



## COVER SHEET

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# Use of preferred music to decrease agitated behaviours in older people with dementia:

## A review of the literature

### Abstract

**Background.** Music has been suggested as a feasible and less costly intervention to manage agitated behaviours in older people with dementia. However, no review of the literature focusing on study findings of preferred music on agitated behaviours in older people with dementia had been reported.

**Aims and objectives.** This paper was to review study findings of preferred music on agitated behaviours for older people with dementia and to provide implications for future research and practice.

**Methods.** A review was undertaken using electronic databases with specified search terms for the period of 1993-2005. The references listed in the publications selected were also searched for additional studies.

**Results.** Eight research-based articles met the inclusion criteria and were included in the review. The preferred music intervention demonstrated positive outcomes in reducing the occurrence of some types of agitated behaviours in older people with dementia. The findings from these studies were relatively consistent in finding improvement in agitated behaviour although the findings in one study did not reach statistical significance. The small sample sizes and some variations in the application of the preferred music intervention mean that caution is needed in drawing conclusions from these studies.

**Conclusions.** This review highlights that preferred music has positive effects on decreasing agitated behaviours in older people with dementia; however, the methodological limitations indicate the need for further research.

**Relevance to clinical practice.** Findings from the review highlight the beneficial outcomes of preferred music in reducing agitated behaviours for older people with dementia. The incorporation of preferred music has the potential to provide a therapeutic approach to the care of older people with dementia.

**Key words:** preferred music, dementia, agitated behaviours, nurses, nursing

## BACKGROUND

Caregivers have identified agitated behaviours as one of the most challenging in caring for those with dementia (Wagner *et al.* 1997) and may put older people at risk of harm to themselves, other residents and caregivers. Agitated behaviours have traditionally been managed with the use of psychotropic medications or physical restraints. These treatments may cause negative effects (Bradley *et al.* 1995). These concerns have led to research seeking alternative approaches to reduce the need for chemical or physical restraints in the care of older people with dementia. One such approach is use of music. Music has been suggested as a feasible and less costly intervention to manage behavioural problems in older people with dementia. Music can be used to modify environmental stimuli (Hall & Buckwalter 1987, Gerdner & Buckwalter 1999) and some types of music may create a neutral environment to mask noises and prevent over-stimulation. Therefore, use of music can be a viable intervention to manage agitated behaviours in older people with dementia.

### Therapeutic use of music

According to Munro and Mount (1978, p.1029), music therapy is defined as ‘controlled use of music and its influence on the human being to aid in physiologic, psychological, and emotional integration of individual during treatment of an illness or disability.’ Music intervention has been used as a valuable nonpharmacologic intervention for patients of all ages in a variety of clinical practice settings. Several literature reviews have documented the positive outcomes of music interventions for various clinical populations (Kneafsey 1997, Snyder & Chlan 1999, Biley 2000, Evans 2002, Savarimuthu & Bunnell 2002). Some reviews have focused on the use of music for people with dementia and finding beneficial effects on their behaviours and social interaction (Brotons *et al.* 1997, Koger *et al.* 1999, Lou, 2001, Vink *et al.* 2003, Sherratt *et al.* 2004). There is a wide range of music interventions used for older people with dementia including listening to different types of music, instrument playing or group exercise while listening to music. Music as an intervention can be implemented by using individualised music to match the past preferences of older people or listening to tapes of classical or calming music privately or in a group setting. Music listening with personal

preferences in particular has been suggested to effectively manage behavioural problems of older people with dementia (Gerdner & Swanson 1993, Gerdner, 2000, Ragneskog *et al.* 2001).

#### Familiarity in older people with dementia

Older people with dementia are especially susceptible to the incongruence created by an environment that is unfamiliar and may result in negative psychosocial outcomes, such as anxiety and agitation (Mirotznik & Ruskin 1985). Although older people with dementia have impaired explicit memory, they have preserved implicit memory and habits (Randolph *et al.* 1995, Fleischman *et al.* 1998, Knight, 1998). One form of implicit memory is associated with the sense of familiarity. Older people with dementia may invoke memories encoded with familiar environmental cues which the elders may perceive as less intimidating and stressful (Son *et al.* 2002). Since older people with dementia are typically unable to learn or interpret a new environment (Camberg *et al.* 1999), introducing the sense of familiarity into a new environment or maximising familiarity in an existing environment can enhance their functional abilities (Son *et al.* 2002). Using aspects of prior familiar environments (such as music, objects and pictures) can be a viable strategy to stimulate remote memories associated with positive feelings in older people with dementia.

