Self-Reported Comorbid Conditions and Medication Usage in Breast Cancer Survivors With and Without Lymphedema

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Purpose/Objectives: To compare the self-reported comorbid conditions and medication usage between breast cancer survivors with and without breast cancer treatment-related lymphedema.

Design: Descriptive, cross-sectional.

Setting: A community-based study conducted in a major metropolitan area and surrounding rural counties in the southeastern United States.

Sample: A convenience sample of 64 breast cancer survivors with lymphedema and 64 breast cancer survivors without lymphedema who were age matched within three years and recruited for a parent study. Twenty-one additional nonage-matched breast cancer survivors with or without lymphedema also were included.

Methods: Self-reported survey instruments and height and weight measurement.

Main Research Variables: Lymphedema, demographic information, self-reported comorbid diseases or medical issues, and medication usage.

Findings: Breast cancer survivors with lymphedema experienced more comorbid conditions. Statistically significant group differences were found in body mass index, orthopedic issues, cardiac medications, hormone blockers, and osteoporosis medication or calcium supplement usage. Co-occurrence of diabetes and carpal tunnel syndrome approached statistical significance. Breast cancer survivors with lymphedema were older and had lower incomes.

Conclusions: Comorbid conditions may influence the development of breast cancer treatment-related lymphedema. Further research, particularly a longitudinal study, is indicated.

Implications for Nursing: Healthcare professionals who care for breast cancer survivors need to routinely assess them for the presence of comorbid conditions and the development of lymphedema. Obese breast cancer survivors may benefit from weight reduction interventions to possibly decrease their risk of developing lymphedema and improve their overall health status. Patients with arthritis and orthopedic and cardiac issues such as hypertension may warrant careful monitoring.

Key Points . . .

- Breast cancer survivors remain at risk for developing lymphedema throughout their lifetimes.
- Comorbid conditions may influence the development of lymphedema or patient symptom profiles.
- Participants with lymphedema had higher body mass index and more orthopedic issues and took more cardiac medications than those without the condition.
- Future research exploring comorbid conditions, their possible influence on the development of breast cancer treatment-related lymphedema, and the temporal patterns of such relationships is warranted.

Since the earliest historic documentation of the removal of a breast and its surrounding structures in the second century (Lewison, 1955), many breast cancer survivors have experienced cancer treatment-related lymphedema (i.e., the collection of fluid and protein in the interstitial spaces) (Rockson, 2001). Breast cancer treatment-related lymphedema was documented in the surgical literature in 1898, when Heuter reported swelling of an arm after breast surgery (Matas, 1913). In 1908, Handley wrote that "brawny swelling" of the arm was one of the worst complications of breast cancer. In 2007, approximately 2.4 million breast cancer survivors were residing in the United States (National Cancer Institute, n.d.). Despite the development of breast-conserving surgical procedures and changes in axillary dissection techniques, current studies suggest that breast cancer survivors continue to be at risk for the development of lymphedema after treatment.

Studies have reported that 6%–40% of breast cancer survivors will develop cancer treatment-related lymphedema at some point during their lives (Armer, Fu, Wainstock, Zagar, & Jacobs, 2004; Petrek, Pressman, & Smith, 2000; Wilke et al., 2006). For example, a large prospective multicenter trial tracked arm circumference, with a 2 cm or more increase indicating lymphedema; the researchers found that 7% of those undergoing sentinel lymph node biopsies had lymphedema six months after the procedure (Wilke et al.). A second study using a 2 cm difference between the affected and unaffected limbs as the definition of lymphedema found that the condition occurred in

