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# The Effect of Education in Managing Side Effects in Women Receiving Chemotherapy for Treatment of Breast Cancer

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**Purpose/Objectives:** To determine the effectiveness of informational audiotapes on self-care behaviors, state anxiety, and use of self-care behaviors; to describe the occurrence and intensity of common side effects in patients with breast cancer.

**Design:** Randomized clinical trial.

**Setting:** Outpatient chemotherapy clinics operated by a university center in a rural area.

**Sample:** 70 women receiving their first treatment of chemotherapy.

**Methods:** Subjects completed demographic data and the Spielberger State-Trait Anxiety Instrument (STAI). The experimental group received two audiotapes. At one and three months, subjects completed the modified Nail Self-Care Diary and STAI via telephone.

**Main Research Variables:** State anxiety, side-effect severity, and use and efficacy of self-care behaviors.

**Findings:** The most frequent side effects were fatigue, nausea and vomiting, and taste change. The experimental group reported symptom improvements that were not found in the control group. The experimental group increased the use of recommended self-care behaviors, whereas the control group continued to use the same self-care behaviors without effectiveness. State anxiety for both groups diminished over time; however, anxiety in the control group was consistently higher.

**Conclusions:** Audiotapes are effective teaching tools. Self-care behaviors can be taught and can be effective in managing side effects. Anxiety was high in both groups, but the symptom decreased in the women who received audiotapes and telephone calls.

**Implications for Nursing:** Constraints on nurses decrease the length of teaching time available, but audiotapes provide effective teaching and reinforcement of education. Anxiety in clinical environments interferes with patient learning. Teaching effective self-care behaviors enhances patients' independence, comfort, control, and quality of life.

Chemotherapy often causes serious side effects in women receiving treatment for breast cancer. Fatigue, nausea and vomiting, sleep disturbances, changes in bowel function, and an altered sense of taste are common problems. These side effects can be overwhelming. If women are unable to develop effective self-care behaviors to manage these side effects, they may delay or terminate their treatment regimen prematurely (Dodd, 1997, 1999).

## Key Points . . .

- ▶ Informational audiotapes can be an effective means for providing instruction about self-care behaviors.
- ▶ Patients who used audiotapes demonstrated effective self-care behaviors over time, whereas patients in the control group appeared to experiment to find effective self-care behaviors.
- ▶ Patients who used audiotapes had lower anxiety at each measurement point than patients in the control group.

Many patients with cancer experience anxiety related to their diagnosis and the side effects of chemotherapy (Greene, Nail, Fieler, Dudgeon, & Jones, 1994). Anxiety can trigger depression, and some researchers have found evidence that suggests that women who are depressed may be less able to perform self-care behaviors (Siegel, 1997). Teaching patients how to reduce their anxiety may help them to manage side effects through self-care behaviors (Arakawa, 1997; Blanchard, Courneya, & Laing, 2001; Longman, Braden, & Mishel, 1997; McDaniel & Rhodes, 1998).

Researchers have identified self-care behaviors to manage the common side effects of treatment such as nausea and vomiting (Dodd, 1988; Foltz, Gaines, & Gullatte, 1996; Jordon, 1989; Lo, 1990; Nail, Jones, Greene, Schipper, & Jensen, 1991), loss of appetite (Foltz et al.), fatigue and sleep problems (Foltz et al.; Nail et al.; Skalla & Lacasse, 1992;

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Winningham, 1991), and anxiety (Devine & Westlake, 1995; Porocho, 1995). In addition, education about treatment, side effects, and self-care behaviors can minimize the side effects of chemotherapy, decrease symptom distress, and improve quality of life (Dodd & Dibble, 1993; Hoskins, 1997; Longman et al., 1996, 1997; Orem, 1995). However, although the importance of education for these patients is well recognized, several factors limit the ability of nurses to provide patients with effective education. In particular, chemotherapy protocols increasingly are performed on an outpatient basis. Information about treatment, side effects, and self-care behaviors must be provided in a limited time frame (Craddock, Adams, Usui, & Mitchell, 1999; Griffiths & Leek, 1995). Many patients have limited attention spans because of fatigue or nausea. Therefore, nurses must rely on written materials for educating these women. Researchers have found that health materials often are written at a reading level that is too advanced for many patients to read and comprehend (Baker, Parker, & Clark, 1998; Cooley et al., 1995; Williams et al., 1995). Thus, printed materials used in oncology clinics often are ineffective in meeting the information needs of these patients (Doak, Doak, & Root, 1996).

