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Music and Medicine 2009 1: 22
DOI: 10.1177/1943862109335215

Music and Medicine
Volume 1 Number 1
July 2009 22-28

10.1177/1943862109335215
http://mmd.sagepub.com

The Effect of Music on the Cognition of Older Adults Undergoing Hip and Knee Surgery

Ruth G. McCaffrey, DNP, ARNP, FNP-BC, GNP-BC[1]

The purpose of this study was to determine the effects of music listening on the acute confusion that is common in older adults after hip or knee surgery. Music listening is an activity that does not require active physical participation from the patient but provides an environment for healing. This study used a random control experimental design with a music-listening group and control group for 22 older adults undergoing hip or knee surgery. The experimental group listened to music at the bedside for at least 4 hours daily. The NEECHAM Acute Confusion Scale and the Folstein Mini-Mental State Exam were used to measure cognition and acute confusion. Findings demonstrate that the music-listening group had higher levels of cognitive function and less confusion than those who did not listen to music.

Keywords: older adults; music medicine; music therapy; neurologic music therapy

The purpose of this study was to determine the effects of music listening on the acute confusion that is common in older adults after hip or knee surgery. Successful rehabilitation depends largely on the patient's cooperative participation. Participation in rehabilitation therapies can be hampered after hip or knee surgery by acute confusion. Music listening is a noninvasive, safe intervention, which may be able to assist in reducing acute confusion in older adults after hip or knee surgery.

Background and Significance

Hip and knee surgeries are the most common types of surgery among persons over the age of 75 and can affect survival and quality of life in this population (Davis et al., 2006). Of older adults, 30% to 50% experience a period of acute confusion or delirium after hip or knee surgery, and these percentages increase with age (Shugars & More, 2005). Among older adults undergoing hip surgery, 50% of those who experienced their first incident of cognitive impairment postoperatively had lingering effects of that disorientation for 2 to 12 months after the surgery (Marx et al., 2005). This group had poorer ability to complete activities of daily living over that period of time. Therefore, cognitive impairment during hospitalization is a risk factor for poor functional outcomes in older adults undergoing hip or knee surgery (Gruber-Baldini et al., 2003).

Acute confusion or delirium is characterized by a sudden change in mental status (Sullivan-Marx, 2001). Acute confusion is defined as disorganized thinking, an altered level of consciousness, and cognitive disturbance without the presence of focal neurological signs and is characterized by disturbances in consciousness, attention, and cognition that develop over a short period of time (Rapp, 2001). The most common causes of postoperative acute confusion include age, the stress of the surgery itself, the patient's preoperative mental status, the administration of anesthesia, postoperative pain, pain medication, electrolyte imbalance, infection, and sensory deprivation after surgery (Lou, Dai, Huang, & Yu, 2003). The outcomes of acute confusion in older adults after surgery include increased length of stay, exacerbation of comorbid conditions, increase risk for falls, and nosocomial infections (Inouye, 1999).

[1]Florida Atlantic University

Address correspondence to: Ruth G. McCaffrey, Florida Atlantic University, Christine E. Lynn College of Nursing, 777 Glades Road, Boca Raton, FL 33431-0991; e-mail: rmccaffr@fau.edu.

Date received: January 12, 2009; accepted: March 10, 2009.

Importantly, Singh and Narro (2005) found that periods of delirium can be disconcerting and cause fear and anguish to family members who bring their loved ones to the hospital with no cognitive dysfunction and then see them confused and anxious after surgery. Common signs of postoperative acute confusion or delirium identified by nurses include patients' confusion, disorientation, altered awareness of where they are and of their own safety needs, agitated and aggressive behavior, and altered ability to interact with others (Schuurmans, Duursma, Shortridge-Baggett, Clevers, & Pel-Little, 2001). These common signs of acute confusion usually subside once older adults recover from the anesthesia and are able to adjust to their surroundings. However, complications such as the inability to complete activities of daily living and a decrease in executive function can last long after the actual period of acute confusion (Wong, Wong, & Brooks, 2002).

