

Uncertainty During Breast Diagnostic Evaluation: State of the Science

Mariann Montgomery, RN, MSN, CNE

Breast cancer is the most common cancer in women and the second leading cause of cancer deaths for women in the United States (Ferrante, Chen, & Kim, 2008). In 2008, more than 1 million women underwent a breast diagnostic evaluation in the United States, with about 182,500 being diagnosed with cancer (American Cancer Society, 2009). Concern is increasing regarding the prolonged psychological impact of the uncertainty experienced while undergoing a diagnostic evaluation for breast disease. For women diagnosed with cancer, this experience is believed to influence treatment outcomes (Thorne, Harris, Hislop, & Vestrup, 1999). In women with benign disease, an unfavorable psychological experience may result in behavioral changes persisting for years afterwards, including a reduction in the likelihood of additional screening compliance (Andrykowski et al., 2002; Barton et al., 2004; Brett, Austoker, & Ong, 1998; Haas, Kaplan, McMillan, & Esserman, 2001; Lampic, Thurfjell, Bergh, & Sjoden, 2001; Lowe, Balanda, Del Mar, & Hawes, 1999; Olsson, Armelius, Nordahl, Lenner, & Westman, 1999; Scott, 1983; Thorne et al.) or overuse of mammography services from a misperceived increased risk of breast cancer (Aro, Pilvikki Absetz, van Elderen, van der Ploeg, & van der Kamp, 2000; Thorne et al.). The purpose of this article is to present the state of the science of uncertainty in the context of women undergoing diagnostic evaluation for suspected breast cancer. This article includes a description and definition of uncertainty, presents a synthesis of quantitative and qualitative studies, a discussion of methodologic issues, and suggestions for additional research.

Conceptual Dimension

Uncertainty in illness is defined as the inability to determine the meaning of an illness-related event and occurs when an individual is unable to predict outcomes accurately (Mishel & Braden, 1988). This upsets the valued order of everyday life and threatens the sense of the taken-for-granted world by challenging the belief that an individual is healthy and forcing that person to confront

Purpose/Objectives: To present the state of the science on uncertainty in relationship to the experiences of women undergoing diagnostic evaluation for suspected breast cancer.

Data Sources: Published articles from Medline®, CINAHL®, PubMed, and PsycINFO from 1983–2008 using the following key words: *breast biopsy, mammography, uncertainty, reframing, inner strength, and disruption*.

Data Synthesis: Fifty research studies were examined with all reporting the presence of anxiety persisting throughout the diagnostic evaluation until certitude is achieved through the establishment of a definitive diagnosis. Indirect determinants of uncertainty for women undergoing breast diagnostic evaluation include measures of anxiety, depression, social support, emotional responses, defense mechanisms, and the psychological impact of events.

Conclusions: Understanding and influencing the uncertainty experience have been suggested to be key in relieving psychosocial distress and positively influencing future screening behaviors. Several studies examine correlational relationships among anxiety, selection of coping methods, and demographic factors that influence uncertainty. A gap exists in the literature with regard to the relationship of inner strength and uncertainty.

Implications for Nursing: Nurses can be invaluable in assisting women in coping with the uncertainty experience by providing positive communication and support. Nursing interventions should be designed and tested for their effects on uncertainty experienced by women undergoing a breast diagnostic evaluation.

the possibility of having a potentially life-threatening disease (Jordens, Little, Paul, & Sayers, 2001). Penrod (2007) stated that being in a state of uncertainty is discomforting, expressed by varying degrees of accompanying fear, shock, powerlessness, anxiety, and uneasy sensations. Characterization of uncertainty comes from how an individual appraises and manages the illness-related event (Mishel, 1990). Appraising uncertainty is based on past experiences, personality dispositions, and the person's interpretation concerning the severity of an illness and the potential impact of the illness on that person's everyday way of life.

In her analysis of uncertainty, McCormick (2002) asserted that situations that elicit uncertainty occur

when they are characterized by unpredictability, lack of familiarity, and lack of information. Through use of a variety of coping methods, women reframe the uncertainty experience and manage its expression. Reframing is a constructive coping mechanism that assists in meeting the demands of life activities while living with uncertainty (Clutton, Buckley, & Pakenham, 1999). Healthcare providers can decrease uncertainty by providing necessary information, promoting a positive interpretation of events through reframing, and providing assistance with coping methods (Mishel et al., 2005). A woman's social support system, including family, friends, and diagnosis-specific others, can assist in providing a means to acquire information and be connected (Clutton et al.).

An understanding of inner strength as it encompasses well-being is necessary to facilitate the quality of life in women (Dingley & Roux, 2003). Although inner strength exists prior to a disruptive event, the experience of threat mobilizes women, making the connection with the inner self to meet the demands of the illness, promote health and well-being, and adapt life to live as fully as possible (Baldacchino & Draper, 2001). The attributes of the inner self influence the degree of experienced anxiety and other expressions of uncertainty. Dingley, Bush, and Roux (2000) described these attributes, specifying that a woman's inner strength encompasses various personality traits, including optimism, resiliency, humor, and a problem-solving attitude; a spiritual dimension; and the individual's sense of purpose, which provides meaning, fulfillment. The attributes of the inner self are antecedents of uncertainty, with a greater sense of them being associated with lower levels of uncertainty (Mishel, 1997).

