The Effect of an Educational Intervention on Promoting Breast Self-Examination in Older African American and Caucasian Women

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Purpose/Objectives: To test the efficacy of innovative, age- and race-sensitive, self-monitored, video breast health kits in increasing knowledge about breast cancer risk and screening and breast self-examination (BSE) proficiency.

Design: Quasi-experimental pretest and post-test design.

Setting: Dual-site study in community-based settings in the Northeast and Southeast United States.

Sample: 328 women (206 in the intervention group, 122 in the control group) aged 60 or older; predominantly African American (77%); mean education of 10.8 years; annual income below $10,000 (50%).

Methods: Individual pretest and post-test interviews conducted by nurses at two-week intervals assessed knowledge about breast cancer risk and screening and BSE proficiency as demonstrated on vested breast models. Intervention subjects used video breast health kits in ethnic editions designed for the study. Control subjects received educational pamphlets.

Main Research Variables: Dependent variables were knowledge about breast health and BSE proficiency measured by demonstration of inspection and palpation skills and detection of lumps in a simulation model.

Findings: Three multiple analyses of covariance revealed statistically significant differences in outcome variables between the intervention and control groups.

Conclusions: The intervention was effective in increasing knowledge about breast cancer risk and screening and BSE proficiency in this sample of older women.

Implications for Nursing: These and other educational interventions designed specifically for age and race sensitivity may enhance cancer screening with vulnerable populations. Future studies with more diverse multicultural groups are needed to improve understanding of how to best influence breast health behaviors of older women.

Key Points . . .

- In the United States, breast cancer screening rates are lowest for older women even though the risk of breast cancer increases with age. Caucasian women have the highest incidence rates of breast cancer, but African American women have the highest mortality rates.
- Because elderly and minority populations are difficult to access and influence for screening, nurses must design innovative and sensitive educational programs targeting these vulnerable consumers.
- Video modeling, specifically targeting high-risk groups by age and ethnicity, conveys desired attitudes and behaviors to the targeted population and personalizes its learning.
- Self-instruction programs, such as the video breast health kit, offer an alternative to traditional, labor-intensive, provider instruction. Clients who have been preeducated in screening issues and how to perform breast self-examinations will be better prepared to understand the nurse-provider instruction and recommendations made during primary care visits.

Breast cancer is the most common cancer diagnosed among women in the United States. The American Cancer Society (ACS) estimates that 203,500 new cases of invasive breast cancer will be diagnosed in 2002, with 39,600 women dying from the disease (ACS, 2002). Despite increasing incidence rates, breast cancer mortality rates decreased from 1992–1996, with the largest decrease occurring in younger women. The decline in mortality rates is attributed largely to earlier detection and more effective treatment. Currently, ACS supports screening recommendations of annual mammograms, annual clinical breast examinations, and monthly breast self-examinations (BSE) for all women older than 40.

The risk of breast cancer increases dramatically with age. Women older than 65 represent greater than half of all new breast cancer cases (Vanderford, 1999). Although older women are at greater risk for developing the disease, they are less likely to be screened routinely. One factor related to low screening rates for this population is poor provider instruction. Older women do not know they are at the highest risk for breast cancer or are not directly instructed by providers to

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have mammograms (Vanderford). Patient fears and attitudes about breast cancer screening also affect risk assessment and screening compliance (Friedman, Neff, Webb, & Latham, 1998; Phillips, Cohen, & Moses, 1999).

Mortality rates are highest among African American women, although Caucasian women have a higher incidence of the disease (ACS, 2002; Phillips et al., 1999). Since 1992, breast cancer death rates for African American women have exceeded those of Caucasian women older than 65 (Kosary, Ries, & Miller, 1995) because their breast cancer is diagnosed at a later stage (Joslyn & West, 2000; Wingo, Ries, Rosenberg, Miller, & Edwards, 1998).

Socioeconomic factors influence breast cancer education and screening. Higher rates of late-stage breast cancers are found among populations with annual income levels of less than $5,000 (Lannin et al., 1998). These researchers found that populations of lower socioeconomic status had decreased access to providers and screening. Freeman, Muth, and Kerner (1995) suggested that cancer education and outreach efforts are insensitive and irrelevant to many low-income individuals. Given that low-income, elderly, and minority populations historically are difficult to access and influence, nurses and other providers must design increasingly innovative and sensitive educational programs targeting these vulnerable consumers.

Purpose

The purpose of this study was to test the effects of innovative age and ethnically sensitive, self-monitored, video breast health kits to increase knowledge about breast cancer risk and screening and BSE proficiency in a sample of older women. The study was designed to answer the following research questions: Did women who used the video breast health kit have significantly better knowledge about breast cancer risk and screening than those who did not use the kit? Were women who used the video breast health kit significantly more proficient at BSE than those who did not use the kit?

