

The use of music to decrease agitated behaviour of the demented elderly: the state of the science

Meei-Fang Lou RN MN

Doctoral Student, School of Nursing, University of Washington, Seattle, WA, USA

Scand J Caring Sci; 2001; 15; 165–173

The use of music to decrease agitated behaviour of the demented elderly: the state of the science

This paper reviews the state of the science of interventions using music to decrease the agitated behaviour of the demented elderly person. Seven research articles were located through computerized databases. The review of the literature suggested that music therapy is a useful intervention to help patients deal with a range of behaviour problems. However, overall weakness and limitations of

studies are considerable. More rigorous research designs are required to evaluate the immediate and sustained physiological, psychological and sociological effects of music therapy on agitation behaviours of demented elderly. Some recommendations for future research are provided.

Keywords: music therapy, agitated behaviour, demented elderly, the state of the science.

Submitted 3 January 2000, Accepted 28 August 2000

Introduction

The older population is growing and ageing. It is estimated that 12.8% of the United States population is aged 65 or older (1). Within this elderly population, 2–4% have dementia of the Alzheimer's type. The prevalence of dementia, especially dementia of the Alzheimer's type and vascular dementia, increases with age, particularly after 75 yrs, with a prevalence of 20% or more over age 85 yrs (2). As people live longer, they are more likely to have dementia.

Dementia is a progressive, debilitating, irreversible neurologic disease that affects more than 4 million Americans. It is characterized by the development of multiple cognitive deficits which include memory deficit, disorientation, sensory-perceptual deficit, and disturbance in executive functioning (2). From all of the behavioural and cognitive disturbances, the presence of agitation and confusion in the elderly, make it one of the most difficult problems for health care providers as well as family caregivers.

The prevalence rate of agitated behaviour among cognitively impaired patients ranges from 42.8 to 86.3% (3). Agitation is defined as inappropriate verbal, vocal or motor activity that is not explained by needs (4). It may be accompanied by anxiety, panic, depression, delusions, hallucinations, and/or delirium (5). Agitated behaviours

are commonly exhibited by persons who have dementia. Agitation can be detrimental to the security and safety of the demented patient. It has been correlated with increased incidence of falls, prolonged onset of sleep, and disruption of sleep patterns among residents in long-term care, and it is also a factor in the stress of nursing staff (6).

Current management of agitation includes using restraints and medications. But restraints and medications may create adverse consequences with physical and psychological effects such as extrapyramidal reactions. Negative consequences of restraint use include functional decrements and deterioration of emotional and mental condition. Therefore a restraint-free environment or non-restraint strategies are necessary for these patients. Other interventions for agitation suggested by the literature are special environment design and a high staff/patient ratio. Additionally, music therapy, a less costly and possibly a more feasible intervention, is one of the alternative methods proposed to address this problem. Music as a nursing intervention may be simple to realize and is worth trying. Thus, the purpose of this paper is to analyse and critique seven intervention studies that tested music as a therapeutic approach in managing agitation with the elderly. Recommendations for further research are also provided.

Rationale for music therapy for agitated behaviour

Music has many purposes. Its multidimensional nature touches the individual's physical, psychological and spiritual levels of consciousness. Music therapy has been

Correspondence to:

Meei-Fang Lou, Office of Academic Program, BOX # 357260, School of Nursing, University of Washington, 1959 N.E. Pacific Avenue, Seattle, WA 98195, USA. (E-mail: mfalou@u.washington.edu)

defined as the use of music and its influence on people to promote the physical, psychological and emotional integration of the individual during treatment of an illness or disability (7). It has been well documented that music has the ability to evoke physical and psychological responses. In the last decade, there has been a great increase in the use of music in a variety of health settings. Music therapy, which works through a variety of mechanisms, serves as a useful nonpharmacological intervention with a wide variety of patient populations.