Empirical Dimension

Investigation of quantitative and qualitative measurements associated with the uncertainty during breast evaluation was conducted using a systematic literature review of studies from Medline®, CINAHL®, PubMed, and PsycINFO using the key words *breast biopsy*, *mammogram*, *inner strength*, *uncertainty*, *reframing*, *breast cancer*, and *disruption*. Limits placed on the searches included the subjects being women, studies published in English, and studies published after 1980. To view summaries of the studies reviewed in this article, see Appendix A in the online version of this article at <http://ons.metapress.com/content/0190-535X>.

Determinants of Uncertainty

The uncertainty experience begins at discovery, and the period of waiting for the results of diagnostic evaluations is distressing (Maxwell et al., 2000). Although

most women are found to have benign disease, raising the possibility that a malignancy might be present is threatening and causes women to experience uncertainty regarding their health status and mortality (Andrykowski et al., 2002; Poole & Lyne, 2000). All reviewed studies document the presence of anxiety persisting throughout the diagnostic evaluation until certitude is achieved through the establishment of a definitive diagnosis, even when it is malignancy (Deane & Degner, 1998; Fridfinnsdottir, 1997; Owen, 1992; Shaw, Wilson, & O'Brien, 1994). Anxiety levels in these women have been reported to be comparable to those admitted with acute anxiety to neuropsychiatric units, interfering with critical thinking, decision-making skills, and the ability to participate in activities of daily living (DeKeyser, Wainstock, Rose, Converse, & Dooley, 1998; Poole et al., 1999; Scott, 1983). The fear of malignancy may interfere with the ability to obtain necessary follow-up care and can result in higher mortality in the presence of a confirmed cancer diagnosis (Allen, Shelton, Harden, & Goldman, 2008).

Few studies have examined the relationship of the attributes of inner strength on the expression of uncertainty during the evaluation period. The personality traits of optimism and hopefulness have been found to correlate with lower anxiety levels by contributing to expectations of a positive outcome and influencing expectations regarding the quality of care that will be received (Deane & Degner, 1998; Northouse, Jeffs, Cracchiolo-Caraway, Lampman, & Dorris, 1995; O'Mahony, 2001). Optimism also has been reported as playing a significant role in helping women cope by influencing the selection of coping strategies (Andrykowski et al., 2002; Lauver & Tak, 1995; Logan, Hackbusch-Pinto, & De Grasse, 2006). Poole et al. (1999) supported this by stating that a woman's personality type, not the efficacy of coping strategies, is the primary influencing factor on her expression of uncertainty.

Demographic Characteristics

A number of studies have described the level of anxiety and its relationship with demographic characteristics, particularly medical history, age, and education. Because women with a history of certain benign breast diseases have an increased risk for breast cancer, the fact that women who have undergone previous breast biopsy report higher levels of anxiety is not surprising (Deane & Degner, 1998; Haas et al., 2001; Heckman et al., 2004; Lebel et al., 2003; Liao, Chen, Chen, & Chen, 2007). This heightened anxiety is compounded by previously negative experiences (Brett et al., 1998; Lampic et al., 2001; Pineault, 2007), with women reporting that the experience made them feel more vulnerable, and, at times, dehumanized (De Grasse, Hugo, & Plotnikoff, 1997; Fridfinnsdottir, 1997; O'Mahony, 2001; Thorne et

al., 1999). Consistent reports exist that suggest a family history of breast cancer generally increases anxiety (Benedict, Williams, & Baron, 1994; Novy, Price, Huynh, & Schuetz, 2001) as well as the presence of other coexisting diseases, such as hypertension (Deane & Degner, 1998; Northouse et al., 1995).

Conflicting reports make generalizations difficult regarding the impact of a woman's age. Although age may not have any effect on anxiety levels (Barton et al., 2004; Liao et al., 2007; Northouse et al., 1995; Olsson et al., 1999), others contradict these reports, stating that younger women experience increased anxiety (Haas et al., 2001; MacFarlane & Sony, 1992; Seckel & Birney, 1996). A woman's age influences the uncertainty experience as a shift from an expected life trajectory to an unexpected abnormal and potentially life-threatening one occurs (Bury, 1982). In younger women, this may impact key identities such as motherhood, femininity, and sexuality, leading the younger women to a greater perception of disruption and heightened anxiety (Seckel & Birney; Wilson, 2007). In older women, high levels of anxiety have been attributed to the perception of being at high risk for malignancy (Novy et al., 2001), although lower levels found in older women who are widowed have been attributed to the bereavement experience, giving them better coping abilities (Olsson et al.).