Conceptual Framework

Based on the Social Learning Theory (Bandura, 1977), the intervention designed for this study used video modeling to increase knowledge about risk and foster desirable breast health practices. Bandura postulated that most human behavior is learned through modeling or observing others to determine how new behaviors should be performed. In addition, practicing the new skill (i.e., rehearsal) is essential because symbolic modeling (i.e., watching others perform a skill) is not as likely to produce the desired behavior as participant modeling (i.e., actively practicing a skill).

Attention to the modeled behavior is enhanced by interpersonal attraction. Learners will seek out models who possess appealing qualities but ignore or reject models they perceive as unappealing. Modeling can strengthen or weaken previously learned behaviors. For example, observing models perform a feared activity without any harmful effects weakens defenses, reduces fears, and creates favorable attitudinal changes. This phenomenon is relevant particularly to this study because BSE potentially is an anxiety-producing activity in which a positive finding (breast lump) is a negative reinforcer. This study builds on the work of other researchers (O'Donnell, San Doval, Duran, & O'Donnell, 1995; Solomon & DeJong, 1989) who used the Social Learning Theory to demonstrate that culturally sensitive videos have a positive effect on public health issues. Featuring actors of the same ethnicity as the target audience in videos that are culturally, linguistically, and gender appropriate both transmits information and models desired attitudes and behaviors, effectively increasing knowledge, attitudes, and adherence to treatment plans (O'Donnell et al.).

As Bandura (1977) pointed out, televised media is an effective way of conveying behavioral learning because a single model can transmit desirable new behaviors simultaneously to large numbers of people in widely different locations. Video is a good learning medium because it readily commands attention. Learners rarely have to be compelled to watch television, whereas oral or written materials aimed at teaching the same skills will not hold learners' attention as effectively or as long (Bandura). In addition, learners with underdeveloped conceptual and verbal skills will benefit more from behavioral demonstrations than from verbal instruction (Bandura). Because video can be replayed, behaviors can be observed again and again at future dates, reinforcing the learning of the skill with consistency and detail. For these reasons, video was chosen as the medium for this educational intervention aimed at a population of elderly adults. Video was an appropriate choice because older Americans watch television more than they read newspapers or listen to the radio (U.S. Department of Commerce, 1996). More than 95% of U.S. homes have televisions, and more than 75% of households have video cassette recorders (VCRs) as well (U.S. Department of Commerce).

Background

In the last decade, key cancer prevention agencies have directed healthcare providers to develop cancer-education materials sensitive to the needs and varied cultures of the most vulnerable populations (Costanza et al., 1992; Freeman et al., 1995; National Institutes of Health, 1993). In the 1989 Report to the Nation on the Status of Cancer (ACS, 1989), gleaned from nationwide hearings on cancer in poor populations, ACS found that cancer education and outreach efforts are insensitive and irrelevant to many of the medically underserved (Freeman et al.). In direct response to those findings, as well as to recommendations from the 1992 Consortium on Older Women and Breast Cancer, the current study's principal author developed age and ethnically sensitive video breast health kits for women older than 60 (Wood, 1996). Kits contain specially designed videos targeting older women and provide breast health information appropriate to their age group and race. The information highlights specific risks for age and race; benefits of and access to mammography; barriers to mammography including discomfort, fear of radiation, and fear of finding cancer; step-by-step BSE using models older than 60; and the treatability of cancer when it is found early. The video kit was produced in African American and Caucasian editions because these ethnic groups have the highest incidence of breast cancer in the United States (ACS, 2002). All actors in the African American video were older, female, and African American. Actors in the Caucasian video were older, female, and Caucasian. The intent was to capture the attention of high-risk women who would identify with other women like themselves who were depicted in the video.

Kits were designed to be interactive by guiding learners to actively practice BSE skills rather than simply viewing the model demonstration passively. Print materials in the video kit include BSE skill checks to encourage active drill and practice by users. The purpose of the 10-point checklist is to have learners score practice attempts and try to improve their scores with each use. Other reinforcers to learning and practice included in the kits are a mini lump model, calendar reminder stickers for annual mammogram and monthly BSE, a BSE poster, and an educational pamphlet (see Table 1). These items were included to encourage learners to interact with the video. Instructions for use and scoring of all kit contents are explained in the video. To ensure appropriateness of use with low-education older adults, the video script was written below a seventh-grade literacy level. Doak, Doak, Friedell, and Meade (1998) reported that the average reading skill of adults in the United States is at an eighth-grade level. Wilson, Baker, Brown-Syed, and Gollop (2000) suggested that cancer-related information for the general public should be written at a fifth- to eighth-grade level.