Finding methods that nurses can use to decrease acute confusion after hip or knee surgery may benefit patients and provide improved patient outcomes as well as decrease distress to family members. The purpose of this study is to investigate the effects of music listening as a noninvasive and safe intervention that nurses can use independently for patients at risk for acute confusion following hip or knee surgery.

Music-Listening Intervention

Music listening is an activity that does not require active physical participation from the patient but facilitates a nonthreatening atmosphere and provides an environment for healing (McCaffrey & Good, 2000). McKinney (1997) demonstrated that music listening reduced anxiety and depression in older adults. Cuddy and Duffin (2005) found that listening to music decreased physical aggressiveness in residents suffering from dementia.

Music is effective in improving cognition as well. Rogers and Gibson (2002) found that listening to baroque classical music improved test scores among learning disabled students. Van de Winckel, Fey, DeWeerdt, and Dom (2004) found that patients with dementia could recall 62% of the words to familiar songs and only 37% of spoken words or information. Emery, Hsiao, Hill, and Frid (2003) studied cognition in cardiac rehabilitation patients using exercise and music. Using the Folstein Mini-Mental State Exam (MMSE; Folstein, Folstein, & McHugh, 1975), these researchers found that cognition in those who listened to music while undergoing cardiac rehabilitation was higher than in those who did not listen to music.

Music has been shown to be effective in calming persons who are agitated, which is often a sign of acute confusion (Hicks-Moore, 2005). Remington (2002) found that older persons who listened to relaxing classical music during hospitalization had lower anxiety scores than those who did not listen to music. In nursing homes, music has been shown to reduce aggressive behavior (Jech, 2001) and reduce agitation (Hicks-Moore, 2005). Postoperative patients have identified listening to music as increasing their sense of comfort in a discomforting situation and making them feel more in control of their surroundings during hospitalization (McCaffrey & Good, 2000).

Most recently, McCaffrey and Locsin (2004) studied the effect of music listening on acute confusion and delirium in older adults undergoing elective hip or knee surgery. This randomized clinical trial studied 66 participants who were 65 years and older and were divided into two groups. One group received routine postoperative care; the other group received routine postoperative care and listened to music for at least 4 hours daily. A group of 50 compact discs (CDs) was available from which participants chose preferred music. After participants were discharged, the researchers reviewed nurses' notes to determine the number of episodes of acute confusion experienced by each group of participants. The group who listened to music had fewer episodes of acute confusion ($F = 19.568$, $p = .001$). One measure of readiness to ambulate is that the patient be alert and oriented to time, place, and person. Those older adults who listened to music after hip or knee surgery had higher readiness to ambulate scores than did those who did not listen to music ($F = 28.14$, $p = .001$).

These studies have all demonstrated the ability of music to improve cognition and reduce anxiety. However, no studies have been undertaken to understand the effect of music on postoperative older adults who have periods of acute confusion. The findings of this research study provide a better understanding of the role of music listening in promoting cognitive function and decreasing postoperative confusion in older adults undergoing hip or knee surgery.

Research Design and Method

The research question investigated in this study was as follows: Is there a difference in cognitive function

as measured by the MMSE (Folstein et al., 1975) or in the amount of acute confusion as measured by the NEECHAM Acute Confusion Scale (Neelon, Champagne, Carlson, & Funk, 1996) in older adults who listen to music following hip or knee surgery when compared with those who do not listen to music?

The MMSE is a reliable and valid measure of cognitive ability in older adults (Folstein et al., 1975). The exam is easy to administer, and the interrater reliability has been measured at .97 (Huusko, Karppi, Avikainen, Dautiainen, & Sulkava, 2000). Baker, Robinson, and Steward (1993) found that the MMSE had a specificity of 93% and a sensitivity of 70% for cognitive impairment. In this study, the MMSE was used to determine the recovery of cognitive function after surgery. A drop in scores was expected after surgery because of anesthesia and other factors. Researchers were interested in determining whether the music group returned to baseline cognitive function more quickly than did the nonmusic group.

