

The Effects of Guided Imagery on Comfort of Women With Early Stage Breast Cancer Undergoing Radiation Therapy

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Purpose/Objectives: To measure the effectiveness of customized guided imagery for increasing comfort in women with early stage breast cancer.

Design: Experimental, longitudinal, random assignment to groups.

Setting: Two urban radiation oncology departments.

Sample: 53 women (26 in the experimental group, 27 in the control group) aged 37-81; 80% European and 10% African American with stage I or II breast cancer about to begin radiation therapy.

Methods: The experimental group was to listen to a guided imagery audiotape once a day for the duration of the study. The Radiation Therapy Comfort Questionnaire was self-administered at three time points: prior to the introduction of intervention and the beginning of radiation therapy (Time 1), three weeks later (Time 2), and three weeks after completing radiation therapy (Time 3). The State Anxiety Inventory was administered at Time 1 only.

Main Research Variables: The effect of use of guided imagery on comfort with anxiety as a control variable.

Findings: Pooled data indicated a significant overall increase in differences in comfort between the treatment and control group, with the treatment group having higher comfort over time. The data also revealed a significant linear trend in differences between groups. No significant interaction of group and time existed.

Conclusions: Guided imagery is an effective intervention for enhancing comfort of women undergoing radiation therapy for early stage breast cancer. The intervention was especially salient in the first three weeks of therapy.

Implications for Nursing Practice: Guided imagery audiotapes specifically designed for this population were resource effective in terms of cost, personnel, and time.

The diagnosis of early stage breast cancer, decisions about therapy, and therapy itself bring about many acute discomforts. Those experienced during RT include pain, altered sensations and mobility on the affected side, fatigue, skin changes, loss of self-esteem and confidence, emotional shock, confusion, disruption of routine, anger, anxiety, fear, and feelings of isolation (Cimprich, 1992; Love, 1990; Mock, 1993; Weisman & Worden, 1976). If RT is concurrent with hormonal therapy, additional physical symptoms can include appetite changes, hot flashes, and insomnia (Love). If chemotherapy is prescribed either before or after RT, additional anxieties and discomforts exist, some of which are experienced during RT. The problem this study addressed was how to ameliorate these discomforts.

Literature Review

In the professional literature, many descriptions of stressors associated with RT for general adult populations exist, but few intervention studies can be found for women with early stage breast cancer. Related articles include two studies with men and women entering RT for the first time (Hagopian, 1996; Rainey, 1985). Preparatory information and nursing care using self-regulation theory demonstrated positive results. The desired outcomes in those studies were reduced emotional distress (Rainey) and increased self-care (Hagopian). In another study, nursing care guided by self-regulation theory was used in an experiment with 226 patients receiving RT for breast or prostate cancer. Findings revealed that the treatment group had significantly less disruption in their usual life activities during and following RT (Johnson, Fieler, Wlasowicz, Mitchell, & Jones, 1997). In a study with women newly diagnosed with breast cancer, Coward (1998) measured the effects of a support group using a pretest/post-test de-

Most women with early stage breast cancer have a choice between traditional mastectomy or breast-conserving therapy consisting of lumpectomy, axillary node dissection, and localized radiation therapy (RT) with or without hormonal therapy or chemotherapy. An increasing number of women are choosing breast-conserving therapy because it is less mutilating and has five-year cure rates comparable to mastectomies (Ganz, Schag, Lee, Polinsky, & Tax, 1992; Guadagnoli et al., 1998).

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sign on a single group of 16 women. No control group existed nor was a distinction made about stage of cancer or type of treatment. Findings revealed that those in the support group demonstrated greater functional performance status, mood state, and satisfaction with life.

In more closely related studies, Mock et al. (1997) measured the effects of exercise on fatigue, physical functioning, and emotional distress in an experimental design with 46 women beginning RT for early stage breast cancer. They found that the treatment group had significantly greater physical functioning and less fatigue and anxiety. Bridge, Benson, Pietroni, and Priest (1988) compared effects of relaxation, relaxation with imagery, and conversations on several psychological outcomes. From a sample of 139 women, three randomized groups were formed. Researcher-led imagery was nonspecific to the discomforts of RT, and patients were asked to imagine only a calm scene. Although differences between groups were not significant, women receiving both imagery and relaxation demonstrated greater improvements in physical and psychological outcomes than did the group practicing relaxation alone, and both treatment groups had better outcomes than the conversation-only group.

