Original Article

Nondrug Therapies for Pain Management Among Rural Older Adults

Judith M. Fouladbakhsh, PhD, APRN, BC, AHN-BC, CHTP, Susan Szczesny, MS, APRN, BC, NP, Elisabeth S. Jenuwine, PhD, MLS, and April H. Vallerand, PhD, RN, FAAN

Abstract:

This quasiexperimental two-group pilot study tested an intervention aimed at educating older adults in rural communities about the appropriate use of nondrug treatments for pain. Earlier data reveal that older adults use significantly less nonpharmacologic modalities than their younger counterparts, and that pain self-treatment is prevalent in rural areas. Individuals aged ≥60 years who experienced pain in the preceding 2 weeks were recruited from rural Midwestern communities through the use of flyers and information sessions at hospitals, churches, and community organizations. Upon enrollment, participants selected a date for an educational session, which was randomized to the experimental or control condition. All participants (n = 53) completed a series of questionnaires (Brief Pain Inventory, Symptom Distress Scale, Perceived Control Scale) at the initial educational session (T1) and at a two-week follow-up session (T2). Participants in the control and experimental groups attended a 30-minute educational session on safe use of over-the-counter medications; the experimental group also received an additional 30-minute session on safe and effective use of heat, cold, and relaxation breathing. Hot and cold packs and relaxation breathing instruction were provided for use over the 2-week period. There was a significant increase in the use of all nondrug treatments and a decrease in pain-related distress and current pain scores in the experimental group compared with the control group. This study informs nurses and other health care providers on the value of education for use of nondrug therapies in conjunction with pharmacologic pain management among rural older adults.

Many older adults in the United States experience persistent pain, with estimates of prevalence varying widely. The Centers for Disease Control and Prevention (CDC, 2006), the American Geriatrics Society (2002), and the American Pain Foundation (2008) estimate that 21%-70% of community-dwelling older adults

From the College of Nursing, Wayne State University, Detroit, Michigan.

Address correspondence to Dr. Judith M. Fouladbakhsh, PhD, APRN, BC, AHN-BC, CHTP, 5557 Cass Avenue, Room 238, Detroit, MI 48202. E-mail: dr.j@wayne.edu

Received March 5, 2010; Revised August 12, 2010; Accepted August 18, 2010.

1524-9042/$36.00

doi:10.1016/j.pmn.2010.08.005

(i.e., >60 years of age) experience persistent pain, with a significant tendency toward underreporting (Helme & Gibson, 2001; Miaskowski, 2000; Thomas et al., 2004). The high prevalence of persistent pain remains a serious public health problem despite extensive treatment efforts by the health care system, with profound effects on older adults' health and quality of life. Pain has also been associated with many secondary problems, including disturbed sleep, depression, impaired physical functioning and disability, decreased participation in social activities, and higher health care costs (Bookwala, Harralson, & Parmelee, 2003; Cosby, Hitt, Thornton-Neaves, McMillen, Koch, Parvin, 2005; Edwards, 2006; Ferrell, Ferrell, & Osterweil, 1990; Gallagher, Verma, & Mossey, 2000; Magni, Marchetti, Moreschi, Merskey, & Luchini, 1993; Roberto & Reynolds, 2002; Ross & Crook, 1998; Scudds & Robertson, 2000; Tsai, Wei, Lin, & Chien, 2005). Persistent pain also impairs the ability and willingness of older adults to engage in health-promoting behaviors and self-management of symptoms due to chronic health conditions (Krein, Heisler, Piette, Makki, & Kerr, 2005; Patil, Johnson, & Lichtenberg, 2008).

Even with the optimal use of analgesics, most pain is best treated with a combination of drug and nondrug approaches. However, many adults are unaware of the multitude of nondrug treatments that can be used for self-treatment to complement pharmacologic pain management approaches (Vallerand, Fouladbakhsh, & Templin, 2003). The previous study reveals that only 35% of rural individuals used nonpharmacologic treatments, in contrast to roughly twice the number using prescription and over-the-counter (OTC) medications (66% and 75%, respectively). In addition, use of nondrug approaches was significantly higher among younger participants, highlighting the need to inform older adults about these self-care treatments. Therefore, the purpose of the present study was to evaluate the effects of an intervention to teach older adults in a rural community about the use of nondrug therapies for self-treatment of pain.

LITERATURE REVIEW AND SIGNIFICANCE

Despite the devastating effect of persistent pain on health and quality of life, many older adults frequently rely on self-treatment by using a wide array of therapies, seeking professional help only when their pain becomes unbearable (Lowe & Ryan-Wenger, 1999; Musil, 1998; Ross, Carswell, Hing, Hollingworth, & Dalziel, 2001; Stoller, Pollow, & Forster, 1994; Woolf, Zeidler, Haglund, Carr, Chaussade, Martin-Mola, 2004). The preference for self-treatment is especially high among those living in rural communities and may be due to lack of proximity to medical care, limited financial resources, and the greater value placed on self-reliance and independence often noted among rural residents (Bartlomé, Bartlomé, & Bradham, 1992; Bushy, 1990). OTC pain relievers are the most popular self-treatment choice, with 20%-30% of adults >65 years old using these products on any given day (Rolita & Freedman, 2008). Other increasingly popular pain self-treatment modalities include many complementary and alternative medicine (CAM) therapies, such as herbal products and supplements, deep breathing exercises, massage, acupuncture, relaxation, meditation, prayer and exercise (American Pain Society [APS], 1999; Fouladbakhsh & Levin, 2006; Fouladbakhsh & Stommel, 2008; Kirkpatrick, Page, & Hayward, 2006; Ross, Carswell, Hing, Hollingworth, & Dalziel, 2001; Vallerand, Fouladbakhsh, & Templin, 2004, 2005).

Although they provide noted benefits, the use of OTC medications and herbal products for self-directed treatment of pain may also create significant health risks owing to potential side effects and drug interactions, especially when providers are uninformed. The use of OTC nonsteroidal antiinflammatory drugs (NSAIDs), for example, increases the risk of gastrointestinal bleeding, especially among older adults (Pitkala, Strandberg, & Tilvis, 2002; Rolita & Freedman, 2008). Extensive use of OTC pain relievers also presents the potential for accidental overdose (Rolita & Freedman, 2008). A recent evaluation by a U.S. Food and Drug Administration (FDA) panel on acetaminophen overdose and liver injury discovered incidences and causes of acetaminophen overdoses in the general population, prompting a nationwide recommendation for a lowered maximum daily amount (FDA, 2009). In addition, older adults often use these widely available nonprescription OTC drugs along with multiple prescription medications for chronic illness; added to the mix of these products may be self-selected herbs and supplements, often without informing their physicians (Johnson, 1999; Vallerand et al., 2005). This further compounds the problem of potential drug interactions and untoward health outcomes.