Familiar music from the past can assist in memory recall and elicit memories associated with positive feelings. Researchers indicate that the areas of the brain that respond to music are the last to deteriorate in dementia and suggested that music may be one form of communication that remains preserved in people with dementia who respond to music (Crystal *et al.* 1989). Cuddy and Duffin (2005) found that memory for familiar music was spared in people with dementia and concluded the presence of music may prompt motor activity or memory recall in people with dementia. Music is often used as a stimulus and a catalyst for reminiscence for older people and may be used to communicate forgotten memories in those with dementia (Clair 1996). When Music is viewed as an important aspect in the person's life and is based on personal preferences, memories associated with positive feelings can be elicited. Older people are usually fond of music that was popular during their youth (Gibbons 1977). Music from religious services, patriotic ceremonies or cultural events would

have specific meaning to the person's life. The level of significance of music in the person's life prior to the onset of dementia is proposed to be associated with the effectiveness of music intervention (Clark *et al.* 1998, Gerdner 2000). Music that elicits positive memories from the past can have a soothing effect, and these positive feelings, in turn, will prevent or reduce agitation in older people with dementia (Gerdner 2000). Listening to one's favourite music can also decrease cortisol which increases in the presence of stress (Fukui 1996), which may in turn reduce state anxiety and promote relaxation (Chlan 1998). Thus, music, which can elicit memories and positive feelings in older people with dementia, has the potential to decrease the occurrence of behavioural problems, such as agitation.

According to current literature, music appears to have beneficial effects on people with dementia, but the effect size of these benefits was not consistent across all studies. In addition, variation in musical selections, different types of music activities and multiple types of measurements for the outcomes also limited the ability to compare and contrast the effects across the studies. Previous reviews on music and dementia research included different types of music activities and various outcomes (Brotons *et al.* 1997, Koger *et al.* 1999, Lou 2001, Vink *et al.* 2003, Sherratt *et al.* 2004); however, these broader based reviews limited the generalisability of findings as they failed to differentiate which type of music activities worked for which outcomes in older people with dementia.

## AIMS OF THE REVIEW

This review differs from previous reviews of music interventions in dementia care in that it focuses on studies using preferred music interventions or comparisons of preferred music with other types of interventions to manage agitated behaviours in older people with dementia. The aim of this review was to provide a summary of the current state of knowledge about the effects of preferred music on agitated behaviours for older people with dementia and to discuss the implications for future research and practice.

## METHODS

The following computerised databases were searched from 1993 to 2005: CINAHL, MEDLINE, PsychINFO, PsycARTICLES and the Cochrane Database of Systematic Reviews.

Keywords used in the literature search included 'preferred music', 'individualised music', 'music', 'agitated behaviours', 'dementia', 'Alzheimer's disease', 'music and dementia' and 'music and Alzheimer's disease'. The literature search resulted in 29 research studies that identified use of music on people with dementia. The references listed in the publications selected were also searched for additional studies. Initial review of the abstract of each article found from data base search were undertaken to determine those meeting the inclusion criteria. The inclusion criteria for study selection were published in English and appeared in refereed journals. Criteria specific for the topic were: (i) intervention studies of preferred or individualised music, (ii) agitated behaviours, and (iii) people with dementia or Alzheimer's disease. Studies of music that did not involve patient participating in preferred music interventions were excluded from the review. A total of eight research-based articles met the criteria and were included in the review. An appraisal of the quality of the included studies was conducted and each study was appraised critically in relation to their sample, designs, treatments, measures and findings (Table 1). The methodological weaknesses of these reviewed studies were discussed. The result of this review was also discussed and compared with those of previous reviews on music and dementia.

