exercise program to reduce cancer-related fatigue and improve quality of life. *Clinical Journal of Oncology Nursing, 20*, E60-E70. doi:10.1188/16.CJON.E60-E70

Hewitt, M., Greenfield, S., & Stovall, E. (2005). *From Cancer Patient to Cancer Survivor*. *From Cancer Patient to Cancer Survivor*. National Academies Press. doi:10.17226/11468

Hofman, M., Ryan, J. L., Figueroa-Moseley, C. D., Jean-Pierre, P., & Morrow, G. R. (2007). Cancer-related fatigue: The scale of the problem. *The Oncologist*, *12*(suppl 1), 4–10. doi:10.1634/theoncologist.12-S1-4

James, S., Wright, P., Scarlett, C., Young, T., Jamal, H., & Verma, R. (2015). Cancer-related fatigue: results from patient experience surveys undertaken in a UK regional cancer centre. *Supportive Care in Cancer*, *23*, 2089–2095. doi:10.1007/s00520-014-2565-9

Jones, J. M., Olson, K., Catton, P., Catton, C. N., Fleshner, N. E., Krzyzanowska, M. K., . . . Howell, D. (2016). Cancer-related fatigue and associated disability in post-treatment cancer survivors. *Journal of Cancer Survivorship*, *10*(1), 51–61. doi:10.1007/s11764-015-0450-2

Kantor, D., & Suzan, Z. (2016). *Issues of Cancer Survivorship: An Interdisciplinary Team Approach to Care*. Philadelphia, PA: Wolters Kluwer.

Kaur, N., Gupta, A., Sharma, A. K., & Jain, A. (2018). Survivorship issues as determinants of quality of life after breast cancer treatment: Report from a limited resource setting. *Breast*, *41*, 120–126. doi:10.1016/j.breast.2018.07.003

Kröz, M., Reif, M., Bartsch, C., Heckmann, C., Zerm, R., Schad, F., & Girke, M. (2014). Impact of autonomic and self-regulation on cancer-related fatigue and distress in breast cancer patients - a prospective observational study. *Journal of Cancer Survivorship*, *8*, 319–328. doi:10.1007/s11764-013-0314-6

Kröz, M., Reif, M., Glinz, A., Berger, B., Nikolaou, A., Zerm, R., . . . Gutenbrunner, C. (2017). Impact of a combined multimodal-aerobic and multimodal intervention compared to standard aerobic treatment in breast cancer survivors with chronic cancer-related fatigue - results of a three-armed pragmatic trial in a comprehensive cohort design. *BMC Cancer*, *17*(1), 1–14. doi:10.1186/s12885-017-3142-7

Lev-ari, S., Zilcha-Mano, S., Rivo, L., Geva, R., & Ron, I. (2013). A prospective pilot clinical trial of “The work” meditation technique for survivors of breast cancer. *European Journal of Integrative Medicine*, *5*, 487–494. doi:10.1016/j.eujim.2013.07.003

Makhoul, I., Pennisi, A., Ochoa, D., Klimberg, S., Henry-Tillman, R., Hutchins, L., & Sherman, A. (2014). Assessment of quality of life outcomes among breast cancer patients and their partners after primary treatment (unpublished protocol). University of Arkansas for Medical Sciences. Little Rock, AR

Mao, H., Bao, T., Shen, X., Li, Q., Seluzicki, C., Im, E. O., & Mao, J. J. (2018). Prevalence and risk factors for fatigue among breast cancer survivors on aromatase inhibitors. *European Journal of Cancer*, *101*, 47–54. doi:10.1016/j.ejca.2018.06.009

Mast, M. (1998). Correlates of fatigue in survivors of breast cancer. *Cancer Nursing. 21*, 136–142. Retrieved from https://journals.lww.com /cancernursingonline/pages/default.aspx

Mendoza, T. R., Wang, X. S., Cleeland, C. S., Morrissey, M., Johnson, B. A., Wendt, J. K., & Huber, S. L. (1998). The rapid assessment of fatigue severity in cancer patients: Use of the brief fatigue inventory. *Cancer, 85*, 1186–1196.

doi:10.1002/(SICI)1097-0142

Miller, L. E. (2014). Uncertainty management and information seeking in cancer Survivorship. *Health Communication*, *29*, 233–243. doi:10.1080/10410236.2012.739949

Mishel, M. H. (1990). Reconceptualization of the uncertainty in illness theory. *Journal of Nursing Scholarship*, *22*, 256–262. doi:10.1111/j.1547-5069.1990.tb00225.x

Mitchell, S. A. (2015). Fatigue. In C. G. Brown (Ed.), *A Guide to Oncology Symptom Management* (2nd ed., p. 22). Pittsburgh, PA: Oncology Nursing Society.

Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., . . . Whitlock, E. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews*, *4*(1), 1–9. doi:10.1186/2046-4053-4-1.

National Cancer Institute. (n.d.). NCI-Designated Cancer Centers. Retrieved from https://www.cancer.gov/research/nci-role/cancer-centers

NCCN. (2018). Survivorship. *NCCN Clinical Practice Guidelines in Oncology*. Retrieved from https://www.nccn.org/professionals /physician_gls/pdf/survivorship.pdf

Neville, K. L. (2003). Uncertainty in illness: An integrative review. *Orthopaedic Nursing*, *22*, 206–214. Retrieved from https://journals.lww.com/orthopaedicnursing/toc/2003/05000

Noonan, K. (2016). Pain, Fatigue, and Cognitive Impairment. In W. H. Gobel, B. H., Triest-Robertson, S., Vogel (Ed.), *Advanced Oncology Nursing Certification:*

Review and resource manual (2nd ed., p. 44). Pittsburgh, PA: Oncology Nursing Society.

Okuyama, T., Akechi, T., Kugaya, A., Okamura, H., Shima, Y., Maruguchi, M., . . . Uchitomi, Y. (2000). Development and validation of the cancer fatigue scale: A brief, three-dimensional, self-rating scale for assessment of fatigue in cancer patients. *Journal of Pain and Symptom Management, 19*, 5–14. doi:10.1016/S0885-3924(99)00138-4

Pannucci, C. J., Wilkins, E. G. (2010). Identifying and avoiding bias in research. *Plastic and Reconstructive Surgery*, *126*, 619–625. doi:10.1097/PRS.0b013e3181de24bc.Identifying

Petiprin, A. (2016). Health as expanding consciousness. Retrieved from http://www.nursing-theory.org/theories-and-models/newman-health-as-expanding-consciousness

Piper, B. F., Dibble, S. L., Dodd, M. J., Weiss, M. C., Slaughter, R. E., & Paul, S. M. (1998). The revised piper fatigue scale: psychometric evaluation in women with breast cancer. *Oncology Nursing Forum*. *25*, 677-684. Retrieved from UAMS interlibrary loan.

RAND Corporation. (n.d.). RAND Medical Outcomes Study: Measure of Quality of Life Core Survey from RAND Health Care. Retrieved from https://www.rand.org/health-care/surveys_tools/mos.html

Ream, E., & Richardson, A. (1996). Fatigue: A concept analysis. *International Journal of Nursing Studies*, *33*, 519–529. doi:10.1016/0020-7489(96)00004-1

Reeve, B. B., Stover, A. M., Alfano, C. M., Smith, A. W., Ballard-Barbash, R., Bernstein, L., . . . Piper, B. F. (2012). The piper fatigue scale-12 (PFS-12): Psychometric findings and item reduction in a cohort of breast cancer survivors. *Breast Cancer Research and Treatment*, *136*, 9–20. doi:10.1007/s10549-012-2212-4

Ryan, J. L., Carroll, J. K., Ryan, E. P., Mustian, K. M., Fiscella, K., & Morrow, G. R. (2007). Mechanisms of cancer-related fatigue. *The Oncologist, 12*(suppl 1). 22-34. doi:10.1634/theoncologist12-s1-22

Sacham, S. (1983). A shortened version of the profile of mood states. *Journal of Personality Assessment, 47*, 305-306. doi:10.1207/s15327752jpa4703_14.