Larsson and Starrin (1992) investigated the effects of relaxation training on stress, mood, appraisal of radiation therapy, and cognitive coping with RT. Nurses read a script of relaxation exercises to 64 women as an integral part of care in the radiation oncology department. Findings were significant only regarding positive appraisal of radiation treatments.

Gruber et al. (1993) measured the effects of relaxation, guided imagery, and biofeedback on immune parameters, psychological status, quality of life, and adjustment to cancer. Findings for the experimental group were significant regarding immune parameters but not for the psychosocial indicators. This study's small sample size ($n = 13$) was a problem.

Conceptual Framework

Comfort is a complex outcome relating to the human needs for relief, ease, and transcendence within physical, social, psychospiritual, and environmental contexts (Kolcaba, 1991). With this holistic definition, interventions to promote comfort can be structured to facilitate positive, interrelated, and simultaneous effects. According to Kolcaba's (1994) Comfort Theory, nurses identify total comfort needs of their patients in stressful healthcare situations. Nurses then design interventions to meet needs currently not being met. In the study discussed here, comfort needs associated with the diagnosis of breast cancer, earlier surgical intervention, and the decision to go through RT may be addressed by a holistic nursing intervention, such as guided imagery, that is specific to the conditions.

The top line of Figure 1 shows the relationships among some of the nursing concepts in the theory. Concepts that were measured in this study are in bold print. The purpose of this study was to examine whether women with early stage breast cancer who are undergoing RT and receive guided imagery have greater comfort over time than women who do not receive guided imagery.

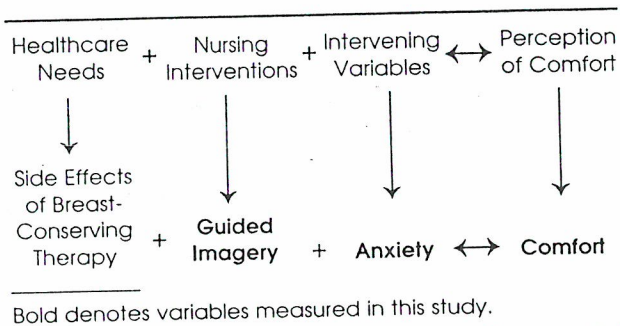


Figure 1. Conceptual Framework for Variables Testing Kolcaba's Comfort Theory

Note. From "A theory of holistic comfort for nursing," by K. Kolcaba, 1994, *Journal of Advanced Nursing*, 19, p. 1181. Copyright 1994 by Journal of Advanced Nursing. Adapted by permission.

Methods

Setting and Sample

The convenience sample consisted of 53 women from two midwestern radiation oncology departments who were ready to start RT for early stage breast cancer. The appropriate institutional review boards granted permission to conduct the study and review patient charts. To be eligible for the study, women had to be aged 17 or older, be fluent in English, have adequate hearing for listening to a tape player, and have been diagnosed with stage I or II breast cancer. Those with previous malignancies, prior experience with guided imagery, or psychological disorders (as determined by chart review) were excluded. Random assignment resulted in 26 women in the treatment group and 27 women in the control group. Three additional women were dropped from the study—one woman in the control group started listening to commercial guided imagery tapes, one woman preferred to listen to religious tapes, and one woman did not have time to listen to the intervention.

Nurses from the radiation oncology departments introduced the study to eligible candidates during their presimulation appointment. Names and phone numbers of women who were interested in the study were forwarded to data collectors, who contacted the women immediately.

Intervention

Using a literature review about comfort needs associated with breast-conserving treatment, the researcher developed the guided imagery script. Kolcaba's (1991) taxonomic structure was used to ensure that the script addressed all aspects of the content domain of comfort. For example, the statement, "The large machinery is helpful to you as you work to return to good health," addressed psychospiritual and environmental comfort, whereas the statement, "The table is a reassuring presence, providing strong support for your body, holding you firmly as you receive the healing rays," addressed social, environmental, and psychospiritual comfort.

Personnel in the radiation oncology departments and five women going through RT for early-stage breast cancer reviewed and validated the script. These women also reviewed and validated the soft jazz background music. A

professional guided imagery therapist recorded the audiotape. The verbal portion of the intervention, set against the music background, filled one side of a 20-minute cassette tape, and music alone continued on the second side of the tape. Women in the treatment group were asked to listen to the verbal portion of the audiotape at least once a day at their convenience throughout the course of RT and for three weeks after treatments were finished. At the end of the study, women in the control group were given a guided imagery audiotape with a general wellness theme that contained statements about healthy lifestyles, immune function, and stress management.