In contrast, nondrug self-treatment methods may allow older adults to avoid potential drug interactions and side effects while providing pain relief similarly to OTC medicines for pain management (APS, 1999). Even with the optimal use of analgesics, most pain is best treated with the combination of drug and nondrug approaches in a complementary manner (Ferrell, Rhiner, & Ferrell, 1993; Fouladbakhsh & Levin, 2006; McCaffery & Pasero, 1999). Data have revealed that

nondrug methods of pain management do the following: 1) diminish pain perception by reducing intensity and increasing pain tolerance; 2) reduce pain-related distress; 3) strengthen coping abilities; and 4) give the patient and family a sense of control over pain (Adams & Arminio, 2008; McCaffery & Pasero, 1999).

Despite the benefits, the literature reveals that older persons use nondrug pain relief therapies less frequently than drug-based analgesics, and at a significantly lower rate than younger persons who report pain (Jakobsson, 2004; Grzywacz et al., 2007; Vallerand et al., 2004). It has been noted that patients tend to use self-care strategies that they are familiar with and believe to be beneficial (Hammond, 1998; Lansbury, 2000). Therefore, lower rates of nondrug treatment by older adults may stem from lack of awareness and knowledge of these methods and their appropriate and safe use. Whereas young and middle-age adults use various sources of health information, including mass media, the internet, advertisements, and communication with friends and family, older adults primarily rely on their physicians for advice and recommendations (Gladden, 2000; Narhi & Helakorpi, 2007).

Although earlier research has demonstrated the importance of nondrug pain therapies, these treatments have seldom been initiated by health care providers. Nondrug pain therapy use, often sporadic and based on previous experience, frequently occurs without adequate instruction and may not reflect selection of the optimal method for the type of pain experienced (Ferrell, Cohen, Rhiner, & Rozek 1991; Rhiner, Ferrell, Ferrell, & Grant, 1993). Older adults, in particular, may lack sufficient information about different nondrug self-treatment methods, their efficacy, and indications for use. Educating older adults about safe and effective nondrug treatment methods can increase their repertoire of pain management strategies and ultimately improve pain control in this population. In addition, with the increased interest in and use of nondrug-based CAM therapies, further study is needed to determine patterns of use and effectiveness for symptom management.

To improve pain management, a number of pain self-management education programs have been developed and tested in clinical trials, with the majority reporting improved knowledge about pain control methods and use of nondrug therapies and perceived control over pain and pain-related distress and anxiety. Effects of educational programs on pain intensity, however, have been inconsistent and inconclusive (Berman, Iris, Bode, & Drengenberg, 2009; Damush, Weinberger, Perkins, Rao, Tierney, Qi, & Clark, 2003; Ersek, Turner, Cain, & Kemp, 2008; Ferrell et al., 1993; Lorig, Laurin, & Holman, 1984; McGillion, Watt-Watson, Stevens, Lefort, Coyote, & Graham, 2008; Moore, von Korff, Cherkin, Saunders, & Lorig, 2000). In addition, none of the existing pain self-management programs have focused specifically on rural older adults. Several of these programs targeted older adults living in retirement communities or at home, but not necessarily in rural settings (Berman et al., 2009; Ersek et al., 2008; Ferrell et al., 1993), and the majority of interventions included adult pain sufferers of all ages (Damush et al., 2003; Lorig et al., 1984; McGillion et al., 2008; Moore et al., 2000). However, several studies have documented higher prevalence of chronic pain and lower use of nondrug therapies among the rural elderly compared with their urban counterparts (Hoffman, Meier, & Council, 2002; Vallerand et al., 2003). Thus, although the preference for self-treatment is especially high among the rural elderly, who also suffer more chronic pain, they continue to have less access to information about nondrug therapies and, therefore, lower use.

Superficial or topically applied cold therapy is used to reduce inflammation, pain, and swelling and to increase pain tolerance (Adams & Arminio, 2008; Sauls, 1999; Wright & Sluka, 2001). Cold application decreases skin and joint temperature, decreases blood flow, increases joint stiffness, and has a direct analgesic effect. It is effective in the treatment of acute pain resulting from surgery, an injury or an inflammation, acute muscular pain, and arthritic pain (Adams & Arminio, 2008; Minor & Sanford, 1999; Schlesinger, Detry, Holland, Baker, Beutler, Rull, Hoffman, & Schumacher, 2002). Superficial heat is used to relieve persistent muscular and joint pain (Adams & Arminio, 2008; Carlson, 2007; Minor & Sanford, 1999). Heat raises skin and joint temperature, increases blood flow to the affected area, and decreases joint and muscle stiffness (Wright & Sluka, 2001). At present, scientific evidence to support the use of superficial heat in the treatment of pain is limited, possibly because only a few painful conditions have been studied. However, patients who use nondrug pain treatments consistently rate superficial heat as one of the most effective methods of pain relief (APS, 1999; Barry, Gill, Kerns, & Reid, 2005; Norrbrink & Lundeberg, 2004). A recent systematic review of a small number of trials concluded that superficial heat application was moderately effective in providing short-term reduction of lower back pain (French, Cameron, Walker, Reggars, & Esterman, 2006).

Relaxation breathing is a technique of slow uniform breathing (Schaffer & Yucha, 2004), and for the present study it was defined as slow deep abdominal

breaths to promote relaxation. This type of focused breathing often provides relief from anxiety and skeletal muscle tension (McCaffery & Beebe, 1989). Relaxation, although not considered a pain relief measure in itself, because it does not always reduce pain intensity, can be used as an adjunctive treatment to reduce pain-related distress or to improve perceived control over pain (Carroll & Seers, 1998; Gustavsson & van Koch, 2006; Kwekkeboom & Gretarsdottir, 2006; Pasero & McCaffery, 2011; Seers & Carroll, 1998).

In summary, the present study provided an educational intervention on the use of nondrug pain relief methods and tested its effectiveness in improving pain management in a group of rural older adults. The researchers hypothesized that participation in this educational program would: 1) significantly increase use of topical moist heat and/or cold and relaxation breathing exercises for pain management; 2) result in a greater decrease in pain intensity; 3) result in a greater decrease in pain-related distress; and 4) provide increased perception of control over pain among rural older adults.

METHOD

Design and Sample

A quasiexperimental two-group (experimental and control) design was used to test an intervention aimed at educating older adults in a rural Midwestern U.S. community about the appropriate use of nondrug treatments for pain relief. For the purposes of this study, nondrug treatments were defined as the application of a moist hot pack and/or cold pack to a part of the body for a specified period of time and/or the use of relaxation breathing exercises while experiencing pain. The initial sample (n = 55) consisted of older adults who called to register for an educational intervention after learning of the study through flyers and informational sessions at hospitals, churches, and community organizations in a rural area. Inclusion criteria included: ≥60 years of age, English-speaking, and experienced pain in the past 2 weeks.

Measures/Instruments

Participant Information Form. A questionnaire was used to obtain information on age, gender, race, income, marital status, and education level. Participants were also asked about current pain management treatments and medication regimens.