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22% of patients who had a sentinel lymph node biopsy and 43% of patients who had axillary dissection (Armer et al., 2004). Those rates demonstrate a reduction in breast cancer treatment-related lymphedema that once was believed to be as high as 80% when radical mastectomies were the standard of care (Lobb & Harkins, 1949). The reduction in lymphedema occurrence suggests that the gross trauma inflicted on the lymphatic system by procedures such as radical mastectomies and extensive axillary lymph node dissections is a key factor in the condition's development. However, little is understood about the factors that may be associated with breast cancer treatment-related lymphedema other than type of breast surgery and lymph node–staging procedures. Research also has been unable to determine why individuals can avoid developing lymphedema for decades after breast cancer treatment, only to have it arise seemingly overnight. Although the literature suggests that obesity and infections in the arms may be associated with post-treatment lymphedema, not all obese breast cancer survivors or those who experience arm infections develop the symptom (Masmoudi et al., 2005). The inconsistencies raise the possibility that individual variables such as comorbid conditions may influence the onset of lymphedema in certain breast cancer survivors.

The purpose of the current study was to compare self-reported comorbid conditions and medication usage between breast cancer survivors with and without breast cancer treatment-related lymphedema. Answers to the following specific research questions were sought.

- Is there a difference in the type and number of comorbid conditions experienced by breast cancer survivors with lymphedema compared to breast cancer survivors who do not have lymphedema?
- Is there a difference in the type and number of medications used by breast cancer survivors with lymphedema compared to breast cancer survivors who do not have lymphedema?
- Do any medical conditions or medications predict lymphedema occurrence?
- Is there an association between lymphedema and the total number of comorbid conditions?
- Is there an association between lymphedema and the total number of medications used?

Literature Review

Although a direct comparison of comorbid conditions between breast cancer survivors with and without treatment-related lymphedema is lacking in current literature, extant literature suggests that some comorbid conditions may be associated with lymphedema. Say and Donegan (1974) reviewed the medical records of 1,551 patients with breast cancer treated from 1940–1965 and found that patients who weighed more than 200 pounds experienced immediate postoperative arm swelling more frequently than those weighing less than 200 pounds. A second, more recent study reported higher body mass index in breast cancer survivors with lymphedema than those without lymphedema and that obese women experienced severe lymphedema more frequently than nonobese women (Johansson, Ohlsson, Ingvar, Albertsson, & Ekdahl, 2002). Erysipelas, a streptococcal hypodermal cellulitis that can develop in affected arms of breast cancer survivors, is believed to trigger lymphedema and occur more frequently in arms in which lymphedema has developed previously (El Saghir, Otrock, Bizri, Uwaydah, & Oghlakian, 2005; Hinrichs et al., 2004; Langer et al., 2005; Masmoudi et al., 2005). Fatigue also has been associated with lymphedema in breast cancer survivors who are not undergoing cancer treatment and managing lymphedema with at-home self-care practices (Armer & Porock, 2001; Ridner, 2005). Breast cancer survivors without lymphedema may experience pain in their arms, but those with lymphedema often report arm sensations or levels of pain intensity that differ from those without lymphedema (Bosompra, Ashikaga, O'Brien, Nelson, & Skelly, 2002; Deutsch & Flickinger, 2001; Newman, Brennan, & Passik, 1996; Passik, Newman, Brennan, & Tunkel, 1995; Ridner, 2005). Psychological distress and depression also have been documented in individuals with secondary lymphedema (McWayne & Heiney, 2005; Passik et al.). Psychological distress often is driven by patients' perception that healthcare professionals have limited knowledge about lymphedema and are uninterested in the complications associated with this chronic outcome of treatment (McWayne & Heiney; Ridner, 2004).

Elevated body mass index may influence lymphedema development, and symptoms such as fatigue, unusual arm sensations, psychological distress, and depression may be related to the lymphedema itself. However, whether physical conditions such as arthritis, hypertension, or diabetes occur more often in breast cancer survivors with treatment-related lymphedema than in those who do not develop lymphedema is unknown. Using self-reported medical problems and medication usage data, this article presents findings relative to a secondary aim of comparing the self-reported comorbid conditions and medication usage between breast cancer survivors with and without cancer treatment-related lymphedema.