As a result, researchers have begun to explore alternatives to written materials for teaching patients undergoing chemotherapy (Craddock et al., 1999; McDaniel & Rhodes, 1998; Wydra, 2001). Videotaped information about the management of chemotherapy side effects can enhance the consistency of patients' adherence to chemotherapy treatments (McDaniel & Rhodes). Similarly, through interactive media, Wydra taught patients receiving cancer treatment about self-care behaviors related to fatigue and found that patients who consistently used the media practiced more self-care behaviors and experienced less fatigue. Craddock et al. determined that patients who received telephone calls from healthcare professionals providing information about self-care behaviors initiated more self-care measures than patients who did not receive this intervention. Chelf et al. (2001) evaluated the use of computer-assisted learning and printed, telephone, audio, and video information for patients with cancer and found that no one type of information delivery was superior to another. Thus, many methods of patient education may be effective.

Structured audiotapes that patients can take home show promise for assisting outpatients receiving chemotherapy because they can be used regardless of literacy. Audiotapes also allow patients to control the amount of information they receive as well as the timing of the education. Patients can replay the tapes for information that they do not understand, and they can play the tapes when they are less anxious and at home rather than in the clinic. Hagopian (1996) demonstrated that informational audiotapes are an effective educational strategy for teaching self-care behaviors to patients who were receiving radiation therapy.

Orem's (1995) self-care deficit nursing theory provided the theoretical framework for this study. Orem regarded individuals as being responsible for and actively involved in their self-care. Patients engage in self-care to maintain health and well-being; therefore, to perform self-care, patients must have a learned ability to meet their needs and access to resources to enhance their knowledge.

The study reported here examined the use of a structured audiotape educational intervention to assist patients with breast cancer in reducing or relieving the side effects of che-

motherapy through effective self-care behaviors. Patients who received the intervention were compared to a control group that received standard care. The study examined the occurrence and severity of side effects experienced by women with breast cancer receiving chemotherapy, the effects of educational audiotapes on the number of self-care behaviors used by women to minimize or eliminate these side effects, and the effects of self-care behaviors in reducing or eliminating side effects. In addition, the level of anxiety experienced by each group was examined.

## Methods

### Design

The study used an experimental design in which subjects were assigned randomly to a treatment or control group after informed consent was obtained. Study approval was received from a university institutional review board, and the study was conducted over a period of three years.

### Setting and Sample

The setting for the study was a cancer center in the southeastern United States operated by a university medical center and a satellite cancer treatment clinic located 70 miles from the medical center. The medical center serves a 29-county rural area with a diverse population.

All subjects were newly diagnosed with breast cancer, and none previously received chemotherapy. Medical records confirmed that the patients had not had prior experience with cancer or chemotherapy treatments. All were receiving IV chemotherapy; these chemotherapy regimens included cyclophosphamide, methotrexate, and fluorouracil or doxorubicin and cytoxan (AC). Subjects were included in the study if they were 18 years of age or older; English-speaking; capable of hearing normal conversation; oriented to time, place, and person; and living in a community setting. All subjects had a rating of more than 70% on the Karnofsky Performance Scale and were not receiving any concurrent therapy. Potential subjects were identified through oncology breast cancer rounds and by clinic nursing staff. Potential subjects were contacted by one of the researchers, the study was explained, and informed consent was obtained. The subjects were assigned randomly to the control or experimental group, and the date and time of the first telephone interview were established.

### Intervention

Two 20-minute audiotapes were developed to provide information about the nutritional management of side effects and exercise and relaxation techniques to manage fatigue, anxiety, and difficulty sleeping. The transcripts of the tapes were written at a fifth-grade reading level in an attempt to present the material at a level that patients could comprehend. The computerized Flesch Readability Scale was used to determine reading level. The audiotapes were reviewed for clarity and inclusiveness by three professional nurses and three former patients who had been treated for breast cancer. A professional female orator was contracted to vocally perform the transcripts, which were recorded in a sound studio where background music was added.

### Instruments

**Self-care diary (SCD):** The SCD (Nail et al., 1991) is a self-report of occurrence and intensity of side effects and the

use and effectiveness of self-care behaviors. The instrument measures the number of side effects experienced, severity of each of the side effects experienced, number of self-care behaviors performed for a given side effect, and effectiveness of the self-care behaviors. Content validity of the original instrument was established by Nail et al. in a study of two patients and three oncology nurse specialists. Foltz et al. (1996) reported a test-retest reliability of 0.80.