Literature Review

Previous studies find most women are unaware that the risk of breast cancer increases with age (Harris et al., 1991; Mah & Bryant, 1992). Older women, in particular, do not believe they are as likely to get breast cancer as younger women or do not know they need screening (Champion, 1992; Costanza et al., 1992; Guillory, 1994; Rimer, Ross, Cristinzio, & King, 1992). These misconceptions prevail despite recent initiatives promoting breast cancer awareness and increased public knowledge about the disease. Friedman et al. (1998) examined age differences in breast cancer knowledge, attitudes, and early-detection behaviors in a multiethnic sample of low-income women and found no significant age differences in breast cancer knowledge or perceptions of personal risk of breast cancer. Because women across all age groups were similar in their perceptions of personal risk, these researchers concluded that older women may not be assessing their increased risk accurately, thereby leading to underscreening. In a qualitative study of breast cancer screening among older low- and middle-income African American women, Tessaro, Eng, and Smith (1994) found that subjects viewed family history, not age, as a risk factor for breast cancer. These subjects were more concerned about hypertension, diabetes, and arthritis than about breast cancer. Underwood (1999) interviewed 197 African American women and found that breast cancer screening procedures were markedly underused. However, data from the study suggested that if healthcare providers informed women of their personal cancer risk and made specific recommendations for screening, greater compliance with guidelines would occur.

Lack of knowledge about the disease may be only one factor inhibiting regular screening for minority women. Other barriers, such as fear and reluctance to discuss breast cancer, have been suggested. Phillips et al. (1999) found that African American women still hold misconceptions regarding the etiology of breast cancer and fatalistic perspectives regarding outcomes because breast cancer is discussed infrequently. All participants in the study stressed that breast cancer seldom is discussed in the African American community.

Although mammography is inarguably the best current screening method available to the general population for the early detection of breast cancer, BSE remains a recommended screening practice. BSE is a viable method of finding cancers between mammograms (Strax, 1989), and BSE aids in breast cancer diagnosis for the estimated 10% of breast cancers that present as palpable lumps not detectable by mammography (Costanza et al., 1992; Kopans, 1992).

Table 1. Video Breast Health Kit

Contents	Description
Video	Full color with simple graphics Highlights specific risk for age and race All actors over age 60 Screening benefits: mammogram, clinical breast examination, breast self-examination (BSE) Mammogram procedure depicted step-by-step Mammogram barriers addressed: fear of radiation, fear of finding cancer, treatability of early cancer, cost, access BSE procedure depicted step-by-step Adaptations for arthritis, loss of tactile sensitivity, visual changes Literacy level below seventh grade Ethnic editions • African American edition contains African American actors and voice-over. • Caucasian edition contains Caucasian actors and voice-over.
Mini lump model	Contains two lumps; dark and light skin tones
BSE skill checks	10-point BSE checklist; aids drill and practice
BSE poster	Depicts 10 key BSE skills; can be wall-mounted
Calendar reminder stickers	Annual mammogram (1) Monthly BSE (12)
Educational pamphlet	*Chances Are You Need a Mammogram: A Guide for Midlife and Older Women* (AARP & National Cancer Institute, 1995)

Note. Contents of *Breast Health for Women Over 60* (HealthWood, Inc., 1996)

Preventive education and training of patients at high risk for developing breast cancer improves compliance and proficiency with BSE techniques (Clarke & Savage, 1999). Sensiba and Stewart (1995) studied the relationship of perceived barriers to BSE and concluded that older women may benefit from education about the value of BSE and less-educated women may need information to reduce fear. In a descriptive study of 119 low-income urban women between the ages of 51–80, Lauver, Kane, Bodden, McNeel, and Smith (1999) found that women who had positive beliefs about mammography, lower perceived risk of breast cancer, no history of breast symptoms, a history of breast biopsies, and family history of breast cancer, as well as those who had received BSE demonstrations, were most likely to engage in monthly BSE. They concluded that many of these factors (e.g., worth of mammography, lower perceived risk, prior breast biopsy, prior BSE instruction) may reflect greater contact with practitioners. Morrison (1996) also concluded that exposure to BSE messages from a clinician was a significant variable predictive of BSE behavior in older, low-income women. Yet, older women are significantly less likely than younger women to have received routine BSE instruction from a healthcare provider or to perform BSE (Celentano, Shapiro, & Weisman, 1982; Champion, 1992).

