MINI META-ANALYSIS OF NURSING RESEARCH
CONCERNING ADJUNCTIVE THERAPIES
FOR CANCER PAIN

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To the Faculty of Washington State University:

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ABSTRACT

Freedom from pain is one of the most basic of human needs. The purpose of this paper is to compare the nursing research related to alternative or adjunctive treatments for cancer pain management. Historically, there have been few relevant controlled studies. These studies have small sample sizes with weak theoretical frameworks. Despite the multiple shortcomings related to the current literature, a correlation has been shown between relaxation, imagery, music and education in decreasing the severity of pain experienced by patients.
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INTRODUCTION

Management of various stressors to the physiological and psychological aspects of the human organism using non-pharmacologic methods has a long and varied history. Cognitive and behavioral interventions such as yoga and meditation have been practiced for centuries in Eastern cultures. The cultural and medical/scientific writings of the past two centuries contain articles on guided imagery, progressive relaxation, music therapy and healing. Guided imagery, a cognitive technique of achieving mental relaxation, dates back to 1909 (Betts, 1909). Edmond Jacobson published his work on progressive relaxation, or decreasing stress by decreasing muscle response in 1938. Florence Nightingale noted in her writings that music had a positive effect in the healing of patients. Paradoxically, despite the above mentioned facts there has been a slow evolution in the application of nonpharmacologic interventions for the relief of cancer pain.

REVIEW OF LITERATURE

Several methods were utilized to identify relevant nursing research. The basic criteria for inclusion in this meta-analysis were that the research focused on nonpharmacological therapy for cancer. Multiple electronic databases were searched for this project. These included Medline (1985 - 1999), Cinahl (1982 - 1998), Psychlit (1981 - 1998). A more specific search regarding each of the individual modalities and cancer pain failed to reveal any articles. A manual search of Nursing and Oncology Journals was also done. The most recent, available journals were searched and several relevant studies were identified. The references and sources of these
articles were scanned, and the appropriate available articles were then retrieved for analysis and inclusion in this research.

In order to review the most recent literature, the nursing research selected for this meta-analysis was published in the last eight years. A variety of interventions were studied as adjunctive therapies for cancer pain. These include relaxation techniques, music therapy, guided imagery, cognitive-behavioral strategies and educational approaches. The titles of all articles appropriately refer to the use of nonpharmacological modalities as interventions for cancer pain relief. A brief summary of the studies is presented in Table 1.

Research studies were systematically reviewed by the author in reference to the following details: examination of the state of the topic in nursing research, evaluation and critique of articles involving the conceptual phase, empirical phase and analysis phase. Utilization and clinical application for the nurse practitioner are also addressed.

RELEVANCE FOR PRACTICE

Freedom from pain is a very basic human need. Pain control issues directly affect quality of life in a number of ways. These include the contribution of unrelieved pain to fatigue, weakness, anxiety, anorexia, nausea and sleep disturbances. Massie and Holland (1989) reported that severe pain contributes to increased depression and anxiety levels. Bonica, Ventafridda and Twycross (1990) note that in addition to being important for humane reasons, pain control is important to the patients psychological and physiological well being. The capability to affect the level of pain can be empowering to the patient, as well as caregiver or healthcare provider.

Pain management is part of all practitioners domain and patient comfort appropriately is a focus of care. The provider who spends more time with patients fosters trust and rapport. This facilitates patient education, as well as objective assessment of efficacy of different methods of teaching and pain relief.
CONCEPTUAL PHASE

The problem statements and methods in each of the articles reviewed included acknowledgment that various non-drug techniques had been shown to be of value in the relief of pain and associated psychological problems. All of the studies acknowledged deficiencies in research pertaining to the effect of non-drug therapies on cancer pain.

Arathuzik (1994) outlined a problem statement to examine the effects of combinations of relaxation, visualization and coping skills on metastatic breast cancer patient’s perceptions of pain, pain control and mood. Participants were divided into three groups. A control group received no interventions, one treatment group received relaxation and visualization training, and a second treatment group received relaxation, visualization and cognitive coping skills training. An evaluation of the relationship between the effects of the interventions and pain relief within the three groups was a stated purpose.

Beck (1991) identified the problem as a need to provide alternative therapies for cancer pain relief. The purpose of the study initiated by Beck was to specifically evaluate the therapeutic effect of music on cancer pain and patient mood. Subjects in this study listened to their choice of music or a control, (a sixty-cycle hum), for three days. After three days they then crossed over in to the alternate group.