Information Management

A number of studies investigated the use of information management strategies, in which women seek balance between the information given to them and the desire for additional information. All women report the need to be informed regarding the testing procedures, the types of breast disease, and their risk of breast cancer (Deane & Degner, 1997; Demir, Donmez, Ozsaker, & Diramali, 2008; Ong & Austoker, 1997). This information decreases uncertainty, improves a sense of trust, and assists in decision-making confidence (Demir et al.; Drageset & Lindstrom, 2005; Liao et al., 2007). Results are consistent that the more satisfied women are with the information they receive, the lower their anxiety will be (Pineault, 2007). The most common practice is for women to receive verbal information from their physicians; consequently, many reported that they did not remember all of what they were told and desired additional or written materials (Liao, Chen, & Chen, 2008; O'Mahony, 2001). A few articles report on nursing intervention studies that are directed at improving information management. Ong and Austoker found that women who received nurse counseling reported lower levels of distress. Conversely, Hislop et al. (2002) found that nurse counseling did not have any effect on anxiety. Barton et al. (2004) tested the use of videotaped and written educational materials designed to reduce

anxiety by providing explanations of follow-up procedures and coping tips. Women reported that using the coping strategies was helpful, but no differences existed in anxiety levels between the intervention and the control groups (Barton et al.). Women in Bradley, Berry, Lang, and Myers's (2006) study felt that the most beneficial practice would be to have a personal counseling session and guaranteed access to a nurse to ask additional questions.

The highest level of education achieved impacts information management by influencing the cause of a woman's anxiety. Although two studies reported that level of education has no effect on anxiety (Barton et al., 2004; MacFarlane & Sony, 1992), the majority of reports stated that, in women with a minimum of a high school education, level of anxiety is positively influenced by a disparity regarding the quality and amount of information desired and dissatisfaction with the amount of information received (Deane & Degner, 1998, Liao et al., 2007; Rehnberg, Absetz, & Aro, 2001). About 66% of the women reported independently seeking additional information to diminish this disparity and lower anxiety levels (Rehnberg et al.). In women with less than a high school education, anxiety levels are not correlated with the information disparity, but instead related to dissatisfaction with the inability to access to additional information, not fully understanding the information given, and having fewer overall resources (Andrykowski et al., 2002; Northouse et al., 1995; Novy et al., 2001; Olsson et al., 1999).

Despite the advent of more rapid diagnostic centers, the average self-reported length of the time interval from the discovery of a breast mass until receiving a definitive diagnosis continues to be from 3–6 weeks (Ferrante et al., 2008; Heckman et al., 2004). The results of several studies have concurred that lower levels of psychological distress and improved satisfaction with care are directly correlated with the more immediate communication of results, shorter waiting periods between tests, and speedier referral times (Barton et al., 2004; Ferrante et al.; Fridfinnsdottir, 1997; Hislop et al., 2002; MacFarlane & Sony, 1992; Pineault, 2007). Speed of referral time also is used as a cue to assist in controlling uncertainty during the waiting period. Women may look for specific cues such as the quickness of the scheduling of testing or rapidity of appointment time with the physician as an interpretation of the gravity of their situation (Poole & Lyne, 2000; Shaw et al., 1994).

Coping Strategies

Several studies in the literature evaluated the relationship among the selection and effectiveness of coping mechanisms. For many women, the waiting period constituted a limbo period in their lives in which their priorities were disrupted and they were just focusing on

getting through their day (Thorne et al., 1999). Women reported relying on reflective coping strategies that focused on inner strength and spirituality, including the use of daily prayer while placing their faith in God and trust in their healthcare providers' knowledge (Chappy, 2004; Demir et al., 2008; Logan et al., 2006; Shaw et al., 1994). Some women searched for the meaning of the experience (Chappy, 2004); others used the time period as one of focused isolation, concentrating on themselves and their families (Riese, 2001). A few women described "preparatory" psychological processes, rehearsing what life with breast cancer would be like or imagining what they would do if their lifespan was to be shortened to only five more years (O'Mahony, 2001; Poole et al., 1999).

Cognitive distraction is thought to be helpful for many during this period, particularly when the woman does not perceive long-term adverse consequences (Clutton et al., 1999). Most find maintaining their daily routines helpful (Heckman et al., 2004; Shaw et al., 1994). Others participate in alternative activities such as going shopping or outings considered as treats (Logan et al., 2006). Potter (2007) offered massage therapy to women during the diagnostic period; the women reported that they felt better but no decline in anxiety levels was noted. Conversely, the use of behavioral avoidance, defined as participating in alternative activities including smoking, sleeping, anti-anxiety medication use, or drinking more alcohol is associated with the highest levels of anxiety (Benedict et al., 1994; Drageset & Lindstrom, 2003; Harcourt, Rumsey, & Ambler, 1999; Heckman et al., 2004; Lebel et al., 2003). Women who rely on avoidance may even end up with symptoms of dysfunctional behavior, projecting on to others, and being overtly hostile.