The 9-item NEECHAM scale for acute confusion is an observational instrument for use in detecting the presence and severity of acute confusion in older hospitalized adults. The NEECHAM addresses cognitive processing, behavior, and physiological control and is strongly positively correlated with the MMSE ($r = .81$) (Neelon et al., 1996). The scale can be completed within 8 to 10 minutes by nurses while taking patients' vital signs and holding general, guided conversation that does not challenge patients or make cognitive deficits highly visible to patients (Clark & Halm, 2003). The scale also correlates biophysical data such as heart rate, oxygen saturation, and blood pressure with the ability to perform requested tasks. The NEECHAM has been studied for reliability on patients after hip fracture surgery with a Cronbach's alpha of .73 and .82, respectively, before and 7 days after surgery (Johansson, Hamrin, & Larsson, 2002).

A randomized control design was chosen for this study to compare scores of the MMSE and the NEECHAM in 22 older adults after hip or knee surgery. After institutional review committee approval for the study was obtained, a convenience sample was recruited from older adults undergoing elective hip or knee surgery at a medical center in the southeast. Table 1 provides participant demographic data. Each patient scheduled to undergo elective hip or knee surgery was approached during the preoperative visit to the hospital and, if interested in participation, was given information about the study. All participants in the study were tested for hearing using a simple whisper test. If hearing was adequate, informed consent was obtained and participants were randomly assigned to control or experimental groups using the sealed-envelope method. The sample was discontinued after 22 participants were recruited for the study. No participants withdrew from the study, and the MMSE and the NEECHAM scales were completed on each of the 3 postoperative days for every participant in the study.

Table 1. Demographic Data

	Experimental Group	Control Group
n	11	11
Age		
Mean	74.5	75.9
Standard deviation	4.8	6.3
Gender		
Male	4	4
Female	7	7
Education in years		
Mean	12.6	12.8
Standard deviation	1.4	1.2

During the preoperative visit to the hospital, each participant was assigned a number for identification purposes, and the initial MMSE and the NEECHAM scale were administered and scored by the researcher. The researcher administered and collected data on the MMSE, and nurses on the unit completed the NEECHAM scale on each of the first 3 postoperative days for each participant to ensure interrater reliability (Table 1).

During the postoperative period, the control group received standard hospital care for hip or knee surgery patients. The experimental group received standard hospital care and had a CD player placed at the bedside. All surgeries in this study were performed by the same surgeon, and time in surgery for all patients was relatively equal. In addition, the protocol for postoperative pain medication and ambulation for hip and knee surgery patients includes standard treatments for pain and ambulation. All patients are on a patient-controlled analgesia pump with morphine for 24 hours, followed by oxycodone 75 mg every 4 hours as requested by the patient. Physical therapists evaluated the patients on the operative day for ability to ambulate, which depends largely on the patients' cognitive status and pain levels. Patients were ambulated twice daily by physical

Table 2. List of Musical Selections Used for Patient Listening

Album Title	Recording Label
Glenn Miller's Greatest Hits	RCA Victor
Barbara Streisand and Other Musical Instruments	Columbia
Royal Fireworks, Water Music	Musical Heritage Society
Lullaby for Relaxation	Columbia
St. Patrick's Mass	Alanna
Romanza Andrea Bocelli	Phillips
Bach for Breakfast	Phillips
Message of the Sea Celtic Music for Guitar	Telarc
Tao of Healing	Soundings of the Planet
Judy Garland Sings	Columbia
Vivaldi for Valentines	Phillips
Nature Sounds of the Caribbean	Lady Slipper
Nature Sounds of the Rain Forest	Lady Slipper
Windham Hill Artists—A Winter's Solstice II	Windham Hill
The Natural Guitar	NorthSound
George Winston—Autumn	Windham Hill
Evening Passages	Elfin Music Company
Grey Eyed Morn—Sue Richards Celtic Harp	Maggie Sansone
Alex de Grassi Turning—Turning Back	Windham Hill
Music for Meditation	Lady Slipper

therapists, and all patients were discharged on postoperative Day 3 to a rehabilitation center.