There is no one theory that provides a plausible explanation of how music may affect physical and psychosocial response. One perspective is discussed in the works of Campbell (8) that music is viewed as having the potential to open the listener for an understanding of self. It promotes healing, which is reflected by a balanced state of mind and body and spirit. Gerdner (6) discussed the theoretical base for individualized music intervention for agitation. A mid-range theory was developed to explain the effects of individualized music on agitative behaviours in demented elderly. For demented elderly patients, music may activate the neural circuits damaged by Alzheimer's disease. Music may be helpful in re-orientation, rebuilding social links, eliciting memory and raising the morale of demented patients. Music has been used to promote food intake (9), improve mood and behaviour (10), trigger memory (11), and decrease need for physical restraints (12) among demented elderly patients. Also, Campbell (13) studied the psychological significance of music and its effects on reducing stress, strengthening the immune system and improving human interactions. The capacity for perceiving and experiencing music is thought to be located in the basal areas of the brain. Aldridge & Aldridge (14) reported that musical ability appears to be preserved in demented patients even when their language ability may be deteriorated. Music might be used as an alternative method of communication when the cognitive ability to receive and express language has gone. Although patients' ability to respond to music varies, depending on the individual's level of perception and degree of pathological changes in the brain, this ability may remain in the demented patient. Music may provide a way to communicate with demented patients even in advanced stages when the patient is unable to understand verbal language and has decreased ability to interpret environmental stimuli (6).

Method

A number of research studies have been undertaken to assess the effects of music on agitated behaviour in demented patients. A review of the research literature was undertaken by searching computerized databases CINAHL and MEDLINE with the index words of 'music therapy', 'agitated behaviour', and 'demented elderly'. The criteria

for article selection included (1) intervention study using music therapy, (2) from 1990 to present, and (3) preferably with demented elderly. A total of seven research articles were identified related to music therapy in the past decade. Results of these studies provide some evidence that music facilitates management of agitated behaviours in persons with dementia. These research designs, measurements and results are summarized in Table 1.

Overview of the seven studies

Research studies meeting the above criteria were evaluated, and strengths and limitations of the study designs, methods of inquiry and instruments used are described below.

Goddaer & Abraham (3) conducted a quasi-experimental study used an ABAB repeated measures design (A = no music, B = music) by introducing relaxing background music during the noon mealtime to assess the effectiveness on agitated behaviours for 29 elderly nursing home residents with severe cognitive deficits. The Cohen-Mansfield Agitation Inventory was used to assess agitated behaviour by one trained observer. The internal consistency (KR-20) of this measurement was 0.88–0.94 in this study. The treatment involved three music conditions: no music in week 1, relaxing music in week 2, no music in week 3 and rehearing relaxing music in week 4 using a pre–post comparison with subjects as their own controls. They found the overall agitated behaviour was significantly reduced to 63.4% of the baseline observation after the 4-week intervention. Also, significant decreases in physical nonaggressive behaviour (e.g. pacing, inappropriate robbing) and verbal agitated behaviour (e.g. complaining, constant request for attention) were reported. No change in physical aggressive behaviour (e.g. hitting, kicking) and hiding/hoarding behaviours were found.

Ragneskog, et al. (15) conducted a quasi-experimental, one group repeated measures study to explore and compare three different types of background music, relaxing music, popular music and pop and rock music, played at dinnertime during three periods of 2 weeks. The sequence of the three types of music chosen for the study was randomly assigned. They aimed to assess the effectiveness of music on food intake, irritability, restlessness and uninhibited behavior. Using a video recording, they studied five nursing home residents with severe dementia during mealtime. The results showed that the patients were affected by music, particularly relaxing music. Patients spent more time with dinner during the three music periods. The total mean time spent with a meal increased by 22% when music was played. Patients ate by themselves more often and were also fed more as they sat without touching the food several times or pushed away their plate during musical sessions. Nurses fed the patients significantly more often when music was played. Dinner music appeared to enhance patients' ability to eat more calmly. It was