Brief Pain Inventory: Short Form (BPI-SF). The Brief Pain Inventory: Short Form (BPI-SF) (Daut, Cleeland, & Flanery, 1983) was used to assess pain location, severity, and interference with life activities. This questionnaire, developed to assess pain in cancer patients and used worldwide for numerous types of pain, has documented strong reliability and validity (Cleeland & Ryan, 1994; Serlin, Mendoza, Nakamura, Edwards, & Cleeland, 1995). Respondents are initially asked to identify pain location(s) on a diagram of the body. The BPI-SF also includes a series of numeric rating scales (NRSs) to rate the severity of the respondent's pain at its worst and least in the past 24 hours, on average, and at the present moment, with 0 representing "no pain" and 10 "pain as bad as you can imagine." The BPI-SF also includes items that rate pain interference with general activity, mood, walking ability, work, relationships with others, sleep, and enjoyment, with 0 indicating "does not interfere" and 10 "completely interferes." The pain severity items have a reported Cronbach value of 0.84, and the pain interference with function scale has a reported Cronbach reliability of 0.88 (Pieper, Vallerand, Nordstrom, & DiNardo, 2009).

Pain-Related Distress. Pain-related distress was measured using two pain-related items (frequency and intensity) from the Symptom Distress Scale (SDS) (McCorkle & Young, 1978). The SDS, a self-rating instrument that was developed as a measure of symptom distress, evaluates 13 symptoms commonly experienced by patients with cancer. Included in the SDS are items for the measurement of frequency and intensity of pain and nausea, mood, appetite, insomnia, concentration, fatigue, bowel pattern, appearance, coughing, and respiration. Respondents rate their distress on a scale from 1 to 5 (most distress). A rating of 3 or higher indicates serious distress related to the symptom. The SDS has established content validity (CVI >0.90), construct validity (analysis of variance: $p < .05$), concurrent validity ($r > 0.60$; $p < .05$), factor analysis, and test/retest reliability ($r > 0.80$) (McCorkle & Young, 1978) and has been widely used to measure symptom distress in patients with cancer and other chronic illnesses (Lobchuk, Kristjanson, Degner, Blood, & Sloan, 1997; McCorkle & Quint-Benoliel, 1983; Wang, Lee, Chang, & Lin, 2005).

Perception of Control Over Pain. The Perceived Control Scale (PCS) contains eight items rating perceptions using a 7-point Likert scale, where 1 is "extremely disagree" and 7 is "extremely agree" (Pellino & Ward, 1998). Three of the items were adapted from the Headache Locus of Control Scale, reflecting perceptions about control of postoperative pain, and five items were developed by the authors cited above to address perceptions of control over taking pain medication and whether the medication relieved pain. Questions relating to postoperative pain were modified with permission for the present study. Responses are summed

and divided by 8 to get an overall control score; higher numbers are indicative of higher perception of control over pain. The PCS has established content validity and reliability with a Cronbach alpha of 0.80 (Pellino & Ward, 1998; Vallerand, Templin, Hasenau, & Riley-Doucet, 2007).

Drug and Nondrug Pain Treatments. Over a 2-week period, participants listed all nondrug treatments used for self-care, pain intensity (0 = no pain; 10 = worst pain) at time of use, and concurrent medication use on a daily log developed by the researchers.

Procedure

We designed an educational program on the appropriate use of nondrug pain relief methods which took into account the geographic isolation, limited ability to travel, low economic status, and the values of self-reliance and independence of many rural older adults. The program included information on nondrug therapies that are relatively inexpensive, safe with appropriate use, readily available, and easy to use. The therapies selected were topical moist heat and cold using specifically designed unscented flax seed packs, and abdominal relaxation breathing techniques. They could be used alone or in combination with pharmacologic approaches for persistent pain.

Participants enrolled in an educational session of their choosing by date and location. We then randomized each session to either the experimental or the control condition. Multiple sessions were held until each group (control and experimental) had a minimum of 25 participants. Participants received either a 30-minute (control group) or a 60-minute (experimental group) education program at time 1 (T1) and a follow up evaluation session 2 weeks later, designated as time 2 (T2). Both groups received a 30-minute educational session on safe use of OTC analgesics; the experimental group also received an additional 30-minute session focused on safe and appropriate use of the three nondrug treatments. The 2-week time frame allowed for better recall of information and determination of short-term effects of the study intervention.

Each participant in the experimental group received one hot pack and one cold pack at the time of the initial education program (T1). These packs, custom made by Mother Earth Pillows (Mother Earth Designs, Arnold , MO) for this study, measured ~11 inches long by 6 inches wide by 1.5 inches thick and could be used on any area of the body. The hot and cold packs were identical in nature but could be distinguished by their color. The "hot pack," which was to remain on top of the microwave oven and heated in the microwave oven when needed, was designated with a red cotton cloth covering. In contrast, the "cold pack" was covered with a blue cotton cover and was to remain in the freezer in a protective Ziploc freezer bag, ready for use when needed. Both products retained moist heat or cold owing to the flax seeds encased within the outer covering. Although many of the Mother Earth Pillows come with flaxseeds scented with essential oils, the ones used for this study were unscented to prevent a potential confounding effect (given that aromatherapy using essential oils has also been used for pain relief). The researchers thought that having two distinguishable packs would allow participants to more easily and quickly choose their self-treatment therapy.

Participants in both groups documented all forms of self-treatment used for pain, and concurrent pain intensity levels, on the daily log forms. All participants returned after 2 weeks to turn in their logs and complete T2 questionnaires. Experimental group participants were allowed to keep their hot and cold packs; $25 gift certificates for a local eatery were given to all participants.

Data Analysis

Data analyses using the Statistical Package for Social Sciences (SPSS) 18.0 software included comparison of descriptive data for the control and experimental groups and *t* tests to determine significance of group differences. Significance of changes between T1 and T2 for the experimental group compared with the control group was determined through the use of general linear modeling. The McNemar test for correlated proportions was also used to determine significant changes in use of nondrug therapies at the two time points.

RESULTS

Participant Characteristics

Fifty-five subjects were enrolled in the study and participated in the initial educational intervention (T1). Analysis was based on the sample (n = 53) that completed both the T1 (intervention) and the T2 (post-intervention) sessions. All 28 participants in the experimental group returned and completed the second set of questionnaires. Of 27 participants in the control group, 25 completed the study. Final participants for both groups included 35 women and 18 men, with an overall mean age of 70 (range 60-87) years. Participants were predominantly caucasian (90%; 10% Native American) and more than one-half (63%) were married. The majority (89%) had completed high school, and 68% had some college education. Ninety-four percent of the participants were retired, with 44% having an annual income <$25,000, 33% an annual income of $25,000-50,000, and 23% an annual income >$50,000. A *t* test analysis

revealed no statistically significant differences in demographic characteristics between the control and experimental groups.