Social support is reported as being a crucial positive coping resource, providing women with comfort and reducing anxiety (Northouse, Tocco, & West, 1997; O'Mahony, 2001; Walter, 2005). The quality of social support alone is an important factor in explaining the differences in a woman's coping ability (Fridfinnsdottir, 1997; MacFarlane & Sony, 1992; Seckel & Birney, 1996). During the breast evaluation phase, women need and seek continuous support and care from those in their support network. This network is defined as the people in a woman's life on whom she relies for socioemotional or physical aid, including her husband, partner, family, friends, and colleagues (O'Mahony). Related others, or women who have undergone similar experiences, also have been included in defining a support network (Benedict et al., 1994; Thorne et al., 1999). These connections provide an opportunity for nurturance, satisfy the sense of belonging, reaffirm self-worth, and instill a sense of mastery or competence to deal with the situation (Clutton et al., 1999; Drageset & Lindstrom, 2003; Pineault, 2007; Riese, 2001). In summary, social support

is thought to be the cornerstone of an overall pattern of women with positive coping; they have an available social network among those they live and work with, have access to information, and have a reasonably good education (Drageset & Lindstrom, 2005).

Despite the recognition that a woman's response to undergoing evaluation is greatly influenced by her social support, few studies have explored the capability of husbands or significant others to provide this critical need. Shaw et al. (1994) reported that significant others often feel left out and that they did not receive the information that they needed. This coincides with reports that husbands have similar levels of anxiety as their wives during this period and that, although both parties wanted the husband present to assist with the information management process described earlier, this often was not occurring (De Grasse et al., 1997; Northouse et al., 1997). This supports findings that married women have reported significantly higher needs for information, which has been attributed to having to convey information to their husbands for more mutual, supported decision making (Liao et al., 2007).

Methodologic Dimension

No instrument exists that specifically measures the uncertainty associated with undergoing breast evaluation. Uncertainty has been indirectly assessed using well-validated quantitative tools that measure depression, emotional responses, optimism, hopelessness, psychological impact of events, social support, the use of defense mechanisms, and anxiety. Coping in this population has been most often measured by using variations of either the Coping Orientation to Problems Experienced (COPE) Inventory or the CODE (Eriksen, 1997), which consists of the Utrecht Coping List and the Defense Mechanism Inventory. Subscales that have been used that are relevant to this population include self-distraction, venting, denial, religion, and active coping (Lebel et al., 2003). The CODE measures two coping factors, instrumental mastery and emotion-focused, and two defense factors, cognitive defense and defensive hostility (Drageset & Lindstrom, 2005).

Variations of the Spielberger, Gorsuch, and Lushene (1970) State-Trait Anxiety Inventory (STAI) scale have been the most widely used instrument to measure anxiety. The original STAI consisted of two self-administered scales with 20 self-report items arranged in four-point Likert scales designed to measure state and trait aspects of anxiety. Scores for each can range from 20–80 (MacFarlane & Sony, 1992). The state scale measures how the person feels at the moment of responding as characterized by feelings of apprehension, nervousness, and worry; the trait scale measures individual differences in anxiety proneness and reflects the subject's perception

of the degree of danger in a situation (Maxwell et al., 2000). Trait anxiety is thought to not fluctuate over time; state anxiety levels increase as the subject perceives a stressful situation as threatening or dangerous. The alpha coefficient for the STAI is reported to range from 0.83–0.92, with a high degree of internal consistency (Shaw et al., 1994).

Three other instruments have been useful in evaluating anxiety in this population. The Psychological Consequences of Screening Mammography (PCQ) and the Breast Cancer Anxiety Indicator (BCAI) have been reported to correlate highly with other measures of anxiety during the period between an abnormal mammogram and during the wait for additional test results (Pineault, 2007). The PCQ consists of 22 items on a four-point Likert scale that measures the positive and negative effects related to the mammography screening experience. The BCAI is a single-item question with a four-point Likert scale that evaluates the woman's anxiety at a specific moment during the diagnostic period. The Suspected Breast Cancer Patient Needs Questionnaire consists of 40 items on a four-point Likert scale that measures informational needs, emotional and social support, resources, and healthcare services (Liao et al., 2007).

Qualitative exploration of the lived experiences of woman undergoing breast evaluations has provided insight regarding the phenomenon (O'Mahony, 2001). Phenomenological studies have used unstructured or semi-structured interviews, which were audiotaped and transcribed verbatim. Resulting texts were then analyzed to gain understanding and meaning of women's stories, which have provided glimpses into the experience of uncertainty.

Implications for Future Research

Several limitations exist in the research that affect the direction of future study. Although some of the needs of women during the diagnostic period are being confirmed across studies, the studies have used small sample sizes, reflect varied populations, and have had conflicting results. A need exists to better understand the relationships among anxiety, selection of coping methods, and demographic characteristics as they relate to uncertainty and to develop a profile of women who may be at higher risk for adverse psychological effects so that appropriate interventions can be taken. Because some evidence points to a younger age being associated with more distress, additional research regarding the relation of age at suspected diagnosis to uncertainty would be helpful, particularly in examining the impact of illness disruption on key role identities, such as motherhood and sexuality. The relationships among education level, employment status, and socioeconomic status have been largely

ignored; these characteristics need better definition and evaluation for their impact on experiences within the healthcare system, availability of social resources, and coping ability.