Theoretical Framework

The Lenz theory of unpleasant symptoms served as the theoretical framework for the parent study and influenced the decision to include a secondary aim to explore comorbid conditions that may be present in breast cancer survivors (Lenz, Pugh, Milligan, Gift, & Suppe, 1997; Lenz, Suppe, Gift, Pugh, & Milligan, 1995; Parshall et al., 2001; Pugh, Milligan, Parks, Lenz, & Kitzman, 1999). Symptoms, according to the theory, are indicators of change in normal functioning as perceived by an individual (Dodd, Miaskowski, & Paul, 2001; Lenz et al., 1997), and breast cancer survivors with lymphedema perceive the swelling of the affected limb as a primary symptom or late effect of cancer treatment. According to the theory of unpleasant symptoms, interrelated physiologic, psychological, and situational factors influence the symptoms that a person experiences. Thus, physical and psychological comorbid conditions and medication usage may influence the symptom profiles of breast cancer survivors with lymphedema.

Methods

Participants

The data collected were part of a community-based descriptive study of breast cancer survivors with and without breast cancer treatment-related lymphedema that had multiple primary and secondary aims (Ridner, 2005, 2006). With university institutional review board approval, the principal investigator contacted women in an existing database of more

than 200 breast cancer survivors who had given permission to be contacted for research studies. In addition, advertisements for the study were posted online through a medical center communications Web site, and brochures describing the study were distributed to lymphedema therapists in the targeted geographic area and at a local community center. Unsolicited reporting of this study by a national lymphedema organization and a local oncology nursing group resulted from word-of-mouth discussions by the study participants, which led to some self-referrals.

Inclusion criteria required the breast cancer survivors to be older than 21, read and speak English, and stand for height and weight measurement. Individuals actively undergoing radiation or chemotherapy and those with metastatic disease were excluded because of possible confounding conditions. Because pregnancy, congestive heart failure, chronic or acute renal disease, cor pulmonale, nephrotic syndrome, nephrosis, liver failure, and cirrhosis can cause edema in limbs, individuals with those conditions were excluded from the study. Also excluded from the study were individuals with a history of bilateral breast cancer treatment because it prohibited comparison to a pure unaffected arm during bioelectrical impedance limb measurements.

Of 184 women eligible for the study, 153 consented to participate. Four women who consented withdrew before data collection for medical and personal reasons; thus, a total of 149 women completed the study. The total sample consisted of 74 women who had developed lymphedema after surgery, chemotherapy, or radiation treatment for breast cancer and 75 women who did not develop lymphedema after treatment. In the two groups, 64 breast cancer survivors with lymphedema were age matched (within three years) to 64 breast cancer survivors without lymphedema as part of the parent study. An additional 21 nonage-matched breast cancer survivors with and without lymphedema were recruited for the study beyond those 128 initially recruited for the parent study to allow for a larger sample size from which to evaluate comorbid conditions.

Procedure

All data were collected by the principal investigator in multiple settings, including participants' homes, private areas in work settings, and in a university school of nursing. Written informed consent was obtained and data collection took place at a single time point. Participants completed demographic, cancer, and lymphedema disease and treatment surveys, as well as surveys soliciting information about existing health problems and medication use. Participants' height and weight were measured during the data collection visit. Each participant was compensated $25 for the time needed to complete the questionnaires and to cover any expenses that may have been incurred such as parking and gasoline.

Measures

Demographic questionnaire: A modification of a standard data collection form previously used in breast cancer research studies to obtain self-reported demographic information was used in this study (Carpenter & Andrykowski, 1999; Carpenter, Johnson, Wagner, & Andrykowski, 2002). Data collected were date of birth (used to calculate age at diagnosis and age at enrollment), years of education completed, race, marital status, income, and employment status. Several items were added for this study to allow examination of the potential relationships among the variables and lymphedema status: city, country, or other geographic area of residence, and insurance status.