Pain Severity, Distress, and Control

Pain site, as noted by participants on a diagram of the body, was most often reported in the back (60%), legs (56%), and arms (50%). Almost 1 out of 4 participants reported head and pelvic pain, whereas abdominal and chest pain was reported by <10%. Participants were allowed to note >1 pain site on the diagram. Pain scores at baseline were not significantly different between the comparison groups; however, the experimental group reported significantly greater perceived control over pain (PCS item no. 3) than the control group ($p = .025$; Table 1). The average pain score at baseline for the experimental group was 4.6 on a scale of 0 (no pain) to 10 (worst pain imaginable), with worst pain at 5.9 and least pain 3.1. Average pain score at baseline for the control group was 5.6, with worst pain at 6.9 and least pain 4.0. There were no significant differences in the baseline scores of symptom distress or pain-related interference between the groups (Table 1).

After the intervention (T2), significant differences were noted in least, average, and current pain ($p < .03$, .007, and .001, respectively) between the control and experimental groups (Table 1). Pain-related distress, measured as frequency and intensity by the SDS items, was significantly different between the groups ($p < .012$ and .003, respectively; Table 1). Medication use for pain management did not differ significantly in the control and experimental groups at T1 or T2, with the exception of use of nonopiod OTC drugs (60% and 86%, respectively; $p < .03$) and use of nonopioid prescription medications, which decreased at T2 for the experimental group (46% to 22%; $p < .07$). Prevalence of medication use at baseline ranged from 8% (adjuvant and opioid prescription medications) to 86% (nonopioid OTC drugs). No significant differences were noted at T1 or T2 in use of herbal products for pain; prevalence of use ranged from 25% to 39% across both groups at both time points. Mean pain relief from the current pain medication regimen used by participants was reported as 43.5% at T1, with no significant differences across time periods (Table 1).

Hypothesis 1: Participation in the educational program will result in a significant increase in use of topical moist heat and/or cold and/or relaxation breathing for pain management.

Baseline data (T1) indicated no significant differences in the use of the three nondrug interventions (heat, cold, and relaxation breathing) between the control and experimental groups. The most frequently used nondrug therapy was topical application of heat and cold in both groups (43.5% and 33.3%, respectively). Relaxation breathing was used by almost 22% of participants in the control group and 33% of the experimental group.

Table 1.
Comparison of Pain Characteristics at Times 1 and 2

	Total Group	Experimental Group		Control Group		Group Comparison (*p*)	
Pain Variable	**Time 1**	**Time 1**	**Time 2**	**Time 1**	**Time 2**	**Time 1**	**Time 2**
Pain severity (mean)—0 (no pain) to 10 (pain as bad as you can imagine)							
Worst pain	6.3	5.9	5.9	6.9	6.8	.148	.124
Least pain	3.0	3.1	2.3	4.0	3.8	.21	.033*
Average pain	4.7	4.6	4.0	5.6	5.6	.086	.007*
Current pain	3.8	3.3	2.8	4.1	4.9	.244	.001*
Pain relief (%)	43.5	50.4	51.5	36.3	53	.112	.86
Pain interference with general activity—0 (does not interfere) to 10 (completely interferes)	4.0	3.9	2.5	4.1	4.3	.725	.021*
Pain distress (mean)							
Pain frequency—1 (almost never have pain) to 5 (have pain constantly)	2.7	2.7	2.4	3.0	3.1	.346	.012*
Pain intensity—1 (mildly distressing) to 5 (unbearable)	1.8	1.8	1.4	2.0	2.1	.27	.003*
Perceived control of pain (mean)—1 (extremely agree) to 7 (extremely disagree)							
Able to control pain	5.4	2.5	2.7	3.0	3.2	.254	.308
Able to avoid pain	3.3	2.7	2.6	4.0	3.7	.025*	.205

*Statistically significant ($p < .05$).

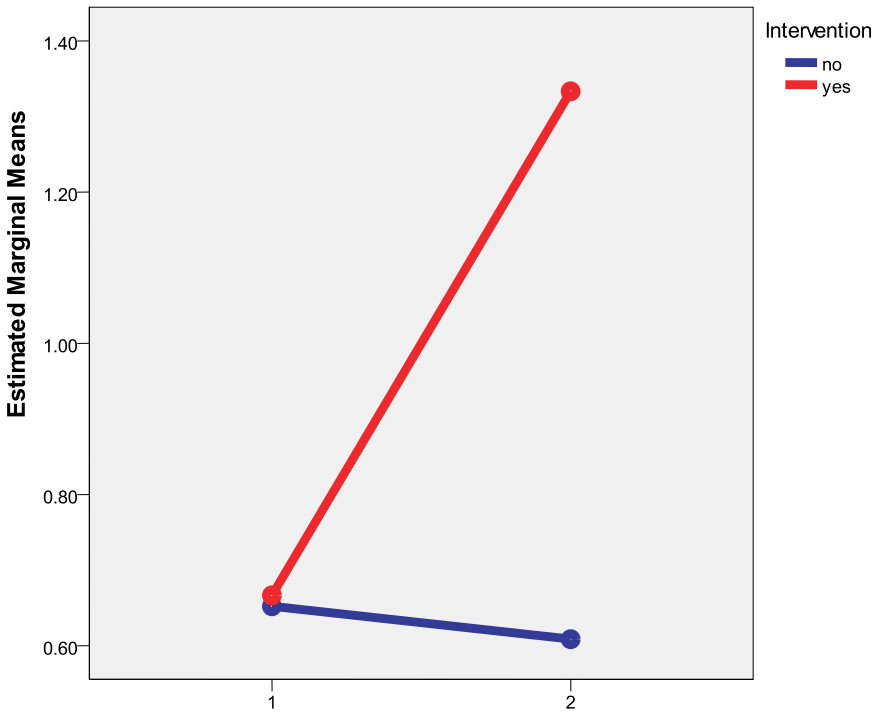

Figure 1. ■ General linear model test of between-subject effects of use of nondrug therapies at times 1 and 2 for experimental and control group. Significant difference ($p < .027$) noted in use of nondrug therapies in the experimental group at time 2 as indicated by estimated marginal means related to use. Model statistics can be provided upon request.

In contrast, T2 data (2 weeks after educational intervention) revealed a significant increase in the use of all three nondrug therapies in the experimental group, supporting the hypothesis ($F(1,48) = 9.71$; $p = .003$; Fig. 1). Data were obtained from daily logs compiled by participants in the experimental group, who reported on their use of nondrug treatments over the 2-week time period. Relaxation breathing was used most frequently (used 11 out of 14 days), followed by the application of heat and application of cold. After the intervention, 56%-78% of the experimental group reported use of nondrug therapies compared with 29.2% in the control group. The McNemar test for correlated proportions showed a significant increase in the use of nondrug treatments in the experimental group ($p = .006$) but no change in the control group ($p = .5$), supporting hypothesis 1 (Fig. 1).

Hypothesis 2: Participation in the educational program will result in a greater decrease in pain intensity.