Clotfelter (1999) cited lack of specific research examples of educational interventions for decreasing pain intensity as the primary problem. The stated purpose was to determine if educational intervention related to pain management could decrease pain intensity in the elderly. The subjects were placed into experimental and control groups. The control group received standard teaching from office staff regarding pain control. The experimental group watched a video and was given a booklet on managing cancer pain.
The study by Kolcaba and Fox (1999) included a problem statement that identified the numerous acute discomforts experienced by women with early stage breast cancer. The purpose of this study was to measure the effectiveness of customized guided imagery for increasing comfort in women with early stage breast cancer. Throughout the study, the experimental group listened daily to a guided imagery audiotape. No interventions were provided for the control group.

Sloman (1995) identified a problem in the lack of established efficacy of non-invasive approaches to pain control. This study investigated progressive muscle relaxation and guided imagery as a part of a relaxation technique in the management of cancer pain. There were three treatment groups. A control group received no interventions, one group had a two-week regime of taped relaxation and imagery using earphones and the third group participated in live nurse directed sessions on relaxation and imagery.

**RESEARCH QUESTIONS AND THEORETICAL FRAMEWORK**

Research questions and theoretical frameworks flowed from the problem and purpose in all the studies. These were substantiated through the literature reviews, and relationships between variables were clearly identified by all researchers. The research questions all related to the effect of nonpharmacological interventions on relieving cancer pain.

LITERATURE REVIEW

Literature Reviews were generally comprehensive. Older referenced studies from appropriate research topics from, as early as 1974 were cited. Each article identified a lack of nursing research in adjunctive therapies for cancer pain. Sloman (1995) stated that there were many possible reasons that studies did not show successful results in decreasing cancer pain. This could have been due to lack of scientific rigor, poor design, not specifically addressing cancer pain, and a lack of investigation of clinical effects of relaxation technique for pain control.

The studies in this meta-analysis identified conceptual and operational definitions relating to the relaxation response and pain control. In each study, the concepts used were defined and easily understood. Operational definitions are clearly developed, and logically relate to the conceptual definitions.

The strengths of the conceptual phase of the research studies exist because of the logical and clear statements of problem and purpose. Research questions are sound, clear and relevant to nursing and improving the health status of patients. The major weakness in this area is the lack of current research on this topic. The minimal number of studies that have been done resulted in small sample size and statistical results that can not be generalized to the general population.

EMPIRICAL PHASE

design with repeated measures; the designs chosen were appropriate to the individual studies. The addition of a qualitative component added additional insight to data results and ideas for further research.

Each of the five research articles reviewed specifically addressed obtaining informed consent from study participants. Sloman's (1995) study does not address approval by an institutional review board or human subject protection. This study was done in Australia, whereas the other four were done in the United States. Two articles mention approval at individual facilities prior to implementation (Clofelter, (1999), Arathuzik, (1994)).

These five studies involved 201 participants, with relatively small sample sizes ranging from fifteen to sixty-seven and intervention group sizes ranging from eight to twenty-six subjects. All participants had a diagnosis of cancer, were able to understand English, and were cognitively and physically able to participate, all participants were at least age eighteen and gave informed consent. Two studies included subjects that had not previously used relaxation, imagery or meditation Sloman, (1995), and Kolcaba and Fox, (1999). Participants ages ranged from 20 years to 88 years. All authors specified in their writings that results of their research were limited to similar populations.

Various instruments were used to gather data. The Visual Analogue scale (VAS) was used in three studies Sloman, (1995), Beck, (1991), and Clotfelter, (1999). Sloman (1995) and Beck (1991) utilized the McGill Pain Questionnaire (MCPQ). Beck (1991) also used a Present Pain Intensity Scale (PPIS). Kolcaba and Fox (1999) used the State Anxiety Index (SAI) as the control variable and the Radiation Therapy Comfort Questionnaire (RTCQ) as the dependent variable. Arathuzik (1994) utilized Johnson Pain Intensity-Distress Scales (JPID), Pain Control Scales (PCS) and Profile of Mood States (PMS). With the exception of Sloman (1995), the authors identified reliability and validity for the scales used. Validity was established through
correlational values and demographic data was also analyzed.

Steps of data collection were clearly presented in all studies. The treatment and control groups were clearly defined. Three studies involved the use of audiotapes for instruction, Beck, (1991), Sloman, (1995), and Kolcaba and Fox, (1999). Clotfelter (1999) utilized a videotape and pamphlet for instruction. The control group received educational instruction from the office staff. Sloman (1995) had three study groups. One was provided an audiotape for relaxation and imagery training, the second made use of staff nurses for live instruction, and the last did not receive specific training. Arathuzik (1994) provided private, live instruction for each treatment group participant. All researchers addressed a standardized format for instruction and prior training for researchers and assistants involved in the study. Arathuzik’s research assistant (1994) administered pretest and posttests. In all other studies the participants completed questionnaires.