Instruments

Control variable: The State Anxiety Inventory (SAI) (Spielberger, 1983), a four-response Likert-type format ranging from "not at all" to "very much so" for each of the 20 items, was used to assess group differences on anxiety at Time 1 (prior to the introduction of intervention and the beginning of radiation therapy). Higher scores indicated higher anxiety. Cronbach's alpha was 0.90 for this sample.

Dependent variable: The 26-item Radiation Therapy Comfort Questionnaire (RTCQ) measured comfort at each time point. The RTCQ was adapted from the General Comfort Questionnaire (Kolcaba, 1992) and contained several items that addressed the specific comfort needs of this population. Items were derived from clinical experience, literature review, and earlier interviews with representatives of the target population. The statement, "I like the way the radiation department feels," represented environmental ease, and the statement, "It helps to talk to people about my cancer," represented social relief. Positive and negative items were generated to fill all 12 cells of the taxonomic structure of comfort (Kolcaba, 1991) so that the RTCQ evenly represented the content domain of comfort specific to this population. A six-response Likert-type format, ranging from "strongly agree" to "strongly disagree," was used for each item. Higher scores indicated higher comfort. For this sample, Cronbach's alpha was 0.76. Using this methodology, the outcome variable (holistic comfort) was congruent with the intervention (holistic guided imagery). Both the outcome and intervention account for the specific needs of the target population.

Procedure

Data collection: Prior to simulation (Time 1), informed consent was obtained and the first set of questionnaires (RTCQ, SAI, demographic sheet) was completed. Those assigned to the treatment group received instructions for using the tape player provided, the guided imagery audiotape, and a diary to record the number of times they listened to the tape and any other feelings they had about RT or breast cancer.

Data from Time 1 was used to measure baseline comfort and to determine homogeneity of groups on demographic variables, anxiety, and comfort. Data from Time 2 (three weeks after radiation started) and Time 3 (three weeks after radiation therapy ended) were collected to determine if comfort was changing over time. The interval for Time 3 was selected because the literature indicated that the three-week post-therapy period was often one in which patients felt alone, depressed, and frightened about relapse

(Andersen, Anderson, & deProse, 1989; Cawley, Kostic, & Cappello, 1990; Love, 1990). To reduce attrition, all women received weekly phone calls and a tape player to keep if they completed the study.

Data analysis: Comfort was computed as the mean RTCQ item score with a possible range of 1-6. A 2 x 3 (2 between and 3 within) repeated measures analyses of variance (Stevens, 1992) was used to analyze responses from the RTCQ. Alpha was set at 0.10 to guard against false nonsignificant findings for guided imagery, an intervention that had no known negative effects (Lipsey, 1990). Data were analyzed using SPSS® (Norris, 1993). Qualitative data from diaries kept by women in the treatment groups were analyzed by extracting themes that appeared in their written statements.

Results

Sample

Ages ranged from 37-81 years ($n = 58$); 42 women (80%) were of European descent, 1 (1%) was of Hispanic descent, 5 (10%) were of African American descent, 1 (1%) was of Asian descent, and 4 (8%) were marked as other; 24 women (46%) had college degrees, 23 (45%) had high school diplomas, 4 (8%) had graduated from trade school, and 1 (1%) did not complete high school; 35 (66%) were married, 8 (15%) were divorced, 6 (11%) were widowed, and 4 (8%) were never married.

Intervention

At Time 1, groups were similar on all demographic variables, preintervention anxiety, and comfort. Thus, no covariates were used in statistical analyses. Regarding the intervention, significant effects were found between groups and across time (see Table 1). The between-group effect was characterized by significantly higher comfort for the treatment group, pooled across all three time periods (see Table 2). A post hoc trend analysis was conducted for the time effect, indicating a significant linear increase in differences between groups on comfort for both groups pooled across time ($p = 0.05$).

Effect sizes for the intervention were computed at Times 2 and 3 by subtracting the means of the control groups from the experimental groups and dividing by the standard deviation of the control group (Lipsey, 1990). The effect size at Time 2 (0.55) was high to medium and was medium at Time 3 (0.41). Thus, the most meaningful difference between groups was at Time 2.