Shapiro, C. L., Jacobsen, P. B., Henderson, T., Hurria, A., Nekhlyudov, L., Ng, A., . . . Rowland, J. H. (2016). ReCAP: ASCO core curriculum for cancer survivorship education. *Journal of Oncology Practice*, *12*, 145–145. doi:10.1200/JOP.2015.009449

Siemieniuk, R., Guyatt, G. (2018). What is GRADE? Retrieved from https://bestpractice.bmj.com/info/us/toolkit/learn-ebm/what-is-grade/

Smith, C., Carmady, B., Thornton, C., Perz, J., & Ussher, J. M. (2013). The effect of acupuncture on post-cancer fatigue and well-being for women recovering from breast cancer: A pilot randomised controlled trial. *Acupuncture in Medicine*, *31*(1), 9–15. doi:10.1136/acupmed-2012-010228

Smith, M. C. (2011). Integrative review of research related to Margaret Newman's theory of health as expanding consciousness. *Nursing Science Quarterly*, *24*, 256–272. doi:10.1177/0894318411409421

Spielberger, C. D. (1972). Review of profile of mood states. Professional Psychology, 3(4), 387–388. doi:10.1037/h0020742

Stan, D. L., Croghan, K. A., Croghan, I. T., Jenkins, S. M., Sutherland, S. J., Cheville, A. L., & Pruthi, S. (2016). Randomized pilot trial of yoga versus strengthening exercises in breast cancer survivors with cancer-related fatigue. *Supportive Care in Cancer*, *24*, 4005–4015. doi:10.1007/s00520-016-3233-z

Stein, K. D., Jacobsen, B., Blanchard, C. M., & Thors, C. (2004). Further validation of the multidimensional fatigue symptom inventory-short form. *Journal of Pain and Symptom Management, 27*, 14-23. doi:10.1016/j.jpainsymman.2003.06.003

Swen, M., Mann, A., Paxton, R. J., & Dean, L. T. (2017). Do cancer-related fatigue and physical activity vary by age for black women with a history of breast cancer? *Preventing Chronic Disease*, *14*, E122. doi:10.5888/pcd14.170128

Terry, A. J. (2015). *Clinical Research for the Doctor of Nursing Practice* (2nd ed.). Burlington, MA: Jones & Bartlett Learning.

Tramm, R., McCarthy, A., & Yates, P. (2012). Using the precede-proceed model of health program planning in breast cancer nursing research. *Journal of Advanced Nursing*, *68*, 1870–1880. doi:10.1111/j.1365-2648.2011.05888.x

Twombly, R. (2004). What’s in a name: Who is a cancer survivor?. *Journal of the National Cancer Institute, 96*, 1414-1415. doi:10.1093/jnci/96.19.1414.

Walden University. (2017a). 2017-2018 Walden University Catalog. Walden Univeristy. Retrieved from http://catalog.waldenu.edu/mime /media/149/4598/Sept_Cat_2017.pdf

Walden University. (2017b). Manual for systematic reviews Doctor of Nursing Practice Scholarly Project. Walden University. Retrieved from https://academicguides.waldenu.edu/ld.php?content_id=32773133

Wang, X. S., & Woodruff, J. F. (2015). Cancer-related and treatment-related fatigue. *Gynecologic Oncology*, *136*, 446–452. doi:10.1016/j.ygyno.2014.10.013

Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Medical Care*, *30*, 473-483. Retrieved from https://pdfs.semanticscholar.org/06cb/0076e310136d0ca8b56cc8585ec2bf43e029.pdf

Weis, J. (2011). Cancer-related fatigue : prevalence, assessment and treatment strategies. *Expert Review Pharmacoeconomics Outcomes Research*, *11*, 441–446. doi:10.1586/ERP.11.44

Wonghongkul, T., Dechaprom, N., Phumivichuvate, L., & Losawatkul, S. (2006). Uncertainty appraisal coping and quality of life in breast cancer survivors. *Cancer Nursing*, *29*, 250–257. doi:10.1097/00002820-200605000-00014