Upon arrival on the orthopedic floor from the recovery area, experimental participants listened to a CD of soothing lullaby music, which played continuously on the CD player. Once the participant was awake and alert, he or she could choose from a variety of music provided by the researchers. Table 2 provides a list of the CDs available to patients for listening. During the recovery period, the CD player was set to play at least four times a day for 1 hour. The patient could play the music more often if desired by pressing the play button or asking hospital staff to do so when they entered the room. Nurses caring for patients were not blinded to which patients were in which group. Both control group and experimental group participants were visited each day by research assistants to determine whether the CD players were working for experimental group participants and to ask about the hospital experiences of both the control and the experimental group participants. Nurses could not be blinded to which patients received the music intervention because the CD player was at the bedside. However, nurses were instructed to ask and record answers to the questions on the NEECHAM scale precisely so as to accurately record responses.

On the first 3 postoperative days, the MMSE was administered to all participants and scored by the researchers. NEECHAM Acute Confusion Scale data were collected on all participants on each of the first 3 postoperative days. The scores of the pre- and postoperative MMSE scores and NEECHAM were compared for the differences between control and experimental scores.

Results

To determine whether listening to music influenced cognition in older adults after hip or knee surgery, *t* tests were used to determine whether the differences in mean MMSE scores between the experimental and the control groups were statistically significant on each postoperative day. Second, a repeated-measures analysis of variance (ANOVA) was completed to determine the differences in group changes over the entire 3-day period. Finally, a multiple-comparisons post hoc analysis was undertaken to determine where the greatest differences between groups occurred. Before surgery, there was no significant difference in MMSE scores between the control and experimental groups ($t = .94$; $df = 1, 22$; $p = .786$), indicating that before surgery, the control and the experimental groups had similar levels of cognitive function.

On the 1st and 2nd postoperative day, there was a significant difference in MMSE scores between the control and the experimental groups. On Day 1, the experimental group had significantly higher scores on the MMSE than did the control group ($t = 110.5$; $df = 1, 22$; $p = .001$); the same occurred on the 2nd postoperative day ($t = 54.9$; $df = 1, 22$; $p = .001$). On the 3rd postoperative day, there was a significant difference between the two groups on MMSE scores ($t = 121.6$; $df = 1, 22$; $p = .000$). Table 3 presents the means for each group at each testing period.

The repeated-measures ANOVA demonstrated a significant difference between groups on the MMSE scores across the 3-day postoperative period. Differences were noted using the Greenhouse-Geisser test for both time ($F = 24.20$; $df = 1, 22$; $p = .001$) and time multiplied by group ($F = 5.00$; $df = 1, 22$; $p = .012$). The control group had a significantly greater drop in cognition on postoperative Day 1 than did

Table 3. Means for MMSE Scores

	Experimental Group			Control Group		
	n	*M*	*SD*	*n*	*M*	*SD*
MMSE preoperation	11	29.72	1.51	11	30.00	1.49
MMSE postoperative Day 1	11	26.91	2.39	11	24.90	1.96
MMSE postoperative Day 2	11	27.50	1.67	11	25.40	1.42
MMSE postoperative Day 3	11	28.91	1.31	11	27.50	1.08

MMSE = Mini-Mental State Exam.

