

The Sequelae of Anxiety in Breast Cancer: A Human Response to Illness Model

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Breast cancer is the most common cancer affecting women in the United States and Canada. In 2009, an estimated 22,700 women in Canada and 192,370 women in the United States were diagnosed with breast cancer (American Cancer Society, 2010; Canadian Cancer Society, 2010). Anxiety and distress are common responses among patients diagnosed with cancer (Canadian Cancer Society, 2010; Zabora et al., 1997). Specific to breast cancer, research indicates that many women experience fluctuations in emotional morbidity as they move through their illness trajectory (Doll et al., 2003; McGregor & Antoni, 2009). The detrimental effects of prolonged anxiety may include an increase in the severity of treatment side effects, delayed or discontinued treatments (Carlson, Specia, Patel, & Goodey, 2003), and decreased quality of life (Madden, 2006). Therefore, recognizing anxiety and intervening at appropriate intervals are pivotal to improving outcomes for women with breast cancer.

The purpose of this article is to review the current state of the scientific literature surrounding anxiety in patients with breast cancer from the point of diagnosis to the end of adjuvant treatment. Mitchell, Gallucci, and Fought's (1991) Human Response to Illness (HRTI) Model will provide the organizational framework for the current state of knowledge surrounding anxiety sequelae. The four major components of the model are the physiologic, pathophysiologic, behavior, and experiential perspectives.

Background

About 33% of patients who undergo treatment for cancer develop psychological morbidity (Carlson & Bultz, 2003; Zabora, BritzenhofeSzoc, Curbow, Hooker, & Piantadosi, 2001). Research has demonstrated that anxiety and emotional distress persist throughout the disease continuum from the moment cancer is suspected to diagnosis, treatment, and beyond (Bultz & Holland, 2006; Carlson & Bultz, 2003). For example, the period following a diagnosis of breast cancer can be challenging for patients as they consider their treatment plans and an upcoming future (Doll et al., 2003; Melinyshyn & Wintonic, 2006). Follow-

Purpose/Objectives: To provide a critical review of the empirical literature on anxiety in women with breast cancer using the physiologic, pathophysiologic, behavior, and experiential perspectives of the Human Response to Illness (HRTI) Model.

Data Sources: Research articles, clinical articles, and Internet sources on breast cancer and anxiety. Literature sources included CINAHL®, PubMed, and PsycINFO, incorporating English language reports through March 2009.

Data Synthesis: Patients with breast cancer experience fluctuating levels of anxiety throughout their diagnosis and treatment trajectory. Anxiety may influence an individual's response to treatment, treatment decision making, and overall quality of life.

Conclusions: Research consistently demonstrates that anxiety in patients with breast cancer can have a negative effect on patient outcomes.

Implications for Nursing: The insight gained from exploring anxiety within the context of the four interrelated perspectives of the HRTI model fosters the provision of optimal care for patients suffering with anxiety throughout their breast cancer illness trajectory.

ing treatment, patients continue to face myriad complex emotional difficulties, such as changes in roles and responsibilities, relationships (Dow, Ferrell, Haberman, & Eaton, 1999), or employment status (Hewitt, Breen, & Devesa, 1999). Anxiety and distress also can affect treatment outcomes and play a role in a patient's overall quality of life (Madden, 2006; Vignaroli et al., 2006).

Despite vast improvements in health care, patients continue to experience anxiety related to fragmented care, difficulties understanding information, and misinterpretation of treatment plans (Canadian Strategy for Cancer Control, 2007). Although these anxiety-inducing circumstances can have negative consequences, screening for anxiety along the breast cancer trajectory remains inconsistent. Typically, medical information exchange, treatment decision making, and scheduling surgery take precedence over anxiety screening and management (Madden, 2006). In addition, potential nursing barriers in assessing anxiety include time constraints, a lack of knowledge of screening tools, and a reluctance to

explore upsetting issues with patients (Madden, 2006). Although screening for anxiety requires time and effort, research indicates that anxious patients ultimately require more guidance and care, resulting in an increased burden on the healthcare system (Corporate Research Associates, 2004; Simpson, Carolson, & Trew, 2001).