Table 1 Selected research results of music therapy for agitated behaviours

Researcher/year	Research design	Sample & setting	Dependent variable	Treatment	Instrument	Data analysis	Findings
Clair and Bernstein (1994)	Quasi-experimental design One group repeated measure in three background music conditions with a total of 30 days period	n = 28 (27 M, 1 F) 56–81 yrs, in hospital unit Severed demented, regressed patients Included criteria: wandering, diagnosed as demented, functional hearing	Agitated behaviour	Three background music conditions were assign randomly Each played 10 days as background music three times a day for 30 min	Agitated behaviours were counted by three trained observers who observed the agitated behaviour at 1-min interval Inter-rater reliability coefficient ranged from 0.93 to 0.97	Descriptive t-test, ANOVA	Background music had no influence over agitated behaviour. No significant decrease in agitated behaviours during these three conditions
Clark et al. (1998)	Experimental design Randomly assigned subjects into two group with no music or preferred music Observed in 2 weeks than subjects switched to the alternative condition with a total of 4 weeks period	n = 18 (4 M, 14 F) 55–95 yrs, in nursing home Alzheimer's type dementia (MMSE 1–22) Included criteria: diagnosis of dementia, history of aggressive Excluded criteria: uncorrected hearing impairment, absence of family member to provide patient's music background and preference	Aggressive behaviour	Preferred music Music played during bath task	Aggressive behaviour checklist was used by a trained research assistant during patients' bath time Inter-observer reliability: >0.90 The validity and reliability of the tool in this research were not reported	Descriptive t-test	Significant decrease occurred in 12 of 15 identified aggressive behaviours during music playing Caregivers reported improved patients' affect and cooperation of patients with the bath task
Denny (1997)	Quasi-experimental design One group repeated measure of clinical trial in two music conditions with a total of 4 weeks period	n = 9 (3M, 6 F) 65–84 yrs, in a long term care facility Alzheimer's disease with severed cognitive impairment (MMSE 0–5) Included criteria: no evidence of hearing loss	Meal time agitation behaviour	Quiet background music Music played everyday during lunch time	Agitated behaviour observed by using Modified Cohen-Mansfield Agitation Inventory by observer The validity and reliability of the tool in this research were not reported	Descriptive	A 64% decrease in the behaviours from the end of the first week. Behaviours increased, but remained 8% below baseline incidence after a week without music. In the fourth week a decrease in behaviours of 37% from baseline and 31% from week 3 (no music) was noted

Table 1 (Continued)

Researcher/year	Research design	Sample & setting	Dependent variable	Treatment	Instrument	Data analysis	Findings
Gerdner (1997)	2 Case reports (1) Individual intervention, agitated behaviours observed before, during and 1 h post music playing (2) Using classical relaxation music for 6 weeks, a wash out period for the following 2 weeks and preferred music played for another 6 weeks	(1) n = 1 (F) 89 yrs, in a day care centre Alzheimer's disease with severe cognitive impairment (2) n = 1 (F) 77 yrs, in a long care facility Alzheimer's disease with severe cognitive impairment	(1) Agitation behaviour (2) Agitation behaviour	(1) Preferred music Music played 30 min, 2 days a week for a total 15 sessions (2) Classic music played 30 min twice a week for 6 weeks followed by a 2 weeks no music period, then preferred music played 2 days a week for 6 weeks	(1) One-to-one observation of patient behaviour change (2) Behaviour monitored by Cohen-Mansfield agitation inventory The validity and reliability of the observation were not shown in the text	(1) Descriptive (2) Descriptive	(1) The patient danced, hummed the tune, clapped during music playing. Patient made no statements to leave during music playing (2) The frequency of agitated behaviour revealed a slight decrease during the presentation of classical music, but a dramatic decrease in agitation behaviour during preferred music played
Gerdner and Swanson (1993)	Case report Individual intervention, agitated behaviours observed before, during and 1 h post music playing with a total of 2 weeks period	n = 5 (0 M, 5 F) 70–99 yrs, in a long term care facility Dementia of the Alzheimer's type who are confused and agitated (MMSE 0–18)	Agitated behaviour	Preferred music	Agitated behaviour observed by using Cohen-Mansfield agitation inventory Inter-rater reliability: 0.97	Descriptive	The mean percentage of Agitated behaviours decreased 46.6% during music intervention and 80.0% 1-h post intervention
Goddaer and Abraham (1994)	Quasi-experimental design One group repeated measure of clinical trial in three music conditions with a total of 4 week period	n = 29 (6M, 23 F) 67–93 yrs, in nursing home Severe cognitive deficit patients (MMSE 0–17) Sampling criteria: MMSE <30, no hearing impairment, needing some assistant with eating and drinking	Agitated behaviour	Relaxing background music Music played at noon meal time	Agitated behaviour assessed by Cohen-Mansfield agitation inventory by one trained independent rater KR-20 internal consistency ranged from 0.88 to 0.94	Descriptive ANOVA	Significant decreased of 63.4% in overall agitated behaviours Significantly decreased physical nonaggressive behaviour (56.3%), verbal agitated behaviour (74.5%), but nonsignificant reduced in physical aggressive behaviour and hiding/hoarding behaviours