Breast cancer history and treatment form: This form has been used previously in breast cancer research studies to collect self-reported information about cancer treatment (Carpenter & Andrykowski, 1999; Carpenter et al., 2002). It included questions about the date of breast cancer diagnosis, stage of disease, and type and dates of treatment. Permission to request medical records to verify self-reported cancer history was sought from each participant to validate breast cancer history, although receipt of such records was not required for study inclusion because of its community-based nature. When permission was granted, medical records were requested from community-based medical oncologists and surgeons. Records were obtained for 98 participants (66%). Comparison of self-reported information to documented medical records revealed 100% agreement in dates (within a month) and types of treatment received (surgery, radiation, and chemotherapy). In addition, although some participants were uncertain of the stage of their cancer at the time of diagnosis, most accurately recalled the size of mass (greater or less than 2 cm) and lymph node status (positive or negative), which enabled staging to be determined.

Lymphedema history and treatment form: This form used the same format and design as the breast cancer treatment form. The following data were collected: date of lymphedema diagnosis, location, grade of lymphedema if known, type and dates of initial treatment, and type of current treatment. Only individuals in the lymphedema group completed this form.

Health and medication or supplement questionnaire: Participants completed a health survey that asked them to list current comorbid conditions or issues and the medications or supplements they were taking.

Body mass index: Participants were weighed using a body weight scale that measures as much as 300 pounds within 0.1 pounds. Weight was measured twice, and the average was recorded. Height was measured twice using a pocket stadiometer, and the average was recorded. Body mass index subsequently was calculated by dividing weight in pounds by height in inches squared and multiplying by a conversion factor of 703 (Centers for Disease Control and Prevention, 2007).

Statistical Analysis

Data were analyzed using SPSS® 14.0 (SPSS Inc.). Unless specifically noted, a maximum alpha level of 0.05 was preserved for all statistical significance tests. Differences between the distributions of nominal data in the lymphedema and nonlymphedema groups (e.g., place of residence) were examined using chi-square tests of independence. After determining that distributional assumptions were met, the researchers used independent t tests to examine differences in continuous variables such as body mass index, age, years since breast cancer diagnosis, and years of education. Distributional assumptions were not met for number of medical issues and medications used; thus, Mann-Whitney tests were used to examine the differences between the groups, and Spearman's rho correlations were used to assess the associations among total number of medical issues, medications used, lymphedema status, and body mass index. Logistical regression was used to evaluate

the relationships of comorbid conditions and medication or supplement use to lymphedema status.

Results

Demographics

Table 1 summarizes the demographic characteristics of study participants. Participants were primarily Caucasian, married, well educated ($\bar{X}$ = 14.6 years of education), and well insured. No statistically significant differences were found between the lymphedema study groups among those characteristics; however, statistically significant differences were found for age and income level (p = 0.030 and 0.001, respectively). Although the ages of the study participants ranged from 34–94 years and most were typically middle aged, the participants with lymphedema were on average about four years older (~60 years) than those without lymphedema (~56 years). Individuals with lymphedema tended to have lower incomes than their nonlymphedema counterparts, with 16% of the participants with lymphedema living below the U.S. poverty level of $20,000 or less per year for a family of four (U.S. Department of Health and Human Services, 2006) compared to 7% of the participants without lymphedema. At the other end of the income continuum, 41% of the participants with lymphedema had incomes of more than $50,000 compared with 75% of those without lymphedema. No statistically significant differences were found between the groups in terms of employment status and geographic area of residence.

Breast Cancer and Lymphedema History

No statistically significant differences were found between the groups regarding the combination of cancer treatments received. A statistically significant difference was found in the type of surgical procedures performed (p = 0.006). Only 30% of those with lymphedema had breast-conserving procedures compared with 52% of those without lymphedema. All participants reported an ongoing professional relationship with an oncologist, although frequency of contact varied based on the length of time since breast cancer diagnosis.