The scientific literature search included articles written in English published through March 2009. The databases included in the search were PubMed, CINAHL®, PsycINFO, Google™ Scholar, Science Direct, and the Cochrane Collaboration. *Breast cancer* coupled with the terms *anxiety*, *stress*, *distress*, *distress screening*, *treatment*, *pathophysiology*, *immune function*, *alopecia*, *sexuality*, and *body image* were used in the search. For the purposes of this article, anxiety refers to the cognitive appraisal of a threat or fear, and stress refers to the body's physiologic response to tense situations.

Conceptual Framework

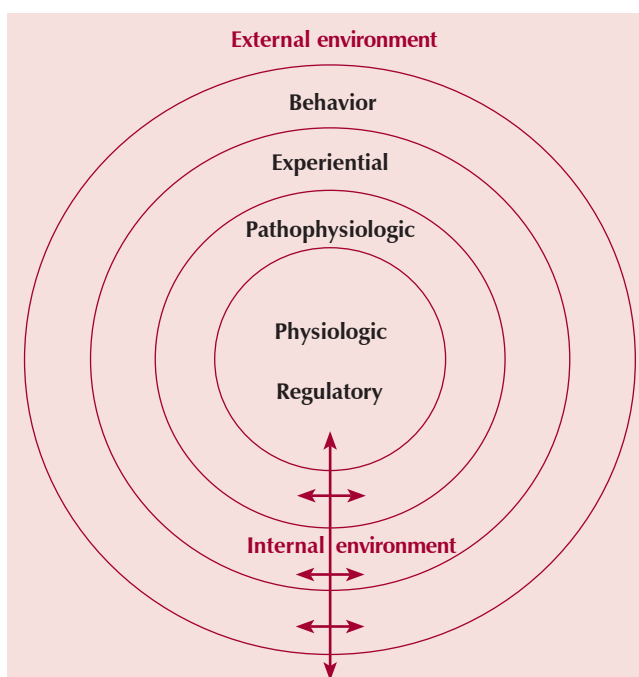
According to Mitchell et al. (1991), the HRTI Model (see Figure 1) provides a comprehensive framework for clinicians by illuminating the psychosocial aspects of illness and the associated physiologic processes. The components of the model are physiologic, pathophysiologic, behavior, and experiential perspectives. An understanding of the variety of human responses from these four interrelated perspectives is central to the science and practice of nursing. Therefore, this model provides a conceptual framework to facilitate a deeper understanding of the various perspectives of anxiety in patients with breast cancer.

The HRTI Model illustrates how anxiety along the breast cancer disease continuum may trigger a physiologic stress response. If this response is left untreated, pathologic consequences may occur (Madden, 2006; Vignaroli et al., 2006). Anxiety elicits behavior and experiential responses that are influenced by a variety of personal and environmental factors. Oncology nurses can use the HRTI Model as a foundation for recognizing anxiety and establishing a supportive care plan for women with breast cancer. In addition, by exploring anxiety within this context, gaps in current practice can be identified.

Physiologic Perspective

According to Mitchell et al. (1991), "physiologic responses are based on the concept of normative or usual biologic functioning" (p. 155). Anxiety is the psychological response to a perceived threat that activates the body's physical stress response. The body responds by activating protective mechanisms during the stress response with the ultimate goal of returning to a state of equilibrium (Lindsey, Carrieri-Kohlman, & Giboney-Page, 1993).

When an individual appraises an event through the central nervous system as anxiety-inducing, the



Note. The arrows illustrate that the human responses (physiologic, pathophysiologic, behavior, experiential) are interrelated.

