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The Effects of Foot Reflexology on Anxiety and Pain in Patients With Breast and Lung Cancer

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Abstract

Purpose/Objectives: To test the effects of foot reflexology on anxiety and pain in patients with breast and lung cancer.

Design: Quasi-experimental, pre/post, crossover.

Setting: A medical/oncology unit in a 314-bed hospital in the southeastern United States.

Sample: Twenty-three inpatients with breast or lung cancer. The majority of the sample were female, Caucasian, and 65 years or older; had 12 or fewer years of education and an annual income of \$20,000 or more; and were receiving regularly scheduled opioids and adjuvant medications on the control and intervention day.

Methods: Procedures included an intervention condition (foot reflexology to both feet for 30 minutes total by a certified reflexologist) and a control condition for each patient (with at least a two-day break). No changes were made in patients' regular schedule or medications.

Main Research Variables: Anxiety and pain.

Findings: Following the foot reflexology intervention, patients with breast and lung cancer experienced a significant decrease in anxiety. One of three pain measures showed that patients with breast cancer experienced a significant decrease in pain.

Conclusions: The significant decrease in anxiety observed in this sample of patients with breast and lung cancer following foot reflexology suggests that this may be a self-care approach to decrease anxiety in this patient population.

Implications for Nursing Practice: Professionals and lay people can be taught reflexology. Foot reflexology is an avenue for human touch, can be performed anywhere, requires no special equipment, is noninvasive, and does not interfere with patients' privacy.

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Key Points

1. Foot reflexology is a form of foot massage that targets points on the foot believed to correspond to parts of the body.
2. With an increased interest in complementary therapies, foot reflexology may appeal to oncology nurses because of the potential relaxation effects.
3. Study findings indicate that foot reflexology has a possible positive effect on anxiety reduction. Effects on pain reduction are less clear.
4. Nurses interested in using foot reflexology should undergo training and certification.

Many patients living with cancer experience anxiety, and 75% of patients with advanced cancer experience pain (U.S. Department of Health and Human Services, 1994). Patients must manage their anxiety and pain as chronic problems.

Patients with cancer often try alternative therapies (e.g., massage, reflexology, therapeutic touch, herbs, special diets) (Dossey, Keegan, Guzzetta, & Kolkmeier, 1995; Montbriand, 1994). However, patients often make these choices based on limited information about the efficacy of the therapies (Montbriand, 1995). Healthcare providers must conduct more research about these therapies if they are to help patients make wise choices about them (Montbriand, 1993).

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Reflexology

Reflexology is a form of foot massage designed to harmonize bodily functions and thus have a healing and relaxing effect (Tappan, 1978). Reflexology is based on the premise that "there are reflex areas in the feet and hands that correspond to all of the glands, organs, and parts of the body" (Byers, 1983, p. 11). Reflexology has been used since ancient times to promote relaxation (Booth, 1994; Byers; Dobbs, 1985). In recent years, it has been used as an alternative or complementary therapy to relieve stress and tension, improve the blood supply, and promote homeostasis (Dossey et al., 1995; Micozzi, 1996). Explanations for its effects are based on several theories. For example, the energy theory proposes that organs communicate via an electromagnetic field and reflexology assists energy to recirculate through blocked pathways. The lactic acid theory states that lactic acid is deposited as microcrystals in the feet and reflexology crushes the crystals and allows for the free flow of energy. The theory of proprioceptive nervous receptors states that a connection exists between the areas of the feet and the body organs and that reflexing the feet affects the organs. Foot reflexology produces its relaxing effect by relieving tension and stress related to physical problems. This relaxation affects the autonomic response, which, in turn, affects the endocrine, immune, and neuropeptide systems (Dossey et al.). Finally, the psychological explanation states that reflexology is simply a method of showing care and concern for patients (Dobbs). Reflexology's relaxing effect supported this study.

No research has examined reflexology as a treatment for patients with cancer, although studies have tested the effects of other nonpharmacologic interventions (e.g., massage) on patients' anxiety and pain (Barbour, McGuire, & Kirchhoff, 1986; Crowther, 1991; Ferrell, Cohen, Rhiner, & Rozek, 1991; Ferrell-Torry & Glick, 1993; Meek, 1993; Weinrich & Weinrich, 1990; Wilkie, Lovejoy, Dodd, & Tesler, 1988). Patients with cancer cited massage as a method of nonpharmacologic pain control they used (Barbour et al.). While observing patients' pain-control behaviors, researchers noted the use of more pain-control behaviors than patients reported (Wilkie et al.), which supports inclusion of participant observation in research designs examining patients with cancer who are experiencing pain. A pilot study found that male patients with cancer experienced a significant decrease in pain after a 10-minute massage (Weinrich & Weinrich). Although pain was not significantly decreased one to two hours following massage, massage was advocated as a short-term nursing intervention. Ferrell-Torry and Glick found similar results after patients with cancer received a 30-minute massage. These nine men demonstrated a decrease in physiologic indicators and improved self-reports of their perception of pain and anxiety. Meek confirmed positive results after male and female patients enrolled in hospice received a three-minute back massage. The patients' decrease in heart rate and diastolic blood pressure and increase in skin temperature were evidence of their increased relaxation.