Ragneskog et al. (1996)	Quasi-experimental design One group repeated measure of clinical trial in three music conditions with a total of 6 week period	n = 5 (1M, 4 F) Severely demented patient, in nursing home Selection criteria: 5 of the 10 patients with the highest scores of the Multi-Dimensional Dementia Assessment Scale (MDDA scale)	Food intake and irritability, restlessness and uninhibited behaviour	Three types of background music: relaxing music, popular music and pop and rock music Music played during dinner time, lasting for 30–45 min	Analysis of patient behaviour by video recorded observations in 2 min The validity and reliability of the observations were not reported	Descriptive	Patients were affected by music, especially in relaxing music. Dinner music made the patients eat more calmly The total mean time spent with a meal increased 22% during music session
-------------------------	---	---	--	---	---	-------------	---

concluded that music could beneficially affect restless and agitated behaviours of the demented patients.

Denny (16) conducted a quasi-experimental, one group repeated measures study to assess the effectiveness of quiet background music played during lunch time to decrease agitated behaviours in nine severely cognitively impaired dementia patients in a long term care facility. The treatment involved collecting baseline data with no music in week 1, introducing the music in week 2, withdrawal in week 3 and reinstatement of music in week 4. The Mansfield Agitation Inventory was used to evaluate the outcome by one observer. The results showed a 64% decrease in the agitation behaviours from the end of the first week. Behaviors increased but remained 8% below baseline incidence after a week without music. In the fourth week a decrease in behaviours of 37% from baseline and 31% from week 3 (no music) was noted.

In contrast to the above research demonstrating that background music was effective in reducing the agitated behaviour of demented patients, Clair & Bernstein (17) reported conflicting results. They conducted a quasi-experimental, one group repeated measures study with 28 severely demented, regressed patients in a hospital setting to evaluate the effectiveness of three background music conditions on agitated behaviours. The treatment involved no music, stimulating music and sedative music. These three treatment conditions were randomly assigned to a playing sequence with each music played three times a day for 30 min. Three trained observers obtained data by counting the number of patients exhibiting agitated behaviour at 1-min intervals in the day room of a hospital unit. Data were collected three times a day for 10 days for each condition. The inter-rater reliability coefficient in this study ranged from 0.93 to 0.97. No significant decrease in agitated behaviours during these three conditions was reported. Subjects did not change in their amount of agitated behaviours over time during the course of study. It appeared that background music did not influence agitated behaviour.

Other studies explored the effectiveness of individually chosen music on agitated behaviours. Gerdner & Swanson (5) investigated the effects of preferred recorded music for 30-min periods in five individual sessions over 2 weeks with five agitated demented elderly patients who resided in a long term care facility. The patient's personal music preference was gathered from a family member by completing a music preference questionnaire for the patient. The Cohen-Mansfield Agitation Inventory was used to observe patients' behaviours. The inter-rater reliability of this observation was 0.97. The intervention consisted of individually selected music played for 30 min. Patient's behaviours were observed of the patient's behaviours during the music and 1-h immediately after listening to music. Results suggested that playing music produced soothing effects on agitated behaviors. Comparisons of

baseline data, data during music listening and postintervention agitation levels, revealed a reduction of 46.6% of agitated behaviours during music intervention and 80.0% 1 h post music intervention.

Gerdner (6) reported two case studies describing the effectiveness of music on patients' behaviour change. The first case was with an 89-yr-old female Alzheimer's type dementia patient with severe cognitive impairment who was introduced to her preferred music in a day care center. Music was played for 30 min, 2 days a week for a total of 15 sessions. One-to-one observation of patient behaviour change carried out by the investigator revealed positive behaviour change. The patient could smile and danced with the music and made no statements that indicated a desire to leave during the music playing. The second case study involved a 77-yr-old woman who resided in a long-term care facility and was diagnosed as having Alzheimer's disease with severe cognitive impairment. Classical music was provided for 30 min twice a week for 6 weeks, a wash out period with no presence of music for the following 2 weeks and preferred music played 2 days a week for another 6 weeks. Patient behaviour was observed by the Cohen-Mansfield Agitation Inventory. The results revealed that the frequency of agitated behaviour decreased slightly during the classical music, increased above baseline during the wash out period, and dramatically decreased during her preferred music.