Figure 1. The Human Response to Illness Model

Note. From "Perspectives on Human Response to Health and Illness," by P. Mitchell, B. Gallucci, and S.G. Fought, 1991, *Nursing Outlook*, 39, p. 155. Copyright 1991 by Elsevier. Reprinted with permission.

physiologic stress response in the body is activated. The hypothalamic-pituitary-adrenal axis and the sympathetic nervous systems are triggered and produce a cascade of events (O'Connor, O'Halloran, & Shanahan, 2000). Numerous feedback interactions are driven by the hypothalamus, pituitary, and adrenal glands during the response. Activation of the sympathetic nervous system stimulates the adrenal glands to release norepinephrine and epinephrine, resulting in numerous effects, including an increase in heart rate, respiratory rate, and blood pressure as well as a dilation of blood vessels and an increase in sebaceous gland activity. Simultaneously, the pituitary gland releases a variety of hormones, including adrenocorticotrophic hormone, which stimulates the release of cortisol. Cortisol is a glucocorticoid that plays an important role in ensuring the body's tissues receive adequate glucose for energy (Lindsey et al., 1993; Shelby & McCance, 2004). Cortisol and epinephrine also contribute to the body's immune response during the stress response (Shelby & McCance, 2004).

The physiologic stress response is an adaptive function with the primary purpose of self-preservation. The body seeks to restore homeostasis following a physiologic stress response. Once this has occurred, the individual no longer maintains the perception that the anxiety-inducing threat or fear is present. Conversely, if the response to the anxiety-inducing event persists, the individual's coping

ability may become exhausted, resulting in pathophysiologic consequences (Segerstrom & Miller, 2004).

Pathophysiologic Perspective

According to Mitchell et al. (1991), “pathophysiological responses result from disordered biologic functioning, with phenomena observable by instruments of the biologic sciences” (p. 155). When anxiety becomes pathologic, it can exist as a primary disorder or it can be associated with a medical or a psychiatric illness, such as depression. Although the body’s physiologic response to anxiety can be valuable in preparing an individual for action, prolonged anxiety may contribute to negative health outcomes.

As women move through the breast cancer illness continuum, fluctuations in anxiety may occur at various stages, including diagnosis, treatment decision making, surgery, and chemotherapy or radiation. Chronically elevated levels of anxiety can cause the body’s physiologic regulatory mechanisms and immune system to become weakened (Segerstrom & Miller, 2004). Persistent anxiety in older patients with cancer, in particular, may have more profound weakening effects because the immune system loses flexibility with age and is less able to adapt to stressors (Segerstrom & Miller, 2004). Chronic stress related to anxiety can cause a reduction in natural killer cell cytotoxicity (Segerstrom & Miller, 2004). Although Segerstrom and Miller (2004) found that this effect does not extend to the number of T-helper and T-cytotoxic lymphocytes, they concluded that “it suggests that a person’s subjective representation of a stressor (event) may be a determinant of its impact in the immune response” (p. 615).

Although very little is known about the role anxiety plays in the development or proliferation of cancer, changes in gene function, damage to DNA, and poorer DNA repair have been associated with emotional distress (Flint, Baum, Chambers, & Jenkins, 2007). As well, DNA repair pathways are an integral part of the etiology of breast cancer (McGregor & Antoni, 2009). Patients’ health behaviors may become altered as a result of chronic anxiety, which may influence the course of their disease process. Negative health behaviors such as high-fat food consumption, increased alcohol intake, and decreased exercise contribute to DNA damage and decreased DNA repair (McGregor & Antoni, 2009). Other pathologic consequences of chronic anxiety may include migraine headaches, chronic fatigue, obesity, hypertension (Lindsey et al., 1993), and panic disorders (Rosen & Schulkin, 1998).

Behavior Perspective

Mitchell et al. (1991) identified behavior responses as “observable and measurable motor and verbal behaviors” (p. 156). Several studies have reported that 35%–45% of patients with cancer feel significant distress

at various intervals throughout their cancer experience (Bultz & Holland, 2006; Carlson & Bultz, 2003; Zabora et al., 2001). A range of observable symptoms may be indicative of anxiety, including labored breathing, dizziness, sighing, increased perspiration, and irritability (Shelby & McCance, 2004). Measurable indicators may include an increase in respiratory rate, blood pressure, heart rate (Shelby & McCance, 2004), and serum cortisol levels (Cruess et al., 2000).