Outside of optimism and hope, little research has examined the role of a woman's inner strength on the uncertainty experience. A need exists to examine the role of the attributes of inner strength in relation to uncertainty and the diagnostic process, particularly given that a greater sense of these dispositions is associated with lower levels of uncertainty (Mishel, 1997). Research should focus on the relationship of personality traits, including self-esteem, humor, resiliency, spirituality, and sense of purpose on coping and the subsequent effects on anxiety levels.

Few experimental studies have examined ways of assisting women in structuring uncertainty. Coping methods such as reflection and seeking support have been documented to decrease anxiety. The numerous coping strategies women report to use may be from the short length of the acute period of distress and women not knowing whether the coping strategy chosen is effective (Heckman et al., 2004). Additional study should emphasize how specific coping mechanisms are used to deal with the threat of a potential cancer (Drageset & Lindstrom, 2005) and to design and test specific nursing interventions that assist in reducing uncertainty. Given that women place a high value on social support, knowing whether having significant others accompany women on their initial and subsequent visits with healthcare professionals and whether assisting women on how to best use their social support network diminishes anxiety would be helpful.

Future research should focus on the design and testing of breast health advocacy programs that expedite scheduling of the diagnostic process to make the wait as short as possible (Arnsberger et al., 2006). A case management approach could be investigated for its impact on uncertainty. This approach would include the coordination of assistance with finances, transportation, and counseling in achieving the expediency goal, particularly in those with lower socioeconomic status who express low levels of optimism in relationship to care expectations (Allen et al., 2008; Lauver & Tak, 1995; Padgett, Yedidia, Kerner, & Mandelblatt, 2001). Longitudinal study also should be undertaken to explore the relationship between the diagnostic experience and the extent that psychological distress influences a future mammography screening.

Conclusions

The anxiety and fear that women experience during the breast diagnostic period can be profound, interfering with the ability to perform activities of daily living and

receive necessary information and health care. Nurses can be invaluable in assisting women in coping with the uncertainty experience by providing positive communication and support throughout the diagnostic period. One of the pivotal roles of the nurse is to see that the woman is provided with desired information at a level she can understand to meet her individual needs and to assure that the woman and her family has continued access to support. Nurses should address the specific needs of women and their significant others so that information can be given on anxiety-relieving coping measures that are tailored to their individual needs. Nurses should promote shortened waiting intervals between appointments and diagnostic tests by serving as an advocate and assisting with scheduling. In

women diagnosed with benign disease, nurses can be valuable in assisting to define a realistic assessment of breast cancer risk and outline a plan for future screening practices. The ultimate goal of nursing practice for reducing uncertainty is to promote a positive experience, particularly for higher risk women, so they have a quick return to a prebiopsy state of mind.

Mariann Montgomery, RN, MSN, CNE, is a doctoral student in the School of Nursing at West Virginia University in Morgantown and an assistant professor in the School of Nursing at Kent State University Tuscarawas in New Philadelphia, OH. No financial relationships to disclose. Montgomery can be reached at mmontgo5@kent.edu, with copy to editor at ONFEditor@ons.org. (Submitted September 2008. Accepted for publication April 19, 2009.)

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Appendix A. Literature Review

Article	N	Age (Years)		Purpose	Method	Results
		\bar{X}	Range			
Allen et al., 2008	64	–	–	Understand factors that facilitate or hinder their receipt of diagnostic services following an abnormal screening mammogram.	SS	Delayed follow-up was associated with dissatisfaction with communication of results; women perceived disrespect, anxiety and fear, and a lack of information. Women who received timely care more often reported availability of social support.
Andrykowski et al., 2002	100	45.3	21–82	Identify the impact of benign breast biopsy and individual variables associated with differences in outcome.	L	Higher levels of anxiety were associated with a family history of breast cancer, less social support, and use of avoidance coping strategies. Women with more education reported less stress. Distress persisted at eight months after biopsy.
Arnsberger et al., 2006	102	–	–	Examine factors influencing time from screening to diagnosis.	SS	Higher levels of anxiety were associated with a decrease in follow-up time.
Aro et al., 2000	492	50	–	Examine psychological distress associated with false-positive mammography results.	L	Although the overall distress levels declined, the false-positive group reported more worry about breast cancer, increased frequency of breast self-examination, and a heightened perceived risk that lasted at least 12 months.
Barton et al., 2004	2,844	52.9	–	Examine effects of immediate mammography results and the use of educational materials.	I	Immediate reading of screening mammograms, but not an educational intervention targeting coping skills, was associated with less anxiety. Elevated levels of anxiety persisted three months after receiving a benign diagnosis.
Benedict et al., 1994	238	52	44–68	Quantify the distress and experience associated with the breast biopsy.	X	Five major themes were identified regarding the response to anxiety: diversion, interpersonal, spiritual, hopefulness, and avoidance. No relationship was found between amount of anxiety and time trajectory.
Bradley et al., 2006	20	–	44–81	Assess the potential effects of a counseling intervention on biopsy knowledge, affective mood, and social support.	E	Participants stressed that they had anxiety during the diagnostic process, but no one asked them about it. The study described benefits in having information from a counseling session and access to talk with a nurse.
Brett et al., 1998	213	–	–	Determine whether distress remains five months after beginning breast diagnostic evaluation.	L	Women who underwent additional evaluation had greater adverse psychological consequences five months after their last screening appointment than women who received a clear result after mammography.
Chappy, 2004	22	–	19–82	Gain perspective into women's experience of the surgical phase of the diagnostic period.	SS	Seeking certitude was the key factor. To deal with loss of control, women used social support and inner strength, focusing on meaning and spirituality to decrease anxiety. Many became advocates for breast health.
Clutton et al., 1999	85	53	40–79	Examine role of social support and use of coping strategies on well-being during the evaluation period.	SS	Higher levels of well-being were associated with use of avoidant and active cognitive coping strategies. Women who perceived the event as more stressful obtained more benefit from social support.