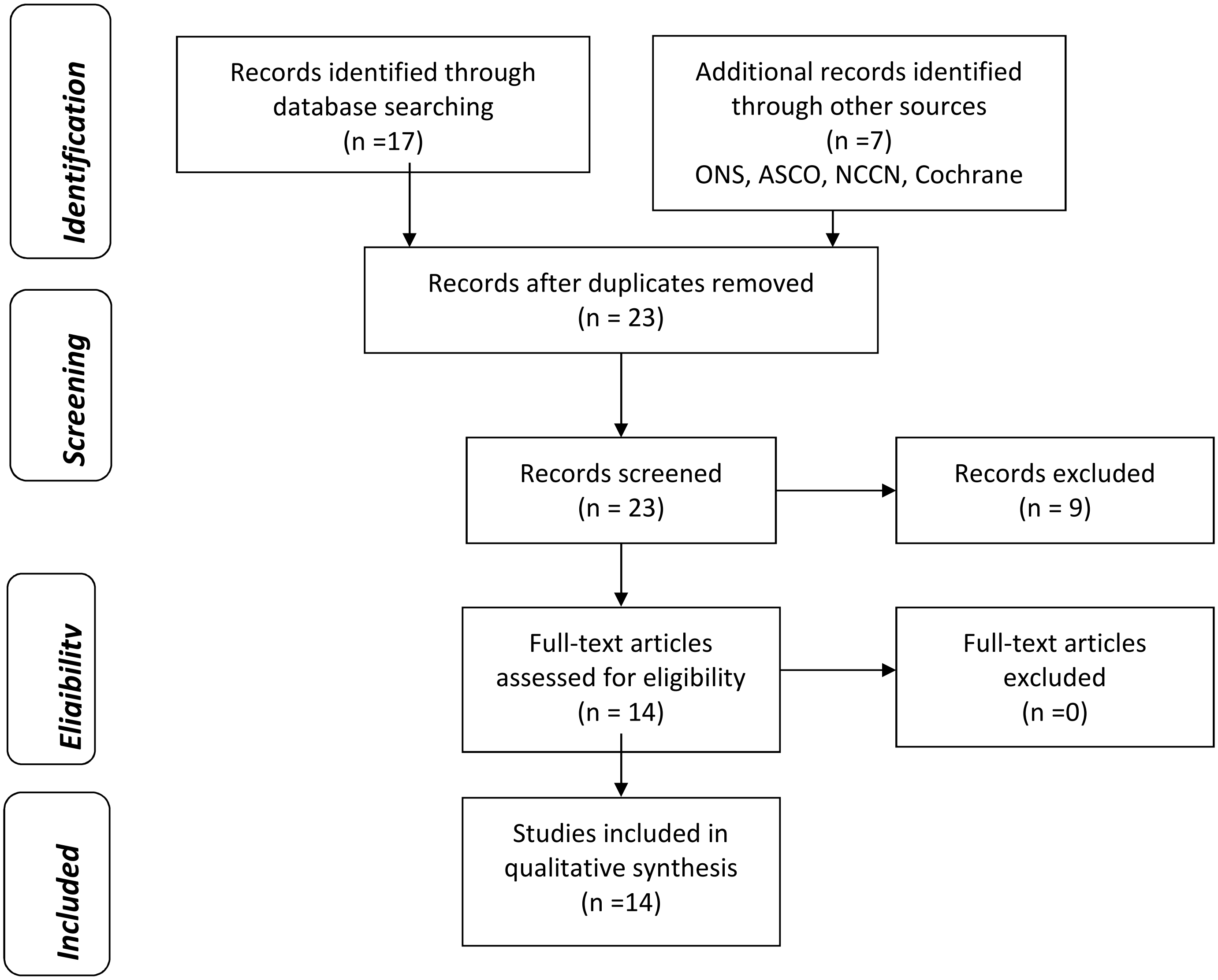
Wonghongkul, T., Moore, S. M., Musil, C., Schneider, S., & Deimling, G. (2000). The influence of uncertainty in illness, stress appraisal, and hope on coping in survivors of breast cancer. *Cancer Nursing*, *23*, 22–429. doi:10.1097/00002820-200012000-00004

Yellen, S. B., Cella, D. F., Webster, K., Blendowski, C., & Kaplan, E. (1997). Measuring fatigue and other anemia-related symptoms with the Functional Assessment of Cancer Therapy (FACT) measurement system. *Journal of Pain and Symptom*