To determine the effects of the educational intervention on pain intensity, changes in the mean group pain score at T1 (baseline) and T2 (2 weeks after intervention) were calculated. A total pain score was then calculated by creating a mean score for the worst pain, average pain, least pain, and current pain scores to determine the overall pain score. Although the total pain score decreased more in the experimental group than in the control group, the effect was not statistically significant ($p = .09$). The participants in the experimental group did, however, report a significantly greater decrease in current pain scores than participants in the control group ($t(45) = 2.12$; $p = .039$), partially supporting hypothesis 2.

Hypothesis 3: Participation in the educational program will result in a greater decrease in pain-related distress.

In testing hypothesis 3, pain-related distress was measured by the two pain-related items on the SDS. The first item addresses the intensity of pain and the second item refers to the distress caused by the pain. After the intervention (T2), the experimental group reported a significantly greater reduction in pain-related distress than the control group ($t(41) = 2.29$, $p = .027$), supporting hypothesis 3.

Hypothesis 4: Participation in the educational program will increase the perception of control over pain.

Although the perception of control over pain (pain avoidance) was significantly higher in the experimental group than in the control group at baseline ($p < .03$) and the change in scores continued to be higher for

the experimental group, differences after the intervention were not statistically significant (Table 1). The significant increase in perceived control over pain predicted in hypothesis 4 was not supported.

Thus, it can be concluded that the nondrug educational intervention had a positive effect on the experimental group, because three of the four hypotheses were fully or partially supported.

DISCUSSION

A review of the research literature reveals a continuing lack of clinical trials testing the effects of nonpharmacologic measures for pain management, pain-related distress, and perception of control over the pain experience. In addition, also lacking in the literature are effects of nondrug therapies on the overall pharmacologic management of pain and the use of these therapies among older adults in rural communities. Given the continuing high prevalence of pain throughout the U.S., it is critical to establish empirical evidence for nondrug measures, whether used to complement pharmacologic approaches in clinical settings or used as self-care measures by individuals in the community (Fouladbakhsh & Stommel, 2008; McCaffery & Pasero, 2002). Clinical findings that support the positive effects of nondrug interventions on pain management outcomes are essential for evidence-based practice and are needed to support a holistic, research-based model of pain management. It is this comprehensive approach that will ultimately address the suffering and distress experienced by those with pain.

The present study succeeded in examining the short-term effects of a nondrug pain management intervention designed for community-dwelling rural elders with pain. Compared with the control group, older adults who received the intervention reported significantly higher use of nondrug pain management approaches taught by the program and a lower level of pain-related distress. The effect of the intervention on reported pain intensity and interference showed a favorable trend; however, it did not reach statistical significance. Heat, cold, and relaxation breathing were chosen for this study because of previous reported use by community-dwelling individuals with pain (Vallerand, Fouladbakhsh, & Templin, 2003, 2004). These nondrug interventions are accessible, affordable, and easy to use and have few reported side effects when used appropriately. Therefore, they are readily available to elders in rural communities where access to health care may be limited due to distance, finances, and lack of resources. This program is inexpensive and relatively easy to implement in community-based sites. It does not require multiple instructional meetings or continuous dose monitoring and is therefore appropriate for rural communities, where time and access problems can limit participation.

The study findings compare favorably with the results of other controlled trials, although comparisons must be made with caution owing to differences in study design, interventions, targeted populations, and instrumentation. Educational interventions on nondrug pain control methods had significant effect on pain management in a group of elderly cancer patients (Ferrell, Ferrell, Ahn & Tran, 1994) and in a group of total hip or knee replacement patients after their surgeries (Pellino et al., 2005). Only one randomized controlled trial has reported on the positive effect of a home-study educational intervention, documenting a significant decrease in pain-related distress among adult chronic pain sufferers in the community (Dush, 2006). Finally, many trials have examined the effect of educational interventions on pain intensity, with results indicating moderate improvement, trends approaching statistical significance, and absence of any effect at all (Berman et al., 2009; Buszewicz et al., 2006; Dush, 2006; Ersek et al., 2008; LeFort, Gray-Donald, Rowat, & Jeans, 1998; Moore, Von Korff, Cherkin, Saunders, & Lorig, 2000; Pariser, O'Hanlon, Speaker, & Espinoza, 2003; Pellino et al., 2005).

In concurrence with previous data, the present study noted a pattern of decreased pain in the experimental group at T2. Use of a larger randomized sample in future research may more clearly identify these patterns. The Brief Pain Inventory, administered twice, before the intervention (T1) and then 2 weeks after (T2), relies entirely on self-rating of pain intensity and interference and thus on the memory of the participants. A modified design asking study participants to rate their pain daily using a reliable instrument may be more sensitive in detecting changes over time. In addition, effects of concurrent use of nondrug treatments with OTC and prescription pain medication warrants study.

Educational Intervention

Teaching elders in the intervention group about the appropriate and safe use of heat, cold, and relaxation breathing was consistently provided by a professional nursing educator with many years of experience in community health nursing. Educational content provided in the intervention was concise and appropriate for the age and anticipated reading level of community participants, and it was appropriately focused on the mechanism of action, proper use, safety, and side effects of nondrug treatments. Selection of the Mother Earth pillows for cold and heat applications was based

on thorough investigation of the product suitability, use in clinical practice sites, and dialogue with the company director, resulting in acceptability of hot and cold packs based on study criteria. Handouts with written instructions for use were provided to all participants in the experimental group, with phone availability of the nurse educator should questions or concerns arise over the study period. In addition, expected use of the daily log for recording pain levels and selected interventions was explained. Verbal feedback after study completion indicated that the educational session was appropriately leveled to the understanding of the participants. The study design allowed for the older adult's choice of nondrug method for pain management. This recognizes the importance of choice of treatment and perception of control of pain, a factor that has been shown to influence the patient's pain experience.

The study support for hypothesis 1 indicates that an educational intervention focused on the appropriate use of heat, cold, and relaxation breathing increased the use of the nondrug methods studied. Further study is warranted to identify the interaction effects of these nondrug treatments and the influence of perception of control over pain that may be provided by these self-care measures. Perhaps the sense of being in control while experiencing pain enhances the pain management effects of these nondrug therapies and ultimately results in increased use. In addition, further study is needed to examine the effects of the following on use of nondrug therapies: 1) the educator-participant relationship; 2) the comfort and appealing nature of the Mother Earth pillows; 3) the novelty of a new method (relaxation/breathing); and 4) the requirement to document use on a daily basis. This is of great importance in today's health care world, where pain management, cost of care, and restrictions on nurses' time are paramount concerns (McCaffery & Pasero, 2002). Although data did not support hypothesis 2, a pattern of decreased total pain scores was apparent in the experimental group. Lack of statistical significance may be due to the small sample size, a noted limitation of this study. Replication with a larger sample is warranted to fully understand this effect.