Seventy-seven percent of the participants with lymphedema reported that they were the first to note swelling in the limb, whereas 10% of participants reported that the surgeon first identified the condition. As expected, length of time from breast cancer diagnosis to lymphedema diagnosis, time from lymphedema diagnosis to lymphedema treatment, and subsequent duration of lymphedema formed extreme, positively skewed distributions. The average time from date of breast cancer diagnosis to lymphedema diagnosis was 39 months; however, the median time was 15 months (interquartile range [IQR] = 8–53 months). Because of some very extreme outliers, 252 and 375 months, the average length of time from lymphedema diagnosis to lymphedema treatment was 15 months; however, the median time to treatment was one month (IQR = 0.5–6 months). Duration of lymphedema at the time of the study varied from a minimum of four months to more than 34 years ($\bar{X}$ = 68 months, median = 44 months, IQR = 21–85 months). Findings about initial lymphedema treatment type and current treatment have been presented elsewhere (Ridner, 2006).

Table 1. Demographic Characteristics

	No Lymphedema (N = 75)		Lymphedema (N = 74)		All (N = 149)	
Characteristic	**$\bar{X}$**	**SD**	**$\bar{X}$**	**SD**	**$\bar{X}$**	**SD**
Age*	55.7	9.8	59.6	11.9	57.6	11.0
Years of education	14.9	2.3	14.3	2.5	14.6	2.4
Characteristic	**n**	**%**	**n**	**%**	**n**	**%**
Caucasian	67	89	65	88	132	89
Married	58	77	47	64	105	70
Private insurance[a]	59	79	50	68	109	73
Income ($)[b]**						
≤ 20,000	5	7	10	16	15	12
20,001–50,000	12	18	27	43	39	30
> 50,000	50	75	26	41	76	58
Employed	41	55	36	49	77	52
Rural dwelling	23	31	24	32	47	31

* p < 0.05; ** p = 0.001

[a] All other participants had government-financed insurance except one participant with lymphedema who did not have insurance.

[b] N = 130 (no lymphedema N = 67; lymphedema N = 63)

Comorbid Conditions

A marginal statistically significant difference (p = 0.052) was found between the total number of comorbid conditions reported on average by the women in the groups. Forty-four percent of those without lymphedema reported no medical issues compared with approximately 30% of the lymphedema group reporting no problems. About 35% of the participants with lymphedema reported three or more comorbid conditions, whereas only about 25% of those without lymphedema reported having more than two conditions. Obesity, defined as a body mass index of 30 or greater (Centers for Disease Control and Prevention, 2007); hypertension; and arthritis were the most frequently occurring comorbid conditions experienced by all study participants (see Table 2). Women in the lymphedema group tended to experience the three conditions more frequently than the comparison group, but only the difference in the rates of obesity was significantly different (p = 0.005). In addition, a statistically significant association was found between lymphedema status and body mass index (r = 0.253, p = 0.002), with those having lymphedema tending to have a higher body mass index. Participants with lymphedema experienced orthopedic (i.e., spine and shoulder) complications at statistically significantly higher levels (p = 0.005) and carpal tunnel syndrome at marginally statistically significantly higher levels (p = 0.051) than those without lymphedema.

A logistical regression analysis that included the self-reported comorbid diseases as predictors of lymphedema status revealed an overall statistically significant model (p = 0.006). Although none of the individual comorbid conditions alone was statistically significant (suggesting the combination of predictors is important), orthopedic problems showed the strongest weight (odds ratio [OR] = 8.00, p = 0.057), followed by diabetes (OR = 6.68, p = 0.086) and carpal tunnel syndrome (OR = 3.46, p = 0.077).

Medications

As summarized in Table 3, osteoporosis medication or calcium supplements and cardiac, hormone blocker, and antidepressant or antianxiety medications were the most frequent