Numerous assessment tools have been developed in response to the challenge of measuring anxiety and distress in patients with cancer. Many of these assessment tools are essential components of comprehensive intervention programs designed to identify and address anxiety and distress. For example, the National Comprehensive Cancer Network (NCCN) developed a brief distress screening tool for patients with cancer. It chose the term *distress screening* because it was determined to be less stigmatizing than words such as *emotional* or *psychosocial* screening (NCCN, 2008). The NCCN instrument includes a **distress thermometer** ranging from 0 (no distress) to 10 (extreme distress), whereby patients indicate their overall distress within the prior week. The tool also contains a brief checklist highlighting potential etiologies of the distress, including financial hardship, practical issues, and physical symptoms. The distress thermometer has been employed in numerous studies and in clinic settings and has been found to be useful for screening patients with cancer for distress (Dabrowski et al., 2007; Jacobsen et al., 2005; Ransom, Jacobsen, & Booth-Jones, 2006). However, based on a pooled analysis of a variety of studies, Mitchell (2007) recommended that brief screening tools, such as the distress thermometer, should not be used as the sole means for screening but rather as part of an initial screening process in conjunction with other tools.

The **Brief Symptom Inventory (BSI)** is an 18-item instrument designed to measure psychological distress. For example, Carlson et al. (2004) reported that 37% of patients with cancer in their study (N = 3,095) met criteria for significant distress based on the BSI. They found that 24% of the distress was caused by anxiety among these patients. This study included individuals from new diagnoses through long-term follow-up and found that significant distress remained for about 33% of the patients. Patients with lung cancer experienced the highest distress, whereas those with breast cancer identified lower distress rates. Interestingly, patients with breast cancer tended to seek out psychosocial services more often than other groups of patients with cancer (Carlson et al., 2004).

The **Hospital Anxiety and Depression Scale (HADS)** is another self-report screening tool developed to capture the presence of anxiety and depression. The HADS consists of 14 questions and is reportedly a reliable and valid tool for screening anxiety and depression (Sellick & Edwardson, 2006). A review of 747 studies using HADS concluded that the scale performed “well in screening for

the separate dimensions of anxiety and depression and cases of anxiety disorders and depression in patients from nonpsychiatric hospital clinics" (Bjelland, Dahl, Haug, & Neckelmann, 2002, p. 75). Although appropriate cutoff scoring for the HADS remains in debate (Cull et al., 2001; Vignaroli, 2006), the tool has performed well in the general population in clinical settings (Bjelland et al., 2002).

Another common tool used to screen for anxiety in the clinical setting is the **Edmonton Symptom Assessment Scale (ESAS)**. This instrument consists of 10 self-report Likert scales (0–10) that evaluate a range of physical and psychological symptoms, including anxiety. Although this instrument has been validated for use in patients with advanced cancer and in palliative care settings (Chang, Hwang, & Feuerman, 2000; Nekolaichuk, Watanabe, & Beaumont, 2008), it also has been employed in other oncology settings. The tool is easy to administer and has very minor patient burden with respect to the time required for completion.

Unfortunately, many patients enter the complex maze of the cancer journey without experiencing routine psychosocial screening. Consequently, clinicians continue to underdiagnose patients with cancer who are experiencing anxiety, which leads to the undertreatment of individuals considered most at risk for psychological morbidities (Vignaroli et al., 2006).

Experiential Response of Anxiety

The rollercoaster of emotions experienced throughout the breast cancer continuum varies dramatically between individuals. According to Mitchell et al. (1991), "experiential responses include concepts of introspection, personal experience, and the derivation of shared meaning. . . . They are measured by self-report" (p. 155). Anxiety may be dictated by factors such as coping abilities, past experiences, or social support networks. How individuals cope with a potential life-threatening event is influenced by their perception of the illness, the meaning they ascribe to their situation, and the availability of coping resources (Lazarus & Folkman, 1984). The words, "you have cancer," render many patients incapable of processing any information while simultaneously reducing their coping abilities. The tremendous amount of anxiety evoked during the postdiagnostic period is well documented in the literature (Corporate Research Associates, 2004; Graydon et al., 1997; Hack et al., 2003).