Frequency of BSE practice alone is unlikely to have an effect on earlier detection of cancer. Regular BSE practice will not ensure finding lumps or abnormalities unless the procedure is performed correctly and thoroughly. Clarke and Savage's (1999) meta-analysis of studies of BSE practice among patients with breast cancer found that the disease was detected at an earlier stage in those who practiced BSE. However, the authors cautioned that effectiveness of BSE depends on the quality of the practice. Many studies have examined the influence of interventions on BSE practice (Assaf, Cummings, Graham, Mettlin, & Marshall, 1985; Brailey, 1986; Grady, 1992; Rutledge, 1992; Young & Marty, 1985), but few have quantified BSE proficiency objectively as an outcome (Baulch, Larson, Dodd, & Deitrich, 1992; Mahloch et al., 1990). Adderley-Kelly and Green (1997) studied the impact of a video intervention combined with individual or group instruction on breast cancer knowledge and BSE self-efficacy (i.e., level of performance confidence) with a sample of older African American women. They found that as knowledge about breast cancer increased, BSE self-efficacy also increased. In addition, the interventions that were most intensive and offered the most feedback sustained the highest BSE self-efficacy. The intervention appeared to have been successful, but data regarding BSE proficiency were lacking.

In summary, older women are not well informed about their high risk of breast cancer, and they do not use breast cancer screening regularly. Barriers to screening have been identified as lack of information related to risk and fear related to screening, particularly if women are African American. In addition, although BSE continues to be a recommended screening strategy, little is known about BSE proficiency in older women or how to improve accuracy and thoroughness of the examination. Therefore, this study was undertaken to determine the effects of a new educational intervention on increasing knowledge about breast cancer and enhancing BSE proficiency in a sample of older African American and Caucasian women.

Methods

Sample and Setting

A volunteer sample of 328 women aged 60 and older was drawn from community settings in the Northeast (Massachusetts) and the Southeast (Georgia). Metropolitan settings in Massachusetts and Georgia were selected because these states had large numbers of low-income elderly who would comprise a pool of possible recruits from which the sample could be drawn. At the outset of the study, 14% of the Massachusetts population were aged 65 or older and 9.4% of this population were poor, whereas 10% of the Georgia population were aged 65 or older and 20.4% were poor (AARP, 1994). At that time, Georgia was one of eight states in the nation with poverty rates of 20% or more for the elderly. Poverty was defined using federal standards of annual household income less than $10,000. In addition, elderly women in Massachusetts and Georgia were known to underuse mammography. In a report of mammography services paid by Medicare, the percentage of Massachusetts women older than 65 having at least one mammogram in two years was 43% for both African American and Caucasian women; in Georgia, 40% of Caucasian women and 28% of African American women had one biennial mammogram (Health Care Financing Administration, 1997). The need for strategies to improve breast cancer screening among the elderly in these states was evident, and the sites offered a fertile opportunity to positively affect the preventive care of older women who resided there.

Selection criteria for the study were African American or Caucasian females aged 60 or older who spoke English, were cognitively intact, and reported no previous history of breast cancer. Because recruitment was carried out in urban settings with high levels of elderly poverty, no criteria were set to limit selection based on income.

Potential subjects were recruited from community settings using a variety of methods, including newspaper, newsletter, and radio advertisements and distribution of recruitment flyers at senior centers, churches, elderly housing projects, health fairs, beauty salons, and social or service clubs. The most successful recruitment strategy was "snowballing," a procedure by which subjects already enrolled in the study recruited other subjects. Procedures for protection from research risk were followed, and written, informed consent was obtained from all women who agreed to participate. The project was approved by appropriate university institutional review boards in Massachusetts and Georgia. A post hoc power analysis for 328 subjects, with two levels adjusted for covariates, produced an effect size of 2.5 yielding a power of 1.00 (Borenstein, Rothstein, & Cohen, 1997). The sample size was considered large enough to undertake subsequent analyses.

Instruments

Knowledge about breast health and BSE proficiency was measured by scores on a 21-item scale, the **Breast Self-Examination Proficiency Rating Instrument (BSEPRI)** (Wood, 1994). Ten items on the scale measure knowledge about breast cancer risk and screening. These multiple-choice knowledge questions address issues about specific, age-related breast cancer risk and benefits and barriers to mammography screening, including radiation risk, Medicare coverage, and BSE procedures. Ten other items measure BSE inspection and palpation skills as the subject demonstrates BSE on

a simulated breast model embedded with seven lumps. Inspection items include looking in a mirror for equal size, shape, and lumps with arms at sides, with arms over head, and leaning forward. Palpation items include positioning arm behind head, beginning at the top of the breast, using the pads of the fingers, pressing lighter to deeper in little circles, feeling around the breast in larger-to-smaller concentric circles, covering the entire breast, and feeling under the arms for lumps. The number of correct responses are summed and converted to 100 to obtain the knowledge and BSE skill scores. Additional proficiency data are assessed as a lump detection score calculated by summing the number of correct lumps found in the simulation model during BSE palpation. Instrument reliability and validity including interrater reliability, content validity, and criterion-related concurrent validity of the BSEPRI have been reported (Wood, 1994, 1996). Internal consistency coefficients ranged from 0.71–0.80. Interrater reliability was 90%. Criterion-related concurrent validity was established by correlating palpation scores on the BSE proficiency scale with number of lumps detected in the simulation model ($r = 0.36$, $p < 0.001$). In the current study, Cronbach's alpha was 0.85.