For the current study, the SCD was modified by reducing the number of side effects studied and using a telephone interview rather than a written survey. In the interest of shortening the SCD and reducing subjects' burden, the less common side effects of eye sensitivity, rectal irritation, headache, pain at the IV insertion site, and numbness or tingling of the hands and feet were eliminated (Foltz et al., 1996; Nail et al., 1991). Hair loss also was eliminated because of the paucity of self-care behaviors to reduce the symptom's severity. The SCD used in this study examined difficulty sleeping, decreased appetite, constipation, diarrhea, sore mouth, nausea or vomiting, change in taste or smell, anxiety, and fatigue. Nausea and vomiting self-care measures were grouped together because their self-care behaviors were identical.

A printed version of the modified SCD that corresponded to the audiotapes was developed for the women to have at home. The modified SCD was written at or below a fifth-grade level as determined by the Flesch Readability Scale. Because patients found remembering the possible answers for each question to be difficult, the answers were printed on a card. Patients were able to refer to the card during the telephone interview.

**State-Trait Anxiety Instrument (STAI):** STAI (Spielberger, 1983) has been used extensively in assessing anxiety in medical-surgical, psychosomatic, and psychiatric patients. The state anxiety scale measures transitory anxiety, whereas the trait anxiety scale measures general anxiety. The score for each item ranges from 1–4, with 1 indicating low anxiety and 4 indicating high anxiety. An individual's total score on each scale is obtained by adding the scores for the 20 items. Test-retest and alpha coefficients demonstrate that STAI is a reliable instrument with internal consistency and stability. Assessments of concurrent, convergent, divergent, and construct validity indicate that STAI is a valid instrument (Spielberger).

## Procedure

Patients in both groups received the standard education provided to all patients with breast cancer in the clinics. Information was given in the chemotherapy clinic at the time of the patients' first treatment visit when their anxiety most likely was high. The general instructions included information about how to handle more frequent side effects, such as nausea, hair loss, and mucositis. The depth of the instructions depended on various factors such as the nurse's time and teaching ability and the patient's ability to attend and understand the information. Information was given verbally, and some patients received printed information published by a national organization. The information given to patients did not include content about fatigue, anxiety, or sleep disturbances, and no standardized plan existed about the information that should be provided to patients; therefore, patients received varying amounts of information depending on the situation. Additional side effects were discussed at later treatment visits as patients reported them.

Patients in the experimental group received the standard education and care from the clinic staff and were mailed the audiotapes and a printed SCD. Patients in the experimental group who did not have access to a cassette player were loaned one. Subjects were instructed to listen to the audiotapes 12–24 hours prior to the start of a chemotherapy cycle and as often as desired during the entire course of their treatment.

Three interviewers were trained by the researchers prior to subject enrollment. The interviewers were senior-level nursing students who were chosen for their interpersonal skills, maturity, and scholastic ability. The researchers reviewed the project with the interviewers until they were completely familiar with it. The interviewers rehearsed the telephone interviews with the researchers until the interviewers were consistent in administering the questionnaires.

All subjects were interviewed three times by telephone by the same interviewer. At interview 1, prior to the first chemotherapy treatment, demographic data were obtained and STAI was administered. Interview 2 took place one month after treatment began, at which time the second state anxiety subscale and first SCD were administered. Interview 3 occurred three months after treatment began, at which time the third state anxiety subscale and second SCD were administered. Thus, by the end of the study, each subject had completed one STAI, three state anxiety subscales, and two SCDs. The surveys were administered in 30 minutes or less.

**Table 1. Description of Sample**

Characteristic	Control Group (N = 33)		Experimental Group (N = 38)	
	n	%	n	%
Mean age (range = 30–74)	50.42		50.39	
<b>Marital status</b>				
Married	19	58	23	61
Divorced, separated, or widowed	11	33	10	27
Single, never married	3	9	5	13
<b>Education level</b>				
< High school	4	12	4	11
High school graduate	10	30	16	43
Some college	9	27	11	30
College graduate or above	10	30	6	16
<b>Race</b>				
African American	12	36	19	50
Caucasian	20	61	19	50
Hispanic	1	3	–	–
<b>Stage</b>				
I	8	28	10	37
II	17	59	14	52
III	3	10	2	7
IV	1	3	1	4
<b>Income level</b>				
< \$19,000	10	33	17	53
\$20,000–\$29,999	7	23	7	22
\$30,000–\$39,999	6	20	3	9
≥ \$40,000	7	23	5	16

*Note.* Because some data are missing for some variables, the n values may not equal the total N. Because of rounding, percentages may not total 100.