Table 2. Presence or Absence of Comorbid Conditions

	No Lymphedema (N = 75)		Lymphedema (N = 74)		All (N = 149)	
Condition	**n**	**%**	**n**	**%**	**n**	**%**
Allergies or chronic obstructive pulmonary disease	4	5	6	8	10	7
Arthritis	15	20	20	27	35	24
Body mass index ≥ 30*	17	23	33	45	50	34
Cardiac	4	5	3	4	7	5
Carpal tunnel syndrome	1	1	6	8	7	5
Cellulitis	–	–	1	1	1	1
Crohn disease	1	1	2	3	3	2
Depression or anxiety	2	3	2	3	4	3
Diabetes	3	4	8	11	11	7
Fibromyalgia	2	3	4	5	6	4
Gastric reflux	7	9	7	9	14	9
High cholesterol	4	5	6	8	10	7
Hypertension	16	21	23	31	39	26
Lower limb lymphedema	1	1	1	1	2	1
Multiple sclerosis	–	–	–	1	1	1
Osteoporosis	4	5	5	7	9	6
Orthopedic*	–	–	7	10	7	5
Pain	3	4	–	–	3	2
Parkinson disease	–	–	1	1	1	1
Rosacea	1	–	–	–	1	1
Sleep disorder	–	1	1	1	1	1
Thyroid	8	4	3	4	11	7
Vaginal discomfort	–	1	1	1	1	1

* $p < 0.01$

categories of medications or supplements used by study participants overall. No statistically significant difference in the total number of medications taken was noted between groups. A detailed examination of individual categories of medication use revealed a statistically significant difference in the use of hormone-blocking agents such as tamoxifen and anastrozole ($p = 0.033$) and cardiac or antihypertensive medications ($p = 0.05$). Logistical regression analysis revealed no statistically significant relationship between medication use and lymphedema status.

Discussion

Few demographic differences were noted between the two groups. Participants with lymphedema were slightly older ($\bar{X} = 59.6$ years, SD = 11.9 years) than those without ($\bar{X} = 55.7$ years, SD = 9.8 years). Individuals with lymphedema had lower incomes than their nonlymphedema counterparts, suggesting that income may be a situational influencing factor, which is consistent with findings in other studies that indicate an association with lower socioeconomic status and self-reported lower health status (Franks, Gold, & Fiscella, 2003; Gold, Franks, & Erickson, 1996). However, in the current study, income level was confounded with a number of other variables (e.g., city, rural dwelling) and further research is needed to delineate the unique influence of financial resources on lymphedema. The high percentage of participants with lymphedema who self-identified the swelling raises questions about the quality and quantity of lymphedema assessments performed by healthcare professionals practicing inside and outside oncology. Patients' overall level of education and lymphedema-specific education during breast cancer treatment also may play a critical role in lymphedema identification and diagnosis (Ridner, 2006).

The present study found differences in the type and number of comorbid conditions experienced by breast cancer survivors with lymphedema when compared with breast cancer survivors who did not have lymphedema. More participants in the lymphedema group were obese and had orthopedic problems, hypertension, and arthritis than their nonlymphedema counterparts. Because of the cross-sectional nature of the study, whether the conditions were preexisting or arose after lymphedema development is unclear. Regardless of the sequence of events, the findings suggest the role of limited activity or movement, compromised cardiovascular systems, and inflammatory processes in the development of lymphedema and as consequences of lymphedema, which warrants further investigation. The findings are particularly salient given that movement of the body is required to propel lymph through the lymphatic system (Foldi, Foldi, & Kubik, 2003), and bench studies have revealed inflammatory changes and upregulation of genes related to acute inflammatory responses in mice that were subjected to laboratory-induced tail lymphedema (Tabibiazar et al., 2006). Similar to the comorbid condition findings, analyses of medication usage revealed a significant difference in the use of cardiac medications between groups, with the lymphedema participants showing a higher pattern of use.

Based on the study's findings, age and income may be associated with breast cancer treatment-related lymphedema or they may be factors that increase the probability of comorbid

Table 3. Medications or Supplements Taken

	No Lymphedema (N = 75)		Lymphedema (N = 74)		All (N = 149)	
Medication	**n**	**%**	**n**	**%**	**n**	**%**
Antibiotic	4	5	2	3	6	4
Antidepressant or antianxiety	17	23	24	32	41	27
Antihistamine or inhaler	14	19	18	24	32	22
Anti-inflammatory	13	17	15	20	29	19
Cardiac or antihypertensive*	20	27	31	42	51	34
Cholesterol lowering	9	12	15	20	24	16
Diabetic	3	4	6	8	9	6
Gastric	12	16	8	11	20	13
Hot flash	2	3	1	1	3	2
Hormone blocker*	27	36	15	20	42	28
Hormone replacement	3	4	5	7	8	5
Osteoporosis or calcium	37	49	25	34	62	42
Pain	5	7	5	7	10	7
Sleep aid	4	5	4	5	8	5
Thyroid hormone	14	19	12	16	26	17