Pain-related distress (hypothesis 3) was found to be significantly different in the experimental group, supporting the use of nondrug methods for this pain-related phenomenon. In the study framework, nondrug methods of pain management were not meant to replace pharmacologic methods (McCaffery & Pasero, 2002). Data support the premise that these nondrug interventions decrease pain-related distress and therefore can enhance pain management. The present study provides empirical evidence that nondrug methods can make a difference in relieving pain-related distress experienced by community dwelling elders. Further research needs to be conducted to determine the effect of encouraging elders to do something for their pain and the resultant impact on pain-related distress. The variable of caring for self (self-care), also viewed as helping oneself (independence, empowerment), enhances one's self-esteem and sense of control. Given the recent recognition of the interrelationship of body, mind, and spirit and ongoing research in this field, it is possible that the simple process of deciding what to use when experiencing pain can be empowering. This alone may influence ratings of pain-related distress and requires further study.

Perception of control (hypothesis 4) was not found to be significantly different in the control and experimental groups. Perception of pain avoidance, however, was higher in the experimental group. The PCS used to examine this variable is used in the acute care setting and may not be the best measure for community-dwelling individuals. The nature of the two populations with pain, hospitalized and community dwelling, are vastly different when one considers control in any aspect of symptom management. Elders in the community are basically on their own, seeking health care assistance as they deem necessary. Perhaps these elders already perceive themselves as in control. Therefore, it is necessary to examine the reliability and validity of existing instruments measuring perception of control for use with different populations. Perhaps other instruments are needed to capture the essence of control over pain among those in rural areas, where self-care is often the norm (Bartlomé et al., 1992). In summary, perception of control, shown to be important in defining people's experience of pain, requires further study (Arathuzik, 1994; Pellino & Ward, 1998). Providing older adults with information and products through an educational intervention can be empowering and has the potential to increase patients' perception of control over pain.

The researchers acknowledge the small sample size and the lack of individual random assignment as limitations of this study. Recognizing the nature of rural communities (where frequently residents know one another) combined with the sense of senior community interrelationships (i.e., elders in rural communities often congregate at churches and senior centers, have time to chat at the local pharmacies, etc.) was an important factor considered in the study design. The decision was made to randomize the group immediately before the educational session, allowing those who knew each other to come together if

desired. In addition, recruitment of study participants covered an extensive geographic area, with educational sessions held in multiple small community sites. Researchers were also alert to any signs of crossover effects, and no evidence of this surfaced.

CONCLUSIONS

Study results are encouraging and suggest that an educational intervention administered by nurses in the community promotes safe and effective use of nondrug pain treatments with the potential to decrease pain intensity and pain-related distress among rural older adults. Although improved pain self-management was achieved among rural older adults with increased use of nondrug treatments (Fig. 1), further research is needed to examine: 1) sustainability of improvements in pain self-management over time; 2) program effects on perceived control over pain; 3) specific program features promoting increased nondrug use; and 4) reproducibility of positive effects with larger sample sizes and participant randomization. It is also recommended that future studies include a follow-up period of 3-6 months to determine continued use of nondrug treatments after an educational intervention. This would provide valuable information on the long-term effects of the nondrug educational intervention. In addition, other nondrug approaches, including many complementary and alternative therapies/practices commonly used by older adults, should be studied for effect on self-management of pain. In summary, preliminary data support use of selected nondrug therapies by rural older adults, with further study indicated to support inclusion in community-based pain management programs.

REFERENCES

Adams, M. L., & Arminio, G. J. (2008). Nonpharmacologic pain management intervention. *Clinics in Podiatric Medicine and Surgery, 25*(3), 409–429.

American Geriatrics Society (AGS) (2002). The management of persistent pain in older persons: AGS Panel on Persistent Pain in Older Persons. *Journal of the American Geriatrics Society, 50*(6 Suppl), S205–S224.

American Pain Foundation (2008). Overview of American pain surveys: 2005-2006. *Journal of Pain & Palliative Care Pharmacotherapy, 22*(1), 33–38.

American Pain Society (APS) (1999). *Chronic pain in America: Roadblocks to Relief*. Retrieved from. http://www.ampainsoc.org/links/roadblocks/.

Arathuzik, D. (1994). Effects of cognitive-behavioral strategies on pain in cancer patients. *Cancer Nursing, 17*(3), 207–214.

Barry, L. C., Gill, T. M., Kerns, R. D., & Reid, M. C. (2005). Identification of pain-reduction strategies used by community-dwelling older persons. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 60*(12), 1569–1575.

Bartlomé, J. A., Bartlomé, P., & Bradham, D. D. (1992). Self-care and illness response behaviors in a frontier area. *Journal of Rural Health, 8*(1), 4–12.

Berman, R. L., Iris, M. A., Bode, R., & Drengenberg, C. (2009). The effectiveness of an online mind-body intervention for older adults with chronic pain. *Journal of Pain, 10*(1), 68–79.

Bookwala, J., Harralson, T. L., & Parmelee, P. A. (2003). Effects of pain on functioning and well-being in older adults with osteoarthritis of the knee. *Psychology and Aging, 18*(4), 844–850.

Bushy, A. (1990). Rural determinants in family health: Considerations for community nurses. *Family & Community Health, 12*(4), 29–38.

Buszewicz, M., Rait, G., Griffin, M., Nazareth, I., Patel, A., Atkinson, A., Barlow, J., & Haines, A. (2006). Self-management of arthritis in primary care: Randomised controlled trial. *BMJ: British Medical Journal, 333*(7574), 879.

Carlson, A. H. (2007). Hot & cold. Tried and true ice and heat modalities still prove effective for acute and chronic pain. *Rehab Management, 20*(10), 32–33.

Carroll, D., & Seers, K. (1998). Relaxation for the relief of chronic pain: A systematic review. *Journal of Advanced Nursing, 27*(3), 476–487.

Centers for Disease Control and Prevention (CDC) (2006). *Health, United States, 2006, with chartbook on trends in the health of Americans*. Retrieved from. http://www.cdc.gov/nchs/data/hus/hus06.pdf.

Cleeland, C. S., & Ryan, K. M. (1994). Pain assessment: Global use of the Brief Pain Inventory. *Annals of the Academy of Medicine, Singapore, 23*(2), 129–138.

Cosby, A. G., Hitt, H. C., Thornton-Neaves, T., McMillen, R. C., Koch, K., Sitzman, B. T., Pearson, E. J., & Parvin, T. S. (2005). Profiles of pain in Mississippi: Results from the Southern Pain Prevalence Study. *Journal of the Mississippi State Medical Association, 46*(10), 301–309.

Damush, T. M., Weinberger, M., Perkins, S. M., Rao, J. K., Tierney, W. M., Qi, R., & Clark, D. O. (2003). Randomized trial of a self-management program for primary care patients with acute low back pain: Short-term effects. *Arthritis and Rheumatism, 49*(2), 179–186.

Daut, R. L., Cleeland, C. S., & Flanery, R. C. (1983). Development of the Wisconsin Brief Pain Questionnaire to assess pain in cancer and other diseases. *Pain, 17*(2), 197–210.

Dush, D. M. (2006). Effectiveness of home-study extended patient education for chronic pain. *American Journal of Pain Management, 16*(1), 5–11.

Edwards, R. R. (2006). Age differences in the correlates of physical functioning in patients with chronic pain. *Journal of Aging and Health, 18*(1), 56–69.