Ferrell et al. (1991) reported that patients with cancer experienced decreased pain specifically after foot massage, but no other

research about reflexology and patients with cancer has been reported. However, reflexology treatments during an eight-week period in a randomized controlled study decreased premenstrual signs and symptoms (including anxiety) significantly more in an intervention group than in the placebo group (n = 35) (Oleson & Flocco, 1993). Omura (1994) used a procedure to map organ representation on the hands and feet of 10 subjects. Omura did not report statistical significance but claimed physiologic results based on an anatomic design. Reflexology has been used as an alternative or complementary therapy to relieve stress and tension, improve the blood supply, and promote homeostasis (Dossey et al., 1995; Micozzi, 1996). This article reports a study of the effects of reflexology on anxiety and pain in patients with cancer.

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Methods

This study was a quasi-experimental, pre/post, crossover trial, with patients serving as their own control (Daly, Bourke, & McGilvray, 1991). This design is appropriate when a treatment such as reflexology produces an immediate effect that may disappear after the treatment is removed. The patients were randomized to two groups: Group A (receiving reflexology on the first contact) and Group B (receiving reflexology on the second contact). The researcher used a coin toss to determine which patients were assigned to the control group first and which patients were assigned to the intervention group first. The researcher then alternated assignment of control and intervention for each of the patients, ensuring that every other patient was assigned to Group A or Group B. Anxiety and pain were measured prior to the intervention, at the beginning of the control time (a 30-minute time period during a day without the intervention), following the intervention, and at the end of the control time.

Setting and Sample

Patients were on an 18-bed medical/oncology unit in a large regional hospital in the southeastern United States. All patients with lung or breast cancer were included in the study during a 20-week period if they were 21 years or older, spoke English, and gave informed consent. Only patients with breast and lung cancer were chosen to limit the types of chronic cancer-related pain (somatic or visceral). Payne (1990) and Portenoy (1990) recommended limiting the types of pain. Because different cancers have different pain characteristics, limiting the types of pain makes the population more homogenous. A nurse researcher asked the patients with breast and lung cancer who met the criteria (determined through chart review) to complete a visual analogue scale (VAS) for anxiety (Herman, 1990). If patients reported any anxiety on the VAS, they were asked to participate in the study. Patients with cancer who reported no anxiety on the VAS were excluded. Patients who had surgery within the past six weeks, open skin wounds on their feet, a foot tumor or foot metastasis, or radiation treatment to the feet also were excluded.

to separate patients experiencing chronic pain from those experiencing acute pain (City of Hope National Medical Center and Beckman Research Institute, 1993). Patients who received radiation to the site of pain were excluded. Patients with dementia or peripheral neuropathy also were excluded to ensure their responses were accurate (McDonald & Bruera, 1990). In addition, patients who had recent surgery were excluded to differentiate chronic cancer-related pain from acute surgical pain (Coyle & Foley, 1987).

The oncologists required a medical consultation before the researcher was allowed to seek participation in the study from patients exhibiting any possible symptoms of deep vein thrombosis. Reflexology is not contraindicated for patients with deep vein thrombosis, but the required medical consultation was physician preference. As in other studies (Booth, 1994; Byers, 1983), patients with lower limb circulatory problems (e.g., phlebitis, gallstones, kidney stones) did not receive foot reflexology to the areas of the foot associated with the diseased areas of the body but received foot reflexology to other areas of the foot. Avoiding reflexology to the affected areas of the foot that are associated with other problem areas of the body is a safety precaution to prevent, for example, stones or possible emboli from moving and causing complications.

Most of the patients on the medical/oncology unit experienced chronic cancer-related pain for which pain medications were ordered. Twenty-four patients agreed to participate in the study; however, one patient died before the reflexology intervention, leaving a final sample of 23. Even though all of the patients experienced pain at some time during their hospitalization, they did not always experience it during the time of measurement for the study.