**Table 2. Mean Number of Side Effects Reported**

Self-Care Diary	Control Group		Experimental Group	
	$\bar{X}$	N	$\bar{X}$	N
First	4.38	34	5.18	38
Second	4.58	34	4.54	34

Note. Possible range of side effects is 0–9.

## Results

Seventy subjects were enrolled in the study with 33 in the control group and 38 in the experimental group. No significant differences were documented between the groups on any of the demographic variables. The sample ranged in age from 30–74, and half were younger than age 50. The participants' average educational level was 13.23 years (range = 6–24 years). Sixty-six percent of the women had an income less than \$29,000, and approximately 60% were married. Eighty-eight percent of the sample had stage I or II breast cancer. Forty-three percent were African American, with one Hispanic (see Table 1). The majority of the women was treated with AC, and 14% were receiving cytoxan, adriomycin, and 5-fluorouracil. Thirty-eight percent of the educational group reported listening to the audiotapes at least once, 31% listened two to six times, 28% listened one to three times per week, and one individual (3%) listened to the tapes four to five times per week. Helpfulness of the tapes was rated on a 0–10 scale. Scores ranged from 0–10, with a median rating of 8. Sixty percent of subjects who listened to the tapes mentioned specific self-care behaviors for fatigue, anxiety, sore mouth, and nausea and vomiting that they found helpful.

The number of side effects experienced by subjects ranged from 0–9, with a mean of 4.8 ( $n = 72$ ) on the first SCD and 4.56 ( $n = 68$ ) on the second SCD. On the first SCD, the experimental group experienced more side effects than the control group. However, on the second SCD, the mean number of side effects for the experimental group declined whereas the number for the control group increased (see Table 2).

Overall, the most frequently experienced side effects were fatigue, nausea and vomiting, and taste change (see Table 3). More women in the experimental group reported these side effects on the first SCD than the control group. However, the number of women in the experimental group experiencing side effects diminished on the second SCD. In fact, in this group, the number of women reporting nausea and vomiting was reduced by nearly half between the first and second SCD. At the same time, the severity of fatigue increased for both groups. At the first SCD, more women in the experimental group experienced difficulty sleeping, yet by the second SCD, difficulty sleeping was a problem for more women in the control group and fewer women in the experimental group. On the second SCD, difficulty sleeping was perceived by the experimental group as more severe than by the control group. Additional side effects reported included appetite loss, constipation, anxiety, sore mouth, and diarrhea. Using *t* tests for independent samples, no significant differences were found between the groups in the mean severity of side effects.

When the current study's researchers examined the number and effectiveness of self-care behaviors used for the most fre-

quently experienced side effects of fatigue, nausea and vomiting, and taste changes, no significant differences were documented between groups. However, significant differences were found in the number of self-care behaviors used for sore mouth and anxiety on the first SCD with the experimental group reporting the use of more self-care behaviors. At the time of the second SCD, no significant differences were found between the groups in mean numbers of self-care behaviors used for these side effects (see Table 4).

The control and experimental groups were similar in the number of self-care behaviors used for fatigue; both groups increased their exercise level and caffeine intake between first and second SCD. A significant difference was found in the effectiveness of taking naps and getting up later reported by the control and experimental groups at the second SCD. The control group reported greater effectiveness of both of these self-care behaviors. Engaging in other activities was rated fairly high by both groups on the first and second SCD. Interestingly, caffeine use increased in both groups by the time of the second SCD, but the effectiveness of this measure increased for the control group and decreased for the experimental group (see Table 5). Other self-care behaviors used were keeping busy, going to bed earlier, getting fresh air, and exercising more.

More self-care behaviors were used for nausea and vomiting than for the other side effects experienced by subjects. Both groups, however, reported decreased effectiveness for most behaviors by the time of the second SCD. Patients in both groups reported on the first and second SCD that prescription medications were the most frequently used self-care behaviors and were effective over time. Patients in both groups reported that avoiding the sight and smell of foods increased in efficacy over time. On the first SCD, patients in both groups reported that the least-used self-care behaviors were eating sour foods or mints and using nonprescription medications. Nonprescription medications were taken by a few patients in both groups at varying times, but no patients found this to be an efficacious method of controlling nausea and vomiting (see Table 6). Additional self-care behaviors, in order of frequency of use, included eating cold foods and crackers, avoiding sweets, eating more slowly, and getting fresh air.