Clark et al. (18) conducted an experimental study using the preferred, recorded music with 18 demented nursing home patients to examine the effect of music in decreasing aggressive behaviours during bathing in a nursing home. Patients were randomly scheduled for observation during bath time under either no music (control) or preferred music (experimental) conditions. Following a 2-week period, conditions were reversed for these two groups. An aggressive behaviour checklist which included 15 behaviours was used to measure the outcomes by a trained research assistant during the patient's bath time. The inter-observer reliability in this research was above 0.90. A significant decrease in 12 of 15 identified aggressive behaviours was observed in the experimental group during music playing. Caregivers also reported improved patient affect and cooperation with the bath task.

Syntheses of study critiques

Generally, the music interventions demonstrated success in decreasing some types of agitated behaviours in demented elderly patients. In summary, of the seven studies, four used background music and three used individual preferred music to decrease agitated behaviour in the demented elderly. Among these studies, six demonstrated that music had positive effect to reduce agitated behaviours of demented elderly, and one study showed no significant difference. The findings were relatively consistent. How-

ever, despite these promising results there are important research issues that need to be addressed.

Theoretical framework

The strength of an intervention can be identified through intervention theory. A theoretical framework could be used to guide the intervention. Although a number of studies elucidate possible mechanisms, most of them did not explicate their theoretical framework for the music therapy intervention. There is no one theory that provides a plausible explanation of how music may influence physical and psychosocial response. Only Gerdner (6) discussed the theoretical base for individualized music intervention for agitation. A midrange theory of music theory was proposed by the author. However rigorous testing of the theory is still needed.

Study design

The study designs of these studies were varied (Table 1). Among these seven studies, one used experimental design (18), four used quasi-experimental design (3, 15–17) and two were case reports (5, 6). The only one experimental study (18) showed that music had a significant positive effect on agitated behaviour. Among these four quasi-experimental studies, two studies used random assignment to assign the music sequence of playing (15, 17). Random assignment for the music sequence had the strength of eliminating the lasting effect or interaction from certain types of music. For comparison, these studies usually used subjects as their own control by pre–post repeated measurement to compare the results. For subjects with dementia, they are unique and difficult to match for control. Use within group repeated test has the strength to eliminate the individual variance from the total variance and add rigour to the design. Those research results that did not use experimental design with randomization will be threatened by other factors that cannot be controlled. Because random assignment is intended to increase the likelihood that subjects in each group are similar, the influence of potential extraneous factors is dispersed across the groups. Also, the causal inference cannot be inferred from nonexperimental designs (19). The effect of music may be confounded by other factors. For example, medications are frequently used to control the agitated behaviour of the demented elderly. The drug effect and disease process instead of music may cause the decreases of agitated behaviour. Also, when caring for demented elderly, the phenomenon of 'sundown syndrome' which is associated with the increasing of agitation that occurs near sunset or evening hours (20), cannot be ignored. When there is a behaviour pattern change during the day, it is hard to support the music effect on agitated behaviours.

When examining the trend of study designs on this topic from the year these papers were published (Table 1), researchers started to explore the effect of music on agitated behaviour by case study (5) in 1993, then by quasi-experimental design (3, 5–17) in 1994–1996, then, by experimental design (18) in 1998. Current studies appear to use more rigorous research design to further support the effect of music in decreasing agitated behaviours of the demented elderly.

Subjects and settings

The subjects involved were diagnosed as having dementia or dementia with Alzheimer's type, so findings may not generalize to other types. The age of the subjects ranged from 56 to 99 yrs old. Although they were all severely cognitively impaired elderly, the cognitive function scores of these patients, when assessed by the MMSE, ranged from 0 to 22. These scores implied that patients had different degrees of physical conditions and disease severity. All of the studies focused on institutionalized elderly. Differences in the settings may contribute to variability in the way the intervention is implemented and in the way subjects respond to the treatment, thus leading to increased variability in the outcomes achieved that is not attributed to the intervention effects. Among these studies, music was played in different settings including hospital units, nursing homes, long-term care facilities and day care centres. The setting variability further implied that these subjects had different disease severity, so the results may be affected by other factors. Also, the extent to which music therapy may apply to the home setting is unclear.

Types of music and outcome measures

There are many types of music used in the research design including background music which included quiet music, relaxing music, stimulating music, sedative music, popular music and pop or rock music (3, 15–17), and individual preferred music (5, 6, 18). Music was played at different time periods including during bathing, dinner time, and lunch time or in general as background music. Different approaches included individual and group music interventions. Although there is some evidence that music facilitates management of agitated behaviours in persons with dementia, there is no empirical evidence about the effect of various types of music, time played and format of delivery. Furthermore, the significance of music to the individual may affect the response. For example, in Clair & Bernstein's (17) study, the lack of effect may be due to the individual preferences in selection of music.