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E—experimental study; I—intervention study; L—longitudinal study; SS—semistructured interview; X—cross-sectional survey

Appendix A. Literature Review (Continued)

Article	N	Age (Years)		Purpose	Method	Results
		\bar{X}	Range			
Deane & Degner, 1997	9	–	–	Identify the information needs of women who have had a breast biopsy with benign results.	SS	Women needed information regarding the types of benign breast disease, the risk associated with benign disease developing into breast cancer, and the tests required to diagnose and treat benign breast disease.
Deane & Degner, 1998	66	41	16–75	Determine the relationship between uncertainty and anxiety in women who had breast biopsy with benign findings.	X	Measurement of anxiety was directly correlated with uncertainty; neither was related to age or education. More educated people sought more information to use to make decisions. Information needs varied by age group. More anxiety was experienced in people without any previous breast-related history.
De Grasse et al., 1997	89	–	40–59	Identify supportive care needs and effectiveness of interventions in women undergoing breast biopsy.	SS	Women reported a lack of support and a desire for more information, to have their partners included, and to have the opportunity to speak with similar people. Women stressed the need for kind, compassionate care and spiritual support.
DeKeyser, 1998	35	–	–	Investigate distress and its association with immune function among women with suspected breast cancer.	L	Psychological distress scores were moderate to high. Increasing levels of distress and the existence of symptom distress negatively affected immune system function.
Demir et al., 2008	20	–	–	Examine the experience of women undergoing biopsy and the meaning that the experience held.	SS	All reported being fearful related to the uncertainty surrounding a diagnosis of cancer. Patients given adequate preoperative information felt more relaxed. All women reported the use of prayer and relying on spirituality.
Drageset & Lindstrom, 2003	117	53.6	25–76	Examine relationships among social support, anxiety, and coping mechanisms in relation to the mental health of women with suspected breast cancer.	X	Women reported elevated levels of anxiety and high levels of social support, but social support was not related to decreasing the level of anxiety. Defensive hostility was unrelated to anxiety; however, women may react with aggression, hostility, or projection, blaming their situation on others.
Drageset & Lindstrom, 2005	117	53.6	25–76	Examine relationships among demographic characteristics, social support, anxiety, and coping mechanisms in women with possible breast cancer.	X	Education level was positively related to social support and use of instrumental coping and negatively related to defense coping. Employment and marital status were negatively related to the use of defense coping. Higher reported levels of social support were positively related to use of instrumental and emotional coping and negatively related to use of defense coping.
Ferrante et al., 2008	105	50.1	–	Examine the effectiveness of a patient navigator in decreasing time to diagnosis, decreasing anxiety, and increasing satisfaction.	I	Use of a patient navigator resulted in improved time to diagnosis. Despite more women in the intervention group being diagnosed with cancer, anxiety levels of women in the group after diagnosis were significantly lower and satisfaction with care was higher than in women in the control group.

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E—experimental study; I—intervention study; L—longitudinal study; SS—semistructured interview; X—cross-sectional survey

Appendix A. Literature Review (Continued)