Cognitive ability was measured using the **Mini-Mental Status Exam (MMSE),** a 20-item, two-part, mental functioning assessment. Orientation, attention, and memory are assessed by verbal responses in Part I. Part II measures attention, short-term memory, language, calculation, and ability to follow verbal and written commands, write a sentence, and copy a geometric design (Folstein, Folstein, & McHugh, 1975). The test is not timed, and the maximum score is 30 with a mean of 27.6 for elderly people (Gallo, Reichel, & Anderson, 1988). Ample psychometric evidence of the MMSE reliability and validity as a tool to screen for cognitive ability among elders exists in the literature (Teresi & Evans, 1997). However, normative data on the MMSE indicates that cognitive performance varies with age and educational level. In a population aged 60–64, mean scores range between 23 for those with a fourth-grade education to 29 for those who have completed college (Crum, Anthony, Bassett, & Folstein, 1993).

Procedures

This study used a nonequivalent control group, quasi-experimental design. True randomization of subject assignment to intervention or control conditions was not possible because the intervention required home video use. Therefore, group assignment of subjects was based on VCR availability. The subjects who had access to home VCRs and could use the breast health kits at home were assigned to the intervention group. The control group was a no-intervention group with one exception. Because the entire sample was drawn from a population known to be both difficult to access and high risk, researchers were obligated by the institutional review boards to provide standard information on breast cancer risk and benefits of screening to all women who participated in the study. *Chances Are You Need a Mammogram: A Guide for Midlife and Older Women* (AARP & National Cancer Institute, 1995) was selected as the best public education material available at that time to address these issues. Although it did not contain specifics on how to perform BSE, it did appraise subjects of their age-specific risks and the benefits of mammography. The pamphlet was given to all control subjects and included in all breast health kits for intervention subjects.

Data collection was accomplished in two, one-hour interviews conducted by trained interviewers in community centers or participants' homes. At the first interview (pretest), participants' demographic characteristics, general health, cognitive ability, breast cancer screening practices, and knowledge about risk and screening were assessed. At the end of the interview, BSE proficiency (i.e., skills and lump detection) was assessed using vested breast models. Post-test data were obtained two weeks later in the second interview. Testing site selection was based on participant preference. All subjects were given a $50 incentive for participation in the study following the second interview to enhance retention through both interviews.

Because this study was grounded in principles of age and race sensitivity, specific measures were taken to collect the data with appropriate and well-trained interviewers. All interviewers were RNs previously experienced in working with the elderly. All interviewers completed a five-hour training and practice session in use of the instruments, including scoring BSE proficiency using the vested models and scoring the MMSE. Seven (64%) of the 11 nurse interviewers were African American and every effort was made to pair African American interviewers with African American participants. Additionally, at the outset of the study, all interviewers were required to complete a video self-training program designed to sensitize them to the functional changes of aging, specifically vision and hearing loss.[a]

Data Analysis

Descriptive statistics were used to analyze the sociodemographic variables and variables related to general health, cognitive ability, and breast cancer screening practices. To determine whether demographic variables had confounding influences on outcome measures, Pearson correlations, t tests, or chi-square statistics were computed between these variables and outcome measures. Significant differences were found for the demographics of age, cognitive ability, and education. The research questions were answered using analysis of covariance (ANCOVA).

Results

Sample

Table 2 shows the demographic and health characteristics of the study sample by group. Selection criteria resulted in a volunteer sample of 328 women aged 60 and older. Participants were between the ages of 60–105, with an intervention group mean age of 70.5 years and a control group mean age of 73.7 years. The majority of subjects receiving the intervention were African American (77%), as were the controls (79%). Some African American subjects initially identified themselves as Native American, although they also self-identified as black or African American in another more detailed question related to race and ethnic background. Interestingly, this confusion may be because a predominance of the sample was from Georgia, where Native American Cherokee tribes have a strong presence and are known to have racially intermingled. Therefore, to maximize accuracy and clarity, those

[a] SECURE Project Master Kit *(1988) video can be obtained from Lee Memory Care, Lee Memorial Health Services, Older Adult Services, 2776 Cleveland Avenue, Ft. Myers, FL 33901 (239-334-5768).*

Table 2. Demographic and Descriptive Characteristics

Variable	Intervention Group (N = 206)		Control Group (N = 122)	
Age (years)				
$\bar{X}$	70.5		73.7	
SD	8.0		9.3	
Range	60–105		60–100	
Education (years)				
$\bar{X}$	11.6		9.4	
SD	4.3		3.9	
Range	2–20		0–20	
Cognitive ability score	26.4		24.3	
Variable	**n**	**%**	**n**	**%**
Race				
African American	158	77	96	79
Caucasian	48	23	26	21
Annual income				
Under $10,000	82	40	83	68
$10,000–$25,000	66	32	22	18
$25,000 and above	24	12	2	2
Missing data	34	16	15	12
General health fair or good	132	64	77	63
Never had a mammogram	37	18	31	26
Previously taught breast self-examination	142	71	92	75

subjects identifying themselves as African American or Native American were clustered into a single category.