Information needs remain high during this time; debates exist surrounding the benefits of titrating information over long periods of time versus providing copious amounts of information during the consultation phase. Information has been shown to significantly reduce the anxiety trajectory (Beaver, Twomey, Witham, Foy, & Luker, 2006; Hack, Degner, Parker & SCRIN Communication Team, 2005), assist in treatment decision making, and augment feelings of control over the illness experience (Corporate Research Associates, 2004; Mills & Sullivan, 1999). Patients

who gain a sense of autonomy and control can decrease their feelings of anxiety during their cancer treatments.

The devastating side effects of treatment for breast cancer can evoke feelings of hopelessness and uncertainty. For example, chemotherapy-induced alopecia has been found to be one of the most anxiety-provoking side effects of the entire cancer treatment (Richer & Ezer, 2002; Sitzia & Huggins, 1998). Browall, Gaston-Johansson, and Danielson (2006) found that women considered losing their hair as the most distressing experience within the disease trajectory and, in some cases, more anxiety inducing than losing a breast. Patients describe the experience of alopecia as identifying them in the public eye as a patient with cancer and decreasing their sexuality and sense of self-image (McGarvey, Baum, Pinkerton, & Rogers, 2001; Richer & Ezer, 2002; Rosman, 2004). Alopecia may diminish their desire to engage in social activities (Cowley, Heyman, Stanton, & Milner, 2000) or increase their reluctance to continue employment (Luoma & Hakamies-Blomqvist, 2004). Some women have even refused chemotherapy treatment because of alopecia fears (McGarvey et al., 2001).

Personal and Environmental Factors

Mitchell et al. (1991) described nonmodifiable or modifiable personal factors that are internal to the individual and may influence the anxiety response within the four perspectives of the model. For example, modifiable factors include exercise, sleep, and diet. Levels of anxiety also may be influenced by nonmodifiable factors, such as age or past experiences. Wenzel et al. (1999) found that younger patients with cancer experience higher anxiety and distress throughout their disease trajectory. Coyne and Borbasi (2007) highlighted several causes of increased anxiety in young women with breast cancer, including fertility after treatment, motherhood demands, and role transitions. Individual differences concerning coping abilities, personality, and cultural factors also may affect the experiential perspectives of anxiety for women with breast cancer.

Environmental factors are external to the individual and also influence the individual's anxiety experience. For example, hospitalizations related to surgery or treatment can increase the risk for anxiety as the "hospital environment is often disruptive to the usual patterns of personal functioning, including eating, sleeping, physical activities, and social interaction" (Heitkemper & Shaver, 1995, p. 420). Social support also has been found to be a significant predictor of changes in psychological distress for women with breast cancer (Moyer & Salovey, 1999). This support can be derived from family, friends, and other individuals who have been through the illness experience.

Implications for Nursing Practice

The HRTI Model provides a comprehensive framework for oncology nurses to glean insight into the assessment

and management of the human response of anxiety along the breast cancer continuum. This discussion highlights how scientific knowledge of the physiologic, pathophysiologic, behavior, and experiential perspectives provides guidance for nursing practice, education, and research related to anxiety in breast cancer.

Nurses need to fully understand and appreciate the anxiety experience of women going through the diagnosis and treatment trajectory for breast cancer. Nurses should anticipate high levels of anxiety at particular phases along the disease trajectory, including biopsy (Deane, 1997), diagnosis, awaiting surgery (Schnur et al., 2008), changes in care providers (surgeon to oncologist), and changes in treatment regimens or disease progression (Carlson et al., 2004). For example, strategies to ameliorate preoperative anxiety could be implemented because presurgery distress can escalate postsurgical nausea, discomfort, and fatigue (Montgomery & Bovbjerg, 2004). Schou, Ekeberg, Kareson, and Sorenson (2008) implemented a psychologic intervention support group as part of routine care for newly diagnosed patients with breast cancer and found that participants showed a dramatic decrease in their anxiety levels compared to nonparticipants.