Table 1. Repeated Measures Analyses of Variance for Group Differences on Radiation Therapy Comfort Questionnaire Over Three Measurement Points

| Source | Degrees of Freedom | Mean Square | F-Value |
|------------------|--------------------|-------------|---------|
| Between | 1, 51 | 2.38 | 4.33** |
| Within | 2, 51 | 0.41 | 2.64* |
| Between X within | 2, 51 | 0.01 | 0.07 |

* $p < 0.10$

** $p < 0.05$

Table 2. Means and Effect Sizes for Experimental and Control Groups at Three Measurement Points on Radiation Therapy Comfort Questionnaire

| Time | Total Sample | Experimental | Control | T-Value | Effect (D ²) |
|------|--------------|--------------|---------|---------|--------------------------|
| 1 | 4.57 | 4.69 | 4.46 | 1.42 | |
| 2 | 4.72 | 4.89 | 4.59 | 2.14* | 0.55 |
| 3 | 4.72 | 4.83 | 4.60 | 1.53 | 0.41 |

* $p < 0.05$

Other Findings

A significant, positive correlation between pre-RT anxiety and comfort ($p = 0.05$) existed at all three time periods (Time 1, $r = 0.60$; Time 2, $r = 0.30$; Time 3, $r = 0.34$). This was an unexpected finding because anxiety was thought to detract from comfort.

A small, inverse relationship between anxiety and age ($r = -0.16$, $p = 0.05$) also was discovered. This negative relationship also was apparent during data collection, when younger women generally expressed greater anxiety than older women during interviews and in their diaries.

Qualitative data from diaries and phone calls revealed that the women enjoyed their tapes, often referring to them as "my tape." Sometimes they shared their tapes with their families, especially in times of stress. For example, two of the husbands had acute illnesses that required hospitalization during the time the women were enrolled in the study. These men found the relaxation and imagery exercises helpful for reducing anxiety. Most women developed a routine for listening to their tapes, usually prior to having their RT treatments. Most women indicated that they mentally recalled the words and music several times a day, especially during RT for the first three weeks.

Most of the women found the intervention especially helpful during the first three weeks of therapy. At this difficult time, the audiotape reframed the radiation treatments so that women began to view them as helpful rather than fearful. "I'm not afraid of my treatments at all anymore" was a recurring theme. After the first three weeks, some women got tired of hearing the same script and listened to their tapes less regularly. Some listened to the music side of the tape as a substitute or to assist with sleeping, especially if they awoke in the middle of the night.

Discussion

Unlike previous studies using guided imagery for women with breast cancer, guided imagery in the study discussed here was directed to the specific comfort needs of the targeted population. These needs included anxiety about RT and recurrence of breast cancer, unease with RT equipment and new personnel, remaining surgically pain, insomnia, interruption of routine, and meeting other patients with cancer. Congruent with Kolcaba's (1992) Comfort Theory, the study discussed here proposed and tested relationships between the holistic intervention of guided imagery and women's perception of holistic comfort over time after repeatedly experiencing the intervention.

Findings showed that comfort was higher in the treatment group compared to the control group at Times 2 and 3. Differences in comfort between women using guided imagery and those not using guided imagery were greatest after the first three weeks of the intervention. This was the expected effect of the intervention because the first three weeks of RT are known to be especially stressful for patients with cancer (Hagopian, 1996). With the intervention, women were able to achieve comfort earlier in their RT protocols, and their comfort remained higher than the control group throughout therapy. The fact that women using guided imagery achieved comfort faster during the overwhelming first three weeks of RT is congruent with the heavier use of the audiotape during that same time period, as reported anecdotally. The intervention apparently addressed and met important comfort needs at a critical juncture in the lives of women in this study.

Data for trend analysis demonstrated that although pooled differences between groups increased over time, comfort increased for both groups as the women became more accustomed to all factors related to RT. However, comfort leveled off in both groups after Time 2. This leveling off could be attributed to physical side effects of RT, which detract from comfort, that both groups experienced after three weeks of treatment. Another possibility is that a dose effect of the intervention was achieved at three weeks. Both possibilities were evident in qualitative data. Most women stated that their physical discomforts, most notably fatigue, skin reactions, and insomnia, increased at or around Time 2, despite using the tape. Many women also indicated in their diaries that the tape became repetitious after the first three weeks and that their regularity of use decreased.

Remembering that the measurement for total comfort accounted for psychospiritual, social, environmental, and physical symptoms is important. Guided imagery may have enhanced the first three aspects of comfort so that physical symptoms were relatively less important in the treatment group. The consulting radiation oncologist also stated that women generally experience a higher degree of anxiety during the first three weeks of treatment. After this important time period, most become accustomed to the routine, personnel, and environment in the department. Guided imagery then might be more effective in relieving discomfort during the first three weeks of treatment. Data from this study support these observations.