For outcome measurement, the instruments used to assess the outcome varied. Four studies used the Cohen-Mansfield Agitation Inventory as outcome measurement

to assess the demented patients' agitation behaviour. However, only two reported the reliability of the observation (3, 5). Other researchers used self-developed checklists to observe patient's behaviour, but they did not report the validity of the tool, the reliability of the observation or the training provided to the observers.

Standardized protocols

Use of standardized protocol is an important element to maintain the integrity of research. Lack of intervention integrity threatens the validity of conclusions about treatment effectiveness. For example, investigators mentioned that the music was played as background music but did not describe who played it, with what kind of equipment and with what kind of control to insure the quality of intervention. Two studies (3, 17) mentioned that the sound level was checked and adjusted to a predetermined level. One study asked staff nurses to find the most suitable sound level (15), and that could lead to a lack of standardization of intervention procedures. The music may have been too quiet or too noisy for the preferences of elderly patients. As the patients had a wide range of age, the hearing ability of this group may have considerable variability as a result of ageing process. The patients' ability to hear the music is a key factor in using music therapeutic. Consequently it is encouraging that five studies included functional hearing ability of the elderly as a criteria for sample selection (3, 5, 16–18).

Generalizability

The major goal of all research is to minimize threats to internal validity and maximize external validity (19). Therefore, limitations such as the lack of theoretical framework and procedure variability discussed earlier also will affect the generalizability of the results. In addition, some medications may influence behaviour of the elderly during music playing sessions. None of the studies, however, examined the possible medication effect or related variables (such as the deterioration of patient's cognitive level) which may have influenced responses to the music intervention. Also, these interventions were provided in a relatively short time. In each session, the time music was played ranged from 30 to 45 min. The frequency of music provided ranged from three times a day (17) to two times a week (6). The intervention period ranged from 2 weeks (5) to 11 weeks (15). The majority of studies (5 over 7) were conducted less than 4 weeks. So, the long-term effect of music as well as the proper dosage of music has not been determined yet. Results of these studies should be viewed with caution because of the small sample sizes and use of convenience samples. The sample sizes of these studies ranged from 1 to 29. The sample size of four of seven studies was <10.

Implications for future research

In summary, these studies provide a foundation for future study. These findings suggested music has the potential to decrease agitated behaviours of demented elderly patients in a variety of institutionalized settings. However, additional research is required to evaluate the immediate and sustained physiological, psychological and sociological effects and to identify the benefits of the use of music on agitation behaviours of the demented elderly.

The next steps in knowledge generation are theory-driven true experimental studies with larger sample sizes and standardized protocols and measures which follow a longer period of time in testing multiple intervention variables (such different types of music, different timing, events, medications, cognitive function) in different settings (home setting, hospital, nursing home, day care centre) to assess the effects of music therapy on different types of dementia. It is also important to identify what types of music are most effective in reducing agitated behaviours, the most appropriate timing of the intervention on behavioural response to music and other interaction effects. For long-term effect, it is important to examine what the music would be on multiple music sessions over longer intervention period, the duration of the effect on behaviour change and if music could affect outcomes such as restraints use or nutritional status of the elderly.

Although most of the studies utilized lists of agitated behaviours, future research might focus on the frequently occurring behaviours for closer examination and identify the precipitating factors of these agitated behaviours. Thus, some preventive interventions could be applied to decrease the incidence of agitated behaviour of the elderly patient. Outcome measures could include the direct effects on patient agitation as well as the indirect effect such as the incidence of falls. While medications are commonly used to manage the agitated behaviours, they create adverse consequences with both physical and psychological effects on the individual. Possible medication effects were not analysed in the reviewed research. Some medications may be more effectively controlled. Further research is needed to explore any interaction effects with certain medication with music therapy. It is also necessary is to explore possible effects of music in decreasing medication usage. It will not only eliminate the adverse effects of medication, but also the cost-effectiveness of the treatment.

The personal preference as well as the type of music and patient's history and sensitivity to music should be considered. A qualitative research can be conducted to interview family members to determine the patient's preference and the effects of music to patients. Nurses and family members can be interviewed regarding their perception and attitude to the music intervention. Studies that test the efficacy of specific music selections and this

relationship to individual characteristics such as personality traits are also needed.