Oncology nurses should educate and prepare patients for potential upcoming stressors, such as changes in treatment regimens or care providers, while normalizing patients' feelings of distress. Studies surrounding psychosocial interventions, such as imagery (Freeman et al., 2008) and mindfulness-based stress reduction programs (i.e., meditation, yoga, and group support) (Carlson et al., 2003), report success in reducing distress and improving quality of life. Oncology nurses play an important role in advocating for program development within institutions and imparting information to patients and families about community resources.

Oncology nurses also should recognize that screening for anxiety and distress alone may not improve a patient's symptoms or overall quality of life. Psychological interventions should be implemented for patients with elevated anxiety for improvements to be seen in patient outcomes (Jacobsen, 2007). By providing anxiety screening at numerous points along the breast cancer trajectory, nurses can plan specific interventions. A simple intervention may include normalizing a patient's feelings of distress or recommending a support group. Anxiety and distress scales should be used at baseline to allow for ongoing comparisons as patients progress through the disease trajectory to provide healthcare clinicians with a foundation for optimal assessments and interventions for patients experiencing anxiety along the entire disease trajectory.

An assessment of the meaning that patients ascribe to their illness also may provide insight into potential distress or coping abilities. For example, questions concerning the individual's support system, socioeconomic status, and day-to-day functioning may allow the nurse

to glean insight into the patient's anxiety or distress and provide counseling during this time. Another direct intervention nurses can provide is to simply ask a patient about anxiety, which may prompt a discussion concerning the patient's emotions. This allows the nurse to provide counseling or make referrals to psychosocial resources within the cancer center. Oncology nurses should be educated to respond appropriately and have knowledge of all available resources. Nurses also should be aware that individuals who self-select to participate in support group interventions are generally more positive-minded than those who do not participate (Schou et al., 2008). Therefore, individuals who do not participate may be at increased risk for anxiety and depression and should not be overlooked when assessing distress screening.

Patients who undergo a longer course of treatment also report higher levels of distress than those being treated with surgery alone (Tuinman, Gazendam-Donofrio, & Hoekstra-Weebers, 2008). With this knowledge, nurses can employ ardent surveillance protocols for patients receiving multiple treatment modalities. Psychological interventions should follow screening and assessment protocols if required, because merely relaying pertinent information to the treating nurse does not necessarily improve health-related quality of life for patients (Rosenbloom, Victorson, Hahn, Peterman, & Cella, 2007).

Advocating for psychological interventions to reduce anxiety in patients with breast cancer benefits the individual as well as the healthcare system because anxious patients tend to make more telephone calls to clinics or hospitals, use more specialist time, and make unnecessary visits to emergency departments (BC Cancer Agency, 2005). Simpson et al. (2001) conducted a randomized, controlled trial and found that implementing appropriate psychosocial interventions for women with breast cancer led to a 25% decrease in costs to the healthcare system. Notwithstanding the significant developments in anxiety instrumentation, a gap continues to exist between screening and actual intervention protocols (Bultz & Holland, 2006; Zabora et al., 2001).

Increased attention is required in the area of psychosocial intervention research to reduce anxiety in patients with breast cancer. Additional research also is required to recognize individuals who may be at higher risk for distress and may benefit from using interventions that have proven to be successful in patients with cancer. Targeted areas of future psychosocial intervention research also should include sexuality and body image therapy for individuals or couples, tailored support groups, and complementary therapies.

Conclusion

Breast cancer is the most common diagnosed cancer for women in the United States and Canada. The effect

of the diagnosis and the burden of treatment are overwhelming for many patients and their families. Most individuals diagnosed with breast cancer experience periods of anxiety throughout their illness trajectory. The HRTI Model provides an appropriate framework for a comprehensive appraisal of the anxiety response in women with breast cancer. With this knowledge, nurses can aim to deliver appropriate psychosocial interventions to achieve optimal patient outcomes. The insight gained from the four interrelated perspectives of the HRTI Model fosters the cultivation of comprehensive approaches to care for patients suffering with

anxiety throughout their breast cancer disease trajectory.

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