Article	N	Age (Years)		Purpose	Method	Results
		\bar{X}	Range			
Fridfinnsdotir, 1997	12	48.3	39–58	Describe stress in women prior to breast biopsy and identify factors related to type and satisfaction with social support.	SS	All women required emotional support from husbands, family, and close friends. Quality of social support rather than number of contacts accounted for differences in coping ability. Healthcare professionals were the most important source of informational support.
Haas et al., 2001	449	–	–	Examine factors associated with anxiety among women who receive an abnormal mammogram result	L	Women who are younger or who have had a prior breast biopsy have greater anxiety after an abnormal mammogram result. Substantial anxiety remained over an eight-month period for many women who receive an abnormal mammogram result.
Harcourt et al., 1999	781	42	–	Examine differences in worry, impact on daily functioning, and perceived satisfaction with care between women receiving one day versus delayed diagnosis.	I	Speedier diagnosis reduces psychological distress for women with benign conditions; results suggest a possible detrimental effect for women with cancer. Concern persisted at two months for women with benign disease. Use of active coping strategies correlated with a decrease in level of anxiety.
Heckman et al., 2004	98	52.5	30–80	Examine the relationship between anxiety and coping strategies after abnormal mammogram.	L	Women used a wide variety of coping strategies, which all were positively associated with lower levels of anxiety. The authors hypothesized that numerous strategies are used because the short length of the acute period of distress does not provide time for the woman to know whether the coping strategy chosen is effective.
Hislop et al., 2002	1,578	–	–	Examine time involvement and information needs on levels of anxiety and stress.	E	Counseling provided by nurse educators did not decrease anxiety or stress. Satisfaction was most related to shorter time delays and information received. Stress and anxiety increased and were correlated to the number of subsequent tests and awaiting each test result. No long-term distress was found.
Lampic et al., 2001	509	54.9	40–74	Examine psychological consequences of additional investigation after breast cancer screening.	X	Results confirmed the existence of anxiety, but not depression, among women. Although long-term levels of anxiety decreased, women continued to experience adverse psychological consequences related to thoughts and feelings regarding breast cancer.
Lauver & Tak, 1995	135	37	19–76	Assess whether optimism is associated with anxiety and expectations of a positive outcome in seeking care for a breast cancer symptom.	X	Optimism was associated with less anxiety and influenced having a higher expectation of a positive outcome from seeking care and the choice of positive coping mechanisms. Optimism was not correlated with the perceived likelihood of having breast cancer. Women with lower socioeconomic status expressed lower levels of optimism in relationship to care expectations.

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E—experimental study; I—intervention study; L—longitudinal study; SS—semistructured interview; X—cross-sectional survey

Appendix A. Literature Review (Continued)

Article	N	Age (Years)		Purpose	Method	Results
		\bar{X}	Range			
Lebel et al., 2003	25	56	–	Describe the experience of waiting for a breast biopsy and identify women at risk for distress.	L	Higher levels of anxiety were associated with a family history of breast cancer, having a previous biopsy, and being employed. The use of avoidance strategies was associated with a higher level of anxiety.
Liao et al., 2007	127	48	22–83	Identify educational and support needs during the breast diagnostic period.	L	The need for accurate and quality information was more important than emotional support. Women who were married, had a history of breast disease, and were more educated reported greater needs. Family involvement is integral in making decisions.
Logan et al., 2006	20	–	30–89	Explore perceptions of spirituality in women during the breast diagnostic period.	SS	Women created a focused isolation which allowed for reflection on their lives and a focus on the experience. Women relied on inner strength (e.g., focusing on spirituality, the use of humor and optimism) and selectively reached out to close family and friends. Distraction was valued.
Lowe et al., 1999	182	–	50–69	Explore the psychological distress of women recalled for diagnostic assessment.	L	Women who underwent breast evaluation experienced a sustained increase in their level of concern regarding breast cancer.
MacFarlane & Sony, 1992	42	–	21–75	Determine women's level of anxiety and the effects of influencing factors and coping mechanisms.	X	All women experienced stress; those aged 29–39 and women who had longer waiting periods reported the highest levels. No difference in anxiety was found based on marital status, education level, or occupation. Friends were most helpful in reducing anxiety at home; nurses were most helpful at the clinic.
Maxwell et al., 2000	52	–	–	Evaluate psychological distress related to breast biopsy.	L	Anxiety levels peaked just prior to biopsy but returned to normal levels at one month afterwards. Women reported that their level of anxiety interfered with their ability to work.
Northouse et al., 1995	300	48	25–75	Describe the emotional distress of women and their partners prior to breast biopsy and identify factors related to levels of distress.	X	Anxiety and uncertainty were positively correlated. Women reported distress that affected their decision-making ability. Women with less education, more feelings of hopelessness, and coexisting medical issues reported more distress. No correlation existed among age, employment, or income level.
Northouse et al., 1997	300	48	25–75	Identify the type of information women and their partners want and receive prior to biopsy and their level of concern.	X	Women and their partners responded that healthcare professionals need to provide written educational materials and support. Anxiety increased as the diagnostic period lengthened. Husbands desired information on how to help their wives cope with distress. High degree of concern existed even when women were told in advance that a benign outcome was highly probable.