DATA COLLECTION

Data collection in the studies done by Beck (1991), Clofelter (1999) and Kolcaba and Fox (1999) depended upon participants to complete and return assessment forms in self-addressed stamped mailers. Telephone contact was made to participants to maintain contact, provide reinforcement to continue the interventions being studied and to complete the questionnaires. Sloman (1995) utilized inpatients, but contacted discharged patients by telephone. None of the studies specifically address who scored the questionnaires or coded the qualitative diaries.

The primary threat to internal and external validity in each study was the small sample size. Subject selection bias also seemed to be present in the studies by Beck, Clofelter and Kolcaba and Fox, which may affect validity. Beck (1991) solicited participants from a variety of settings in Utah. Participants who were more motivated may have responded. Clofelter (1999)
utilized physicians and nurses in a private practice to identify patients. Kolcaba and Fox (1999) also utilized nurses from the research site to introduce the study to eligible candidates. The actual process of subject selection was not addressed in any of the studies.

Randomization to treatment groups provided unequal demographics within the groups, which may have affected internal and external validity. Arathuzik (1994) had significant educational differences between the treatment groups, which may have affected results. There were also significant age differences. The control group was predominantly over age 50 and only 37.5% had a college education. One of the treatment groups in the study by Arathuzik was predominantly in the 31 - 45 year age group and 100% had a college education.

The educational instruction provided by office staff in the Clofelter (1999) study was not standardized, jeopardizing interrator reliability. Beck (1991) provided a one-day washout period between treatments during the crossover study. On the washout day the researcher contacted the participants and administered a questionnaire. The question arises as to whether this is really a washout day.

Kolcaba and Fox (1999) specifically address the rationale for time of testing, which was based on previous research. Beck's (1991) study was implemented within the subjects' homes. This may have significantly different implications from the Sloman (1995) and Kolcaba and Fox (1999) studies, which were implemented in an institutional setting.

ANALYSIS

Data analysis was completed using SPSS in two studies (Sloman, 1995, Kolcaba and Fox 1999). Analysis of variance (ANOVA) was used in three of the studies. Clofelter (1999) utilized analysis of covariance (ANCOVA). Sloman (1995) utilized ANCOVA, as well as ANOVA.

Beck (1991) utilized MANOVA for analysis of variables and Wilcoxon summed ranks for
carryover effect because of the crossover study design. The data was presented in tables that were concise and easy to understand, and clearly showed the results. The graphs presented in the Beck (1991) study would be more helpful, if a better explanation were given.

RESULTS

The discussion of results logically flowed from the studies. The authors in each of the articles addressed research questions and purposes. It is interesting to note that there were no reports of any complications or adverse effects from the interventions. The expected results were obtained by Beck (1991), Clofelter (1999) and Sloman (1995). Beck found that music significantly increased the ability of cancer patients to reduce pain intensity. There were inconsistent findings in Beck’s study in the relationship between mood and pain intensity. No significance was found between sound and music as an intervention, and the role of music to improve mood was not supported. Clofelter (1999) discovered a significant reduction in pain intensity with educational intervention. Sloman (1995) found no difference between response to video or live instruction. Both live and video instructions were effective in reducing pain intensity and PRN analgesic intake. He also found a significant difference in affective state with the use of progressive relaxation.

Arathuzik (1994) discovered that only one of three hypotheses proposed was supported. The treatment group with relaxation, visualization and cognitive coping skills combined, showed an increase in ability to control and reduce pain. This group did not experience any decrease in actual pain intensity. This group also did not achieve any significant difference in their affective state.

The research done by Kolcaba and Fox (1999) supported their hypotheses and had unexpected findings. Guided imagery was found to be an effective intervention for enhancing comfort in the women studied. The effectiveness was most meaningful during the
treatment group with relaxation, visualization and cognitive coping skills combined, showed an increase in ability to control and reduce pain. This group did not experience any decrease in actual pain intensity. This group also did not achieve any significant difference in their affective state.

The research done by Kolcaba and Fox (1999) supported their hypotheses and had unexpected findings. Guided imagery was found to be an effective intervention for enhancing comfort in the women studied. The effectiveness was most meaningful during the first three weeks of radiation therapy, which are often the most stressful. The unexpected findings include a significant positive correlation between anxiety and comfort. Previously, anxiety was thought to detract from comfort. They also found was a small inverse relationship between anxiety and age.

IMPLICATIONS FOR NURSE PRACTITIONERS

All of the studies definitely have implications for the nurse practitioner. The studies emphasize the use of a combination of nonpharmacological interventions. All the articles stress that these interventions are not a replacement for pain medication, they are and should be considered adjunctive therapies. The interventions are inexpensive, widely available, easily taught to people and can be tailored to the individual's needs and capabilities. The benefits for cancer patients have been well demonstrated, showing the importance of patient and nursing education. The nurse practitioner needs to know the options and skills involved and how to either effectively teach them or find resources for their patients.