## RESULTS

The studies reviewed were predominantly from North America and only one study was conducted in Europe. Four studies were conducted by nursing professionals, one study was by mental health professionals (Cohen-Mansfield & Werner 1997), one was by music therapists (Clark *et al.* 1998), one was by a group of recreational professionals (Thomas *et al.* 1997), and one was by occupational therapists (Casby & Holm 1994). Prior to reporting the main findings about preferred music for those with dementia, methodological issues for the included studies are outlined. They are examined according to the sample, design, treatments, measures and main findings of the reviewed studies.

### Sample

The participants involved in the studies were older people diagnosed with dementia or dementia of Alzheimer's type and were residents in long-term care facilities. Two studies did not mention anything about the screening measures for estimating disease severity or reporting levels of cognitive function for their participants (Casby & Holm 1994, Snyder & Olson 1996). Of those that did refer to screening measures, three studies assessed their participants' cognitive function by the Mini-Mental State Examination (MMSE) (Gerdner & Swanson 1993, Clark *et al.* 1998, Ragneskog *et al.* 2001), two studies used the Global Deterioration Scale (GDS) for determining disease severity (Thomas *et al.* 1997, Gerdner 2000), and one study used the Brief Cognitive Rating Scale (BCRS) to assess cognitive deterioration (Cohen-Mansfield & Werner 1997). One study reported their participants had a moderate level of dementia (Thomas *et al.* 1997), three studies classified their participants as having severe level (Cohen-Mansfield & Werner 1997, Clark *et al.* 1998, Ragneskog *et al.* 2001), and two studies included participants with both moderate and severe levels of dementia (Gerdner & Swanson 1993, Gerdner 2000). There were four studies in which the sample size was less than six participants (Gerdner & Swanson 1993, Casby & Holm 1994, Snyder & Olson 1996, Ragneskog *et al.* 2001).

## Design

The studies reviewed used various research designs. One study used a case study design (Gerdner & Swanson 1993), one was a case control (Ragneskog *et al.* 2001), and another employed a quasi-experimental design (Thomas *et al.* 1997). The remaining five studies used a crossover design with each participant serving as their own control and with repeated measures (Casby & Holm 1994, Snyder & Olson 1996, Cohen-Mansfield & Werner 1997, Clark *et al.* 1998, Gerdner 2000). Only two studies used random assignment of participants into treatment groups (Clark *et al.* 1998, Gerdner 2000). Some of the crossover design studies had one group of participants receiving preferred music and the other group receiving other types of treatment conditions, such as classical music (Gerdner 2000) or use of family video or social interaction (Cohen- Mansfield & Werner 1997) or hand massage (Snyder & Olson 1996), then the order of the conditions was reversed so that each group of

participants received all treatment conditions but in different time periods. There were only three crossover studies that provided a washout period of 1-2 weeks between sequences of different treatment conditions (Cohen-Mansfield & Werner 1997, Clark *et al.* 1998, Gerdner 2000), thereby preventing carry-over effects and nullifying possible cumulative effects of the music interventions. One study (Ragneskog *et al.* 2001) had each participant receiving the same order of treatment conditions (no music period then classical music period and followed by two periods of preferred music) and compared their behavioural responses before, during, and after each period of treatment conditions. Earlier studies reviewed appear to use smaller sample size while more recent studies appeared to use more rigorous research designs with larger sample to test the effects of preferred music intervention.

### Treatments

The majority of the studies evaluated the effects of preferred music interventions in comparison with either no music or with other types of treatment conditions, such as classical music, taped music, family-generated video, social interaction or hand massage. In addition, music interventions were conducted at different time periods, such as at a fixed time of day (Gerdner & Swanson 1993, Snyder & Olson 1996), at peak time for agitation (Cohen-Mansfield & Werner 1997, Gerdner 2000, Ragneskog *et al.* 2001), or during bathing time (Thomas *et al.* 1997, Clark *et al.* 1998). One study did not mention the time of day when they implemented the music sessions (Casby & Holm 1994). Gerdner's study (2000) was the only one which implemented music sessions 30 minutes prior to the peak level of each participant's agitation. Furthermore, the numbers of preferred music sessions conducted in the studies also varied. There were as little as three sessions of music intervention once a day in a 3-day period (Thomas *et al.* 1997) and as many as twelve sessions of preferred music in a six-week period (Gerdner 2000).