**Table 3. Incidence and Mean Severity of Most Frequently Reported Side Effects**

Self-Care Diary	Control Group (N = 33)		Experimental Group (N = 38)	
	$\bar{X}$	n	$\bar{X}$	n
<b>First diary</b>				
Fatigue	3.26	27	3.67	30
Nausea and vomiting	3.04	23	3.04	29
Taste change	3.00	18	3.81	26
Difficulty sleeping	3.25	12	2.96	23
<b>Second diary</b>				
Fatigue	3.15	26	3.75	24
Nausea and vomiting	3.11	18	3.20	15
Taste change	3.18	22	3.36	22
Difficulty sleeping	2.80*	15	3.36*	14

\*  $p \leq 0.05$

Note. Severity ranges from 0–5.

**Table 4. Mean Number of Most Frequently Used Self-Care Behaviors**

Self-Care Diary	Maximum X̄	Control Group X̄	Experimental Group X̄
<b>First diary</b>			
Fatigue	8	4.04	4.1
Nausea and vomiting	18	9.70	10.5
Taste change	7	3.60	4.1
Sore mouth	11	3.60	5.5
Anxiety	8	4.20	6.0*
<b>Second diary</b>			
Fatigue	8	4.30	4.0
Nausea and vomiting	18	10.40	10.1
Taste change	7	3.10	3.3
Sore mouth	11	3.60	4.8
Anxiety	8	4.30	4.3

\* p &lt; 0.05

Patients in both groups initially reported using the same self-care behaviors for the side effect of taste changes. By the time of the second SCD, the experimental group cleaned the mouth significantly more frequently than the control group and reported more effectiveness of this behavior. In addition, patients in the experimental group who stopped eating certain foods and ate cold foods reported significantly more efficacy for these behaviors than the control group (see Table 7). By the time of the second SCD, the frequency of avoiding the sight and smell of food had increased in the control group. Additional self-care behaviors used included eating different foods, avoiding the sight and smell of foods, and eating sour foods.

This study also examined the impact of the educational intervention on anxiety. No difference in trait anxiety was found between the control and experimental groups at the first interview. State anxiety was high for both groups. However, although state anxiety decreased over time for both groups, the control group consistently exhibited higher state anxiety levels than the experimental group (see Table 8).

## Discussion

This study examined how an audiotape intervention could increase the frequency of self-care behaviors used by women

receiving chemotherapy for breast cancer. Initially, more subjects in the experimental group reported side effects than those in the control group, yet by the second SCD, the number of women in the control group reporting side effects had increased whereas the number of women in the experimental group reporting side effects had decreased. This finding is consistent with previous studies that found self-care measures could be learned and could have a positive effect on side effects (Dodd, 1983) and lends support to Orem's (1995) theory that patients can engage in effective self-care.

For both groups, the most common side effects reported on the first and second SCDs were fatigue, nausea and vomiting, and taste changes. Other researchers also have found that these side effects are the most common and distressing for patients (Longman et al., 1997; Northouse et al., 1999). Some side effects became more severe over time, including changes in taste and nausea and vomiting. Although women used more self-care behaviors for nausea and vomiting, they experienced less effectiveness over time. Prescription drugs were the most effective method of controlling nausea and vomiting for women in both groups.

Women in the experimental group experienced some important improvements in symptoms that did not occur in the control group. Women in the experimental group reported that the incidence of nausea and vomiting was reduced by nearly half by the second SCD. The number of women in the experimental group who reported difficulty sleeping on the second SCD was almost half the number who reported it on the first SCD, whereas the women in the control group reported an increase in sleeping difficulty.