Ersek, M., Turner, J. A., Cain, K. C., & Kemp, C. A. (2008). Results of a randomized controlled trial to examine the efficacy of a chronic pain self-management group for older adults. *Pain, 138*(1), 29–40.

Ferrell, B. A., Ferrell, B. R., & Osterweil, D. (1990). Pain in the nursing home. *Journal of the American Geriatrics Society, 38*(4), 409–414.

Ferrell, B. R., Cohen, M. Z., Rhiner, M., & Rozek, A. (1991). Pain as a metaphor for illness. Part II: Family caregivers' management of pain. *Oncology Nursing Forum, 18*(8), 1315–1321.

Ferrell, B. R., Ferrell, B. A., Ahn, C., & Tran, K. (1994). Pain management for elderly patients with cancer at home. *Cancer, 74*(7 Suppl), 2139–2146.

Ferrell, B. R., Rhiner, M., & Ferrell, B. A. (1993). Development and implementation of a pain education program. *Cancer, 72*(11 Suppl), 3426–3432.

Food and Drug Administration (FDA) (2009). *Acetaminophen overdose and liver injury—Background and options for reducing injury.* Retrieved September 18, 2009 from. http://www.fda.gov/downloads/AdvisoryCommittees/CommitteesMeetingMaterials/Drugs/DrugSafetyandRiskManagementAdvisoryCommittee/UCM164897.pdf.

Fouladbakhsh, J. M., & Levin, J. (2006). Complementary and alternative medicine. *Treatment options: A guide for people living with pain*. Baltimore, MD: American Pain Foundation. pp. 35-46.

Fouladbakhsh, J. M., & Stommel, M. (2008). Comparative analysis of CAM use in the U.S. cancer and noncancer populations. *Journal of Complementary & Integrative Medicine, 5*(1), 1–25.

French, S. D., Cameron, M. C., Walker, B. F., Reggars, J. W., & Esterman, A. J. (2006). Superficial heat or cold for low back pain. *Cochrane Database of Systematic Reviews 1*. CD004750.

Gallagher, R. M., Verma, S., & Mossey, J. (2000). Chronic pain. Sources of late-life pain and risk factors for disability. *Geriatrics, 55*(9), 40–44, 47.

Gladden, J. C. (2000). Information exchange: Critical connections to older adult decision-making during health care transitions. *Geriatric Nursing, 21*(4), 213–218.

Grzywacz, J. G., Suerken, C. K., Neiberg, R. H., Lang, W., Bell, R. A., Quandt, S. A., & Arcury, T. A. (2007). Age, ethnicity, and use of complementary and alternative medicine in health self-management. *Journal of Health and Social Behavior, 48*(1), 84–98.

Gustavsson, C., & von Koch, L. (2006). Applied relaxation in the treatment of long-lasting neck pain: A randomized controlled pilot study. *Journal of Rehabilitation Medicine, 38*(2), 100–107.

Hammond, A. (1998). The use of self-management strategies by people with rheumatoid arthritis. *Clinical Rehabilitation, 12*(1), 81–87.

Helme, R. D., & Gibson, S. J. (2001). The epidemiology of pain in elderly people. *Clinics in Geriatric Medicine, 17*(3), 417–431.

Hoffman, P. K., Meier, B. P., & Council, J. R. (2002). A comparison of chronic pain between an urban and rural population. *Journal of Community Health Nursing, 19*(4), 213–224.

Jakobsson, U. (2004). Pain management among older people in need of help with activities of daily living. *Pain Management Nursing, 5*(4), 137–143.

Johnson, J. E. (1999). Older rural women and the use of complementary therapies. *Journal of Community Health Nursing, 16*(4), 223–232.

Kirkpatrick, C. F., Page, R. M., & Hayward, K. S. (2006). Nonvitamin, nonmineral supplement use and beliefs about safety and efficacy among rural older adults in southeast and south central Idaho. *Journal of Nutrition for the Elderly, 26*(1-2), 59–82.

Krein, S. L., Heisler, M., Piette, J. D., Makki, F., & Kerr, E. A. (2005). The effect of chronic pain on diabetes patients' self-management. *Diabetes Care, 28*(1), 65–70.

Kwekkeboom, K. L., & Gretarsdottir, E. (2006). Systematic review of relaxation interventions for pain. *Journal of Nursing Scholarship, 38*(3), 269–277.

Lansbury, G. (2000). Chronic pain management: A qualitative study of elderly people's preferred coping strategies and barriers to management. *Disability and Rehabilitation, 22*(1-2), 2–14.

LeFort, S. M., Gray-Donald, K., Rowat, K. M., & Jeans, M. E. (1998). Randomized controlled trial of a community-based psychoeducation program for the self-management of chronic pain. *Pain, 74*(2-3), 297–306.

Lobchuk, M. M., Kristjanson, L., Degner, L., Blood, P., & Sloan, J. A. (1997). Perceptions of symptom distress in lung cancer patients: I. Congruence between patients and primary family caregivers. *Journal of Pain and Symptom Management, 14*(3), 136–146.

Lorig, K., Laurin, J., & Holman, H. R. (1984). Arthritis self-management: A study of the effectiveness of patient education for the elderly. *Gerontologist, 24*(5), 455–457.

Lowe, N. K., & Ryan-Wenger, N. M. (1999). Over-the-counter medications and self-care. *Nurse Practitioner, 24*(12), 34–44.

Magni, G., Marchetti, M., Moreschi, C., Merskey, H., & Luchini, S. R. (1993). Chronic musculoskeletal pain and depressive symptoms in the National Health and Nutrition Examination. I. Epidemiologic follow-up study. *Pain, 53*(2), 163–168.

McCaffery, M., & Pasero, C. (1999). *Pain: Clinical manual*, (2nd ed.) St. Louis, MO: Mosby. pp 399–427.

McCaffery, M., & Pasero, C. (2002). *Pain management: Assessment & overview of analgesics for windows, institutional version*. Philadelphia: Lippincott, Williams, & Wilkins.

McCorkle, R., & Quint-Benoliel, J. (1983). Symptom distress, current concerns and mood disturbance after diagnosis of life-threatening disease. *Social Science & Medicine, 17*(7), 431–438.

McCorkle, R., & Young, K. (1978). Development of symptom distress scale. *Cancer Nursing, 1*(5), 373–378.

McGillion, M. H., Watt-Watson, J., Stevens, B., Lefort, S. M., Coyte, P., & Graham, A. (2008). Randomized controlled trial of a psychoeducation program for the self-management of chronic cardiac pain. *Journal of Pain and Symptom Management, 36*(2), 126–140.

Miaskowski, C. (2000). The impact of age on a patient's perception of pain and ways it can be managed. *Pain Management Nursing, 1*(3 Suppl 1), 2–7.

Minor, M. A., & Sanford, M. K. (1999). The role of physical therapy and physical modalities in pain management. *Rheumatic Diseases Clinics of North America, 25*(1), 233–248.