### Measures

The assessment instruments used in the studies mainly included informant ratings, self-developed behavioural checklists, and video-taped recording. The most frequently used instrument



was Cohen-Mansfield Agitation Inventory (CMAI), which is a type of informant rating scale (e.g. Gerdner & Swanson 1993, Cohen-Mansfield & Werner 1997, Thomas *et al.* 1997, Gerdner 2000). The CMAI demonstrated high reliability and was used to record the occurrence of 29 observable agitated behaviours. Gerdner (2000) modified the CMAI for the time classification to provide more detailed assessment of each specific agitated behaviour during a ten-minute period and this was the only study which assessed the peak level of participants' agitation using a valid assessment tool. Ragneskog and colleagues (2001) used video-taped recording for agitated behaviours in one-minute segments and suggested that video-recordings are a more reliable method to code behaviours compared to observational rating scales. Cohen-Mansfield and Werner (1997) used taped-recording accompanied by the CMAI and the SBMI (Screaming Behavioural Mapping Instrument) to measure verbal disruptive behaviours accurately. Other researchers used self-developed behavioural checklists to measure the outcomes, but the validity and reliability of the checklists were not reported (Casby & Holm 1994, Clark *et al.* 1998). One study did not name the assessment tool used for measuring aggressive behaviours nor its validity and reliability (Snyder & Olson 1996).

#### Main findings of the reviewed studies

While there are some methodological limitations in the included studies, the preferred music intervention used in these studies consistently demonstrated positive outcomes in reducing occurrence of some types of agitated behaviours in older people with dementia although in one study (Snyder & Olson 1996) the positive outcome was not statistically significant. These studies found that music listening with personal preferences generally has a soothing effect on older people with dementia. Seven of the eight studies reported preferred music to be effective in decreasing occurrence of some types of agitated behaviours in older people with dementia. However, one study (Snyder & Olson 1996) found that preferred music intervention did not significantly decrease the occurrence of aggressive behaviours, but it significantly improved relaxation.

Among the seven studies reporting significant improvement in agitation, there were only two studies which found significant changes in agitated behaviours both during and following the music

interventions. A significant decrease of agitated behaviours during and one hour after the music intervention was found for four of the five participants in Gerdner & Swanson's study (1993). Similar results were found in another crossover design of 39 participants (Gerdner 2000), in which the occurrence of agitated behaviours were significantly reduced during and 30 minutes following preferred music by comparing to classical music listening. The other 5 studies reporting significant improvement measured the effect of preferred music on agitation during the intervention. Given that preferred music reduced the occurrence of some types of agitated behaviours in people with dementia from the seven reviewed study findings; however, family-generated videotape playing and social interaction with other staff also produced similar effects while comparing to individualised music listening in one study (Cohen-Mansfield & Werner 1997).

## DISCUSSION

From reviewing the existing literature, it is evident that music listening intervention matched with personal preferences has positive effects in reducing occurrence of some forms of agitated behaviours in older people with dementia. Nevertheless, a number of methodological limitations were apparent in the studies reviewed.

### Study design

The majority of studies employed purposive sample with the size of samples ranging from three to 39. Small and purposive samples reduced the external validity of these studies, and findings should be interpreted cautiously as they may not be representative of wider populations of older people with dementia. In addition, there was a lack of adequate descriptions of methods for determining sample size and randomisation procedures in most of the reviewed studies. Moreover, all studies focused on older people with dementia in long-term care facilities; however, differences in the settings and environments may contribute to variability in the way the music intervention is administered and in participant's responses to the interventions. The variation of settings for implementing music intervention may affect the outcomes achieved. Further, recent studies appear to use more rigorous research design to test the effects of preferred music on behavioural outcomes in

people with dementia. However, more studies with larger sample sizes and use of experimental designs (such as randomised controlled trials) are needed and can provide more empirical evidence of the effectiveness of preferred music intervention in reducing agitated behaviours in older people with dementia.