Intervention

The International Institute of Reflexology, which uses the Original Ingham Method, trained and certified the researcher as a reflexologist. Before patients were enrolled in the study, reflexology was described explicitly to them through a written protocol and a form that illustrated the areas that would be reflexed (i.e., areas on the foot related to a body part or organ that are stimulated by pressure of the reflexologist's thumb or forefinger).

Foot reflexology was chosen because most of the patients were receiving IV fluids through the hands or arms, making hand reflexology less appropriate. Of the 30-minute reflexology session, 15 minutes were spent reflexing the areas of the feet corresponding to areas of patients' self-reported pain and organs or body parts where cancer sites were located (to promote homeostasis) (Byers, 1983; D. Byers, personal communication, November 1, 1996). If patients reported no pain, the reflex areas on the feet associated with the organs or body parts where the cancer was located were reflexed. The specific areas reflexed for breast cancer and lung cancer (i.e., the balls of the feet and on top of the feet over the balls) are identical. Byers defined helper areas as areas that, when reflexed, may have a direct effect on the afflicted areas and are

used as reinforcements. These areas were reflexed to aid the specific area of the pain or cancer sites. Helper areas included the pituitary, thyroid, and adrenal glands to boost the immune response to stress (D. Byers, personal communication, November 1, 1996). If swelling was a problem, areas of the feet corresponding to the lymphatics were reflexed. The area corresponding to the solar plexus was reflexed on all patients as part of the relaxing techniques. Relaxing techniques, administered at the beginning and end of the session, comprised 10 minutes of the 30-minute reflexology session. Relaxing techniques consisted of a back-and-forth movement of the reflexologist's palms on the outer edges of the patients' metatarsals and an ankle-loosening technique in which the reflexologist's palms were used to reflex the outer edges of the patients' ankles. Five minutes were devoted to reflexing the entire area of the feet to ensure that all areas of the body were covered.

Thirty-minute foot reflexology sessions are recommended (Byers, 1983; Oleson & Flocco, 1993; Rick, 1986; Tappan, 1978) and were administered using a crossover design during one of two consecutive researcher visits with each patient, between 7 am and 7 pm. Half of the patients received reflexology first and then served as their own control. The other half of the patients served as their own control first and then received reflexology. Hospital-brand lotion was applied to the feet at the end of the session (lotion was withheld during the reflexology to prevent the reflexologist from slipping over an area). The reflexologist responded to the patients' comments or questions during the session.

No intervention was used during the 30-minute control time. The researcher was not present during this time. At least 48 hours elapsed between the reflexology intervention and the control time. The mean time between the intervention and control was 2.4 days, with a maximum interval of 7 days. Patients continued their regular routine of rest and activity during that time period.

Instruments

Two instruments were used to measure anxiety and pain. The **VAS**, the simpler of the two instruments, was used to measure anxiety and administered first so that the procedure for completing a VAS could be explained. The VAS for anxiety is a 10-cm line with verbal anchors at each end stating "not anxious at all" to "the most anxious I have ever been" (Cline, Herman, Shaw, & Morton, 1992; McGuire, 1988). The VAS score ranged from 0-100. The instrument has been standardized and is reliable (Cline et al.).

The **Short-Form McGill Pain Questionnaire (SF-MPQ)** (Melzack, 1987) was used to measure pain. It contains descriptor words representing the sensory dimension of the pain experience (throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, and splitting). Four descriptors (tiring-exhausting, sickening, fearful, and punishing-cruel) depict the affective dimension. The words are ranked according to intensity from 0-3 (none, mild, moderate, severe) (Melzack). The Present Pain Intensity (PPI) component of the SF-MPQ and a VAS measure

the pain intensity. The PPI scores range from 0-5 and are accompanied by descriptor words (no pain, mild, discomforting, distressing, horrible, and excruciating).

The SF-MPQ takes only two to five minutes to administer and correlates highly with the sensory, affective, and total indices of the longer McGill Pain Questionnaire. It is sensitive to therapies such as analgesic drugs, epidural blocks, and transcutaneous electrical nerve stimulation (Melzack, 1987). Validity and reliability of the SF-MPQ have been established with patients with chronic cancer pain (Dudgeon, Raubertas, & Rosenthal, 1993). Correlations between the long and short forms ranged from $r = 0.81-0.97$ for the descriptive words.

Demographic data collected included age, gender, race, education, and income. Other pertinent information included diagnoses (specific type of cancer, metastasis sites, and diagnoses other than cancer) and, based on a previous study (Stephenson, 1990), medications (pain and other medications) taken within the last 24 hours.

Data Analysis

Data were analyzed using the Statistical Analysis System and provided descriptive statistics, correlations, and univariate analysis. The Wilcoxon and Signed-Rank tests were used for analyses because of the highly skewed distribution of data.