The frequency and effectiveness of self-care behaviors for fatigue, nausea and vomiting, and taste changes differed between the groups. The frequency of the majority of self-care behaviors used by the control group did not change between the first and second SCDs over time. The control group tended to use the same self-care behaviors during their treatment despite the fact that they did not seem to be working. These women may have been unaware of additional options. In contrast, by the second SCD, the experimental group had increased the number of self-care behaviors they tried. This is consistent with Craddock et al.'s (1999) research that demonstrated that patients initiated more self-care behaviors when they had received information on symptom management. These findings are similar to those of Dodd, Thomas, and

**Table 5. Fatigue: Most Frequently Used Self-Care Behaviors and Effectiveness on First and Second Self-Care Diary**

Self-Care Behavior	Control Group				Experimental Group			
	First Self-Care Diary (N = 27)		Second Self-Care Diary (N = 26)		First Self-Care Diary (N = 30)		Second Self-Care Diary (N = 24)	
	%	X̄ Efficacy	%	X̄ Efficacy	%	X̄ Efficacy	%	X̄ Efficacy
Took naps	78	3.23	73	3.7**	73	3.27	58	2.7**
Got up later	48	3.38	62	3.1*	53	3.10	46	2.3*
Caffeine	19	2.40	23	2.7	17	2.80	29	2.0
Got more exercise	26	2.86	31	2.5	37	2.64	46	2.4
Other activity	11	3.30	12	4.0	23	4.00	25	3.7

\* p = 0.05

\*\* p = 0.001

Note. Possible efficacy ranges from 0–5.

**Table 6. Nausea and Vomiting: Most Frequently Used Self-Care Behaviors and Effectiveness on First and Second Self-Care Diary**

Self-Care Behavior	Control Group				Experimental Group			
	First Self-Care Diary (N = 27)		Second Self-Care Diary (N = 26)		First Self-Care Diary (N = 30)		Second Self-Care Diary (N = 24)	
	%	$\bar{X}$ Efficacy	%	$\bar{X}$ Efficacy	%	$\bar{X}$ Efficacy	%	$\bar{X}$ Efficacy
Took prescription medication	96	3.5	94	3.6	97	3.2	93	3.6
Rested in a quiet place	74	3.3	100	3.1	83	3.8	93	3.1
Rested after meals	61	2.9	77	2.5	79	3.2	87	2.9
Cleaned mouth more often	61	2.6	77	2.8	79	2.9	73	2.9
Ate small, frequent meals	65	2.9	65	3.1	73	3.1	67	2.8
Avoided sight and smell of foods	61	2.5	72	2.8	69	3.0	87	3.3
Kept busy	78	2.8	58	3.0	69	3.6	60	2.8
Drank clear liquids	68	2.9	72	2.8	66	3.4	87	2.5
Ate less	78	2.4	71	2.6	66	3.1	60	2.6
Took nonprescription medication	—	—	5	—	3	5.0	—	—

Note. Possible efficacy ranges from 0–5.

Dibble (1991) who found that patients with information about self-care behaviors used them earlier in their treatment and patients without information about self-care behaviors tended to experiment with self-care behaviors until they found something that worked. This approach is not the most desirable because patients may experiment with interventions that have negative effects. For example, in this study, the subjects in the control group used several self-care behaviors that could be detrimental over time, such as eating less food to control nausea.

One of the most interesting findings in the study related to the anxiety experienced by the subjects. Trait anxiety levels were similar in both groups at the beginning of the study. State anxiety decreased over time for both groups but was higher at each measurement point for the control group. The consistently lower anxiety levels experienced by the experimental group may have been related to their greater self-confidence in managing their side effects. However, anecdotal data from the interviewers suggest that these subjects were appreciative that someone was calling to ask about their symptoms and self-care behaviors.

Because subjects were interviewed by the same interviewer at each point in time, they became familiar with one another, which may have reduced anxiety. Many of the subjects were

economically disadvantaged and African American; as a result, their previous experiences with the healthcare system might have been less than optimal. This study may have provided them with an important new resource for dealing with anxiety. This is an area that needs to be explored in further research.

## Limitations

The limitations in this study must be addressed. No control or assessment was available regarding the type or amount of additional information either group received from the healthcare facility, family, friends, or community resources. The researchers assumed that the women in the control group did not have the same amount or depth of information as the women in the experimental group.

The telephone intervention may have had a substantial effect on patients' behaviors. The questions asked during each telephone interview reinforced the self-care behaviors to the women in the experimental group and provided information to the women in the control group that they may not have had otherwise.