### Treatments

All studies asked participants to listen to music of their preferences, but there was wide variation in duration and frequency of the music sessions. Limited information about the ideal number and length of music sessions that should be conducted provides minimal guidance for the use of music sessions in clinical practice. In addition, although mid-afternoon is suggested as the time for increased anxiety and agitated behaviours according to Progressive Lowered Stress Threshold model (Hall & Buckwalter 1987) and would be a suitable time period for implementing music interventions, not all older people with dementia display agitated behaviours in the mid afternoon. Therefore, the pattern of agitated behaviours for each person should be assessed to determine the peak level of agitated behaviours and the best time for implementing music intervention. It is also important to examine whether preferred music intervention has a carry-over effect and the duration of the effects on behavioural changes among older people with dementia.

### Measures

The use of assessment measures is important for accurately and practically measuring behavioural outcomes. Two of the studies used self-designed behavioural checklists to assess participant's behaviours, but they did not report the validity and reliability of the tools. Further testing is needed to establish validity and reliability of these behavioural checklists. While video recording was suggested as a more accurate and reliable method for measuring and coding behavioural outcomes, it is more costly and requires technical assistance on data coding and analysis. More studies concluded that the behavioural outcomes can be assessed reasonably by using a reliable and valid observational rating scale, such as the CMAI. Moreover, only one study assessed participant's personal preferences of music with a valid music preference assessment tool (Gerdner 2000). Personal

preferences of music should be assessed by a assessment tool developed according to the cultural differences of older people. The information gathered from the music preference assessment tool can become a database for other caregivers to implement preferred music intervention for older people in long-term care facilities.

## Findings

This review suggested that preferred music intervention demonstrated positive outcomes in reducing the occurrence of some types of agitated behaviours in older people with dementia. The findings from the reviewed studies were relatively consistent in finding improvement in agitated behaviour except for the findings in one study (Snyder & Olson 1996) that did not reach statistical significance. The finding of this review is similar to those of previous reviews (Brotons *et al.* 1997, Koger *et al.* 1999, Lou, 2001, Sherratt *et al.* 2004) in which music interventions in general have the potential to reduce problem behaviours in older people with dementia, but the process by which this effect occurs remains unclear and several methodological limitations of the studies indicate the need for further research. A meta-analysis of 21 empirical studies by Koger *et al.* (1999) also revealed that the overall effect of music was highly significant for managing symptoms of dementia, but the effect size was not consistent across all studies. However, a Cochrane systematic review of five randomised controlled trials by Vink *et al.* (2003) concluded that the quality of the studies was generally too poor to draw useful conclusions about effectiveness of different types of music therapy in the treatment of symptoms of older people with dementia.

This review focused on the effect of one specific music modality, preferred music, on agitated behaviours of older people with dementia, unlike previous reviews in which different types of music interventions were included. Two of the previous reviews recommended that music preference is a key element to ensure success of music interventions for managing problem behaviours in people with dementia and needs to be considered for future research (Brotons *et al.* 1997, Lou 2001). In addition, previous reviews found music effective for a range of outcomes, such as emotional, social and behavioural outcomes; however, the current review only focused on agitated behaviours since social

interaction is not considered as a valid outcome for preferred music intervention in older people with dementia. Further, this review, similar to some of the previous reviews, also recommended further study with more stringent methodology in terms of validity and reliability of measures (Koger *et al.* 1999, Lou 2001, Vink *et al.* 2003, Sherratt *et al.* 2004), experimental design with a larger sample size (Vink *et al.* 2003), consistency of music modality (Lou 2001), interaction effects of other confounding variables (Lou 2001), impact of disease severity (Brotons *et al.* 1997, Koger *et al.* 1999) and potential long-term effects (Koger *et al.* 1999, Vink *et al.* 2003).

## CONCLUSION AND RECOMMENDATIONS

This paper reviewed study findings on preferred music in decreasing agitated behaviours in older people with dementia and highlights the use of preferred music as a less costly alternative intervention to chemical and physical restraints in dementia care. However, the methodological limitations of past studies needs to be considered. More rigorous research designs with larger sample sizes are needed to determine the effects of preferred music on agitation in older people with dementia. There is also a need for investigations into the interaction effects with possible confounding variables, such as use of medications and physical restraints. Since psychotropic medications are often used to manage behavioural problems in older people with dementia, the outcome measures could be affected by use of the medications. Correlations between the level of severity of dementia and the effects of preferred music should also be further examined. A qualitative research study could be conducted to interview nursing staff to assess their attitudes and perceptions about implementation of preferred music intervention for older people with dementia in long-term care facilities. Future research can also examine the effect of preferred music on older people with dementia in different settings, such as day care centres and communities.