Group A and Group B each were pretested and post-tested at two separate times. Medications were treated as categorical variables. Demographic data were collapsed into two categories for each variable to enhance the clarity of the data.

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Results

Of the total sample of 23 patients, 13 (56.5%) had breast cancer and 10 (43.5%) had lung cancer (see [Table 1](#)). Of the 13 patients with breast cancer, 10 had metastases. Of the 10 patients with lung cancer, 5 had metastases.

Medications given to the sample on control and intervention days were not significantly different. On the control and intervention days, 14 patients (61%) received opioids. On the control day, six patients (26%) received nonopioid analgesics, and, on the intervention day, seven patients (30%) received nonopioid analgesics.

Anxiety

Anxiety scores, used to measure the effects of foot reflexology on anxiety, were significantly lower after foot reflexology in both groups of patients and between the two groups. [Table 2](#) indicates post-test scores minus pretest scores with the reflexology intervention and the

differences between anxiety scores of the control group and following reflexology treatments.

Pain

The 13 patients with breast cancer (11 reporting pain) experienced a significant decrease in pain following foot reflexology as measured by the descriptive words of the SF-MPQ (see [Table 3](#)). Because only two patients with lung cancer reported pain, results from this group of subjects could not be calculated. The differences in pain between the groups as measured by the PPI and VAS were not significant.

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Discussion

Patients with breast and lung cancer experienced significantly decreased anxiety following reflexology. Patients with lung cancer experienced the greatest decrease in anxiety. Because the majority of these patients were male, gender was a confounder with cancer type.

In addition, patients with breast cancer experienced significantly decreased pain, as measured by the descriptive words of the SF-MPQ, following reflexology. Additional study is required to determine the effects of foot reflexology on pain as measured by the intensity sections of the SF-MPQ, the VAS, and the PPI. The fact that the mean pain score on the VAS was only 20.13 for the sample as a whole before reflexology and most patients with lung cancer reported no pain at the time of measurement may explain, in part, the nonsignificant decrease in pain in either group. Other patients were taking medications to manage their pain.

The findings of this study are consistent with the literature regarding reflexology (Oleson & Flocco, 1993; Omura, 1994). Reflexology can be used to decrease anxiety and pain in patients with cancer. Despite the fact that the patients in this study were taking drugs to manage pain, 61% reported pain at some time during the study. Reflexology also can be an avenue for increasing human touch, which is a basic human need. Reflexology can be performed anywhere, requires no special equipment, is noninvasive, and does not interfere with patients' privacy. Some patients in this study were concerned that their feet might have an odor. Washing patients' feet first and applying cornstarch if the feet are moist can remedy this concern.

Future research studies are needed to compare reflexology with other complementary/alternative therapies (e.g., massage, healing touch, relaxation response). Repetitive sessions of reflexology might be studied for a cumulative effect. Research on cost-effectiveness and gender and aging differences associated with reflexology would enhance the efficacy of practitioners' incorporation of reflexology into their practice. Research to ensure that the best nonpharmacologic

methods are matched with different types of pain will contribute to the expanding knowledge of pain.

Limitations of this study were the small sample size (considering that only two of the patients with lung cancer reported pain during the measurement) and the unusually high representation of males with lung cancer. The crossover design allowed the 23 patients to be their own control, which lessened the problem of a small sample size. Because only 11 patients with breast cancer measured pain that was reportable, future studies would benefit from a pain score minimum as part of the inclusion criteria. Replication with a larger sample of a single cancer type is necessary to limit the type of pain. Studies testing nonpharmacologic interventions for anxiety and pain continue to be a challenge but will provide vital information for healthcare providers to manage symptoms of patients with cancer.

Nurses who wish to incorporate reflexology in their practice can study it in the book *Better Health With Foot Reflexology* (Byers, 1983). Certification in reflexology through the International Institute of Reflexology involves 100 hours of study (books, study guides, videos, and seminars), 100 hours of documented practice of reflexology sessions, and a written and practical examination about the Ingham Method of Reflexology. Certification is the best way to ensure proper performance of the technique and can be obtained in a minimum of nine months. Practitioners can obtain more information about reflexology by contacting International Institute of Reflexology, 5650 1st Avenue North, St. Petersburg, FL 33710-7912 (727-343-4811; ftreflex@concentric.net, e-mail; <http://www.reflexology-usa.net/>, Web site).

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For more information:

A Reflexology Foot Chart

<http://www.ozemail.com.au/~sharonc/fchart.htm>

Reflexology

<http://www.cyberus.ca/~lroybpal/reflexology/index.htm>

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