Different perspectives have been discussed in the literature to explain how music may affect physical and psychosocial response but no one aspect supports a generalizable theory. Additional work in theory testing is needed to build knowledge and improve practice. To increase the generalizability of music as a therapeutic modality, future research needs to consider factors such as affordability, acceptability, accessibility and cultural and developmental appropriateness of the music. For example, if the individually preferred music has an effect on reducing the agitated behaviour of the elderly, the implementation of this strategy needs to be evaluated in terms of its cost-effectiveness in the current system. If use of music can promote the effective management of agitative behaviours, the change in nursing hours in a unit should be explored for future research.

Conclusion

This review highlights the usefulness of music as an intervention to help patients deal with agitative behaviour problems. This indeed can increase patients' quality of life. However, the overall weakness and limitations of studies are considerable. What is required is more rigorous research design that validates the intervention, covering the range of techniques, applications and interdisciplinary collaboration to evaluate the immediate and sustained effects of music therapy on agitation behaviours of demented elderly.

Acknowledgements

The author wishes to thank the perceptive and sensitive reviews of earlier versions of this article by Marie-Annette Brown, RN, PhD, FAAN and Cathy S. Lindenberg, RN, Dr. PH.

References

- 1 Treas J, Longino CF. Demography of aging in the United States. In Ferraro KF, ed. *Gerontology: perspectives and issues*. NY: Springer, 1997.
- 2 APA. *Diagnostic and statistical manual of mental disorders*, 4th edn. Washington DC: APA, 1994.
- 3 Goddaer J, Abraham IL. Effects of relaxing music on agitation during meals among nursing home residents with severe cognitive impairment. *Arch Psychiatr Nurs* 1994; 8: 150-8.
- 4 Cohen-Mansfield J, Billig N. Agitated behaviours in the elderly: a conceptual review. *J Am Geriatr Soc* 1986; 34: 722-7.
- 5 Gerdner L, Swanson EA. Effects of individualized music on confused and agitated elderly patients. *Arch Psychiatr Nurs* 1997; 7: 284-91.
- 6 Gardner L. An individualized music intervention for agitation. *J Am Psychiatr Nurs Assoc* 1997; 3: 177-84.

- 7 Covington H, Crosby C. Music therapy as a nursing intervention. *J Psychosoc Nurs* 1997; 35: 34–7.
- 8 Campbell D. *Music physician for times to come*. Wheaton, IL: Quest, 1991.
- 9 Ragneskog H, Brane G, Karlsson I, Kihlgren M. Influence of dinner music on food intake and symptoms common in dementia. *Scand J Caring Sci* 1996; 10: 11–7.
- 10 Pinkney L. A comparison of the Snoezelen environment and a music relaxation group on the mood and behaviour of patients with senile dementia. *Br J Occup Ther* 1997; 60: 209–12.
- 11 Sambandham M, Schirm V. Music as a nursing intervention for residents with Alzheimer's disease in long-term care. *Geriatr Nurs* 1995; 16: 79–83.
- 12 Janelli LM, Kanski GW. Music intervention with physically restrained patients. *Rehabil Nurs* 1997; 22: 14–9.
- 13 Campbell DG. The innovative: personal transformation with music. *Music Ther* 1988; 7: 38–50.
- 14 Aldridge D, Aldridge G. Two epistemologies: music therapy and medicine in the treatment of dementia. *Arts Psychother* 1992; 19: 243–55.
- 15 Ragneskog H, Kihlgren M, Karlsson I, Norberg A. Dinner music for demented patients: analysis of video-recorded observations. *Clin Nurs Res* 1996; 5: 262–77.
- 16 Denny A. Quiet music: an intervention for mealtime agitation. *J Gerontol Nurs* 1997; 23: 16–23.
- 17 Clair AA, Bernstein B. The effect of no music, stimulative background music and sedative background music on agitated behaviours in persons with severe dementia. *Activities, Adapt, Aging* 1994; 19: 61–70.
- 18 Clark ME, Lipe AW, Billrey M. Use of music to decrease aggressive behaviours in people with dementia. *J Gerontol Nurs* 1998; 24: 10–7.
- 19 Sidani S, Braden CJ. *Evaluation nursing interventions: a theory-driven approach*. Thousand Oaks: Sage; 1998.
- 20 Burney-Puckett M. Sundown syndrome: etiology and management. *J Psychosoc Nurs* 1996; 34: 40–3.