Management, *13*, 63–74. doi:10.1016/s0885-3924(96)00274-6

Appendix A: PRISMA

PRISMA Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed100009

Appendix B: Literature Review Matrix

Authors /datE	Title	Fatigue Scale	Method	Summary	Strengths	Weakness
NCCN/ 2018	NCCN Guideline Version 2.2018 Survivorship	Numerical analog scale for screening	Clinical practice guildine	Screen all using numerical severity scale. If 0-3 rescreen at regular intervals. If 4-10 conduct more extensive assessment and screen for common contributing factors.	from NCCN multidisciplinary panel of experts, simple screening method	does not use an established scale. No recommendation on how to assess for contributing factors.
Bower et al/2014	Screening, Assessment, and Management of Fatigue in Adult Survivors of Cancer: An American Society of Clinical Oncology Clinical Practice Guideline Adaptation	Numerical analog scale for screening	Clinical practice guideline	Screen all patients with numerical scale. If score 4-10 then assess using one of many tools.	review of pan-Canadian guideline, ONS, and NCCN guidelines. Simple screening method	no recommendation on which multisymptom screening tool to use
Kroz et al/2017	Impact of a combined multimodal-aerobic and multimodal intervention comparet to standard aerobic treatment in breast cancer survivors with chronic cancer-related fatigue- results of a three-armed pragmatic trial in a comprehensive cohort design	CFS	Cohort	Compare multimodal therapy with or without aerobic training effect on cancer-related fatigue and sleep. Concluded multimodal superior.	use of reliable and valid fatigue scale that measures physical, cognitive, and affective fatigue	limit the generalization to survivors with CRF. Small sample size, high drop-out rate and use of last-value-carried-forward technique could induce bias
Stan et al/2016	Randomized pilot trial of yoga versus stengthening exercises in breast cancer survivors with cancer-related fatigue	MFSI-SF	Pilot feasibility	Feasibility of DVD guided home based yoga versus strengthening interveion for improved CRF and QOL. Both intervetions were determined to be feasible.	use of a reliable and valid measure of fatigue.	lack of non-intervention group, low adherence to intervetion, small sample size and short follow-up period, lack of in-person contact with instructor, the two interventions quite different in length.
Galiano -Castillo et al/2014	Depressed mood in breast cancer survivors:	Revised PFS	Cross-sectional	Examine relationship between depressed mood, QOL,	Piper fagtigue scale with high reliability of	other potential variables for depressed mood such as sleep not

	Associations with physical activity, cancer-related fatigue, quality of life, and fitness level			physical activity, health-related fitness, and salivary flow rate in breast cancer survivors in Granada. Statistically positive correlations between depressed mood and fatigue. CRF, physical activity level, systemic side effects and body image were significant predictors of depressed mood.	Cronbach's alpha= 0.96	considered. Not possible to establish causal relationship due to study design. Limited inclusion criteria.
Goedendorp et al/2016	Fatigue screening in breast cancer patients: identifying likely cases of cancer-related fatigue	SF-36, FSI, POMS	Cross-sectional	Selected optimal cutoff scores for each screening index based on the proportion of false negative and the proportion of women misclassified. Brief, accurate screening can be done in clinic using any of the 6 indices, parituclarly accurate is the FSI.	crossvalidation at 2 month and 6 month intervals. More efficient screening indices	not ideal to cross-validate using the data from same sample just different time points. Homogeneous sample. SF-36 contains reverse-worded items.
Swen et al/2017	Do Cancer-Reatled Fatigue and Physical Activity Vary by Age for Black Women with a History of Breast Cancer?	FACIT	Cross-sectional	Study of African American breast cancer survivors, physical activity level association with fatigue level. Meeting the phsycial activity guidelines was associated with less CRF, most robust for women age less than 50 years. Older survivors had no difference in fatigue score by physical activity level.	short recall period of 7 days on the FACIT questions, this reduces recall bias. Conducted during the summer months to reduce seasonal variations. Analyzed by age group instead of as a whole.	does not establish a causal relationship between fatigue and physical activity, does not differientiate between phsycial and emotional fatigue. Use of self-reported data makes prone to recall bias. Facit scale developed for those in active cancer treatment, not surviviors.
Hall et al/2014	Living with cancer-related uncertainty: associations with fatigue, insomnia, and affect in younger breast cancer survivors	Revised PFS	Cross-sectional	Investigate the relationship between cancer-related uncertainty and survivorship-related functioning in youger breast cancer survivors. Fatigue is a persistent concern for surivors and is significantly related to cancer-related uncertainty	well-validated scale that assesses multiple domains of fatigue. More diverse sample with both african american and caucasians.	does not establish a causal relationship. Self-report measures of fatigue and insomnia, better to use objective measures.