Descriptive statistics on all study variables were examined for systematic missing data, marked skewness, and the presence of outliers. Because the income variable had 49 missing cases, further analyses were undertaken to determine if these data were systematically missing. This was accomplished by creating a grouping variable with two levels: 1 = those who did not answer the income variable and 0 = those who answered the item. Independent t tests or chi-square statistics then were computed between the newly formed grouping variable and major study variables. No significant differences were noted between the two levels, indicating no presence of systematic missing data. Significant differences also were found between groups on pretest scores for knowledge, BSE skill, and lump detection. Therefore, these variables became covariates in subsequent analyses. These variables also were normalized using the recoding method for handling skewness suggested by Tabachnick and Fidell (1996). This resolved problems with severe skewness, and the recoded variables were used in subsequent analyses.

The entire sample had low income and low education levels, but the control group clearly had lower incomes and less education than the intervention group. Almost half (40%) of the intervention group was living below the federal poverty level of less than $10,000 per year, but 68% of control group subjects were in the lowest income level. Average years of school completed was 11.6 years for the intervention group and 9.4 years for the control group. Cognitive ability of both groups was comparable with a mean MMSE score of 26.4 for the intervention group and 24.3 for the control group. These scores are well within the cognitively intact range when considering factors of age and education (Crum et al., 1993). Most subjects rated their general health as fair or good, and most previously had been taught BSE. Eighteen percent of the intervention group and 26% of the control group had never had a mammogram.

Effect of Intervention

Mean scores on the three outcome measures of knowledge about risk and screening and BSE proficiency (i.e., skills and lump detection) are depicted in Table 3. Mean knowledge pretest scores were somewhat higher for the intervention group (52/100) than for the control group (47.2/100). Mean BSE skills pretest scores were markedly higher for the intervention group (29/100) compared with the control group (15.7/100). Mean lump detection pretest scores were similar for the intervention group (2.9/7) and the control group (2.0/7). Post-test scores for all three variables were significantly higher for the intervention group. The control group began with lower levels of knowledge and skills; those variables were not significantly changed at post-test.

The research questions were answered using three separate ANCOVA techniques (see Table 4). In the first ANCOVA, after removing the influence of age, education, cognitive ability, and pretest knowledge scores, subjects in the intervention group had significantly higher knowledge scores than those in the control group. In the second ANCOVA, after removing the influence of age, education, cognitive ability, and pretest BSE skill scores, subjects in the intervention group had significantly higher BSE skill scores than those in the control group. In the third ANCOVA, after removing the influence of age, education, cognitive ability, and pretest lump detection scores, subjects in the intervention group had significantly higher lump detection scores than those in the control group. Thus, after removal of covariate influences, subjects who used the breast health kits performed significantly better on all three outcome measures than those who did not use the kits.

Discussion

The results of this study confirm that use of breast health kits significantly improves risk and screening knowledge and BSE proficiency in a sample of cognitively intact, older African American and Caucasian women living independently in community settings. Two weeks after viewing the video and using the kit, knowledge and BSE proficiency scores had improved significantly for the intervention group. Even after removing the influence of confounding variables of age, edu-

Table 3. Means and Standard Deviations of Main Effects Variables

Variable	Intervention Group (N = 206)		Control Group (N = 122)	
	$\bar{X}$	SD	$\bar{X}$	SD
Knowledge				
Pretest	52.0	20.0	47.2	19.7
Post-test	81.5	16.2	62.8	16.3
Breast self-examination skill				
Pretest	29.0	24.9	15.7	17.6
Post-test	51.7	30.0	20.1	20.8
Lump detection				
Pretest	2.9	2.2	2.0	2.0
Post-test	4.1	2.2	2.8	2.3

Table 4. Analyses of Covariance Summary Table for the Corrected Model After Removal of Covariate Influence

Scale	F	p
Post-test		
Knowledge	19.1	0.000
Breast self-examination skill	27.2	0.000
Lump detection	12.8	0.000

cation, cognitive ability, and pretest scores, the intervention had a significant effect on the outcome variables.

Knowledge about breast cancer risk and screening clearly improved with the use of video kits. Although mean pretest scores for total knowledge across groups were similar, the intervention group significantly differed from the control group at post-test. Women who used the kits were much better informed about their personal risk of breast cancer and the benefits of screening. Subjects in the control group also showed some increases in mean total knowledge scores from pretest to post-test even though those subjects did not use the video kits. These gains may be attributable to control subjects reading the educational pamphlet because it addressed many items on the knowledge test.