The small number of subjects in this study was a limitation, and, although the study was funded for a three-year period,

**Table 7. Taste Change: Most Frequently Used Self-Care Behaviors and Effectiveness on First and Second Self-Care Diary**

Self-Care Behavior	Control Group				Experimental Group			
	First Self-Care Diary (N = 18)		Second Self-Care Diary (N = 22)		First Self-Care Diary (N = 26)		Second Self-Care Diary (N = 22)	
	%	$\bar{X}$ Efficacy	%	$\bar{X}$ Efficacy	%	$\bar{X}$ Efficacy	%	$\bar{X}$ Efficacy
Cleaned mouth more often	78	2.6	62	2.5*	89	3.1	77	3.4*
Stopped eating certain foods	61	3.4	57	2.4*	62	3.4	55	3.5*
Ate cold food	50	3.2	38	2.3*	58	3.1	50	3.4*
Avoided sight and smell of foods	61	3.5	57	3.3	58	3.4	46	3.7

\*  $p < 0.05$

Note. Possible efficacy ranges from 0–5.

**Table 8. Measure of State Anxiety Over Time in Control and Experimental Subjects Using a Repeated Measure Analysis of Variance**

Interview	Control Group		Experimental Group	
	State	Trait	State	Trait
1	41.53	34.9	33.55	33.6
2	33.62		30.91	
3	31.44		27.80	

Note.  $F = 6.05$  and  $p = 0.017$

the researchers lost several months of data because of a hurricane and the subsequent flooding of most of the 29 counties in the region. The majority of the subjects lived in the flooded area, and many who were enrolled had not yet completed the three interviews. These potential participants were lost to the study because they were in temporary housing, their location was unknown to the researchers, they had no phone, or they stopped or delayed treatment. The chemotherapy clinic was closed for some time; therefore, no new patients were recruited during that time. This, in turn, required additional time for the researchers to recruit more subjects.

The number of times women listened to the audiotapes varied widely among patients and could have affected the results of the study. For some side effects, women indicated that they used other interventions. The women believed that delineating other behaviors that were useful for managing side effects would be helpful.

## Future Studies

Future studies of the effect of education on self-care behaviors could provide more information for clinicians. This study should be repeated with the following modifications: Increase the number of subjects, control the type and amount of information the women receive in the clinic, and ascertain how much information the women receive from sources in the community. Additional research should evaluate how the frequency of listening to the tapes influenced the use of self-care behaviors and other behaviors women engaged in to manage their side effects beyond those specifically asked about in this study. Studies are planned to further evaluate self-care behaviors to lessen the anxiety of women receiving chemotherapy.

## Nursing Implications

Effective self-care behaviors can assist patients in minimizing the side effects of chemotherapy, decreasing symptom distress, and improving quality of life. Although research has shown that no one particular method of education is more effective than another (Chelf et al., 2001), the use of audiotapes in addition to printed literature does provide benefits to patients.

This study suggests that nurses in chemotherapy clinics need to use alternative methods for providing information to patients about management of side effects. Supportive telephone calls as well as informational audiotapes can foster self-care behaviors and reduce anxiety. Teaching materials that can be taken home and referred to when needed can be very helpful in reinforcing information. Women who have limited reading skills can benefit from audiotaped information about self-care behaviors.

Fatigue, nausea and vomiting, and taste changes are significant and difficult to control through self-care behaviors. Patients should be encouraged to use the self-care behaviors that are known to be effective and should be prepared for the side effects that may be more difficult to control with self-care behaviors. For instance, where appropriate, nurses should reinforce the importance of taking prescription medications for symptoms such as nausea and vomiting as opposed to less-effective self-care behaviors.

Patients who learn that they can manage many of their side effects may gain self-confidence and improve their physical and psychological well-being. In addition, teaching self-care behaviors that are known to be effective will allow women to use appropriate self-care behaviors rather than experimenting. Patients who understand that some side effects may not be as manageable as others through self-care behaviors may be more likely to seek help from the healthcare community when they experience these side effects.

Improving patients' abilities to perform effective self-care behaviors and lowering their anxiety levels can enhance quality of life, give women more self-confidence and a sense of control, and likely diminish the possibility of terminating treatment because of side effects (Longman et al., 1996).

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## For more information . . .

- ▶ Y-ME National Breast Cancer Organization  
[www.y-me.org](http://www.y-me.org)
- ▶ Susan G. Komen Breast Cancer Foundation  
[www.komen.org](http://www.komen.org)
- ▶ National Breast Cancer Coalition  
[www.natlbcc.org](http://www.natlbcc.org)

*Links can be found using [www.ons.org](http://www.ons.org).*