CONCLUSION

These articles help substantiate the effectiveness of nonpharmacological therapies to assist in pain control in the cancer patient. Although research in this area is sparse, the articles
chosen were overall well conducted, well written, concise and understandable. Critiquing the articles individually and then comparing them revealed few problems. The researchers discussed reported problems and potential problems with validity. The research done by Kolcaba and Fox (1999) was impressive because the control group was given a copy of the guided imagery tape. Clofelter (1999) provided the study results to participants.

After analyzing the five research articles, several ideas for further research became apparent. Larger sample sizes and wider demographic sampling is suggested. Replication studies also need to be done. Further studies analyzing a combination of these therapies may show even more symptom relief. The extension of these studies to target caregivers and methods to improve their coping would be interesting. It would be helpful to address the application of these interventions to other catastrophic or life limiting disease processes.
### Table 1 Summary of studies for nonpharmacological interventions for cancer pain

<table>
<thead>
<tr>
<th>Author</th>
<th>Intervention</th>
<th>Study Design</th>
<th>n and Groups</th>
<th>Instruments</th>
<th>Analysis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arathuzik</td>
<td>Relaxation</td>
<td>Pilot Study</td>
<td>n = 24</td>
<td>JPID</td>
<td>Analysis of Variance</td>
<td>SD ↑ ability to ↓ pain.</td>
</tr>
<tr>
<td></td>
<td>Visualization</td>
<td>Experimental</td>
<td>8 = Control Group</td>
<td></td>
<td>Duncan Procedure</td>
<td>NSD in pain intensity, distress or mood</td>
</tr>
<tr>
<td></td>
<td>Cognitive coping skills</td>
<td>Pretest/Posttest</td>
<td>8 = Relaxation + visualization</td>
<td></td>
<td>Multiple Range Test</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8 = Relaxation + Visualization + Cognitive coping skills</td>
<td></td>
<td>T-tests</td>
<td></td>
</tr>
<tr>
<td>Beck</td>
<td>Music</td>
<td>Experimental</td>
<td>n = 15</td>
<td>SFMPQ</td>
<td>MANOVA</td>
<td>SD ↑ ability to ↓ pain.</td>
</tr>
<tr>
<td></td>
<td>Sound</td>
<td>Cross over with related</td>
<td></td>
<td>PPI</td>
<td>Wilcoxon summed ranks</td>
<td>NSD ↑amt. pain control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>measures</td>
<td></td>
<td>VAS</td>
<td>Qualitative analysis</td>
<td>NSD Sound vs. music</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Qualitative</td>
<td></td>
<td></td>
<td></td>
<td>No significant relationship pain &amp; mood control</td>
</tr>
<tr>
<td>Clofelter</td>
<td>Education</td>
<td>Quasi-experimental</td>
<td>n = 36</td>
<td>VAS</td>
<td>ANCOVA</td>
<td>SD ↓ pain with education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pretest/Posttest</td>
<td>18 = Video + written</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18 = Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kolecaba and Fox</td>
<td>Guided Imagery</td>
<td>Experimental</td>
<td>n = 53</td>
<td>STAI</td>
<td>Mean RTCQ</td>
<td>SD enhancing comfort</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Longitudinal</td>
<td>27 = audio instruction</td>
<td>RTCQ</td>
<td>Repeated measures of ANOVA</td>
<td>SD anxiety &amp; comfort</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Qualitative</td>
<td>26 = control group</td>
<td></td>
<td>Qualitative analysis</td>
<td>Small inverse relationship age &amp; anxiety</td>
</tr>
<tr>
<td>Sloman</td>
<td>Relaxation</td>
<td>Experimental</td>
<td>n = 60</td>
<td>SFMPQ</td>
<td>1-Way ANOVA</td>
<td>Video &amp; live instruction both effective.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pretest/Posttest</td>
<td>20 = audio tape</td>
<td></td>
<td>ANCOVA</td>
<td>SD ↓ pain intensity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20 = Live instruction</td>
<td></td>
<td></td>
<td>SD ↓ affective state</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20 = Controlgroup</td>
<td></td>
<td></td>
<td>SD ↓ PRN analgesic intake</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NSD scheduled analgesics</td>
</tr>
</tbody>
</table>
Abbreviations

JPID = Johnson Pain Intensity Distress Scale. SFMPQ = short form McGill Pain Questionnaire.
PPI = Present Pain Intensity Scale. VAS = Visual Analog Scale. STAI = State Anxiety Index.
RTCQ = Radiation Therapy Comfort Questionnaire. SD = Significant Difference. NSD = No Significant Difference.
REFERENCES