Examining individual items on the knowledge scale revealed that older women in this sample overall were informed poorly about their risk of breast cancer at the outset of the study. When asked, "At what age is a woman most likely to get breast cancer?", only 23% of control group subjects and 21% of intervention group subjects gave the correct answer (aged 60 and older). In answering a similar question, most of these subjects did not know that women older than 70 are more likely to have breast cancer than women younger than 50. To that question, 77% of intervention groups' subjects and 75% of control group subjects answered incorrectly. These findings are similar to those of other researchers who suggested that most women are unaware that risk of breast cancer increases with age (Champion, 1992; Friedman et al., 1998; Guillory, 1994; Harris et al., 1991; Mah & Bryant, 1992; Rimer et al., 1992), particularly when they are older, low- and middle-income African American women (Tessaro et al., 1994). These findings support the need for intervention studies informing older women of breast cancer risk.

BSE skills improved with kit use. Intervention group participants showed significant BSE skill gains from pretest to post-test and had significantly higher BSE skill scores than controls at post-test. As predicted, modeling step-by-step BSE on the video helped subjects who used the kits to learn the correct procedure and recall those steps at post-test. BSE learning was reinforced further by skill checks in the kits that subjects used to improve self-test scores each time they practiced the examination during the two-week interval between interviews. BSE instructional posters in the kits also may have been helpful. Additionally, intervention subjects could replay the video any time during the pretest to post-test interval to further reinforce learning. Control subjects showed very little improvement in BSE skills pretest to post-test.

The intervention group had significantly higher lump detection scores at post-test, a finding that is consistent with improved BSE skill scores. Finding lumps is connected closely to improved BSE skills. As learners become more skillful and thorough at breast palpation by using correct finger-pad pressure and covering the entire breast, they will find more lumps. In addition, because mini lump models were provided in the kit, subjects had a realistic tactile perception of what was abnormal when felt in the vested model at post-test. Although statistically significant gains in finding lumps for those who used the kits were encouraging, intervention subjects only detected an average of four lumps when seven lumps actually were present. Older women may be less likely to feel small, deeper lumps as a result of losses in tactile sensitivity of the fingertips or arthritic changes associated with the normal aging process. Further analysis of data is needed to clarify which lumps were most frequently missed and size and depth of lumps not found, as well as linking missed lumps to specific items answered incorrectly on the BSE skill test. Missing key BSE skills, such as pressing lighter to deeper or failing to cover all areas of the breast, likely would result in finding fewer lumps when they are present.

The current study's results indicate that using age- and ethnic- or race-sensitive video programs positively influences outcomes, both in terms of knowledge gains and increased BSE proficiency. Although most of the total sample had been taught BSE previously, the learning had not been retained sufficiently as reflected in the overall low pretest knowledge and proficiency scores. Because the intervention described here was interactive, involving the active participation of learners, it provided for optimum practice and modeling of the desired behaviors by those who used the kit. Data regarding the impact of the kits in long-term retention of knowledge and skills were not obtained, but short-term gains were evident.

Exposure to previous BSE education was high for this sample (71%–75%), suggesting that public health messages regarding some aspects of breast health were reaching the targeted population. However, 18%–26% of these women never had received a mammogram. Therefore, many of these very high-risk subjects never had the screening procedure most likely to find early breast cancer. A key feature of the video breast health kit tested in this study is that it informs women of the benefits of mammography, guides them through the steps of the procedure, and addresses issues related to fear of radiation, discomfort of the procedure, fear of finding breast cancer, cost, and access. The two-week interval of the study was not enough time to assess the impact on mammography usage. Therefore, six-month follow-up telephone interviews were made to determine the impact on behavioral changes regarding mammography screening for the sample. Analyses of those data currently are under way and will be reported in future publications.

Limitations

Some limitations of the study are evident. Bias was introduced by the quasi-experimental nature of the study and assignment of subjects to intervention or control groups based on VCR availability. Approximately 63% of this sample had access to VCRs and were assigned to the intervention group. This percentage approximates national statistics of 75% VCR ownership in U.S. homes (U.S. Department of Commerce, 1996). Considering these figures together, it appears that approximately two-thirds of women older than 60 might be expected to benefit from a video-based intervention de-

signed for home use. Subjects in the intervention group clearly had higher levels of education and income than those in the control group. Therefore, the poorest and least-educated older women may be the least likely to have access to the technology needed for the intervention. The relationship of socioeconomic factors, particularly low income to late-stage cancer diagnoses, suggests that these women are the most in need of the intervention. Therefore, future studies should explore video interventions with alternative VCR access strategies, such as through community agencies and healthcare sites or by loaning portable equipment.