Moore, J. E., Von Korff, M., Cherkin, D., Saunders, K., & Lorig, K. (2000). A randomized trial of a cognitive-behavioral program for enhancing back pain self-care in a primary care setting. *Pain, 88*(2), 145–153.

Mother Earth Designs. *Small flax pillow.* Retrieved from. http://www.motherearthpillows.com/small_flaxpillows.html.

Musil, C. M. (1998). Gender differences in health and health actions among community-dwelling elders. *Journal of Gerontological Nursing, 24*(2), 30–38.

Narhi, U., & Helakorpi, S. (2007). Sources of medicine information in Finland. *Health Policy, 84*(1), 51–57.

Norrbrink Budh, C., & Lundeberg, T. (2004). Nonpharmacological pain-relieving therapies in individuals with spinal cord injury: A patient perspective. *Complementary Therapies in Medicine, 12*(4), 189–197.

Pariser, D., O'Hanlon, A. M., Speaker, R. S., & Espinoza, L. (2003). The effects of telephone intervention on arthritis self-efficacy, depression, pain and fatigue in older adults. *Journal of Geriatric Physical Therapy, 26*(3), 45.

Pasero, C., & McCaffery, M. (2011). Pain Assessment & Pharmacologic Management. St. Louis: Mosby/Elsevier.

Patil, S. K., Johnson, A. S., & Lichtenberg, P. A. (2008). The relation of pain and depression with various health-promoting behaviors in African American elders. *Rehabilitation Psychology, 53*(1), 85–92.

Pellino, T. A., Gordon, D. B., Engelke, Z. K., Busse, K. L., Collins, M. A., Silver, C. E., & Norcross, N. J. (2005). Use of nonpharmacologic interventions for pain and anxiety after total hip and total knee arthroplasty. *Orthopaedic Nursing, 24*(3), 182–191.

Pellino, T. A., & Ward, S. E. (1998). Perceived control mediates the relationship between pain severity and patient satisfaction. *Journal of Pain and Symptom Management, 15*(2), 110–116.

Pieper, B. A., Vallerand, A. H., Nordstrom, C., & DiNardo, E. (2009). Comparison of bodily pain: Persons with and without venous ulcers in an indigent care clinic. *Journal of Wound, Ostomy, and Continence Nursing, 36*(5), 493–502.

Pitkala, K. H., Strandberg, T. E., & Tilvis, R. S. (2002). Management of nonmalignant pain in home-dwelling older people: A population-based survey. *Journal of the American Geriatrics Society, 50*(11), 1861–1865.

Rhiner, M., Ferrell, B. R., Ferrell, B. A., & Grant, M. M. (1993). A structured nondrug intervention program for cancer pain. *Cancer Practice, 1*(2), 137–143.

Roberto, K. A., & Reynolds, S. G. (2002). Older women's experiences with chronic pain: Daily challenges and self-care practices. *Journal of Women & Aging, 14*(3-4), 5–23.

Rolita, L., & Freedman, M. (2008). Over-the-counter medication use in older adults. *Journal of Gerontological Nursing, 34*(4), 8–17.

Ross, M. M., Carswell, A., Hing, M., Hollingworth, G., & Dalziel, W. B. (2001). Seniors' decision making about pain management. *Journal of Advanced Nursing, 35*(3), 442–451.

Ross, M. M., & Crook, J. (1998). Elderly recipients of home nursing services: Pain, disability and functional competence. *Journal of Advanced Nursing, 27*(6), 1117–1126.

Sauls, J. (1999). Efficacy of cold for pain: Fact or fallacy? *Online Journal of Knowledge Synthesis for Nursing, 6*, 8.

Schaffer, S. D., & Yucha, C. B. (2004). Relaxation & pain management: The relaxation response can play a role in managing chronic and acute pain. *American Journal of Nursing, 104*(8), 75–82.

Schlesinger, N., Detry, M. A., Holland, B. K., Baker, D. G., Beutler, A. M., Rull, M., Hoffman, B. I., & Schumacher H. R., Jr. (2002). Local ice therapy during bouts of acute gouty arthritis. *Journal of Rheumatology, 29*(2), 331–334.

Scudds, R. J., & Robertson, J. M. (2000). Pain factors associated with physical disability in a sample of community-dwelling senior citizens. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 55*(7), M393–M399.

Seers, K., & Carroll, D. (1998). Relaxation techniques for acute pain management: A systematic review. *Journal of Advanced Nursing, 27*(3), 466–475.

Serlin, R. C., Mendoza, T. R., Nakamura, Y., Edwards, K. R., & Cleeland, C. S. (1995). When is cancer pain mild, moderate, or severe? Grading pain severity by its interference with function. *Pain, 61*(2), 277–284.

Stoller, E. P., Pollow, R., & Forster, L. E. (1994). Older people's recommendations for treating symptoms: Repertoires of lay knowledge about disease. *Medical Care, 32*(8), 847–862.

Thomas, E., Peat, G., Harris, L., Wilkie, R., & Croft, P. R. (2004). The prevalence of pain and pain interference in a general population of older adults: Cross-sectional findings from the North Staffordshire Osteoarthritis Project (NorStOP). *Pain, 110*(1-2), 361–368.

Tsai, Y. F., Wei, S. L., Lin, Y. P., & Chien, C. C. (2005). Depressive symptoms, pain experiences, and pain management strategies among residents of Taiwanese public elder care homes. *Journal of Pain and Symptom Management, 30*(1), 63–69.

Vallerand, A. H., Fouladbakhsh, J. M., & Templin, T. (2003). Use of complementary and alternative therapies in urban, suburban and rural communities. *American Journal of Public Health, 93*(6), 923–925.

Vallerand, A. H., Fouladbakhsh, J. M., & Templin, T. (2004). Self-treatment of pain in a rural community. *Journal of Rural Health, 20*(2), 166–172.

Vallerand, A. H., Fouladbakhsh, J. M., & Templin, T. (2005). Patients' choices for the self-treatment of pain. *Applied Nursing Research, 18*(2), 90–96.

Vallerand, A. H., Templin, T., Hasenau, S. M., & Riley-Doucet, C. (2007). Factors that affect functional status in patients with cancer pain. *Pain, 132*, 82–90.

Wang, S. Y., Lee, C. W., Chang, Y. C., & Lin, C. C. (2005). Symptom distress changes during first postoperative month in newly diagnosed Taiwanese breast cancer patients: A longitudinal study. *Cancer Nursing, 28*(4), 263–269.

Woolf, A. D., Zeidler, H., Haglund, U., Carr, A. J., Chaussade, S., Cucinotta, D., Veale, D. J., & Martin-Mola, E. (2004). Musculoskeletal pain in Europe: Its impact and a comparison of population and medical perceptions of treatment in eight European countries. *Annals of Rheumatic Diseases, 63*(4), 342–347.

Wright, A., & Sluka, K. A. (2001). Nonpharmacological treatments for musculoskeletal pain. *Clinical Journal of Pain, 17*(1), 33–46.