Table 4. Means for NEECHAM Acute Confusion Scale

	Experimental Group			Control Group		
	n	*M*	*SD*	*n*	*M*	*SD*
NEECHAM postoperative Day 1	11	24.00	0.97	11	22.50	1.22
NEECHAM postoperative Day 2	11	25.00	0.70	11	26.25	1.95
NEECHAM postoperative Day 3	11	28.50	1.31	11	27.2	1.22

the experimental group who listened to music. The control group therefore had a greater increase in MMSE scores on Days 2 and 3. Using a multiple-comparisons Scheffe test, it appears that the greatest difference in scores between groups occurred between postoperative Days 1 and 2 (mean difference = 2.64, $p = .000$).

To determine whether music had an effect on postoperative episodes of acute confusion, an ANOVA was used to determine whether differences between control and experimental group means on the NEECHAM Acute Confusion Scale were statistically significant. A repeated-measures ANOVA was conducted to determine the changes occurring over the 3-day postoperative period.

NEECHAM Acute Confusion Scale measures were completed by asking the participants to complete tasks and rating the participants on their ability to do so as well as measuring physiologic factors such as oxygen saturation, blood pressure, pulse, and respirations. On each of the postoperative days, there was a significant difference in NEECHAM Acute Confusion Scale scores between the two groups: Day 1 ($t = 64.2$; $df = 1, 22$; $p = .000$), Day 2 ($F = 156.7$; $df = 1$; $p = .002$), and Day 3 ($t = 98.5$; $df = 1, 22$; $p = .000$). Table 4 provides the means of the NEECHAM scale results for each testing point.

The repeated-measures ANOVA using the Greenhouse-Geisser analysis showed a significant difference between the two groups across the 3-day period ($F = 7.28$; $df = 1, 22$; $p = .014$). The control group had lower scores and more confusion across the 3-day postoperative period than did the experimental group. The multiple-comparisons Scheffe test determined that the greatest differences were evident between Days 1 and 2 (mean difference = 1.87, $p = .001$).

Based on the statistical findings presented here, it is evident that the control group in this study had a greater decline in cognition immediately after surgery, and cognition in this group improved on postoperative Days 2 and 3. The experimental groups had a significantly smaller decline in MMSE scores than did the control group on all 3 days and across the 3-day postoperative stay. This indicates higher levels of cognitive function in the music-listening group on the 1st and 2nd postoperative days. By the 3rd postoperative day, both groups were similar in cognitive function. On the NEECHAM Acute Confusion Scale, the experimental music-listening group had lower levels of acute confusion on all 3 postoperative days compared with the control group. Across the 3-day postoperative period, the music-listening group had lower levels of acute confusion. However, even by postoperative Day 3, the control group had significantly lower NEECHAM Acute Confusion Scale scores than did the experimental music-listening group.

Discussion

The purpose of this study was to examine the effects of music listening on postoperative cognition and

acute confusion in older adults undergoing hip or knee surgery. Findings demonstrate that the music-listening group had higher levels of cognitive function and less confusion than did those who did not listen to music.

This study had similar results to the two studies by McCaffrey and Locsin (2004) and McCaffrey (2006), which each reviewed nurses' notes post-discharge to determine whether music listening affected the number of episodes of acute confusion, assessed by nurses, in older adults after hip or knee surgery. Using valid and reliable measures such as the MMSE and the NEECHAM allows the researchers to understand the effect of music listening on older individuals after hip or knee surgery in a more measurable and concrete way.

The findings of this study are similar to the findings of Rogers and Gibson (2002), Van de Winckel et al. (2004), and Emery et al. (2003), which each demonstrated improved cognition in older patients when using music. Lai and Good (2006) found that soft music improved sleep quality, duration, and efficiency; shortened sleep latency; and decreased sleep disturbance and daytime dysfunction. This may be one of the reasons that music was found to decrease acute confusion in the population in this study. Findings enhance the body of nursing knowledge in the area of using music as a method to improve cognition and reduce acute confusion in older adults after hip or knee surgery.

Limitations of this study include small sample size and a convenience sample from one hospital, which may have influenced findings. A larger group from different areas of the country will strengthen understanding of the effects of music on cognition and acute confusion in older adults undergoing hip or knee surgery.