Frequency and extent of kit use by subjects in the intervention group are not clear and may be confounding variables. Although all intervention group subjects viewed the video and used the kit at least once during the two-week pretest to post-test interval, no data were analyzed to determine how many times the video was viewed, how many times component parts of the kit were used, or how much time elapsed between these activities and the post-test. As was intended, some subjects may have viewed the video or practiced with the skill checks and mini-model several times. Others may have used kit components only once. Also, some subjects may have viewed the video immediately after the pretest whereas others may have viewed the video immediately before the post-test. These factors may have influenced what was learned and how learning was retained. Those who used the kit at least once over a two-week time period were found to be more knowledgeable and better at BSE than those who did not use the kit at all. Further research is needed to clarify issues related to repetitive use of component parts, length of time since use, and retention of learning.

A strength of this study not reported in previous studies was using nurses to test BSE proficiency skills one-on-one with participants. However, this method also introduced possible bias affecting reliability. Although the nurse interviewers were pretrained in rating BSE skills, subjective judgment was unavoidable, particularly in rating the skills of covering the entire breast and using lighter to deeper palpation. Logistics and expense involved in conducting the tests in community settings precluded simultaneous or spot-check rating by two interviewers, a technique that would have supported interrater reliability. Future studies should include these methods to establish interrater reliability for BSE proficiency.

Because this study was designed to test the impact of the intervention versus no intervention, it did not examine differences in BSE proficiency between women who used the breast health kit and those who used typical BSE educational literature. Future studies that compare BSE proficiency outcomes between video-based programs and standard printed format would be useful.

Implications for Nursing

Video breast health kits offer the potential to assist caregivers in educating high-risk women about breast cancer and the benefits of screening. Oncology nurses and nurses practicing in primary-care settings are the ideal providers of information regarding breast cancer risk and strategies to enhance BSE proficiency in their clients. However, as provider time for health screening visits becomes increasingly limited, nurses everywhere are challenged to meet the wellness needs of diverse patient populations. These challenges are intensified in geriatric practices with older clients who may have several coexisting conditions requiring interventions and whose higher risk for many conditions, including several types of cancer, requires myriad vigilant screening procedures. The conscientious and caring provider, knowing that exposure to BSE messages from a clinician is a significant variable predictive of BSE behavior in older, low-income women, may nevertheless be unable to follow through with appropriate instruction because of time constraints. A self-instruction program, such as the video breast health kit, offers an alternative to traditional, labor-intensive, provider instruction. Women who have access to VCRs could watch the video at home prior to annual physical examinations. Those without VCRs could view the video and use the kit in an office or clinic setting while waiting for an appointment. Thus, valuable time could be saved in educating these women of their risk, informing them of the benefits and barriers to screening, and teaching them BSE before the provider is seen. As an added benefit, women who are well informed of their risk and the issues surrounding mammography may be more easily convinced to schedule mammograms regularly. If competent BSE skill and lump detection are desirable behaviors, opportunities also could be available in waiting rooms to practice with breast simulation models prior to the scheduled appointment. Learning would be reinforced by BSE return demonstrations with nurse providers during the physical examination. These self-instruction strategies have interesting time-management potential for providers whose clients are preinstructed and ready for ensuing discussions related to breast health and screening. Thus, provider instruction would be enhanced and facilitated—not eliminated or diminished.

Despite the recent decline in breast cancer mortality rates, older women, particularly minority women, continue to die from the disease at alarming rates. Older women, in general, and older African American women, in particular, must be targeted more rigorously with innovative, aggressive programs that not only educate them about their risk but convince them of the need for regular screening and provide them with strategies to access screening services. Schulz, Cukr, and Ludwick (1999) suggested that screening programs that target the underserved may be failing those they intend to serve. In addition to older women, those at risk include rural women outside the influence of a major medical center, women who do not have family physicians, and women who are disabled or whose mobility is restricted. Age-sensitive and culturally relevant programs in appropriate languages are needed for non-English-speaking ethnic groups in the United States, including Hispanics and Asian Americans. Video-based educational programs, such as the one tested in this research study, have the potential to have a positive effect on these populations. Nurse-initiated programs reducing screening barriers and facilitating screening access for these vulnerable groups must be continually designed and tested with diverse groups if healthcare professionals are to reach the *Healthy People 2010* goal of reducing deaths from breast cancer to 20.6 per 100,000 women in the United States (U.S. Department of Health and Human Services, 2000).

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- Celebrating Life
  www.celebratinglife.org

- National Women's Health Network Fact Sheet—Breast Cancer and African American Women
  www.womenshealthnetwork.org/advocacy/wocbreastca/africam.htm

- Susan G. Komen Breast Cancer Foundation: African American Women and Breast Cancer
  www.breastcancerinfo.com/bhealth/html/african-american.html

These Web sites are provided for information only. The hosts are responsible for its own content and availability. A link can be found using ONS Online at www.ons.org.