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Appendix A. Literature Review (Continued)

Article	N	Age (Years)		Purpose	Method	Results
		\bar{X}	Range			
Novy et al., 2001	102	–	–	Investigate the level of anxiety and role of demographic factors immediately preceding breast biopsy.	X	Strong correlations with increased anxiety were found to be trait anxiety, increased age, less education, and number of relatives with breast cancer.
Olsson et al., 1999	235	–	50–69	Assess the long-term psychological impact on women who underwent breast evaluation and find factors that predict coping ability.	L	Strongest predictors of psychological distress six months after diagnostic evaluation were low level of education, living in high-density urban areas, and having only one child or no children at all. Widows appeared to cope better. Age had no effect.
O'Mahony, 2001	8	–	22–54	Gain insight and understanding of the experience of women undergoing breast biopsy with benign diagnosis.	SS	Themes that emerged from the data were finding the lump, waiting, not knowing, knowing, getting back to normal, and reflections. Support and information were viewed as the most positive coping resources. Women relied on hope and optimism.
Ong & Austoker, 1997	1,492	–	–	Identify the informational needs of women requiring additional evaluation after an abnormal mammogram.	X	Information received from healthcare providers was the most stress-relieving tool. Women responding from centers who provided nurse counseling reported higher levels of distress relief.
Owen, 1992	31	–	23–73	Examine relationships among coping behavior, emotional distress, and immune function across time in women undergoing breast biopsy.	L	All women had increased levels of stress and increased use of coping behaviors that peaked just prior to biopsy. No difference was noted in levels indicating immune system function between the biopsy and control groups.
Padgett et al., 2001	45	–	–	Give a narrative voice to what is known about the psychological sequelae of abnormal mammography.	SS	Using a message-framing strategy that informs a woman of the odds of a significant finding would be more reassuring. Case management approach could help women who need assistance during the diagnostic period.
Pineault, 2007	631	–	50–70	Describe the anxiety associated with breast cancer screening and explore the role of social support during the diagnostic period.	SS	High levels of anxiety were reported. Factors that increased anxiety were long waiting periods, poor communication, lack of written information, and a history of taking anti-anxiety medications. Family and others' support was comforting but did not relieve anxiety.
Poole et al., 1999	98	49	21–82	Investigate the differences in anxiety, mood, and coping behaviors between women who receive immediate diagnostic results and women with delayed results.	SS	Waiting for the results of diagnostic investigations sustains but does not exacerbate psychological distress. The authors described time as one of preparatory psychological process and gave vivid accounts of rehearsing life with breast cancer. The type of coping strategy was not related to reported level of psychological distress.
Poole & Lyne, 2000	40	–	21–73	Investigate the psychological impact associated with diagnosing breast disease.	SS	Monitoring for cues appears to offer a means of reducing uncertainty and regaining control by serving as a potential indicator of a pending diagnosis.

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E—experimental study; I—intervention study; L—longitudinal study; SS—semistructured interview; X—cross-sectional survey

Appendix A. Literature Review (Continued)

Article	N	Age (Years)		Purpose	Method	Results
		\bar{X}	Range			
Potter, 2007	35	52	37–75	Evaluate stress responses to a Reiki intervention.	I	Women reported high levels of anxiety; no difference existed in reports between study participants and control group.
Rehnberg et al., 2001	45	50	–	Determine information needs and satisfaction with information of women referred for breast biopsy.	X	Women with a high level of education expressed dissatisfaction with amount of information and took an active role in finding their own information. Less-educated women worried more from lack of understanding the information about procedures and terminology in general.
Riese, 2001	22	–	19–82	Examine the lived experience of women undergoing breast biopsy.	SS	Women's strongest need was to have the biopsy results as soon as possible. Most women sought reassurance and support from family and friends; many turned to a focused isolation. Most said their experiences made them advocates for breast health.
Scott, 1983	85	–	18–60	Evaluate the relationships among anxiety level, critical-thinking ability, and ability to process information during the diagnostic process.	L	All women had high anxiety levels during the diagnostic process; the levels were not present six weeks after receiving a benign diagnosis. Critical-thinking ability decreased as anxiety level increased. Level of anxiety had no effect on the timely processing of information.
Seckel & Birney, 1996	30	–	–	Identify the relationship between age and social support while experiencing the stress of a breast biopsy.	X	All women had significant stress; the highest levels were reported in women younger than age 40. Number of social support people did not affect anxiety; a lower level of strength of support was associated with higher anxiety. No relationship was noted between age and social support.
Shaw et al., 1994	11	55.9	35–72	Determine the informational needs of women and their partners and how information influences the biopsy experience.	SS	All women reported distress; information management was useful in reducing distress. Lower levels of distress occurred in women with a previous biopsy experience. Women coped by staying busy and putting their faith in God.
Thorne et al., 1999	33	–	42–69	Understand the experience of women following abnormal screening mammogram and before definitive diagnosis.	SS	Information, support from women with similar experiences, and timely coordination of services are critical. Women believed that the overall experience was dehumanizing; this could have been mediated by positive healthcare communication. Level of anxiety and fear interfered with ability to work and make decisions.
Walter, 2005	29	–	–	Examine relationships among perceived stress, coping, social support, and neuroendocrine and immune markers in women undergoing breast biopsy.	L	The level of perceived stress was directly related to social support. Measurements of immune system indicators showed that immune mobilization processes were in effect. Women were more likely to use emotion-focused coping processes during the pre-biopsy period.

E—experimental study; I—intervention study; L—longitudinal study; SS—semistructured interview; X—cross-sectional survey