Further research to determine the effect of music on the cognition of older adults after surgery should be undertaken. A study with a larger, more randomly selected sample would provide higher level evidence of music as an intervention in older adults after surgery. Older adults undergoing different types of surgeries should also be studied to improve the generalizability of findings to a greater population of patients. Finally, using imaging techniques, such as fMRI, to determine the differences in brain patterns of older adults who listen to music, compared with those who do not, would provide increased knowledge regarding exactly how music works in the older brain.

Implications for Health Care Providers

Findings from this study have implications for health care providers. Music is a safe, easy-to-use, inexpensive therapy that nurses may use independently as an intervention for older adults after hip or knee surgery. The findings of this study suggest that music can be used with confidence as an intervention for those older adults undergoing hip or knee surgery to improve postoperative cognitive function and to reduce episodes of acute confusion.

Using music in a clinical setting requires attention to the preference of the listener. In this study, quiet lullaby music was used until the participant was awake and alert after surgery. At that time, the participant was provided with a choice of many different types of music and could choose what was appropriate based on musical preference. There was no one genre of music chosen most often by participants in this study perhaps because of the diversity of culture and ethnicity among the participants of the study. Further research might be undertaken to determine the most appropriate types of music to orient older adults to their surroundings after surgery. Once awake and alert, participants could change the music as often as desired and often chose different music during different parts of the day. Health care providers should be encouraged to develop music listening as an intervention for older adults after hip or knee surgery, and further research in this area should be undertaken to strengthen nursing knowledge.

Conclusion

Music is a safe, inexpensive, easy-to-use intervention that can be used by nurses to improve cognition and episodes of acute confusion, thereby improving recovery in older adults after hip or knee surgery. Music should be used as part of an integrative approach to the creation of healing environments. Health care providers can use music as an intervention to promote the establishment of a healing environment for older adults after hip or knee surgery.

Declaration of Conflicting Interests

The author has declared that there are no conflicts of interests in the authorship and publication of this contribution.

References

Baker, L., Robinson, R., & Steward, T. (1993). Using the MMSE in older adults of color. *Journal of the American Medical Association*, *248*(98), 1244-1256.

Clark, B., & Halm, M. (2003). Post procedural acute confusion in elderly: Assessment tools can minimize this common condition. *American Journal of Nursing*, *103*(5), 67-72.

Cuddy, L., & Duffin, J. (2005). Music, memory, and Alzheimer's disease: Is music recognition spared in dementia and how can it be assessed? *Medical Hypotheses*, *64*(2), 229-235.

Davis, A., Agnidis, Z., Badley, E., Kiss, A., Waddell, J., & Gross, A. (2006). Predictors of functional outcome two years following revision hip arthroplasty. *Journal of Bone & Joint Surgery*, *88*(4), 685-691.

Emery, C., Hsiao, E., Hill, S., & Frid, D. (2003). Short-term effects of exercise and music on cognitive performance among participants in a cardiac rehabilitation program. *Heart & Lung*, *32*(6), 368-373.

Folstein, M., Folstein, S., & McHugh, P. (1975). Mini-mental state: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Residency*, *12*(3), 189-198.

Gruber-Baldini, A., Zimmerman, S., Morrison, R., Grattan, L., Hebel, J., Dolan, M., et al. (2003). Cognitive impairment in hip fracture patients: Timing of detection and longitudinal follow-up. *Journal of the American Geriatrics Society*, *51*(9), 1227-1236.

Hicks-Moore, S. (2005). Relaxing music at mealtimes in nursing homes: Effect on agitated patients with dementia. *Journal of Gerontological Nursing*, *31*(12), 26-32.

Huusko, T., Karppi, P., Avikainen, V., Dautiainen, H., & Sulkava, R. (2000). Randomized, clinically controlled trial of intensive geriatric rehabilitation in patients with hip fracture: Subgroup analysis of patients with dementia. *British Medical Journal*, *321*, 1107-1111.