A possible explanation for the positive relationship between pretest anxiety and comfort is that women who were more anxious also reached out to friends, family, and healthcare personnel in a more overt way. Such women then perceived more social and psychospiritual comfort than those who professed low anxiety and did not ask for help. The therapeutic value of anxiety had been noted in earlier literature (Andersen & Tewfik, 1985; Samarel & Fawcett, 1992) and was supported in the study discussed here. Also, anxiety (like the physical discomforts of fatigue and skin reactions) is a narrowly focused outcome and only a small part of total comfort. Other aspects of comfort that were enhanced could mediate anxiety.

Descriptive data from this study explained the positive relationship between comfort and age and supported findings from an earlier study (Walker, Nail, Larsen, Magill,

& Schwartz, 1996). Older women, when asked how their age affected their ability to cope with breast cancer, most often answered that their age made it easier to cope because they did not have child-care responsibilities or fears about not seeing their children mature. Also, older women said that they had many friends who were cancer survivors and who were willing and able to offer support based on prior experiences.

Future Research

Study Limitations

Convenience sampling limits generalizability of findings to a wider population of women with early stage breast cancer going through RT. Replication studies across many samples are indicated to confirm results and increase generalizability. Findings from the study discussed here about the effectiveness of guided imagery for enhancing comfort in women going through RT apply only to women with early stage breast cancer. They do not apply to women with recurrence of cancer nor to those whose initial cancer was outside the axillary lymph nodes.

Suggestions for Future Studies

Information from diaries was useful for revising the design of the study for future research. Because women generally did not keep accurate records about their tape usage in the diaries, this purpose for the diaries should be reconsidered. If diaries are not used as logs for tape usage, they should be given to all women in the study (experimental and control groups) so that a more complete picture of the RT experience can be obtained.

Many women commented that they liked the audiotape reference to a "healing white light" but took exception to the reference about "gentle sounds" produced by radiation equipment. The description, they claimed, was not accurate because the sounds actually were quite loud and grating. They suggested removing any descriptor of sound but retaining the reference to sounds being noticeable because it was helpful to be forewarned about and reinterpret this aspect of the equipment.

A few women were uncomfortable with the reference in the tape to "stray cancer cells." They preferred to think of their cancer as being eradicated totally by their earlier surgery. On the other hand, the women stated that positive thoughts about radiation treatments resulted in greater relaxation during their treatments. Most did not listen to their tapes during therapy because of a lack of time. Rather, they developed a daily routine for using the intervention, the most frequent time being just prior to treatments. In addition to making the above changes, future research can test more of the variables in Kolcaba's Comfort Theory. Subsequent outcomes have

not yet been correlated with comfort (the immediate desired outcome) or to nursing interventions that demonstrated effectiveness for enhancing comfort. A subsequent outcome that would be of primary interest to women in this study is recurrence of their breast cancer. Other outcomes of interest to nursing research might include functional status, general health status, immune function, and healthcare costs. All of these outcomes would be theoretically important, appropriate, and congruent with Kolcaba's Comfort Theory.

Implications for Nursing

The significant between-group effect, the large effect size three weeks after beginning the intervention, and qualitative data from diaries, interviews, and observation supported the effectiveness of audiotaped guided imagery for enhancing comfort in women undergoing RT for early stage breast cancer. All data demonstrated that guided imagery contributed to higher comfort early in the radiation protocol compared to women who did not receive the intervention. Thus, guided imagery had a positive impact on comfort as women coped with stressors associated with early stage breast cancer and its treatment. Moreover, the intervention was cost-effective in terms of resources and money. In practice, radiation oncology nurses gave the inexpensive audiotapes to women who wanted them. (After this study was completed, 10 audiotapes were given to each of the participating research sites, and nurses lent them out to women in similar situations. The nurses and women who received them appreciated this very much).

The holistic nature and state-specificity of the outcome of comfort presented challenges for measuring changes in comfort from one time point to the next and for assessing differences between groups. However, the idea that a meaningful, repetitive intervention could generate significant, linear, positive differences in comfort when compared to a control group over a 10-week time frame was hypothesized and confirmed statistically in this study. Thus, the outcome of comfort was measurable and sensitive to effects of a therapeutic intervention.

The study addressed gaps in nursing knowledge about holistic research methods as noted by Johnson (1990). Johnson cited the absence of operationalized holistic interventions, such as guided imagery, and a paucity of appropriate measurement techniques that reflected the interactive effects of such interventions. Despite an increased interest in holistic interventions as indicated by the growing number of articles about them, few internally consistent, quantitative studies investigating their effectiveness existed until now. This study provided a blueprint for operationalizing a research paradigm where effects of a holistic intervention are measured congruently with a holistic outcome.

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