Jones et al/2016	Cancer-related fatigue and associated disability in post-treatment cancer survivors	FACT-F	Cross-sectional	Assess the prevalence of CRF across time in breast, prostate, and colorectal cancer survivors. Found mean fatigue scores were higher in breast and colorectal groups but did not differ by time. CRF persists upt to 6 years post-primary treatment.	FACT-F correlates with ICD and NCCN definitions of CRF. Psychometric data to support its use. Large sample size from three prominent cancer groups, high response rate.	cross-sectional design only assess CRF at one-time. Can not draw causal conclusions.
Mao et al/2018	Prevalence and risk factors for fatigue among breast cancer survivors on aromatase inhibitors	BFI	Cross-sectional	Define prevalence of fatigue in survivors on aromatase inhibitors (AI), along with risk factors for fatigue and relationship with comorbid symptoms. 4 in 5 AI users experience fagiute with more than 1 in 2 having moderate to severe fatigue.	brief fatigue insturment. large sample size. Focus on specific group of fatigue sufferers	self-report can lead to recall bias, study of survivors on AI only not of survivors with no AI, can not establish causal relationship. BFI is not multidimensional.
Lev-ari et al/2013	A prospective pilot clinicl trial of "The work" meditation technique for survivors of breast cancer	FACT	Descriptive study of pilot program	Pilot program to evaluate the feasibilty and effectivness of meditation in improving well being in breast cancer survivors. Found significant improvement in physical and mental health after intervention.	high level of compliance and no adverse effects reproted	lack of control group, modest sample size, self-selection, reliance of self-report outcomes, no data over time
Kroz et al/2014	Impact of autonomic and self-regulation on cancer-related fatigue and distress in breast cancer patients- a prospective observational study	CFS-D	Prospective observational	Study of autonomic regulation and self-regulation as predictors of CRF, cognitive fatigue, and distress. High autonomic regulation co-occurs with reduced risk of CRF. High self-regulation associated with reduced symptoms of distress	looks at cognitive fatigue in addition to phsycial fatigue. Use of reliable estimate of CRF	small cohort, observational study not causation, selection bias, caucasian sample, patient-related outcome measures should be confirmed with phsyciological measures
Smith et al/2013	The effect of acupuncture on post-cancer fatigue and well-being for women recovering from breast	BFI	Mixed method RCT	Feasibility of acupuncture in management of fatigue and well-being in breast cancer survivors. Concluded the	Good treatment compliance and BFI sensitive to changes in farigue during the intervention as supported by qualitative	slow recruitement. Small number in pilot study, short duration, dose response bias

	cancer: a pilot randomised controlled trial			intervention was acceptable.	interviews. Randomization with control group. No issues with needles and devices as in previous studies.	
Kaur et al/2018	Survivorship issues as determinants of quality of life after breast cancer treatment: Report from a limited resource setting	FACT-B	Cross-Sectional	To understand the perspective of indian BC survivors and their QOL limitations. Most commonly reported issues include fatigue, shoulder restriction, body and joint pain, chemotherapy induced cessation of menstration, and loss of sexual desire.	Control group of age-matched healthy women. First studty to look at this population.	hospital based study so does not reflect issues in ambulatory setting. Cross-sectional not longitudinal.

Appendix C: Summary of Tools

Tool	Uni or Multidimensional	Number of items	Type of report	Subscales or domains measured
POMS	Uni	37	self-report	Tension-anxiety; depression-dejection; anger-hostility; fatigue-inertia; vigor-activity; confusion-bewilderment
SF-36	Multi	36	Self-report or clinician administered	physical functioning, role limitations because of physical health problems, bodily pain, social functioning, and mental health, roll limitations because of emotional problems, vitality, and general health perceptions
FACT	Uni	47	Self-report	physical well-being, social/family well-being, relationship with physician, emotional well-being, and functional well-being
PFS	Multi	12	Self-report	behavior/severity, affective meaning, sensory, and cognitive/mood
BFI	Uni	9	Self-report	how the fatigue interferes with general activity, mood, walking ability, normal work, relationships, and enjoyment of life
FSI	Multi-Multi	7	Self-report or clinician administered	the amount of interference the fatigue had on general activity, activities of daily living, work, concentration, relationships, enjoyment, and mood
MFSI-SF	Multi	30	Self-report	General fatigue, physical fatigue, emotional fatigue, mental fatigue, and vigor.
CFS	Multi	15	Self-report	physical, affective, and cognitive dimensions
FACIT	Multi	13	Self-report or clinician administered	physical well-being, social/family well-being, emotional well-being, and functional well-being