Inouye, S. (1999). Delirium in hospitalized older patients. *New England Journal of Medicine*, *341*(5), 369-370.

Jech, A. (2001). Calming the cognitively impaired. *Nursing Spectrum*, *2*(9), 30-35.

Johansson, I., Hamrin, E., & Larsson, G. (2002). Psychometric testing of the NEECHAM confusion scale among patients with hip fracture. *Research in Nursing & Health*, *25*(3), 203-211.

Lai, H., & Good, M. (2006). Music improves sleep quality in older adults. *Journal of Advanced Nursing*, *49*(3), 234-244.

Lou, M., Dai, Y., Huang, G., & Yu, P. (2003). Postoperative cognitive changes among older Taiwanese patients. *Journal of Clinical Nursing*, *12*(4), 579-588.

Marx, R., Jones, E., Atwan, N., Closkey, R., Salvati, E., & Sculco, T. (2005). Measuring improvement following total hip and knee arthroplasty using patient-based measures of outcome. *Journal of Bone & Joint Surgery American Volume*, *87*(9), 789-793.

McCaffrey, R. (2006). The effect of music on pain and acute confusion in older adults undergoing hip and knee surgery. *Holistic Nursing Practice*, *34*(9), 234-245.

McCaffrey, R., & Good, M. (2000). The lived experience of listening to music while recovering from surgery. *Journal of Holistic Nursing*, *18*(4), 378-390.

McCaffrey, R., & Locsin, R. (2004). The effect of music listening on acute confusion and delirium in elders undergoing hip and knee surgery. *Journal of Clinical Nursing*, *13*(S2), 91-96.

McKinney, J. (1997). Current awareness in geriatric psychiatry. *International Journal of Geriatric Psychiatry*, *18*(4), 365-372.

Neelon, V., Champagne, M., Carlson, J., & Funk, S. (1996). The NEECHAM confusion scale: Construction, validation and clinical testing. *Nursing Research*, *45*(6), 324-330.

Rapp, C. (2001). Training of acute confusion resource nurses: Knowledge, perceived confidence and role. *Journal of Gerontological Nursing*, *27*(4), 21-23.

Remington, R. (2002). Calming music and hand massage with agitated elderly. *Nursing Research*, *51*(5), 317-323.

Rogers, A., & Gibson, C. (2002). Experiences of orthopedic nurses caring for elderly patients with acute confusion. *Journal of Orthopedic Nursing*, *6*(1), 9-17.

Schuurmans, M., Duursma, S., Shortridge-Baggett, L., Clevers, G., & Pel-Little, R. (2001). Early recognition of delirium: Review of the literature. *Journal of Clinical Nursing*, *10*(6), 721-749.

Shugars, R., & More, R. (2005). Arthroscopic hip surgery. *AORN Journal*, *82*(6), 975-998.

Singh, V., & Narro, M. (2005). Delirium in the elderly. *British Journal of Hospital Medicine*, *66*(8), 474-476.

Sullivan-Marx, E. (2001). Achieving restraint-free care of acutely confused older adults. *Journal of Gerontological Nursing*, *27*(4), 56-61.

Van de Winckel, A., Fey, H., De Weerdt, W., & Dom, R. (2004). Cognitive and behavioral effects of music-based exercises in patients with dementia. *Clinical Rehabilitation*, *18*(3), 253-260.

Wong, J., Wong, S., & Brooks, E. (2002). A study of hospital recovery pattern of acutely confused older patients following hip surgery. *Journal of Orthopedic Nursing*, *6*(2), 68-78.

Ruth McCaffrey, Doctor of Nursing Practice, is an associate professor at the Christine E Lynn College of Nursing at Florida Atlantic University in Boca Raton, Florida, and the director of the Initiative for Intentional Health, whose mission is to promote individual health through self-reflection and self-discovery.