In conclusion, given that methodological limitations are evident in the reviewed studies, preferred music is considered to have the potential to reduce agitated behaviours and can be a viable alternative to chemical and physical restraints for managing behavioural symptoms of dementia. The

incorporation of preferred music has the potential to provide a therapeutic approach to the care of older people with dementia and improve the quality of their life.

#### CONTRIBUTIONS

Literature review and study design: HS; data analysis: HS, AC; manuscript preparation: HS, AC.

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Table 1 Summary of the studies of preferred Music on agitated behaviours in older people with dementia

Authors	Design	Participants	Intervention	Instrument	Findings
Gerdner & Swanson (1993)	Case study	N=5 Age 87-97 MMSE < 21	Preferred music played 30 min for 5 days (3:30-4 pm)	CMAI	The mean percentage of agitated behaviours decreased 46.6% during intervention and 80% 1 hour after intervention for 4 subjects.
Casby & Holm (1994)	3-single subject withdrawal design Repeated measure	N=3 (No screening tool)	Sub1: ABCA Sub2: ACA Sub3: ABA 20 min of music for 4 days A-baseline B-classical music, C-individualised music	Self-designed behavioural checklist	Both classical and favourite music significantly decreased repetitive vocalisations in 2 subjects.
Snyder & Olson (1996)	Experimental crossover design	N=5 Mean age 92 (No screening tool)	Preferred music vs. hand message (3-9 pm)	Not mentioned measures for aggressive behaviours	Significantly improved levels of relaxation, but did not significantly reduce frequency of aggressive behaviours.
Thomas et al. (1997)	Quasi-experimental design	N=14 Age 69-86 GDS (moderate)	Preferred music played before and during bathing	CMAI	Significant decreased aggressive behaviours during intervention, but no significant change for hiding, hoarding, physically nonaggressive behaviours and verbally agitated behaviours
Cohen-Mansfield & Werner (1997)	Repeated measures pre-posttest crossover design	N=32 mean age 86.8 BCRS (mean score 5.5)	4 grps Each grp: family video (2 wks) +wash-out (1 wk) +social interaction (2 wks) +wash-out (1 wk) +preferred music (2 wks)	1. Tape-recording 2. SBMI 3. CMAI	Verbal disruptive behaviours decreased by 56% during social interaction, 46% during videotape, 31% during music, 16% during no

			+wash-out (1 wk) +control (2 wks)		intervention
Clark et al. (1998)	One group experimental crossover design	N=18 mean age 82 MMSE (mean score 10)	no music for 2 wks and preferred music for 2 wks in bathing time (4 wks :10 episodes with no music + 10 episodes with music)	Observational checklist for aggressive behaviours	Decrease occurred in 12 of 15 aggressive behaviours during music, significant decrease for hitting behaviours.
Gerdner (2000)	Experimental repeated measures pre-posttest crossover design	N=39 mean age 82.6 GDS (3-7)	Grp A:30-min preferred music(6 wks)+ wash-out (2wks)+ 30-min classical (6wks) Grp B: reverse (30'x2 days/wk)	Modified CMAI	Significantly reduction in agitation during and following preferred music compared to classical music.
Ragneskog et al. (2001)	Case control	N=4 mean age 81.25 MMSE (0-7)	period 1(no music) period 2(class music) period 3(preferred) period 4(preferred) (45 min/session x 4-5 sessions /subject)	1. Video recording 2. FACS	Reduced agitation and shouting for 2 subjects.

MMSE: Mini-Mental State Examination

GDS: Global Deterioration Scale

BCRS: Brief Cognitive Rating Scale

CMAI: Cohen-Mansfield Agitation Inventory

SBMI: Screaming Behavioural Mapping Instrument

FACS: facial action coding system