* $p < 0.05$

conditions that influence the development of lymphedema. In this study, comorbid conditions of obesity, hypertension, arthritis, and orthopedic problems were suggested as influencing the development of breast cancer treatment-related lymphedema.

Study Limitations

Findings from this study should be considered in light of its limitations. First, because of exclusion criteria for the parent study, individuals with certain comorbid conditions such as renal disease or heart failure were not included; thus, the association of those conditions with the development of breast cancer treatment-related lymphedema remains under reported. Second, the information presented relies on self-reports of comorbid conditions and, therefore, may not provide an accurate or comprehensive view of diagnosed medical conditions in this population. Third, the cross-sectional design limits the ability to evaluate a causal relationship among comorbid conditions, demographic characteristics, and breast cancer treatment-related lymphedema. Finally, the use of a convenience sample of volunteer participants may have introduced self-selection bias.

Implications for Nursing

Practice

Healthcare professionals who care for breast cancer survivors need to assess them regularly for the presence of comorbid conditions and lymphedema. Arm measurement protocols incorporating valid and reliable measurement methods need to be developed and become a standard of practice similar to the common practices of measuring blood pressure and weight during each office visit. When developing such protocols, healthcare professionals can measure lymphedema in an arm using several methods, including water displacement, limb girth via tape measurements in centimeters, limb volume using serial circumferential measurements, and infrared laser perometry. In addition, bioelectrical impedance devices have been approved by the U.S. Food and Drug Administration and are available for use in clinical settings (ImpediMed, 2007). Clinicians may want to consider issues such as equipment cost, time to conduct measurements, and patient and staff ease of use when deciding which technique to use because studies suggest that each method appears to be a valid technique for assessing upper-limb lymphedema (Ridner, Montgomery, Hepworth, Stewart, & Armer, 2007). If objective methods to measure limbs are unavailable, nurses can assess patients for lymphedema by conducting a brief interview (Armer, Radina, Porock, & Culbertson, 2003). Specifically, nurses can ask patients whether, compared to the opposite arm, the arm on the side where they had breast cancer felt heavy in the past year, does it currently feel heavy, and if the arm, hand, fingers, and chest have swelled now or in the past year.

Obese breast cancer survivors may benefit from weight reduction interventions, including nutrition and exercise counseling, to decrease their risk of developing lymphedema and improve their overall health status. Based on findings from this study, patients with arthritis, orthopedic, and cardiac problems such as hypertension may warrant careful monitoring. When healthcare professionals identify breast cancer survivors with comorbid conditions, ongoing assessment of total symptom burden is warranted. Implementation of psychological and physiologic interventions may be required to help reduce overall symptom burden.

Future Research

Findings from this study suggest that a relationship may exist between some comorbid conditions in combination with certain demographic characteristics and breast cancer treatment-related lymphedema. Longitudinal studies of lower socioeconomic status, educational level, lymphedema education, and rural residency are indicated to better understand their role in the development and severity of lymphedema after breast cancer treatment. Researchers also may wish to investigate the potential influence of the type of healthcare professionals most frequently seen by breast cancer survivors as well as the initial (Ridner, 2006) and ongoing lymphedema education received on the early diagnosis of the condition.

Comorbid conditions, their possible influence on the development of breast cancer treatment-related lymphedema, and the temporal patterns of such relationships warrant further investigation. Additional research into the influence of comorbid conditions on symptom profiles or clusters experienced by breast cancer survivors with and without lymphedema and their patterns over time also is indicated. Such research would enable healthcare professionals to improve patient care.

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